



Minnesota Department of Transportation

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Saint Paul, MN 55155

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October 31, 2014

The Honorable Frank Hornstein, Chair
House Transportation Finance Committee
471 State Office Building
Saint Paul, MN 55155

The Honorable Linda Runbeck, GOP Lead
House Transportation Policy Committee
295 State Office Building
Saint Paul, MN 55155

The Honorable Michael Beard, GOP Lead
House Transportation Finance Committee
207 State Office Building
Saint Paul, MN 55155

The Honorable Scott Dibble, Chair
Senate Transportation and Public Safety Committee
111 Capitol
Saint Paul, MN 55155

The Honorable Ron Erhardt, Chair
House Transportation Policy Committee
543 State Office Building
Saint Paul, MN 55155

The Honorable John C. Pederson
Ranking Minority Member
Senate Transportation and Public Safety Committee
27 State Office Building
Saint Paul, MN 55155

RE: Study on Grade Crossing and Rail Safety for Oil and other Hazardous Materials

Dear Legislators:

On behalf of the Minnesota Department of Transportation, I am submitting a working draft of the Improvements to Highway-Rail Grade Crossings and Rail Safety report due to the Legislature October 31, 2014.

Up to seven Bakken oil trains travel through Minnesota on a daily basis putting thousands of Minnesotans at risk in the case of a collision or derailment. In addition, there are many trains carrying hazardous materials on these same routes. These trains travel on 700 miles of track through some of Minnesota's most populous communities. They intersect with Minnesota roads at 683 grade crossings throughout the state. MnDOT has an important role to play in working with communities and railroads to ensure each crossing is as safe as possible.

This draft report includes information about how MnDOT calculated the risk assessments for crossings on oil routes, a list of the 100 highest risk crossings in the state and preliminary recommended safety improvements needed based on Federal Rail Administration criteria and additional information collected by MnDOT staff.

MnDOT worked with the affected communities to gather the data to develop the risk assessments. This data informed MnDOT's preliminary safety improvement recommendations included in the draft report.

Our next step is to work with each community affected to understand if our preliminary safety improvement recommendations adequately meets the communities' needs. We are eager to solicit this input, and MnDOT will issue a final report when we have gathered community feedback.

Thank you for partnering with MnDOT to begin to address the critical issue.

Sincerely,

Charles A. Zelle
Commissioner

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Draft Report on the

Improvements to Highway-Rail Grade Crossings and Rail Safety

October 2014



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Legislative Request

This interim update is issued to comply with Laws of Minnesota 2014, Chapter 312, Article 10, Section 10.

IMPROVEMENTS STUDY ON GRADE CROSSINGS AND RAIL SAFETY FOR OIL AND OTHER HAZARDOUS MATERIALS TRANSPORTATION.

(a) The commissioner of transportation shall conduct a study on highway-rail grade crossing improvement for oil and other hazardous materials transported by rail, and on rail safety. At a minimum, the study must:

- (1) provide information that assists in risk management associated with transportation of oil and other hazardous materials by rail;
- (2) develop criteria to prioritize needs and improvements at highway-rail grade crossings;
- (3) consider alternatives for safety improvements, including but not limited to active warning devices such as gates and signals, closings, and grade separation;
- (4) provide findings and recommendations that serve to direct accelerated investments in highway-rail grade crossing safety improvements; and
- (5) analyze state inspection activities and staffing for track and hazardous materials under Minnesota Statutes, section 219.015

(b) The commissioner shall submit an interim update on the study by August 31, 2014, and a final report by October 31, 2014, to the chairs and ranking minority members of the legislative committees with jurisdiction over transportation policy and finance.

The cost of preparing this report is under \$5,000.

Summary

The 2014 Minnesota Legislature directed the Minnesota Department of Transportation to conduct a study of highway-rail grade crossings improvements for rail corridors carrying unit trains of crude oil and other hazardous materials¹. The legislature also appropriated \$2 million for implementation of safety improvements at these grade crossings specifically along crude-by-rail corridors². It is estimated that this appropriation will fund the installation of approximately 10 lower cost grade crossing improvements.

The MnDOT study identified more than 700 miles of train routes that carry the Bakken crude oil across Minnesota to refinery destinations on the East and Gulf coasts. These routes have 683 at-grade crossings of roads and railroads. Each grade crossing has the potential risk of a train and vehicle collision, or a train derailment. If a train filled with Bakken oil has an incident such as a derailment, there is a high probability that the oil, a highly volatile, hazardous material, would be released in significant volumes.

The volatility of the Bakken crude oil makes it highly prone to catching fire in the presence of an ignition source, including sparks and heated metal common at accident sites. The volatile makeup of Bakken crude oil and recent train accidents bring this issue to the forefront and raise safety concerns about transporting the oil across the state.

Most of the Bakken crude oil is going to the Gulf Coast or the East Coast, but it passes through the state. Trains carrying the oil travel through major metropolitan areas, such as the Twin Cities, but also travel through rural Minnesota where response times to an accident may be an issue. The study is designed to address concerns about rail grade crossings and the safety needed to ensure trains carrying hazardous material reach their destinations while the citizens of the state are assured of the safety of the operation.

The study focuses on the transportation of Bakken crude oil by train since the volume exceeds any other flammable or hazardous material being transported through Minnesota by several times over. The recommended improvements to grade crossings covers some of the most heavily trafficked railroad mainlines in the state and will provide similar safety improvement to the transport of all hazardous materials on these key routes.

The study focuses on prioritizing risks, while also reducing potential collisions by improving the overall safety of each grade crossing. The risks are assessed by focusing on the people who would potentially be most affected by an accident involving a train, such as nearby residents, workers and emergency responders in the vicinity of the rail crossing. The focus on risk assessment for those people most likely impacted by any possible incidents is the key difference in the study from a conventional grade crossing safety assessment; therefore, the areas with the highest potential risk to the population informed all of the evaluations that identified improvable crossings in the recommendations. Due to this new focus in the risk assessments, all recommended improvements to specific crossings improve public safety in the presence of transporting the highly flammable Bakken crude oil by rail.

¹ Laws of Minnesota, 2014 Chapter 312, Article 10; <https://www.revisor.mn.gov/laws/?id=312&year=2014&type=0>

² Laws of Minnesota, 2014 Chapter 312, Article 9; <https://www.revisor.mn.gov/laws/?id=312&year=2014&type=0>

Background

Bakken crude oil is identified by the federal government as a highly volatile flammable material. The transport of the oil accounts for significant new rail business, which increased from almost no rail transport in 2005 to nine fully loaded crude oil trains originating from North Dakota daily in 2014. Of the nine trains originating in North Dakota, five to seven of those trains cross Minnesota on a daily basis, destined for refineries on the East Coast and Gulf Coast.

There were several catastrophic incidents involving trains carrying crude oil, including the Lac Megantic, Quebec, derailment and fire that killed 47 persons in July 2013. There was also the fire in Casselton, N.D. in January 2014. Since Lac Megantic, six other incidents involving spills and fires from derailed and ruptured loaded crude oil tank cars were recorded in North America. None of the other recent incidents resulted in additional injuries or deaths, due to either unpopulated locations or limited and contained spills and fires. However, these incidents highlight the potential safety risks due to the substantial increase in traffic and large volumes of hazardous material transported by railroads.

The volatility of Bakken crude oil is the subject of debate, but it has consistently been shown to be more prone to vaporization and ignition compared to other heavier crude oil. Bakken crude has these characteristics that make it categorized as volatile:

- An average flash point of 73 degrees Fahrenheit, the point where natural atmospheric vaporization creates an ignitable air/fuel mix at the surface of the liquid
- A boiling point of 120 to 140 degrees Fahrenheit, the point where heating the liquid produces significant volumes of vaporization
- A specific gravity of 40, lighter than water and analogous to light motor fuels including gasoline, jet fuel, and diesel

It is notable that crude oil by definition is a natural mix of hydrocarbon compounds, ranging from ethanes, butanes and methanes through natural gasoline to heavy oils and bitumens, combined in a liquid mix. This often complicates the handling and emergency response requirements because of the wide range of chemical reactions exhibited by different compounds within the mix of crude oil.

As a result of these findings, the Federal Rail Administration, in conjunction with the Pipeline and Hazardous Material Safety Administration, issued emergency orders requiring documentation and labeling of all rail shipments carrying Bakken crude oil. The orders mandate that Bakken crude oil be classified under the most dangerous and highly controlled category of flammable liquids. This means the hazmat documentation must disclose a hazardous materials category of Flammable 3, Packing Group 1 without exception.

Increasing the risks associated with transporting Bakken crude oil is the design of the general purpose rail tank car carrying the crude oil. In 2005 there was virtually no Bakken crude oil to transport, so the majority of the general purpose rail tank car fleet is comprised of a DOT 111a car, with design specifications dating back to the 1960s. In recent years, the railroad industry recognized the design of the DOT 111a railcar as outdated and deficient, especially with regard to spill prevention and rupture protection. The industry adopted a new, more robust design standard in

2011, commonly referred to as the 1232 specification. Of the reported 90,000 tank cars currently used to transport Bakken crude oil, only an estimated 15,000 are the 1232 specification.

The federal agencies involved in railroad design and safety standards have not adopted the 1232 specification for rail tank cars. FRA and PHMSA are entered into the emergency rulemaking process. In part, the rulemaking process is to adopt improved rail tank car standards, which will most likely exceed the 1232 specification. The public and industry comment period on that rulemaking ended Sept. 29, 2014. Final rulemaking is expected to occur in the next several months, and a complete fleet transition to new safer cars is expected to take three years from the date of rule adoption.

The long term risks posed by the continuing presence of crude-by-rail shipments within Minnesota were researched internally by the Minnesota Department of Commerce and MnDOT. The research forecasts a potential range of outcomes over the next 10 years based on estimates of Bakken production growth, Alberta heavy oil production growth and potential capacity improvements in pipeline and rail transport systems.

The forecast assumes a long term continuing demand for crude oil production from these fields, and destinations for the crude oil movements roughly similar to current patterns, namely consumption by East Coast and Gulf Coast refineries for the majority of crude production. The forecast suggests that crude-by-rail traffic will, at best, stay at current levels, with five to seven loaded trains per day crossing Minnesota. However, if the demand and production doubles in volume, this doubling would strain the system. The report shows the new oil production will likely be equal to or possibly exceed planned new pipeline expansions; therefore, oil producers will continue to rely on the railroad's flexibility and capacity to transport the excess volumes in the next 10 years and beyond.

The analysis of the factors, influences and potential continuation of the transportation of Bakken crude oil via rail highlights the increased need for safety of at-grade highway-rail crossings. Along the three Bakken crude oil routes in Minnesota, there are 683 at-grade crossings, which means the intersection of railroad and highway traffic. Each crossing should be outfitted with appropriate warning devices and safety measures to prevent collisions. Collisions often cause a train derailment, ruptures of the loaded rail cars and subsequent spills and fires. The study specifically evaluates the top 100 crossings with the intent to improve current levels of safety at these key crossings.

Prior to the 2014 legislation, MnDOT only had one track inspector. With the added funding, provided through the state rail safety account, MnDOT hired an additional Track Inspector and a new Hazardous Materials Inspector. Both Track Inspectors and the Hazmat Inspector all have previous experience in their fields, and were able to begin field work while undergoing FRA training. All the necessary training and federal certification are expected to be accomplished by the end of 2014.

The legislation allows the hiring of a third Track Inspector in 2015 after evaluating the effectiveness and workload of the new Inspectors. That evaluation will take place beginning in spring 2015.

Scope of Study

The study focuses on the three rail corridors currently carrying five to seven unit trains of Bakken crude oil from North Dakota through Minnesota daily. The corridors are:

- BNSF mainline from the Twin Cities to Fargo/Moorhead via St Cloud, Staples and Detroit Lakes
- Canadian Pacific's mainline from La Crescent to the Twin Cities and then to North Dakota via Glenwood
- BNSF corridor from Fargo/Moorhead to Willmar to the South Dakota border via Marshal and Pipestone (Figure 1)

These three corridors represent over 700 miles of the 4,450 miles of railroad track in Minnesota, and include 683 road crossings at grade, protected by a variety of installed at-grade crossing protection signage or equipment.

The statutory language included identifying sites where safety can be improved by one of four alternative strategies, with the goal of reducing public exposure to derailments, spills and fires in areas with the highest risks for personal injury and property damage. The named strategies include;

- closing at-grade crossings
- upgrading passive warnings to active signals
- improving active protection with more effective safety treatments
- constructing grade separations

As the study progressed, additional recognized and proven strategies were included for consideration. These strategies include:

- Improving the condition and signage of passive crossings (crossbucks combined with stop or yield traffic signs)
- Signal interconnects at adjacent traffic signals to reduce backups across grade crossings
- Programmed education and enforcement

The programmed education and enforcement strategy is a recognized FRA safety improvement but requires proof and implementation of ongoing, systematic and sustainable actions by local education and enforcement agencies.

Conventional safety evaluations concentrate on reducing railroad and highway vehicle collisions at crossings. These evaluations and prevention strategies are well documented in a number of safety and design protocols and standards. These include:

- FHWA's Manual on Uniform Traffic Control Devices
- USDOT Technical Working Group reports on grade crossing traffic control
- FRA's Horn Rule and Quiet Zone Rules

This study is different because it expands the conventional evaluation scope to include the risk to adjacent residents and workers. The study shifts the focus to an area and population based risk assessment, rather than just an accident prediction assessment. The risk assessment for each grade crossing is defined by the population, facilities and activity within a half mile radius of each crossing. It also encompasses a half mile wide buffer zone on either side of the railroad tracks. This distance represents the evacuation zone around an incident site for a flammable material spill and fire.

The size of the evacuation zone is specified in the *USDOT Emergency Response Guidebook*, which is used by first responders reacting to the initial phases of a dangerous goods or hazardous materials transportation incident. The risk assessment also considered these influencing factors:

- Road usage, such as evacuation route and school bus routes
- Presence of heavy commercial vehicles in the traffic mix
- Volume and frequency of crude oil unit trains
- Overall traffic volumes and historic accident rates

Methodology

MnDOT used its internal expertise in rail and grade crossing safety to achieve a comprehensive evaluation of all the grade crossings in the targeted crude oil corridors. MnDOT completed a systematic evaluation of crossing safety based on an existing, detailed database, which was further expanded to accommodate the needs of the study. MnDOT is coordinating efforts with the Minnesota Department of Public Safety and surveyed MnDOT Districts, counties, and city engineers and administrators to isolate special conditions and concerns. The input provided through the Governor's Rail Safety Roundtables, which began on Aug. 11, 2014, was a valuable source of local feedback and is incorporated in the study findings. Other input is being integrated, such as the results of site visits and face-to-face communications with local officials, emergency responders and citizens along the corridors.

Crude-by-rail corridor grade crossings receive a multi-part comparative score involving three index numbers. The first score is the public risk assessment based on population density within one half mile of each crossing. This is from the federal hazmat response guidance for potential risk and recommended evacuation area for this particular hazardous material.

GIS mapping and satellite imagery were used to delineate the buffer zones and the number of households, businesses and other facilities within the threat area. Scores are given for residential population levels, fixed vulnerable populations such as hospitals, nursing homes and prisons, and transient vulnerable populations such as schools. The presence of public service facilities, including fire and police stations, were also located and counted. MnDOT analysts began with census population density figures, but in the case of high priority crossings identified for detailed study, actual building counts and city-level homestead occupancy rates were used to develop a site-specific population count.

The second score involves the use of the established Federal Railroad Administration Safety Index, a predictive index of possible grade crossing accidents. The FRA Safety Index also includes:

- Recorded accidents
- General vehicle counts
- Heavy commercial vehicle counts
- Special road uses such as emergency access
- Evacuation routes
- School bus routes
- Other nearby traffic generators

The FRA Safety Index includes consideration of train and highway vehicle counts and speeds specific to the location and the installed safety equipment, and allows for evaluation of variances in levels of traffic and levels of protection.

The third score evaluates the existing physical conditions, not specific to the first two indexes, which may influence accident risks and movements over the crossing. This score ranks the general crossing condition on a sliding scale, and includes evaluating the sight lines, the grades and approaches to the crossing, the crossing itself, the road surfaces and condition, and other variations

from the ideal specifications. On occasion, this score may include comments or scoring for unusual situations, such as proximity to refineries, truck terminals, power plants, special event venues, casinos, and chemical or fuel storage.

Each individual score is directly compared to the data about similar crossings, while the cumulative information gathered from the three scores together is designed to create the comprehensive picture of the safety of the crossing. The cumulative scores together informed the final evaluations and serves as the list of the top 100 crossings (Appendix A). An example of the evaluation template is included below for illustration (Figure1). The evaluation sheets for the 40 highest ranked grade crossings are included in Appendix B.

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Figure1: Example of the form used to evaluate an at-grade rail crossing

Crude Oil by Rail Study
Railroad – Highway Grade Crossings Analysis

Location _____

USDOTNO _____

Railroad _____

Milepost _____

Location _____

AADT _____

HCADT _____

Oil Trains/Day _____

Criteria

A. Population Density (area within ½ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	3
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	3
4	4
5	5

Total _____

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each _____

Near Misses - reported near misses by railroad; add 1 point each _____

Total _____

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each _____

Local designation as safety concern (county, city engineer call-out); add 2 points each _____

Total _____

Scoring Background

Each grade crossing received three numbers. These three numbers are scores that describe assigned point values for “Risk/Safety/Condition.” Maximum values are 19 points for risk, 15 points for safety and 10 points for condition. For example, the worst possible crossing would have an R/S/C rank of “19/15/10”

Each high-risk crossing should be evaluated for recommended treatment:

- | | |
|--|---|
| 1. Close Crossing | C |
| 2. Upgrade Passive Crossing to Active Crossing | A |
| 3. Improve Active Crossing (ASM's, SSM's, Quads) | I |
| 4. Construct Grade Separation | S |

The spreadsheet has relevant information about the top 100 high priority grade crossings, which handle either significant traffic or are in high population areas. The information includes:

- USDOT identity number
- Railroad name
- Crossing location
- Intersecting roadways identified
- Annual Average Daily Traffic or AADT
- Accident Prediction Index

The spreadsheet also lists the combined evaluation scores and the population score. For the at-grade crossings that were scored as the top 40 high priority crossings, MnDOT performed actual traffic counts to verify past reported traffic volumes data. The counts include AADT, all vehicular traffic and Heavy Commercial Annual Average Daily Traffic or HCAADT. Each of the top 100 crossings on the spreadsheet is supported by GIS mapping that collected information from a wide variety of state databases. The map information was used in scoring both population and conditions, including emergency response facilities and certain specified routes such as evacuation and school bus routes.

Status of Project

Work began on the study immediately following the adjournment of the 2014 Legislative Session. An initial survey of county and city engineers and administrators was circulated on May 30, 2014. The survey asked for feedback about issues within each official's scope of knowledge and the results highlighted a list of local concerns. GIS and traffic specialists mapped facilities and buffer zones, confirmed traffic counts, and, in particular, the counts of heavy commercial vehicle traffic. Commercial trucks posed a unique derailment risk during a collision with a train at grade crossings.

MnDOT's rail project managers conducted engineering and safety evaluations along with outreach to the railroads. The railroads voluntarily provided their own crossing evaluations, accident reports and near-miss reports. Railroad employees reported safety violations at crossings, which greatly enhanced the study data.

The score sheet was developed in collaboration with all involved parties, and further refined by test application to a variety of random crossing sites with known ranges of conditions. The MnDOT grade crossing database, updated annually by road authorities and railroads, was used to populate the spreadsheet of all the targeted crossings. The final spreadsheet includes basic data, as well as the cumulative scores. A file of individual score sheets will be maintained for reference. Analysts scored all mainline crossings, deleted non-involved local crossings (those on branch lines or spurs that cannot accommodate a through-routed unit train) and corrected other data inconsistencies. The initial scoring was completed in mid-September 2014. The evaluation was reviewed by the team and a list of the top 100 high-priority candidates for safety improvements was created based on that review.

Each of the 100 high-priority crossing candidates was studied in greater detail to determine whether the installed protection was appropriate or could it be improved. If an improvement was suggested, then the most effective safety improvement was explored. Among the top 100 high priority candidates, the top 45 were designated for extensive GIS mapping and actual traffic counts of general vehicle traffic, as well as heavy commercial vehicle traffic, to confirm historic or formulaic traffic counts.

Once the mapping and traffic counts were completed, a detailed review was conducted with the completed data. A detailed map showing the top 40 prioritized projects is included in Appendix C.

Strategies for Safety

The application and design of safety measures at grade crossings have advanced significantly in the last 20 years, with a corresponding decline in grade crossing incidents and fatalities. The current options for safety and protection draw heavily on scientific and engineering studies. Prior to these advancements, “state-of-the-art” often meant a simple raised flashing light installation without gates, and visible from a long distance. These are often dubbed “cants” in crossing descriptions and equipment inventories, because the warning lights are anchored or cantilevered out from a roadside pole with the flashing warning lights directly over the traffic lane.

Now “state-of-the-art” is represented by extended gate arms, quad gates and traffic control measures to prevent attempts at bypassing the safety measures. These traffic control measures might include raised medians, traffic delineators, and right-turn-only entrances and exits to streets and parking lots near the crossing gates. Road closures and grade separations are highly recommended when they are appropriate.

The basic premise for the installation of these improved options is safety. More aggressive safety applications are needed as the frequency of train and vehicle interactions rises at a given crossing.

Passive protection is generally a device that consists of a traditional crossbuck supplemented by either a stop sign or yield sign posted below the crossbuck. Passive protection is usually the lowest cost option. The FRA considers passive protection an acceptable safety installation only if the vehicle count at the crossing is low, and sight lines and conditions allow motor vehicle operators sufficient opportunity to detect approaching trains.

When the frequency of vehicle crossings occurs just as train volumes and speeds increase, then passive protection is no longer an adequate safety measure. At this point, active warning devices consisting of flashing lights, bells and gates are recommended. Active protection places the emphasis on preventing vehicles from bypassing or driving around the gates, or excluding vehicles from the crossing entirely as in full-span or four quadrant (four quad) gates that block all accessible traffic lanes.

The one notable strategy not included in the list of safety options is grade separation, where road traffic and rail traffic are permanently separated by either an overpass or an underpass. The selection of alternatives and design components of the grade separation is considered site specific and was not evaluated in the study, other than to make informed assumptions on the grade separation design to estimate a rough cost.

Another option which can be a highly effective alternative is to close a crossing altogether. The permanent closure creates an absolute level of safety, similar to a grade separation, with no ongoing maintenance expense for crossing equipment.

Other strategies were considered as the study progressed. A routine option is a signal interconnect. This is possible where an active traffic signal or light is in place on a nearby intersection close to the crossing, yet the traffic signal is not tied into the grade crossing activation circuitry. When a traffic signal is not tied into the grade crossing program, it can cause safety concerns at the light. This happens when the train gates are activated, yet the traffic light continues to go through its program, stopping traffic and trapping vehicles on the tracks in the path of an approaching train. An

interconnected signal can warn, hold or divert traffic away from a grade crossing when the grade crossing system is activated.

The final strategy suggested by the FRA is programmed education or programmed enforcement. Either of these is effective if the effort is local and sustained. If the program is not sustainable, then it has no lasting safety effect and must be discounted as an effective prevention tool. The state currently works with and partially funds "Operation Lifesaver," a nationwide rail safety and grade crossing program. This is a local program, and if sustained, shows good results.

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Grade Separations

Grade separations are the complete and permanent separation of road and rail traffic, with an absolute level of crossing safety. The threshold for considering a grade separation is covered by Minnesota Rules 8830.2740³. The following is a summary of the criteria needed to consider the option of a grade separation from the Minnesota Rules:

- Train speeds are 40 mph or more and the roadway has four or more lanes of traffic
 - The road has a 30 mph or greater speed limit and an ADT of 5000 or more vehicles
 - The road has a 55 mph or greater speed limit and an ADT of 3000 or more vehicles
- There is already an active warning device, yet in the past five years, there was a serious vehicle-train accident at the crossing
- The construction of a grade separation would eliminate another safety problem in the immediate area

Many of the grade separations listed in this study fail to meet the thresholds listed in the Minnesota Rules, but, were included because of community concerns about grade crossing safety, connectivity to portions of the community, and emergency response access, which are negatively impacted by multiple, frequent train movements and blocked crossings due to stopped or slowly moving trains.

Installing a grade separation is very expensive, but an effective solution. In general, to install a grade separation on a rural, two-lane road costs about \$10-15 million. Urbanized areas and multiple-lane construction are usually more expensive.

An example of a proposed grade separation project is the Moorhead downtown area. The at-grade crossings intersect two of the state's three oil train routes. Every day there are approximately six loaded oil trains that run through these crossings, as well as about 80 other train movements. The current at-grade crossings, while safe, experience up to 90 minutes per day of train blockages and are a serious detriment to emergency response in the city.

This project would construct two overpasses, each with four lanes, to remove any potential interaction between vehicles and trains. The estimated cost is around \$40 million.

The at-grade crossing on the most densely populated segment of the entire oil train route is along Como Avenue in St. Paul. The Como Avenue at-grade crossing is one of two at-grade crossings between University Junction in Minneapolis and Hoffman Junction in St. Paul, which are about 12 miles apart. The Como Avenue crossing has a highly effective safety treatment, four quad gates, but in order to make improvements to the safety of this crossing, a grade separation is the most likely alternative.

The Como Avenue crossing experiences 55 to 70 trains per day, has high bus traffic, and has the highest residential population estimate of all the areas studied. The risks to people living near the crossing is high although there are other grade separations in the area that do allow emergency

³ <https://www.revisor.mn.gov/rules/?id=8830.2740>

responder's access on either side of the tracks, a grade separation would reduce the risk to people living near the area by removing the need for vehicles and trains to interact.

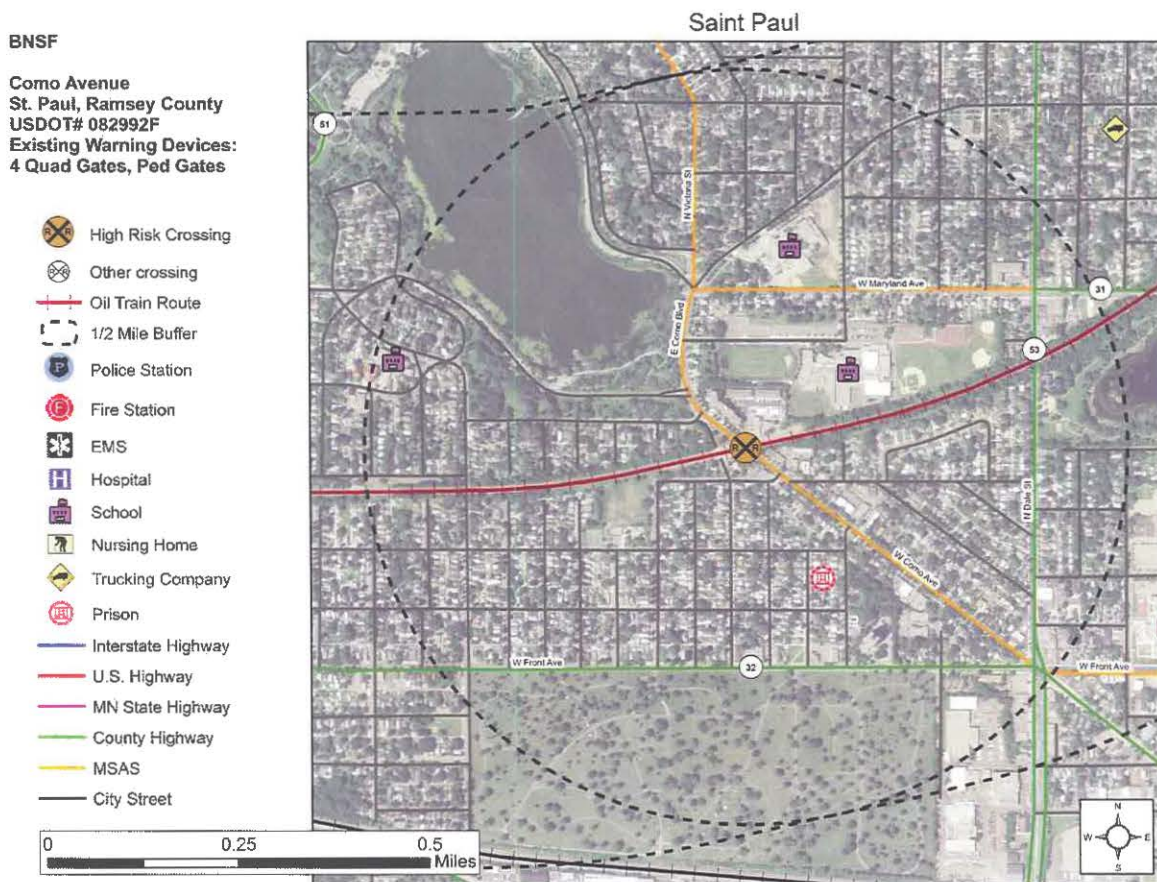
The estimated cost of a grade separation for Como Ave. has yet to be determined. Constructing the Como Avenue grade separation poses unique challenges. The estimated costs and probable disruptions to vehicle and rail traffic make this project problematic because of its location within such a heavily populated area and along one of the busiest rail corridors. An overhead view (Figure 2) and the risk assessment mapping for the Como Avenue crossing show some of the factors and influences considered when making the recommendation about this crossing (Figure 3).

Figure 2: Overhead view of the Como Ave. at-grade crossing in St. Paul*



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Figure 3: Risk assessment map for the Como Ave. crossing*



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Project Recommendations

The study represents MnDOT's first effort to identify and prioritize the cost effective safety improvements using the new methodology for risk assessment. This list will guide investments of the \$2 million appropriated in the 2014 session and will be used for future appropriations.

Over the next month, MnDOT will solicit feedback from each community to determine whether MnDOT's recommended safety improvement meets community needs and expectations. We are eager to solicit this input, and MnDOT will issue a final report when we have gathered community feedback.

DRAFT

Top 100 High Priority Grade Crossings

DOT #	Rail Operator	Crude Oil Corridor	City	Location within the City	Current Warning/Safety Device(s)	Recommended Improvement or Adequate Safety	Annual Average Daily Traffic	Heavy Commercial Average Daily Traffic	Accident Prediction	Risk Assessment Rank	Pop. Rank
689211C	CP/SOO	Tenney - La Crescent	Annandale	S Poplar La	Gates	Adequate Safety	416		0.01514	16	6
689212J	CP/SOO	Tenney - La Crescent	Annandale	S Myrtle Dr	Stop Signs	Adequate Safety	416		0.02773	18	6
082926T	BNSF	Moorhead - Prescott	Anoka	Ferry St N	Cants & Gates, Medians	Grade Separation	16372	7.80%	0.0489	18	4
062867N	BNSF	Moorhead - Prescott	Audubon	4th St	Gates	Adequate Safety	2344		0.02875	18	5
691738J	CP/SOO	Tenney - La Crescent	Barrett	Hawkins Ave	Gates	Adequate Safety	810		0.01104	19	8
097834A	BNSF	Moorhead - Prescott	Becker	Hancock St	Gates	Adequate Safety	416		0.01544	16	6
067927M	BNSF	Moorhead - Hills	Benson	14th St S	Cants & Gates	Grade Separation	7373	5.50%	0.02426	30	20
067929B	BNSF	Moorhead - Hills	Benson	12th St S	Cants & Gates	Grade Separation	416		0.00927	26	18
067928U	BNSF	Moorhead - Hills	Benson	13th St S	Cants & Gates	Adequate Safety	416		0.00927	27	20
082517B	BNSF	Moorhead - Prescott	Big Lake	165th Ave SE	Gates	Interconnect	11231		0.08144	21	1
082543R	BNSF	Moorhead - Prescott	Big Lake	Lake St S	Cants & Gates, Medians	Adequate Safety	10227		0.08037	18	5
689180F	CP/SOO	Tenney - La Crescent	Buffalo	Central Ave	Cants & Gates	Adequate Safety	11259	4.20%	0.02754	25	14
696288G	CP/SOO	Tenney - La Crescent	Buffalo	5th St NE	Gates, Medians, Ped Gates	Adequate Safety	8329	3.40%	0.02862	22	12
067230N	BNSF	Moorhead - Prescott	Clear Lake	Center St	Cants & Gates	Medians	11021		0.03507	16	3
082810S	BNSF	Moorhead - Prescott	Coon Rapids	Egret Blvd	Cants & Gates, Medians	Adequate Safety	6996	3.20%	0.08921	21	7

Top 100 High Priority Grade Crossings

DOT #	Rail Operator	Crude Oil Corridor	City	Location within the City	Current Warning/Safety Device(s)	Recommended Improvement or Adequate Safety	Annual Average Daily Traffic	Heavy Commercial Average Daily Traffic	Accident Prediction	Risk Assessment Rank	Pop. Rank
082811Y	BNSF	Moorhead - Prescott	Coon Rapids	Hanson Blvd	Cants & Gates, Medians	Grade Separation	28854	4.00%	0.05259	19	8
082914Y	BNSF	Moorhead - Prescott	Coon Rapids	Crooked Lane Blvd NW	Cants & Gates, Medians	Adequate Safety	5999		0.08595	17	5
082806C	BNSF	Moorhead - Prescott	Coon Rapids	85th Ave NW	Cants & Gates, Medians	Adequate Safety	6799		0.0466	13	2
688952K	CP/SOO	Tenney - La Crescent	Crystal	Broadway Ave	Cants & Gates	Adequate Safety	7999		0.04818	17	6
688953S	CP/SOO	Tenney - La Crescent	Crystal	Douglas Dr	Cants & Gates	Adequate Safety	9699		0.05068	17	5
081018G	BNSF	Moorhead - Prescott	Detroit Lakes	Washington Ave	Gates, Medians	Adequate Safety	4769	3.50%	0.09122	28	15
062943E	BNSF	Moorhead - Prescott	Dilworth	Main St S	Gates, Medians	Adequate Safety	425		0.02096	17	8
689257R	CP/SOO	Tenney - La Crescent	Eden Valley	State St	Gates	Adequate Safety	2341	3.20%	0.03202	19	5
691749W	CP/SOO	Tenney - La Crescent	Elbow Lake	Central Ave	Gates	Adequate Safety	1991		0.01388	16	6
082944R	BNSF	Moorhead - Prescott	Elk River	Jackson St	Gates	4 Quad Gates, Interconnect, Grade Separation	4155	9.50%	0.09184	27	11
082943J	BNSF	Moorhead - Prescott	Elk River	Main St	Cants & Gates	4 Quad Gates, Interconnect, Grade Separation	10237	No Data	0.0443	23	11
082946E	BNSF	Moorhead - Prescott	Elk River	Proctor Ave	Cants & Gates	Grade Separation	13020	No Data	0.16484	24	8

Top 100 High Priority Grade Crossings

DOT #	Rail Operator	Crude Oil Corridor	City	Location within the City	Current Warning/Safety Device(s)	Recommended Improvement or Adequate Safety	Annual Average Daily Traffic	Heavy Commercial Average Daily Traffic	Accident Prediction	Risk Assessment Rank	Pop. Rank
917432K	BNSF	Moorhead - Prescott	Elk River	Tyler Ave NW	Cants & Gates, Medians, Ped Gates	Adequate Safety	5963		0.05045	13	2
062847C	BNSF	Moorhead - Prescott	Frazee	Lake St N	Gates	Adequate Safety	1663	2.50%	0.03145	21	10
062849R	BNSF	Moorhead - Prescott	Frazee	5th St W	Gates	Medians	1123		0.02465	21	10
082803G	BNSF	Moorhead - Prescott	Fridley	Osborne Rd NE	Cants & Gates, Medians, Ped Gates	Adequate Safety	6199		0.10122	17	4
689355G	CP/SOO	Tenney - La Crescent	Glenwood	MNTH 29	Cants & Gates, Median	Adequate Safety	6699		0.07314	11	1
062920X	BNSF	Moorhead - Prescott	Glyndon	Parke Ave S	Gates	Medians	1855		0.0274	17	6
062909X	BNSF	Moorhead - Prescott	Glyndon	Partridge Ave	Gates	Adequate Safety	416		0.01974	16	6
689233C	CP/SOO	Tenney - La Crescent	Kimball	Main St	Cants & Gates	Medians	4512	13.70%	0.02335	19	8
391174Y	CP/SOO	Tenney - La Crescent	Lake City	W Lyon Ave	Cants & Gates	4 Quad Gates	5510	5.30%	0.02419	21	10
097668K	BNSF	Moorhead - Prescott	Little Falls	Broadway W	Cants & Gates	4 Quad Gates	12607	7.30%	0.13097	28	13
689133X	CP/SOO	Tenney - La Crescent	Loretto	Medina St	Gates, Medians	Adequate Safety	6999		0.02415	14	4
689196C	CP/SOO	Tenney - La Crescent	Maple Lake	Oak Ave	Gates	Medians	2255		0.01869	17	7
689197J	CP/SOO	Tenney - La Crescent	Maple Lake	Birch Ave	Cants & Gates	Adequate Safety	416		0.01235	17	7

Top 100 High Priority Grade Crossings

DOT #	Rail Operator	Crude Oil Corridor	City	Location within the City	Current Warning/Safety Device(s)	Recommended Improvement or Adequate Safety	Annual Average Daily Traffic	Heavy Commercial Average Daily Traffic	Accident Prediction	Risk Assessment Rank	Pop. Rank
067282F	BNSF	Moorhead - Hills	Marshall	W Main St	Cants & Gates, Medians	Adequate Safety	9618	6.40%	0.02554	15	7
067283M	BNSF	Moorhead - Hills	Marshall	Legion Field Rd	Gates	Adequate Safety	674		0.01074	15	9
082978K	BNSF	Moorhead - Prescott	Minneapolis	Talmadge Ave SE	Gates, Medians	Adequate Safety	186	2.70%	0.02377	15	4
688936B	CP/SOO	Tenney - La Crescent	Minneapolis	Humboldt Ave	Gates	Adequate Safety	2949	No Data	0.0199	18	7
070798D	BNSF	Moorhead - Prescott	Moorhead	5th St S	4 Quad Gates, Ped Gates	Adequate Safety	1707	2.30%	0.03559	22	13
062952D	BNSF	Moorhead - Prescott	Moorhead	8th St S	4 Quad Gates, Cants, Ped Gates	Adequate Safety	7629	10.70%	0.04991	25	14
062949V	BNSF	Moorhead - Prescott	Moorhead	11th St S	4 Quad Gates, Cants, Ped Gates	Adequate Safety	3639	9.20%	0.04004	26	16
062923T	BNSF	Moorhead - Hills	Moorhead	Main Ave	Flashing Lights	Grade Separation	7722		0.05831	21	6
085966B	BNSF	Moorhead - Hills	Moorhead	7th St N	4 Quad Gates, Ped Gates	Adequate Safety	1805		0.02083	21	13
062927V	BNSF	Moorhead - Hills	Moorhead	14th St N	Cants & Gates, Median	Adequate Safety	2256		0.02191	18	10
070799K	BNSF	Moorhead - Prescott	Moorhead	4th St S	4 Quad Gates, Ped Gates	Adequate Safety	1604		0.03078	22	13
103817B	BNSF	Moorhead - Hills	Moorhead	30th Ave S	Gates	Grade Separation	6719		0.02178	13	4
067931C	BNSF	Moorhead - Hills	Morris	W 7th St	Gates	4 Quad Gates	1252	0.40%	0.01484	18	8
067933R	BNSF	Moorhead - Hills	Morris	W 5th St	Cants & Gates	4 Quad Gates	3094	2.50%	0.0488	23	10
067934X	BNSF	Moorhead - Hills	Morris	CSAH 22	Cants & Gates	Medians	1755		0.01345	19	9
067449P	BNSF	Moorhead - Hills	Nashua	MN 55	Flashing Lights	Adequate Safety	991		0.1213	13	1
688954Y	CP/SOO	Tenney - La Crescent	New Hope	Winnetka Ave	Cants & Gates	4 Quad Gates	9748	6.10%	0.12275	23	9

Top 100 High Priority Grade Crossings

DOT #	Rail Operator	Crude Oil Corridor	City	Location within the City	Current Warning/Safety Device(s)	Recommended Improvement or Adequate Safety	Annual Average Daily Traffic	Heavy Commercial Average Daily Traffic	Accident Prediction	Risk Assessment Rank	Pop. Rank
062796U	BNSF	Moorhead - Prescott	New York Mills	S Main Ave	Gates	4 Quad Gates	2199		0.03454	21	8
062798H	BNSF	Moorhead - Prescott	New York Mills	S Walker Ave	Gates	Adequate Safety	416		0.01974	19	8
689278J	CP/SOO	Tenney - La Crescent	Paynesville	Washburne Ave	Gates	Adequate Safety	416		0.01235	18	7
062822G	BNSF	Moorhead - Prescott	Perham	N 1st Ave	Gates	Interconnect, 4 Quad Gates	5299	No Data	0.0337	26	15
062826J	BNSF	Moorhead - Prescott	Perham	NW 6th Ave	Gates	Grade Separation	482	2.90%	0.08823	29	14
097910R	BNSF	Moorhead - Hills	Pipestone	E Main St	Cants & Gates	4 Quad Gates E/W, Gates & Medians N/S	2788	2.00%	0.01637	17	7
097911X	BNSF	Moorhead - Hills	Pipestone	3rd St SE	Gates	Adequate Safety	416		0.00947	14	7
097913L	BNSF	Moorhead - Hills	Pipestone	5th St SE	Gates	Adequate Safety	416		0.00947	14	7
097916G	BNSF	Moorhead - Hills	Pipestone	S Hiawatha Ave	Gates	Adequate Safety	456		0.0097	19	10
689118V	CP/SOO	Tenney - La Crescent	Plymouth	Vicksburg La	Gates	Adequate Safety	8449		0.09574	17	3
082932W	BNSF	Moorhead - Prescott	Ramsey	Armstrong Blvd NW	Gates	Adequate Safety	6599		0.04133	14	1
082930H	BNSF	Moorhead - Prescott	Ramsey	Ramsey Blvd	Cants & Gates, Medians	Adequate Safety	6999		0.04826	14	4
082928G	BNSF	Moorhead - Prescott	Ramsey	Sunfish Lake Blvd NW	Cants & Gates, Medians	Adequate Safety	9099		0.05004	13	2
097588S	BNSF	Moorhead - Prescott	Randall	W 6th St	Gates	Adequate Safety	729		0.05028	20	5
391204N	CP/SOO	Tenney - La Crescent	Red Wing	Broad St	4 Quad Gates	Adequate Safety	890	91.70%	0.02975	21	13

Top 100 High Priority Grade Crossings

DOT #	Rail Operator	Crude Oil Corridor	City	Location within the City	Current Warning/Safety Device(s)	Recommended Improvement or Adequate Safety	Annual Average Daily Traffic	Heavy Commercial Average Daily Traffic	Accident Prediction	Risk Assessment Rank	Pop. Rank
391216H	CP/SOO	Tenney - La Crescent	Red Wing	Sturgeon Lake Rd	Cants & Gates	Grade Separation	12599		0.03467	13	2
391206C	CP/SOO	Tenney - La Crescent	Red Wing	Jackson St	Cants & Gates	Adequate Safety	799		0.02321	16	9
067255J	BNSF	Moorhead - Prescott	Sauk Rapids	10th St N	Gates, Medians	Adequate Safety	750		0.05049	22	9
067245D	BNSF	Moorhead - Prescott	St Cloud	15th Ave SE	Gates, Medians	Adequate Safety	8547	No Data	0.03346	19	8
067248Y	BNSF	Moorhead - Prescott	St Cloud	E Saint Germain St	Cants & Gates	Medians	10999		0.09299	19	6
082992F	BNSF	Moorhead - Prescott	St Paul	Como Ave	4 Quad Gates, Ped Gates	Grade Separation	4800	4.10%	0.03281	26	11
061138T	BNSF	Moorhead - Prescott	St Paul Park	Hastings Ave	Flashing Lights	Closure of Crossing/Adequate Safety	2926	29.50%	0.0208	16	2
097617A	BNSF	Moorhead - Prescott	Staples	6th St N	Cants & Gates, Medians	Adequate Safety	2728	6.70%	0.03713	26	11
062758K	BNSF	Moorhead - Prescott	Verndale	Farwell St	Cants & Gates	Medians	1207		0.0277	14	5
062760L	BNSF	Moorhead - Prescott	Verndale	S Brown St	Cants & Gates	Medians	1309		0.02817	17	5
391154M	CP/SOO	Tenney - La Crescent	Wabasha	Gambia Ave	Gates	Adequate Safety	770		0.04603	21	8
062773M	BNSF	Moorhead - Prescott	Wadena	1st St SE	Gates	Adequate Safety	3995	5.50%	0.03286	27	13
062779D	BNSF	Moorhead - Prescott	Wadena	2nd St SW	Gates	Interconnect	6586	7.30%	0.03409	27	14

Top 100 High Priority Grade Crossings

DOT #	Rail Operator	Crude Oil Corridor	City	Location within the City	Current Warning/Safety Device(s)	Recommended Improvement or Adequate Safety	Annual Average Daily Traffic	Heavy Commercial Average Daily Traffic	Accident Prediction	Risk Assessment Rank	Pop. Rank
062775B	BNSF	Moorhead - Prescott	Wadena	Jefferson St S	Gates	Interconnect	5045	5.00%	0.04146	24	13
689244P	CP/SOO	Tenney - La Crescent	Watkins	Central Ave N	Cants & Gates	4 Quad Gates	2149		0.01848	16	6
067709F	BNSF	Moorhead - Hills	Willmar	Trott Ave SW	Gates, Medians	Adequate Safety	2177	3.60%	0.02	18	8
067834T	BNSF	Moorhead - Hills	Willmar	7th St SW	Cants & Gates	Willmar WYE	2004	1.90%	0.02414	27	15
067836G	BNSF	Moorhead - Hills	Willmar	10th ST SW	Gates	Willmar WYE	2101		0.01782	20	11
061089Y	BNSF	Moorhead - Hills	Willmar	30th St NW	Cants & Gates	Willmar WYE	7707		0.02657	13	2
391080X	CP/SOO	Tenney - La Crescent	Winona	5th St S	Cants & Gates, Medians	Adequate Safety	6204	2.60%	0.06472	27	12
391079D	CP/SOO	Tenney - La Crescent	Winona	6th St	Cants & Gates	Adequate Safety	5760	3.10%	0.02657	19	10
391062A	CP/SOO	Tenney - La Crescent	Winona	Main St	Cants & Gates	Medians	4648	5.30%	0.02657	19	9
391072F	CP/SOO	Tenney - La Crescent	Winona	Sioux St	Cants & Gates	4 Quad Gates	1399		0.01827	20	9
391075B	CP/SOO	Tenney - La Crescent	Winona	10th St	Cants & Gates	Adequate Safety	750		0.01573	20	10
391093Y	CP/SOO	Tenney - La Crescent	Winona	Bierce St	Gates	Adequate Safety	750		0.01573	20	11
391078W	CP/SOO	Tenney - La Crescent	Winona	S Baker St	Cants & Gates, Medians	Adequate Safety	1599		0.01885	20	10
391066C	CP/SOO	Tenney - La Crescent	Winona	Huff St	Cants & Gates, Medians	Adequate Safety	11499		0.02902	13	7
391055P	CP/SOO	Tenney - La Crescent	Winona	Mankato St	Cants & Gates, Medians	Adequate Safety	12699		0.08249	25	13

TOTALS 4, 6, 8GRAND TOTAL 18

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 0829267
 Railroad BNSF
 Milepost 27.52
 Location Ferry St, Anoka

AADT 20,159
 HCADT _____
 Oil Trains/Day 6

Criteria

A. Population Density (area within 1/4 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	<u>1</u>
500-1,500	2
1,500-3,000	3
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	<u>3</u>
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	3
4	4
5	5

Total 4

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>4</u>
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each 0
 Near Misses - reported near misses by railroad; add 1 point each 2

Total 6

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	<u>2</u>

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 1

Local designation as safety concern (county, city engineer call-out); add 2 points each 0

Total 8

TOTALS 26,317GRAND TOTAL 30

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO067927M

Railroad BNSF

Milepost 132.7

Location 14th St S, Benson

AADT 8,199

HCADT _____

Oil Trains/Day 1

Criteria

A. Population Density (area within 1/4 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	8
5	<u>10</u>

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	<u>4</u>
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	<u>3</u>
4	4
5	5

Total 20

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each

Near Misses – reported near misses by railroad; add 1 point each

0
0Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2

Local designation as safety concern (county, city engineer call-out); add 2 points each _____

Total 7

TOTALS 14,318
GRAND TOTAL 25

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 689180F
Railroad CP
Milepost 36.94
Location Central Ave, Buffalo

AADT 13,007
HCADT _____
Oil Trains/Day 1

Criteria

A. Population Density (area within ½ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	<u>4</u>
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
5	<u>5</u>

Emergency Services (Police Department, Fire station)

1	1
2	<u>2</u>
3	3
4	4
5	5

Total 14

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each 0
Near Misses – reported near misses by railroad; add 1 point each 0

Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 3
Local designation as safety concern (county, city engineer call-out); add 2 points each _____

Total 8

TOTALS 12/3/7

GRAND TOTAL 22

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO696288G

Railroad CP

Milepost 36.4

Location 5th St NE, Buffalo

AADT 5983

HCADT _____

Oil Trains/Day 1

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	<u>2</u>
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
5	<u>5</u>

Emergency Services (Police Department, Fire station)

1	1
2	<u>2</u>
3	3
4	4
5	5

Total 12

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each

Near Misses - reported near misses by railroad; add 1 point each

0
0

Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	<u>4</u>
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each

Local designation as safety concern (county, city engineer call-out); add 2 points each

3

Total 7

TOTALS 7 / 7 / 7GRAND TOTAL 21

Crude Oil by Rail Study

Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 0828105Railroad BNSFMilepost 21.86Location Egret Blvd, Coon RapidsAADT 7893

HCADT _____

Oil Trains/Day 6

Criteria

A. Population Density (area within 1/4 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	<u>2</u>
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	<u>2</u>
3	3
4	4
5	5

Total 7

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	4
0.050	<u>5</u>

Safety Record – Recorded crashes in last 5 years; add 2 points each

Near Misses - reported near misses by railroad; add 1 point each

2
0Total 7

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	<u>4</u>
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each

Local designation as safety concern (county, city engineer call-out); add 2 points each

3Total 7

TOTALS 8, 5, 6GRAND TOTAL 19

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO082811Y

Railroad BNSF

Milepost 22.82

Location Hanson Blvd, Coon Rapids

AADT 13299

HCADT _____

Oil Trains/Day 6

Criteria

A. Population Density (area within ½ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>4</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	<u>2</u>
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	<u>3</u>
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	3
4	4
5	5

Total 8

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	4
0.050	<u>5</u>

Safety Record – Recorded crashes in last 5 years; add 2 points each

0

Near Misses – reported near misses by railroad; add 1 point each

0Total 5

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	<u>4</u>
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each

2

Local designation as safety concern (county, city engineer call-out); add 2 points each

0Total 6

TOTALS 15, 7, 6
GRAND TOTAL 28

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 0810186
Railroad BNSF
Milepost 210.02
Location Washington Ave, Detroit Lakes

AADT 5666
HCADT _____
Oil Trains/Day 6

Criteria

A. Population Density (area within ¼ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	<u>4</u>
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
<u>6</u> 5	<u>5</u>

Emergency Services (Police Department, Fire station)

1	1
2	2
3	<u>3</u>
4	4
5	5

Total 15

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	4
0.050	<u>5</u>

Safety Record – Recorded crashes in last 5 years; add 2 points each 2
Near Misses – reported near misses by railroad; add 1 point each 0

Total 7

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	<u>4</u>
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2

Local designation as safety concern (county, city engineer call-out); add 2 points each 0

Total 6

TOTALS 5, 6, 8GRAND TOTAL 19

Crude Oil by Rail Study

Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 689257RRailroad CPMilepost 73.21Location State St, Eden ValleyAADT 3049

HCADT _____

Oil Trains/Day 1

Criteria

A. Population Density (area within 1/4 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	<u>2</u>
1,500-3,000	3
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	<u>1</u>
2	2
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	<u>2</u>
3	3
4	4
5	5

Total 5

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>4</u>
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each 2Near Misses – reported near misses by railroad; add 1 point each 0Total 6

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 3

Local designation as safety concern (county, city engineer call-out); add 2 points each _____

Total 8

TOTALS 11,9,7GRAND TOTAL 27

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO082944R

Railroad BUSF

Milepost 38.67

Location Jackson St, Elk River

AADT 6062

HCADT _____

Oil Trains/Day 6

Criteria

A. Population Density (area within 1/4 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	③
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	②
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
5	⑤

Emergency Services (Police Department, Fire station)

1	①
2	2
3	3
4	4
5	5

Total 11

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	4
0.050	⑤

Safety Record – Recorded crashes in last 5 years; add 2 points each

2

Near Misses – reported near misses by railroad; add 1 point each

2Total 9

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	⑤
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each

2

Local designation as safety concern (county, city engineer call-out); add 2 points each

0Total 7

TOTALS 11 / 5 / 7GRAND TOTAL 23

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 082943 J
 Railroad BNSF
 Milepost 38.46
 Location Main St, Elk River

AADT 16237
 HCADT _____
 Oil Trains/Day 6

Criteria

A. Population Density (area within 1/4 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	<u>2</u>
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
5	<u>5</u>

Emergency Services (Police Department, Fire station)

1	<u>1</u>
2	2
3	3
4	4
5	5

Total 11

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>4</u>
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each

Near Misses - reported near misses by railroad; add 1 point each

0
1
Total 5

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2Local designation as safety concern (county, city engineer call-out); add 2 points each 0Total 7

TOTALS 8,9,7GRAND TOTAL 24

Crude Oil by Rail Study Railroad - Highway Grade Crossings Analysis

Location

USDOTNO 082946 ERailroad NSFMilepost 34.31Location Proctor Ave, Elk RiverAADT 13020HCADT Oil Trains/Day 6

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
5	<u>5</u>

Emergency Services (Police Department, Fire station)

1	1
2	2
3	3
4	4
5	5

Total 8

B. Safety (Safety Index - Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	4
0.050	<u>5</u>

Safety Record - Recorded crashes in last 5 years; add 2 points each 4Near Misses - reported near misses by railroad; add 1 point each 0Total 9

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2Local designation as safety concern (county, city engineer call-out); add 2 points each Total 7

TOTALS 10,4,7GRAND TOTAL 21

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 0628472
 Railroad BNSF
 Milepost 200.39
 Location Lake St N, Frazee

AADT 3684
 HCADT _____
 Oil Trains/Day 6

Criteria

A. Population Density (area within ½ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	<u>2</u>
1,500-3,000	3
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	<u>4</u>
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	<u>2</u>
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	<u>2</u>
3	3
4	4
5	5

Total 10

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>4</u>
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each

Near Misses – reported near misses by railroad; add 1 point each

0
0

Total 4

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each

Local designation as safety concern (county, city engineer call-out); add 2 points each

2
7
 Total 7

TOTALS 8,38GRAND TOTAL 19

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 684233CRailroad CPMilepost 60.91Location Main St, KimballAADT 5999

HCADT _____

Oil Trains/Day 1

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	<u>2</u>
1,500-3,000	3
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	<u>2</u>
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	<u>2</u>
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	<u>2</u>
3	3
4	4
5	5

Total 8

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each

Near Misses – reported near misses by railroad; add 1 point each

0
0Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 3

Local designation as safety concern (county, city engineer call-out); add 2 points each _____

Total 8

TOTALS 10 / 3 / 8GRAND TOTAL 21

Crude Oil by Rail Study Railroad - Highway Grade Crossings Analysis

Location

USDOTNO 391174 YRailroad CPMilepost 353.73Location W Lyon Ave, Lake CityAADT 5510HCADT Oil Trains/Day 1

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	<u>2</u>
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	<u>3</u>
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	<u>2</u>
3	3
4	4
5	5

Total 10

B. Safety (Safety Index - Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record - Recorded crashes in last 5 years; add 2 points each 0Near Misses - reported near misses by railroad; add 1 point each 0Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 3Local designation as safety concern (county, city engineer call-out); add 2 points each 0Total 6

TOTALS 13, 7, 8GRAND TOTAL 28

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO097668 K

Railroad BNSF

Milepost 105.47

Location Broadway W, Little Falls

AADT 13449

HCADT _____

Oil Trains/Day 6

Criteria

A. Population Density (area within ½ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	<u>4</u>
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	<u>2</u>
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	3
4	<u>4</u>
5	5

Total 13

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	4
0.050	<u>5</u>

Safety Record – Recorded crashes in last 5 years; add 2 points each 2Near Misses - reported near misses by railroad; add 1 point each 0Total 7

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 3

Local designation as safety concern (county, city engineer call-out); add 2 points each _____

Total 8

TOTALS 7,315GRAND TOTAL 15

Crude Oil by Rail Study Railroad - Highway Grade Crossings Analysis

Location

USDOTNO067282F

Railroad BUSF

Milepost 62.63

Location W main st, Marshall

AADT 9618

HCADT _____

Oil Trains/Day 1

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	<u>2</u>
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	<u>1</u>
2	2
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	<u>1</u>
2	2
3	3
4	4
5	5

Total 7

B. Safety (Safety Index - Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record - Recorded crashes in last 5 years; add 2 points each

Near Misses - reported near misses by railroad; add 1 point each

0
0Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	<u>3</u>
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each

Local designation as safety concern (county, city engineer call-out); add 2 points each

0
2Total 5

TOTALS 71310GRAND TOTAL 18

Crude Oil by Rail Study

Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 6869363Railroad CPMilepost 3.94Location Humboldt Ave N, MinneapolisAADT 2949HCADT Oil Trains/Day 1

Criteria

A. Population Density (area within 1/4 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	3
3,000-5,000	<u>4</u>
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	<u>2</u>
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	<u>1</u>
2	2
3	3
4	4
5	5

Total 7

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each

0

Near Misses - reported near misses by railroad; add 1 point each

0Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each

3

Local designation as safety concern (county, city engineer call-out); add 2 points each

0Total 8

TOTALS 4,38
GRAND TOTAL 15

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 082978 K
Railroad B O S F
Milepost 9.0
Location Talmage Ave SE, Minneapolis

AADT 899
HCADT _____
Oil Trains/Day 6

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	③
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	①
2	2
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	3
4	4
5	5

Total 4

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	③
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each
Near Misses – reported near misses by railroad; add 1 point each

0
0

Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	⑦

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 1

Local designation as safety concern (county, city engineer call-out); add 2 points each 0

Total 8

TOTALS 13, 4, 5GRAND TOTAL 22

Crude Oil by Rail Study Railroad - Highway Grade Crossings Analysis

Location

USDOTNO 070798 DRailroad BNSFMilepost 6.83Location 5th St S, MoorheadAADT 3464

HCADT _____

Oil Trains/Day 6

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>(3)</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	<u>(6)</u>
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	<u>(4)</u>
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	3
4	4
5	5

Total 13

B. Safety (Safety Index - Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>(4)</u>
0.050	5

Safety Record - Recorded crashes in last 5 years; add 2 points each 0Near Misses - reported near misses by railroad; add 1 point each 0Total 4

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	<u>(4)</u>
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 1Local designation as safety concern (county, city engineer call-out); add 2 points each 0Total 5

TOTALS 14, 5, 6GRAND TOTAL 25

Crude Oil by Rail Study Railroad - Highway Grade Crossings Analysis

Location

USDOTNO662952 D

Railroad BNSF

Milepost 6.62

Location 88th St S, Moorhead

AADT 11,199

HCADT _____

Oil Trains/Day 6

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	<u>6</u>
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	<u>4</u>
5	5

Emergency Services (Police Department, Fire station)

1	<u>1</u>
2	2
3	3
4	4
5	5

Total 14

B. Safety (Safety Index - Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	4
0.050	<u>5</u>

Safety Record - Recorded crashes in last 5 years; add 2 points each

0

Near Misses - reported near misses by railroad; add 1 point each

0Total 5

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	<u>4</u>
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2

Local designation as safety concern (county, city engineer call-out); add 2 points each _____

Total 6

TOTALS 16 / 4 / 6
 GRAND TOTAL 26

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 062949 V
 Railroad BWSE
 Milepost 6.37
 Location 11th St S, Moorhead

AADT 4211
 HCADT _____
 Oil Trains/Day 6

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	<u>6</u>
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
5	<u>5</u>

Emergency Services (Police Department, Fire station)

1	1
2	<u>2</u>
3	3
4	4
5	5

Total 16

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>4</u>
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each 0

Near Misses – reported near misses by railroad; add 1 point each 0

Total 4

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	<u>4</u>
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2

Local designation as safety concern (county, city engineer call-out); add 2 points each 0

Total 6

TOTALS 8,37GRAND TOTAL 18

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO0679312
 Railroad BNSF
 Milepost 157.24
 Location W 7th St, Morris

AADT 2607

HCADT _____

Oil Trains/Day 1

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	③
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	③
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	②
3	3
4	4
5	5

Total 8

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	③
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each 0Near Misses - reported near misses by railroad; add 1 point each 0Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	⑤
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2Local designation as safety concern (county, city engineer call-out); add 2 points each 0Total 7

TOTALS 10,6,7GRAND TOTAL 23

Crude Oil by Rail Study Railroad - Highway Grade Crossings Analysis

Location

USDOTNO 067433R
 Railroad BUSF
 Milepost 157.15
 Location W 5th St, Morris

AADT 4399
 HCADT _____
 Oil Trains/Day 1

Criteria

A. Population Density (area within 1/4 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	③
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	②
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	③
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	②
3	3
4	4
5	5

Total 10

B. Safety (Safety Index - Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	④
0.050	5

Safety Record - Recorded crashes in last 5 years; add 2 points each 2

Near Misses - reported near misses by railroad; add 1 point each _____

Total 6

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	⑤
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2

Local designation as safety concern (county, city engineer call-out); add 2 points each _____

Total 7

TOTALS 9, 7, 7
GRAND TOTAL 23

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 6889544
Railroad CP
Milepost 8.1
Location Winnetka Ave, New Hope

AADT 10399
HCADT _____
Oil Trains/Day 1

Criteria

A. Population Density (area within ½ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	<u>2</u>
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	<u>4</u>
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	3
4	4
5	5

Total 9

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	4
0.050	<u>5</u>

Safety Record – Recorded crashes in last 5 years; add 2 points each 2
Near Misses - reported near misses by railroad; add 1 point each 0

Total 7

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2
Local designation as safety concern (county, city engineer call-out); add 2 points each 0

Total 7

TOTALS 15,477GRAND TOTAL 26

Crude Oil by Rail Study

Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 0628226
 Railroad BNSF
 Milepost 18A.16
 Location 1st Ave, Pesham

AADT 5299
 HCADT _____
 Oil Trains/Day 60

Criteria

A. Population Density (area within ¼ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	<u>4</u>
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
5	<u>5</u>

Emergency Services (Police Department, Fire station)

1	1
2	2
3	<u>3</u>
4	4
5	5

Total 15

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>4</u>
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each
 Near Misses – reported near misses by railroad; add 1 point each

0
0

Total 4

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2

Local designation as safety concern (county, city engineer call-out); add 2 points each 0

Total 7

TOTALS 11 / 11 / 7
 GRAND TOTAL 29

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 0628245
 Railroad 8228 F
 Milepost 189.52
 Location W 16th Ave, Perham

AADT 482
 HCADT _____
 Oil Trains/Day 6

Criteria

A. Population Density (area within 1/4 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)	
<500	1
500-1,500	<u>2</u>
1,500-3,000	3
3,000-5,000	4
>5,000	5
Vulnerable fixed population (hospital, nursing home, prison)	
1	2
2	<u>4</u>
3	6
4	8
5	10
Vulnerable temporary population (schools, city halls)	
1	1
2	2
3	3
4	<u>4</u>
5	5
Emergency Services (Police Department, Fire station)	
1	<u>1</u>
2	2
3	3
4	4
5	5

Total 11

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	4
0.050	<u>5</u>

Safety Record – Recorded crashes in last 5 years; add 2 points each 4
 Near Misses - reported near misses by railroad; add 1 point each 2

Total 11

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2
 Local designation as safety concern (county, city engineer call-out); add 2 points each 0

Total 7

TOTALS 7,3,7GRAND TOTAL 17

Crude Oil by Rail Study

Railroad – Highway Grade Crossings Analysis

Location

USDOTNO0917910R

Railroad BUSF

Milepost 104.58

Location E main st, Pigestone

AADT 3597

HCADT _____

Oil Trains/Day 1

Criteria

A. Population Density (area within ¼ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	<u>2</u>
1,500-3,000	3
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	<u>2</u>
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	<u>1</u>
2	2
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	<u>2</u>
3	3
4	4
5	5

Total 7

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each

0

Near Misses - reported near misses by railroad; add 1 point each

0Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	<u>6</u>
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each

1

Local designation as safety concern (county, city engineer call-out); add 2 points each

0Total 7

TOTALS 13,3,5GRAND TOTAL 21

Crude Oil by Rail Study Railroad - Highway Grade Crossings Analysis

Location

USDOTNO 391204NRailroad CPMilepost 370.64Location Broad St, RockawayAADT 2749

HCADT _____

Oil Trains/Day 1

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	<u>4</u>
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	<u>3</u>
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	<u>3</u>
4	4
5	5

Total 13

B. Safety (Safety Index - Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record - Recorded crashes in last 5 years; add 2 points each 0Near Misses - reported near misses by railroad; add 1 point each 0Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	<u>4</u>
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 1Local designation as safety concern (county, city engineer call-out); add 2 points each 0Total 5

TOTALS 8,516GRAND TOTAL 19

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 6672450Railroad BNSFMilepost 72.7Location 15th Ave SE, St. CloudAADT 8547HCADT Oil Trains/Day 6

Criteria

A. Population Density (area within 1/4 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	<u>2</u>
1,500-3,000	3
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	<u>4</u>
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	<u>1</u>
2	2
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	<u>1</u>
2	2
3	3
4	4
5	5

Total 8

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>4</u>
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each

Near Misses – reported near misses by railroad; add 1 point each

0
1Total 5

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	<u>4</u>
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each

Local designation as safety concern (county, city engineer call-out); add 2 points each

Total 6

TOTALS 11 / 7 / 8GRAND TOTAL 26

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 082492FRailroad BNSFMilepost 4.24Location W Como Ave, St PaulAADT 4351

HCADT _____

Oil Trains/Day 6

Criteria

A. Population Density (area within ½ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	3
3,000-5,000	<u>4</u>
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	<u>2</u>
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	<u>3</u>
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	3
4	4
5	5

Total 11

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>4</u>
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each 2Near Misses – reported near misses by railroad; add 1 point each 5Total 7

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	<u>7</u>

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 1Local designation as safety concern (county, city engineer call-out); add 2 points each 0Total 8

TOTALS 2, 5, 9GRAND TOTAL 16

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 061138TRailroad BNSFMilepost 42.16Location Hastings Ave, St. Paul ParkAADT 674HCADT Oil Trains/Day 6

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	<u>1</u>
500-1,500	2
1,500-3,000	3
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	<u>1</u>
2	2
3	3
4	4
5	5

Total 2

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each

Near Misses – reported near misses by railroad; add 1 point each

0
2Total 5

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	<u>6</u>
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each

Local designation as safety concern (county, city engineer call-out); add 2 points each

30Total 9

TOTALS 11,69GRAND TOTAL 26

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 047417A
 Railroad USF
 Milepost 147.84
 Location 6th St W, Staples

AADT 5,577
 HCADT _____
 Oil Trains/Day 6

Criteria

A. Population Density (area within ½ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
<u>5</u>	<u>5</u>

Emergency Services (Police Department, Fire station)

1	1
2	2
3	<u>3</u>
4	4
5	5

Total 11

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>4</u>
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each

0

Near Misses – reported near misses by railroad; add 1 point each

2Total 6

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	<u>4</u>
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 3Local designation as safety concern (county, city engineer call-out); add 2 points each 2Total 9

TOTALS 13, 7, 7GRAND TOTAL 27

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 062773 M
 Railroad BNSF
 Milepost 145.42
 Location 1st St SE, Wadena

AADT 41,631
 HCADT _____
 Oil Trains/Day 6

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	<u>4</u>
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	<u>3</u>
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	<u>3</u>
4	4
5	5

Total 13

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>4</u>
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each
 Near Misses – reported near misses by railroad; add 1 point each

0
3

Total 7

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2
 Local designation as safety concern (county, city engineer call-out); add 2 points each _____

Total 7

TOTALS 13, 4, 7
GRAND TOTAL 24

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 062775B
Railroad BNSF
Milepost 16.56
Location Jefferson St S, Wadena

AADT 10723
HCADT _____
Oil Trains/Day 6

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	<u>4</u>
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	<u>3</u>
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	<u>3</u>
4	4
5	5

Total 13

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>4</u>
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each 0
Near Misses - reported near misses by railroad; add 1 point each 0

Total 4

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2
Local designation as safety concern (county, city engineer call-out); add 2 points each 0

Total 7

TOTALS 14, 6, 7GRAND TOTAL 27

Crude Oil by Rail Study Railroad - Highway Grade Crossings Analysis

Location

USDOTNO 062774DRailroad BNSFMilepost 165.71Location 2nd St SW, WadenaAADT 5638

HCADT _____

Oil Trains/Day 6

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	<u>4</u>
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	<u>4</u>
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	<u>4</u>
4	4
5	5

Total 14

B. Safety (Safety Index - Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	<u>4</u>
0.050	5

Safety Record - Recorded crashes in last 5 years; add 2 points each

Near Misses - reported near misses by railroad; add 1 point each

0
2Total 6

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speeds, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2Local designation as safety concern (county, city engineer call-out); add 2 points each ()Total 7

TOTALS 15, 4, 8GRAND TOTAL 27

Crude Oil by Rail Study Railroad - Highway Grade Crossings Analysis

Location

USDOTNO067834T
 Railroad BUSF
 Milepost 102.54
 Location 7 1/2 St SW, Willmar

AADT 2852

HCADT _____

Oil Trains/Day 1

Criteria

A. Population Density (area within 1/2 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	<u>8</u>
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	<u>3</u>
4	4
5	5

Emergency Services (Police Department, Fire station)

1	<u>1</u>
2	2
3	3
4	4
5	5

Total 15

B. Safety (Safety Index -- Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record -- Recorded crashes in last 5 years; add 2 points each
 Near Misses - reported near misses by railroad; add 1 point each

0
1

Total 4

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	<u>6</u>
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2

Local designation as safety concern (county, city engineer call-out); add 2 points each 0

Total 8

TOTALS 8,37GRAND TOTAL 18

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 067709F
 Railroad BNSF
 Milepost 46
 Location Trotter Ave SW, Willmar

AADT 2351

HCADT _____

Oil Trains/Day 1

Criteria

A. Population Density (area within 1/4 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	<u>2</u>
1,500-3,000	3
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	<u>6</u>
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	3
4	4
5	5

Total 8

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each

Near Misses – reported near misses by railroad; add 1 point each

0
0
Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each

Local designation as safety concern (county, city engineer call-out); add 2 points each

2
0
 Total 7

TOTALS 12,718GRAND TOTAL 27

Crude Oil by Rail Study

Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 341080XRailroad CPMilepost 304.65Location 5th St, WinonaAADT 6349

HCADT _____

Oil Trains/Day 1

Criteria

A. Population Density (area within ½ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	<u>2</u>
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
5	<u>5</u>

Emergency Services (Police Department, Fire station)

1	1
2	<u>2</u>
3	3
4	4
5	5

Total 12

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	3
0.030	4
0.050	<u>5</u>

Safety Record – Recorded crashes in last 5 years; add 2 points each 2Near Misses – reported near misses by railroad; add 1 point each 0Total 7

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	5
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	<u>6</u>
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2Local designation as safety concern (county, city engineer call-out); add 2 points each 0Total 8

TOTALS 9,3,7GRAND TOTAL 19

Crude Oil by Rail Study

Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 341042ARailroad LPMilepost 308.84Location main st, WinonaAADT 7499

HCADT _____

Oil Trains/Day 1

Criteria

A. Population Density (area within ½ mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	<u>2</u>
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	<u>4</u>
5	5

Emergency Services (Police Department, Fire station)

1	1
2	2
3	3
4	4
5	5

Total 9

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each 0Near Misses – reported near misses by railroad; add 1 point each 0Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 2

Local designation as safety concern (county, city engineer call-out); add 2 points each _____

Total 7

TOTALS 10 / 3 / 6

GRAND TOTAL 19

Crude Oil by Rail Study Railroad – Highway Grade Crossings Analysis

Location

USDOTNO 391079D
Railroad CP
Milepost 309.55
Location 6th St, Winona

AADT 7499
HCADT _____
Oil Trains/Day 1

Criteria

A. Population Density (area within 1/4 mile/800 yard radius of crossing)

General Population Density (Per Sq. Mi.)

<500	1
500-1,500	2
1,500-3,000	<u>3</u>
3,000-5,000	4
>5,000	5

Vulnerable fixed population (hospital, nursing home, prison)

1	2
2	4
3	6
4	8
5	10

Vulnerable temporary population (schools, city halls)

1	1
2	2
3	3
4	4
5	<u>5</u>

Emergency Services (Police Department, Fire station)

1	1
2	<u>2</u>
3	3
4	4
5	5

Total 10

B. Safety (Safety Index – Per USDOT Crash Prediction Model)

0.005	1
0.008	2
0.010	<u>3</u>
0.030	4
0.050	5

Safety Record – Recorded crashes in last 5 years; add 2 points each 0

Near Misses – reported near misses by railroad; add 1 point each 0

Total 3

C. Conditions at Crossing (appropriate signal applications & safety-related conditions)

Appropriate safety application for condition (passive signals for low ADT, etc.)	1
Poor physical condition (poor geometry, surface, line of sight)	2
Very poor physical condition (inadequate geometry, stacking distance, line of sight)	3
Multiple crossings (two or more active tracks, especially main line, high speed)	4
Inadequate protection for vehicular traffic (allows drive-arounds, turn onto tracks, etc.)	<u>5</u>
Inappropriate safety application for traffic (passive needs active, 2 quad to 4 quad)	6
Grade separation needed (high speed, 20+ daily trains, high ADT or EMS access)	7

Special Highway Status (school bus route, evacuation, emergency access, designated truck route); add 1 point each 1

Local designation as safety concern (county, city engineer call-out); add 2 points each 0

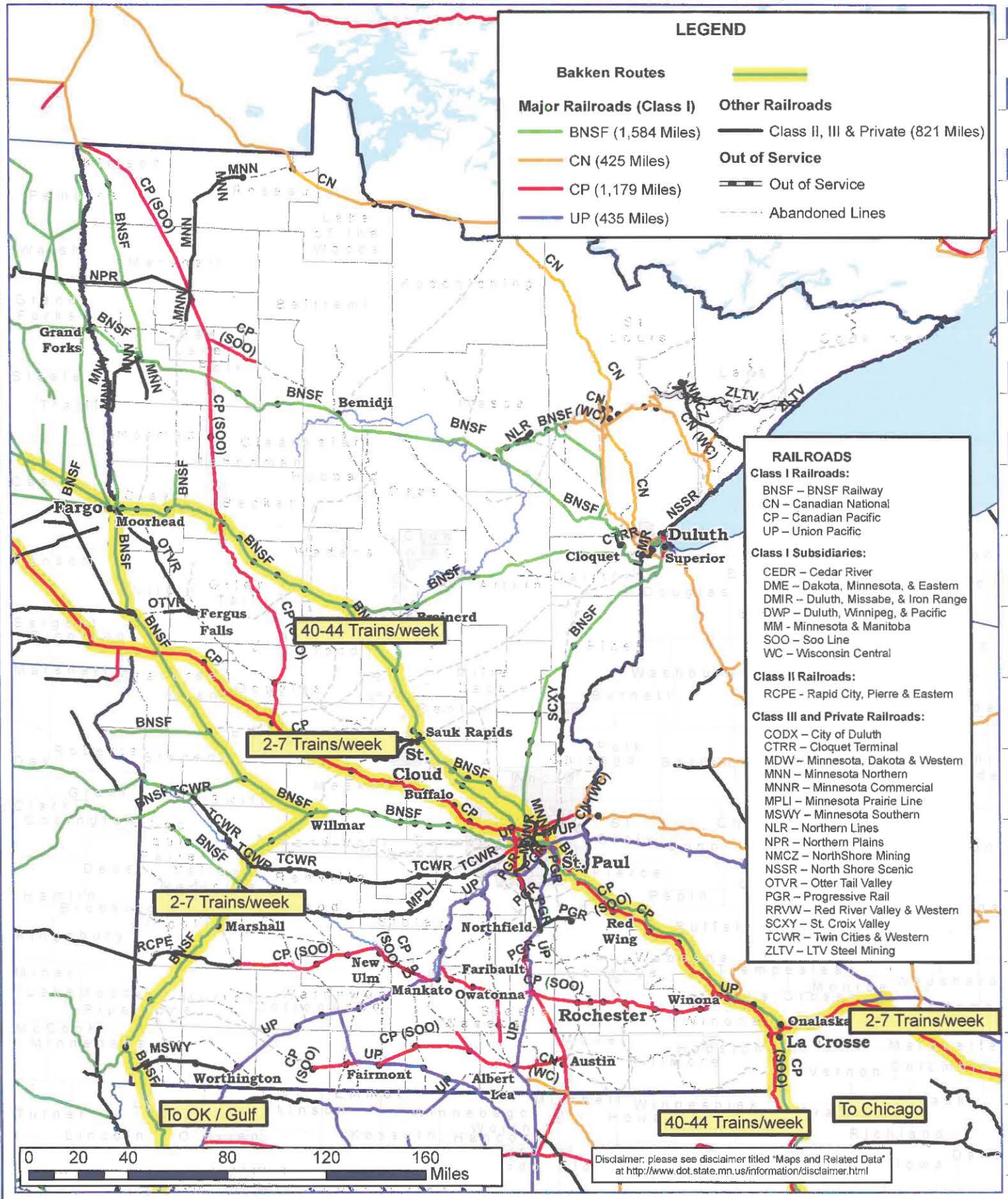
Total 6



MINNESOTA FREIGHT RAILROAD MAP

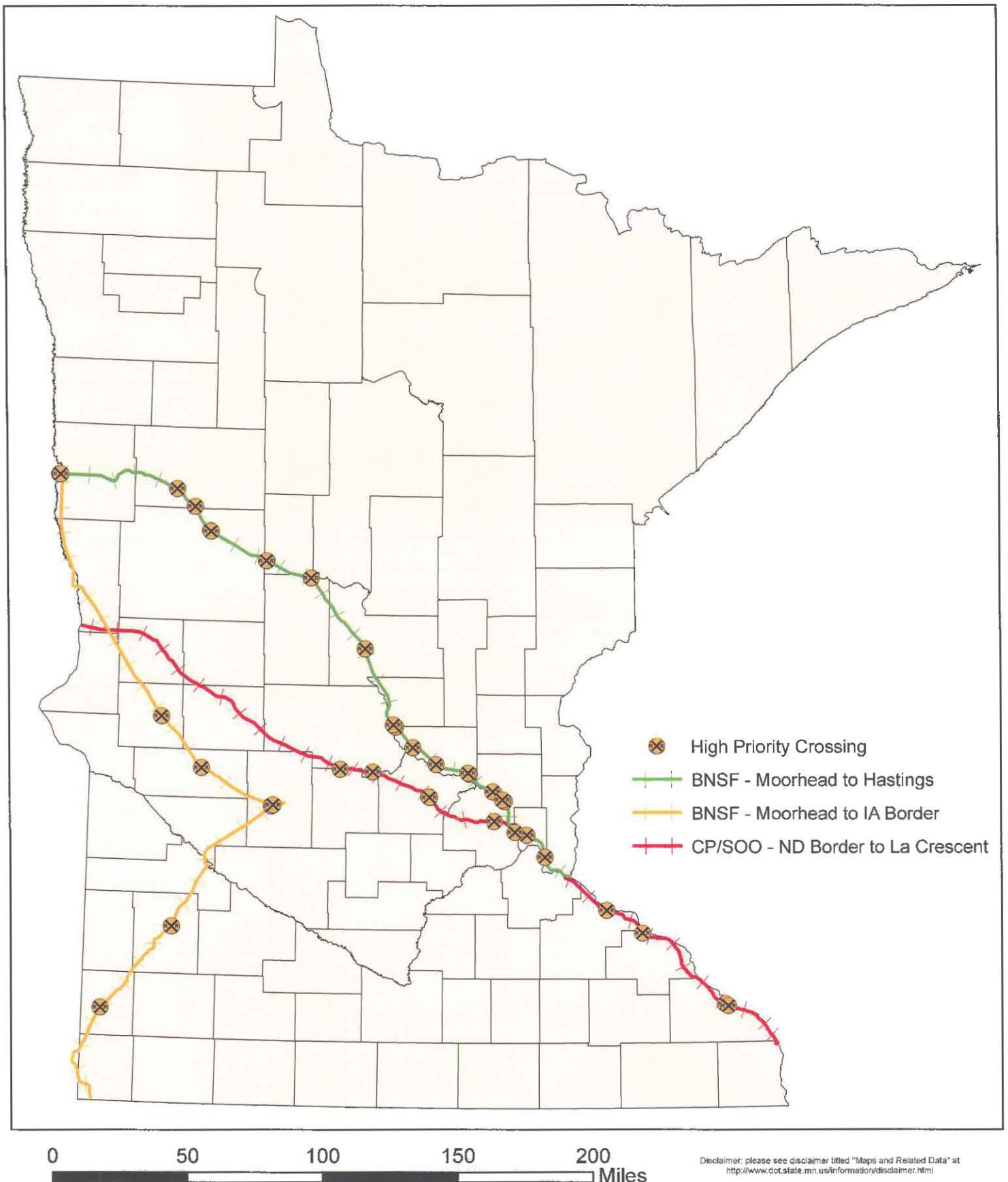
Bakken Oil Routes

Office of Freight and Commercial Vehicle Operations, August 2014

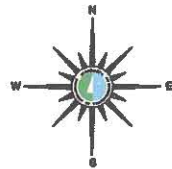




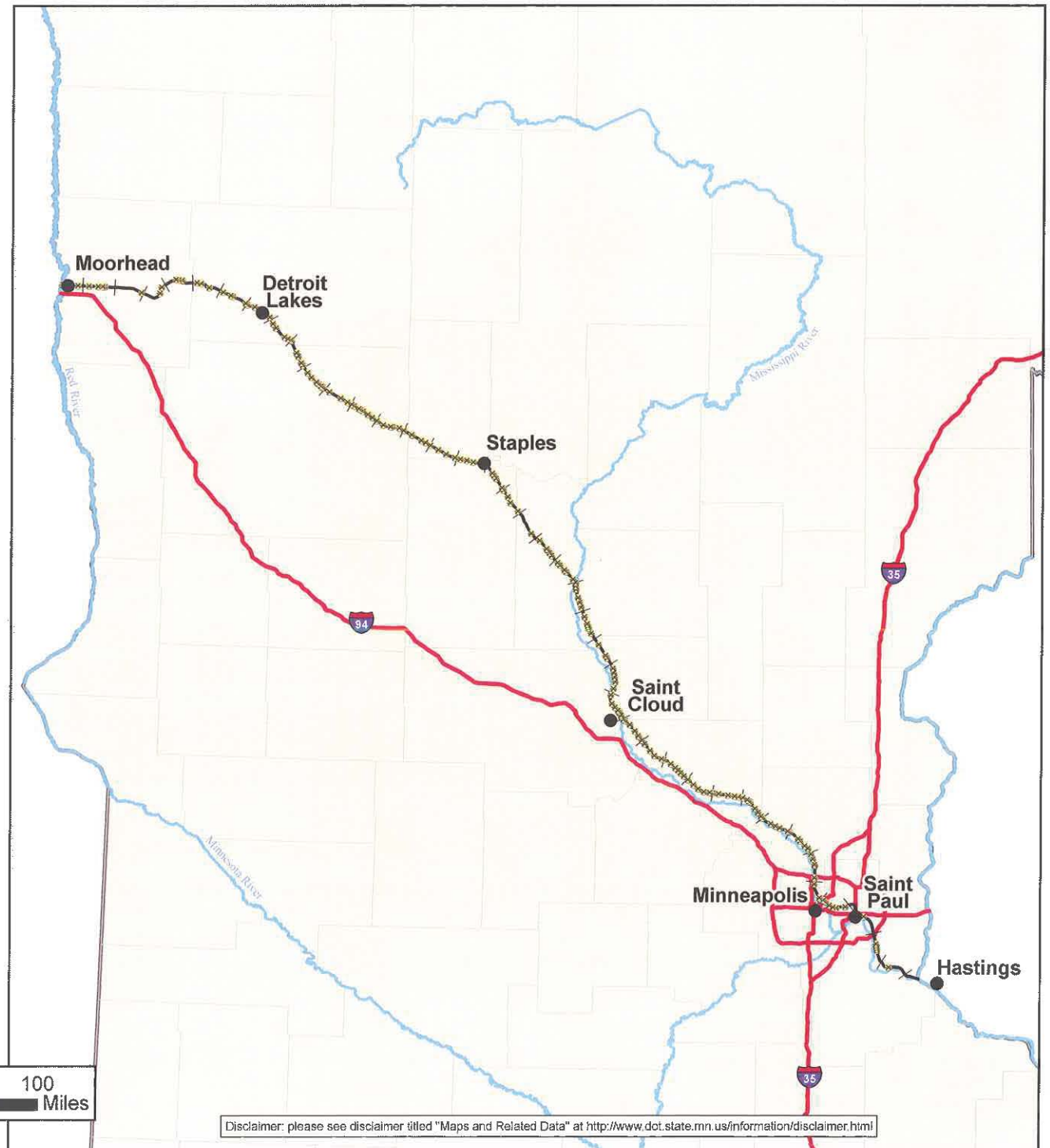
Minnesota Rail Oil Corridors and Recommended Project Crossings



BNSF Rail Oil Corridor: Moorhead to Hastings

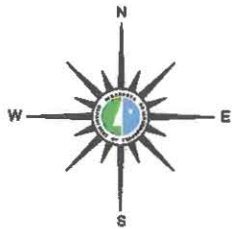


- Rail Crossing
- +— BNSF Rail Route
- Interstate
- ~ Major River

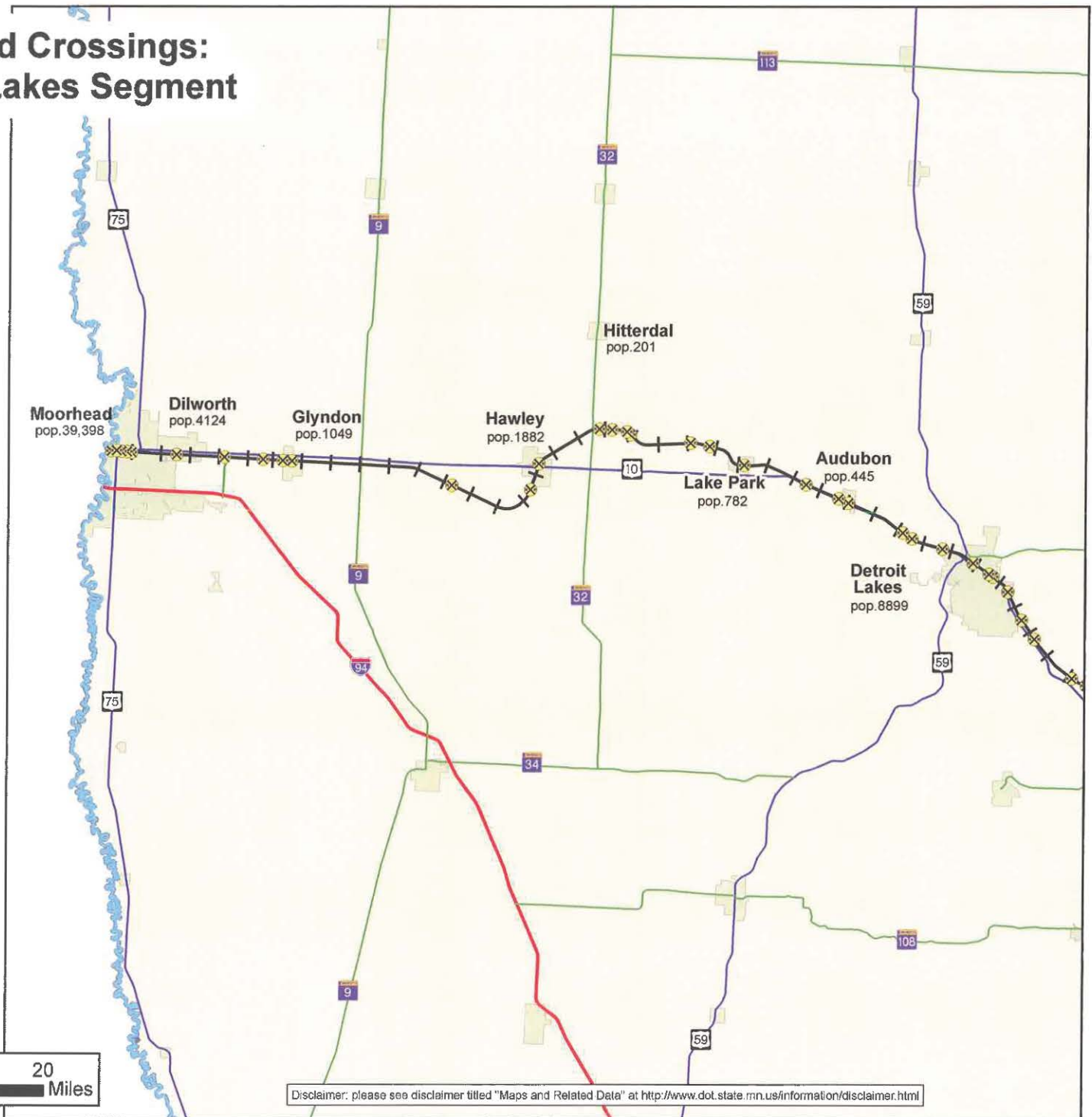
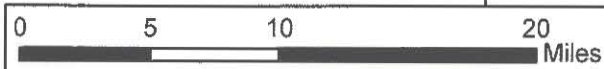


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BNSF Rail Route and Crossings: Moorhead to Detroit Lakes Segment

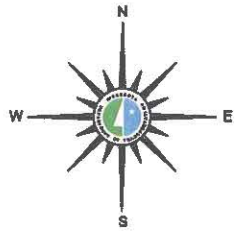


- Rail Crossing
- BNSF Rail Route
- Interstate
- US Highway
- State Highway
- Major River
- City

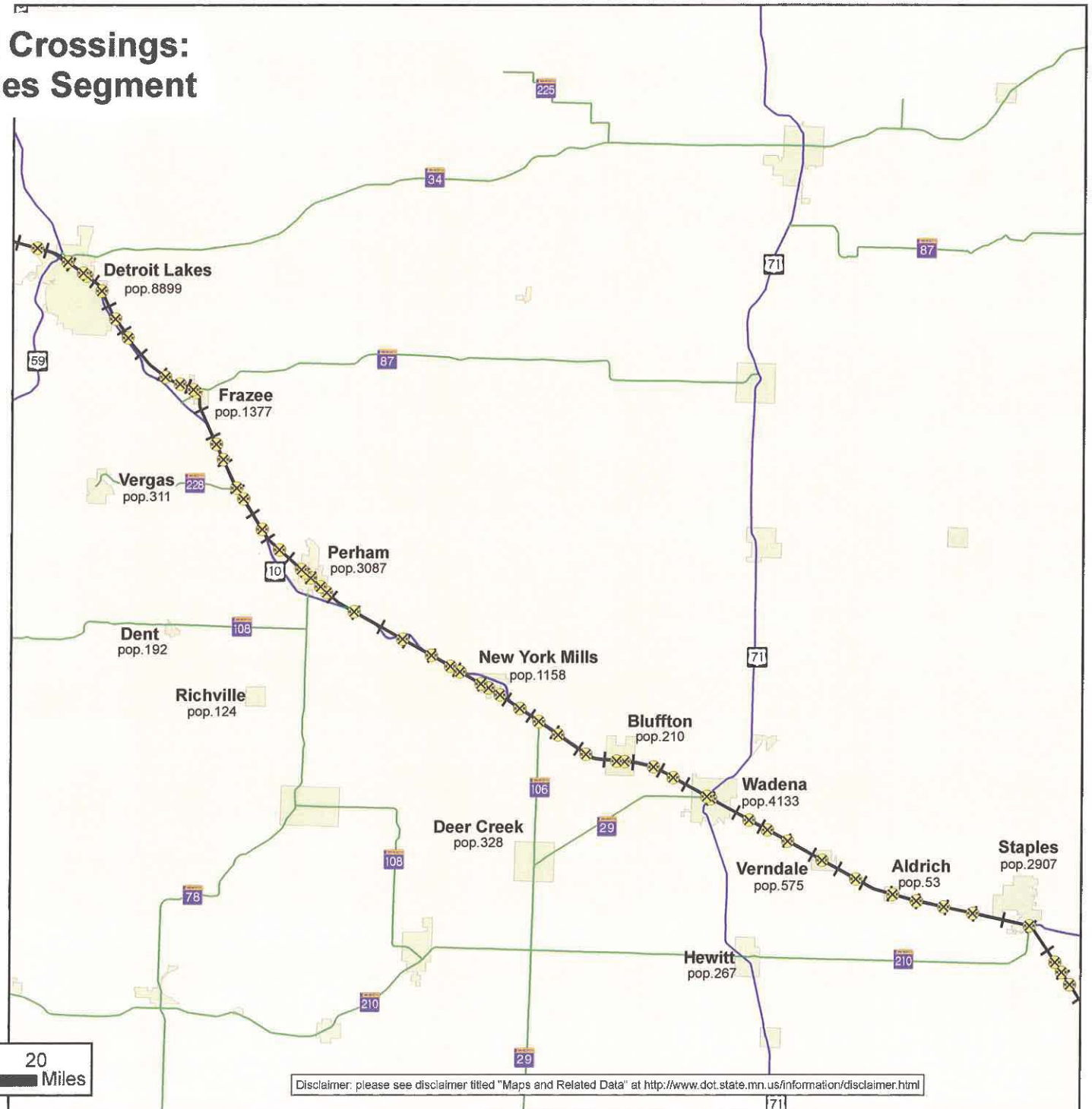
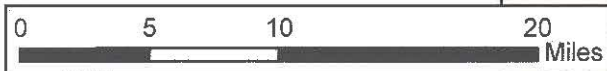


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BNSF Rail Route and Crossings: Detroit Lakes to Staples Segment

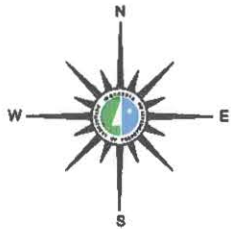


- Rail Crossing
- BNSF Rail Route
- Interstate
- US Highway
- State Highway
- Major River
- City



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BNSF Rail Route and Crossings: Staples to Sartell Segment



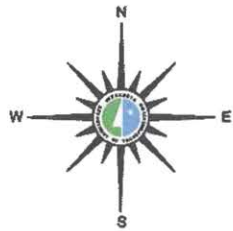
- Rail Crossing
- BNSF Rail Route
- Interstate
- US Highway
- State Highway
- Major River
- City

0 5 10 20 Miles

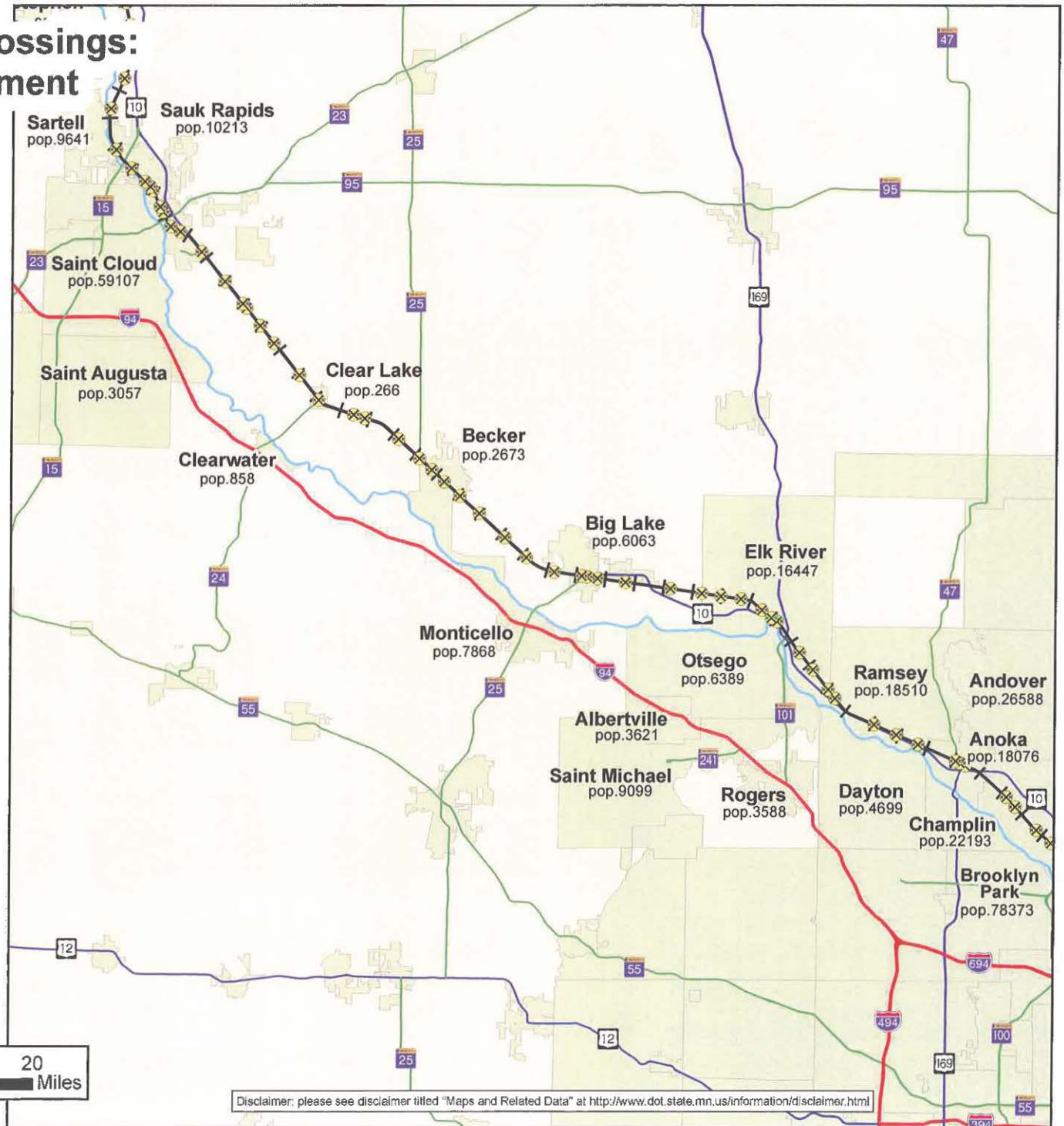
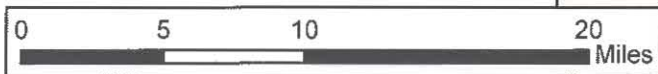


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BNSF Rail Route and Crossings: Sartell to Anoka Segment

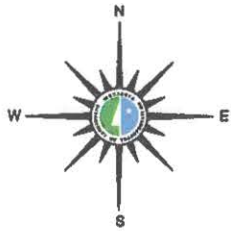


- Rail Crossing
- BNSF Rail Route
- Interstate
- US Highway
- State Highway
- Major River
- City

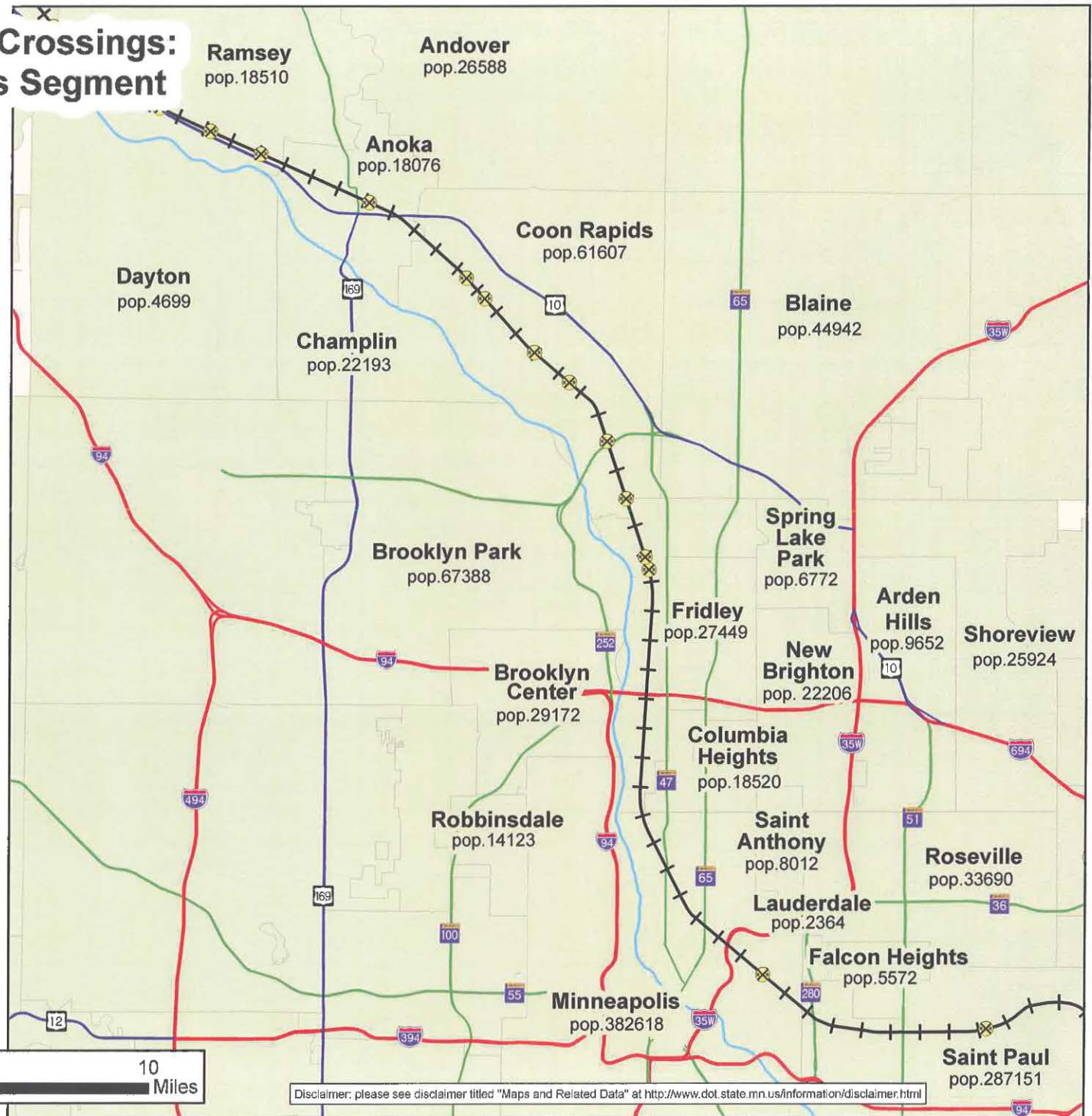
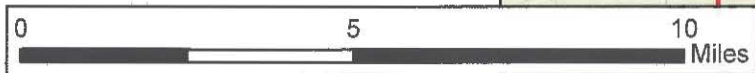


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

BNSF Rail Route and Crossings: Anoka to Minneapolis Segment

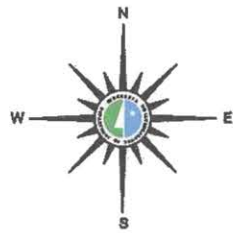


- Rail Crossing
- BNSF Rail Route
- Interstate
- US Highway
- State Highway
- Major River
- City

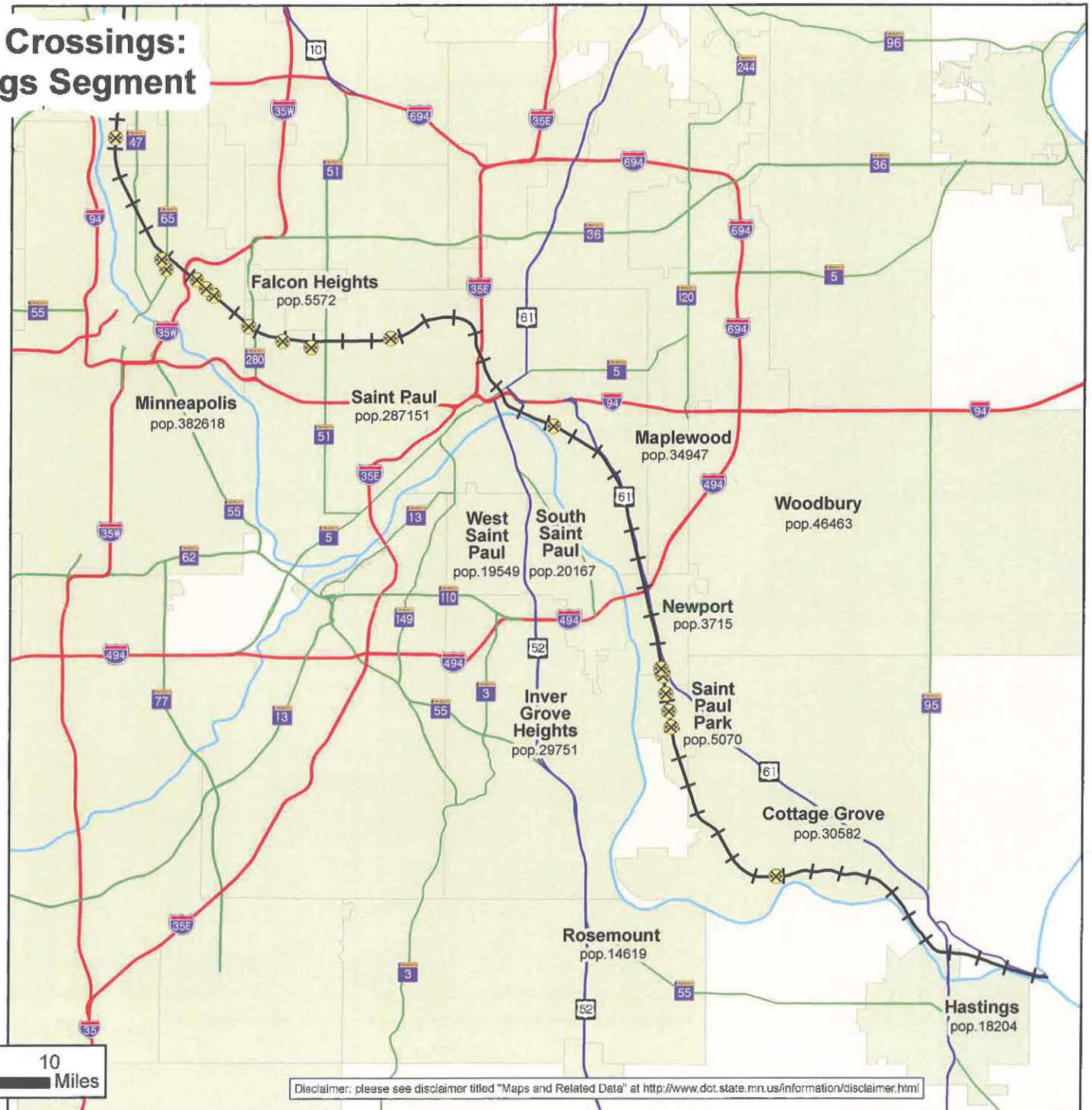
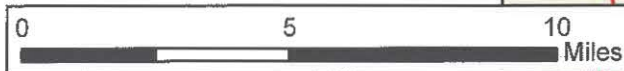


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

BNSF Rail Route and Crossings: Minneapolis to Hastings Segment

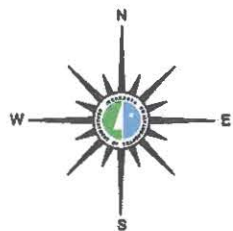
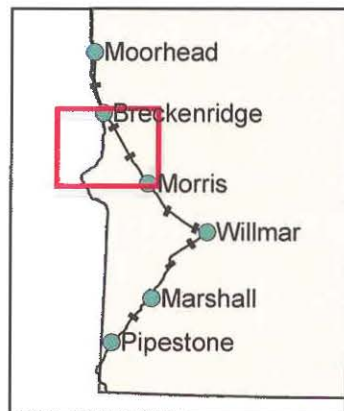


- Rail Crossing
- BNSF Rail Route
- Interstate
- US Highway
- State Highway
- Major River
- City



Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

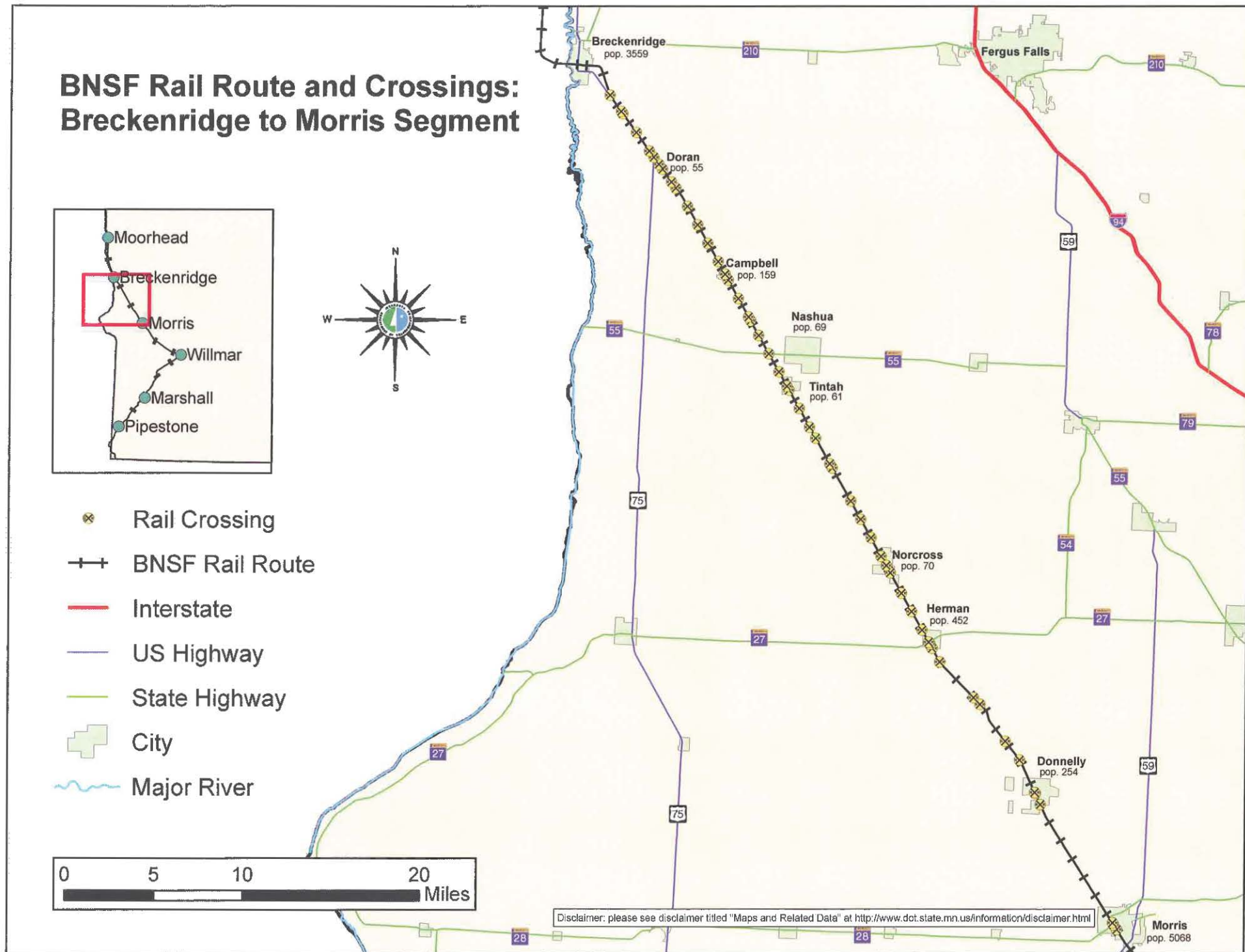
BNSF Rail Route and Crossings: Breckenridge to Morris Segment



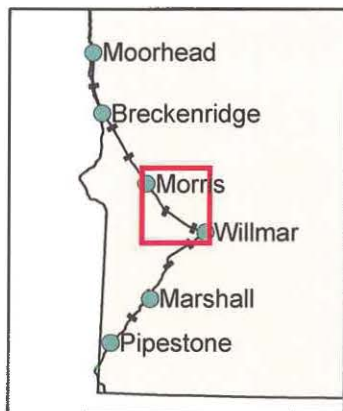
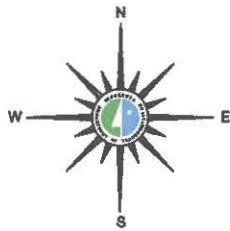
-  Rail Crossing
-  BNSF Rail Route
-  Interstate
-  US Highway
-  State Highway
-  City
-  Major River



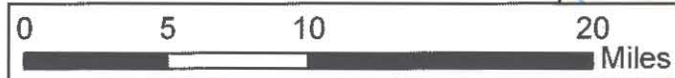
Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>



BNSF Rail Route and Crossings: Morris to Willmar Segment

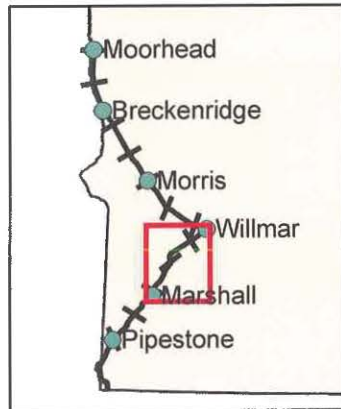
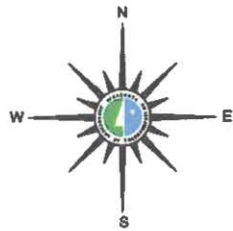


- Rail Crossing
- BNSF Rail Route
- Interstate
- US Highway
- State Highway
- City
- Major River

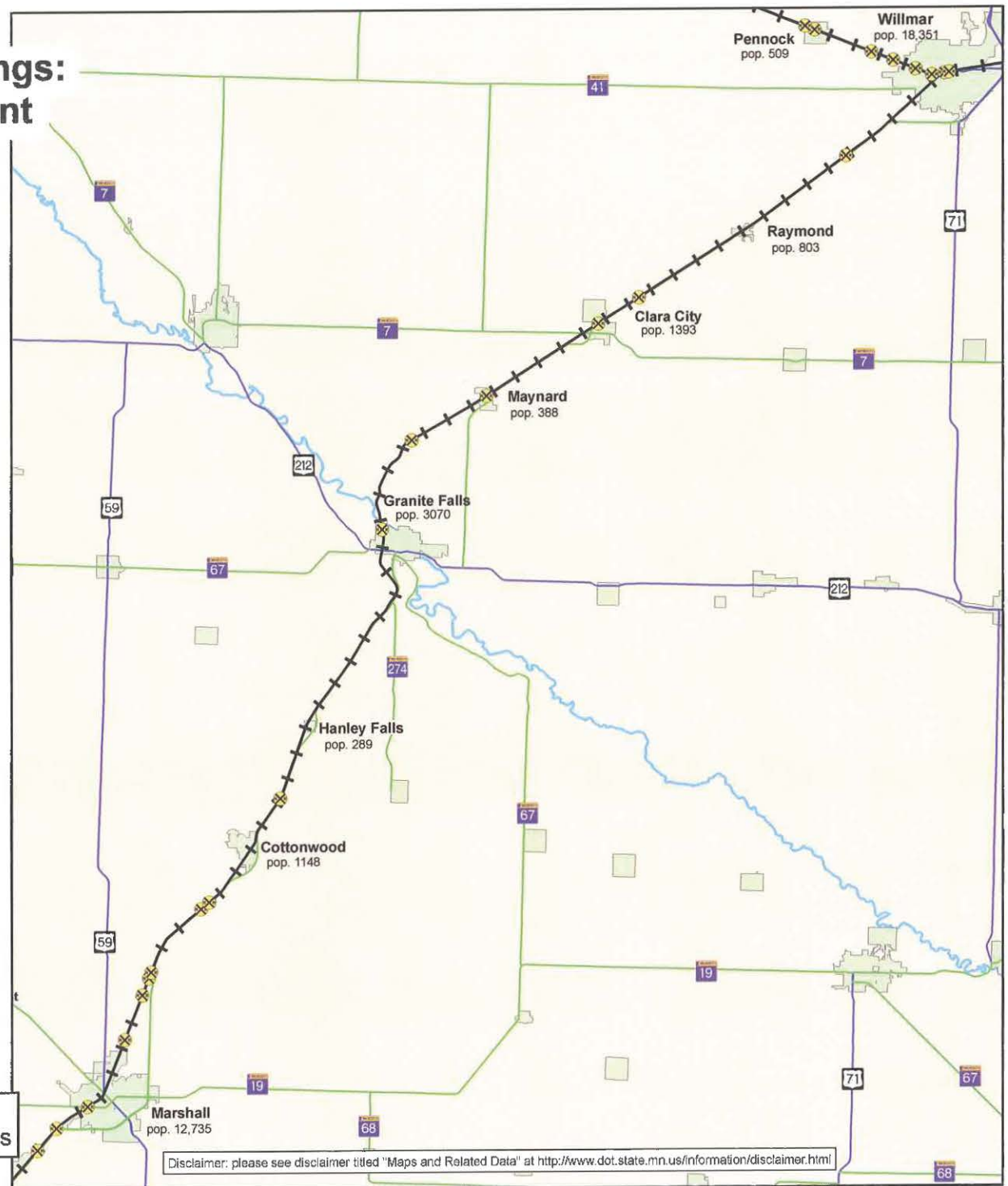
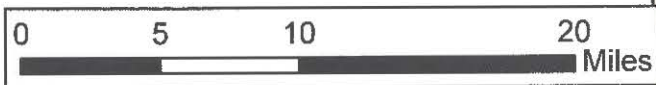


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

BNSF Rail Route and Crossings: Willmar to Marshall Segment

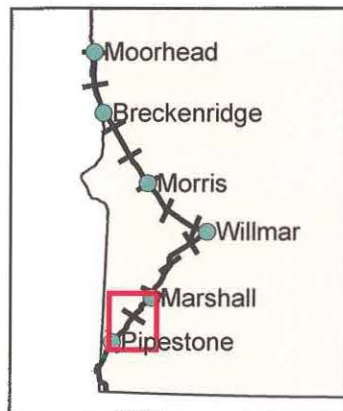
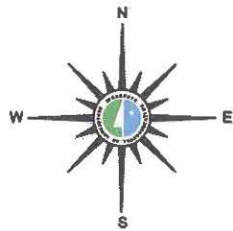


- Rail Crossing
- BNSF Rail Route
- Interstate
- US Highway
- State Highway
- City
- Major River

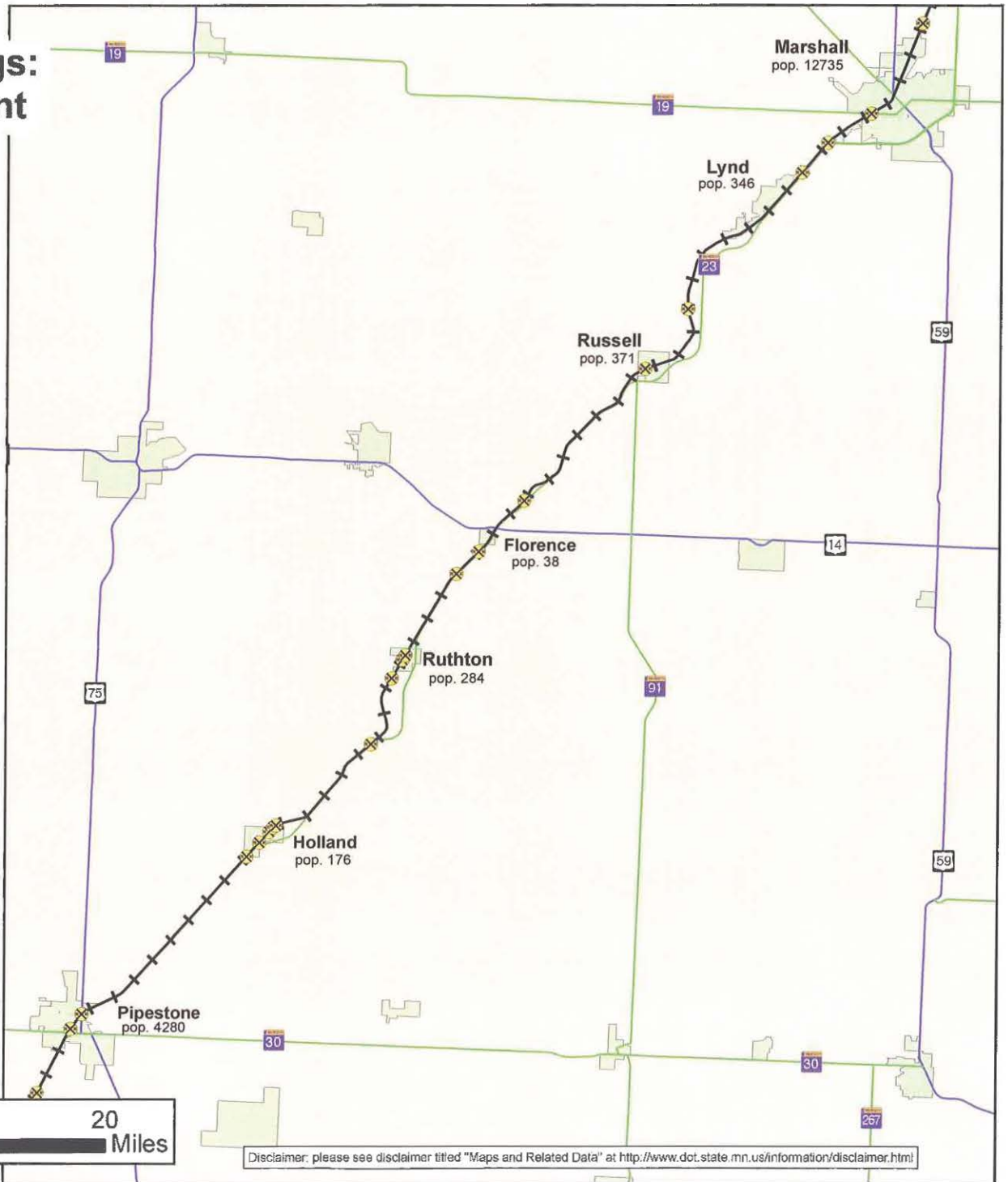
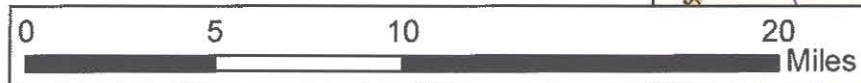


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

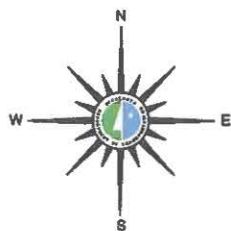
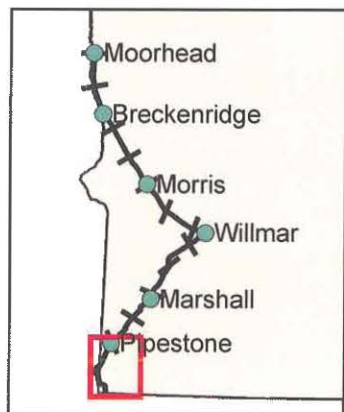
BNSF Rail Route and Crossings: Marshall to Pipestone Segment



- Rail Crossing
- BNSF Rail Route
- Interstate
- US Highway
- State Highway
- City
- Major River

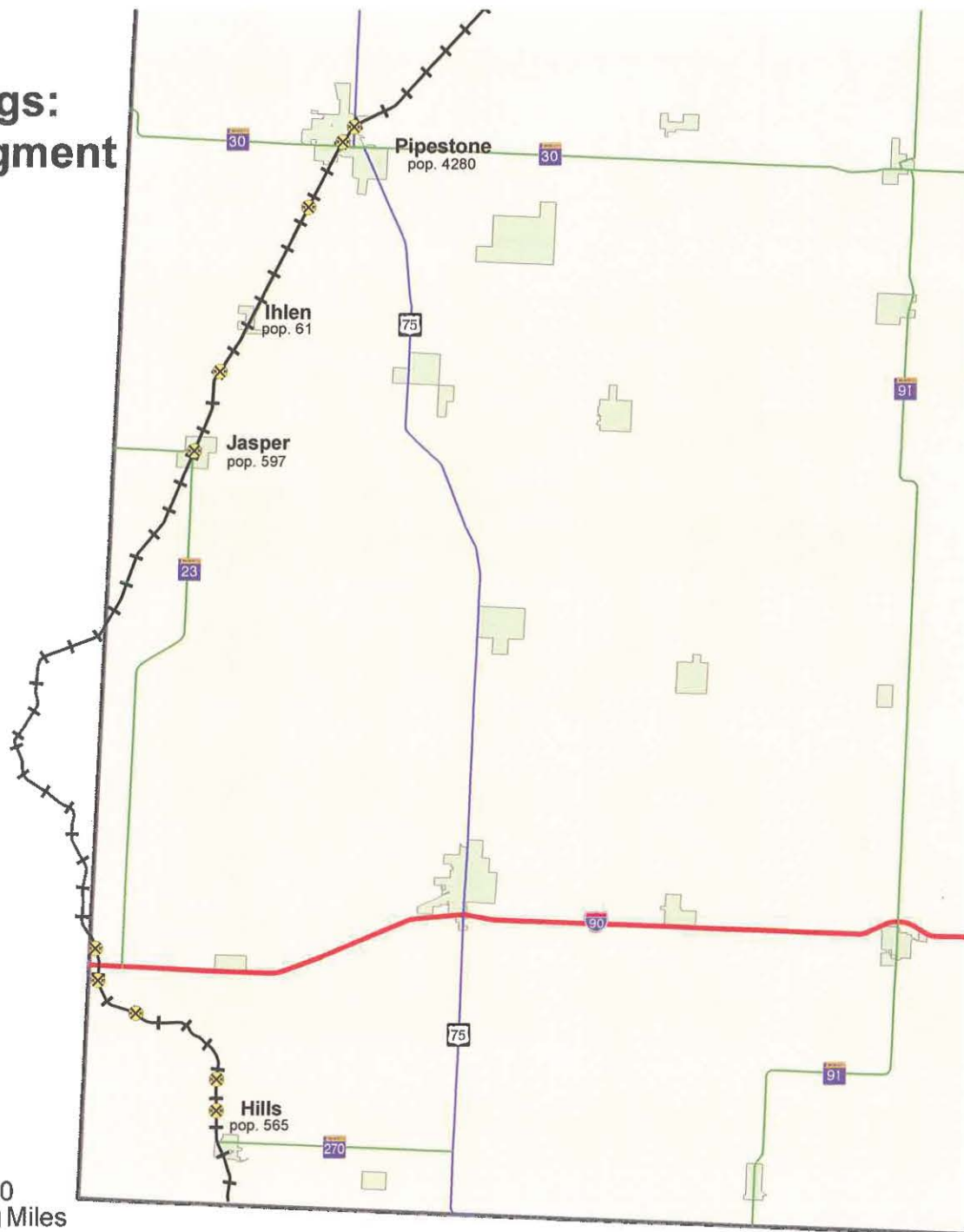


BNSF Rail Route and Crossings: Pipestone to Iowa State Line Segment



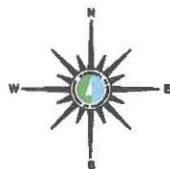
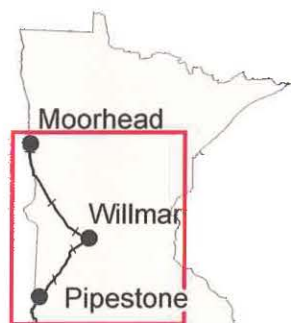
- Rail Crossing
- BNSF Rail Route
- Interstate
- US Highway
- State Highway
- City
- Major River

0 5 10 20 Miles

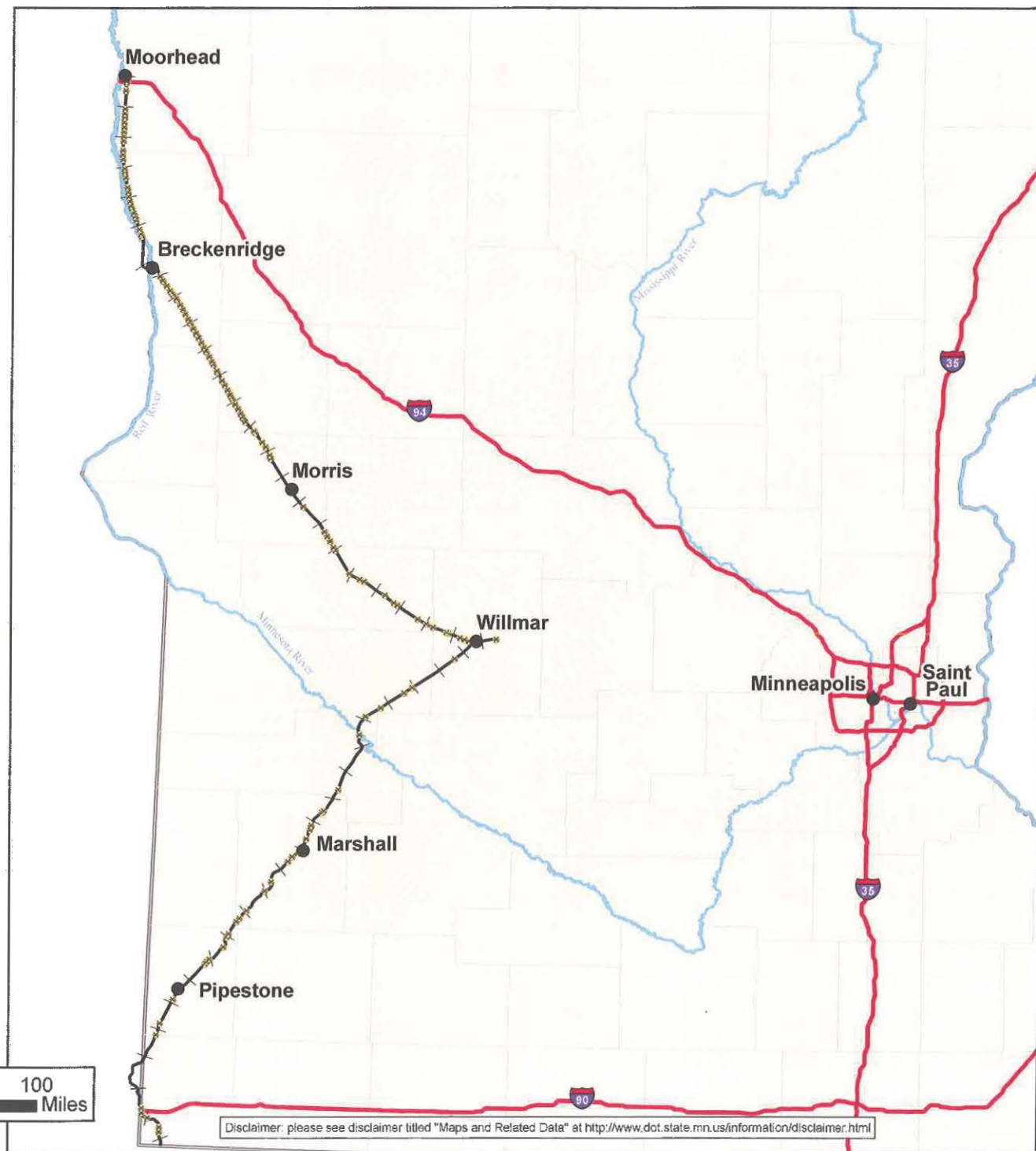
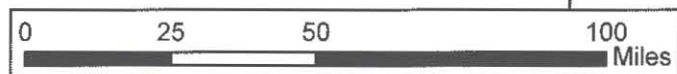


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

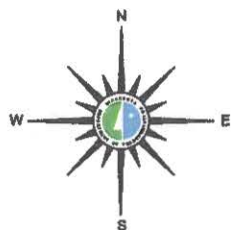
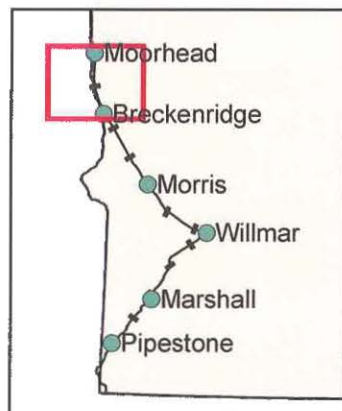
BNSF Rail Oil Corridor: Moorhead to Iowa State Line



- Rail Crossing
- + + + BNSF Rail Route
- Interstate
- ~ Major River



BNSF Rail Route and Crossings: Moorhead to Breckenridge Segment



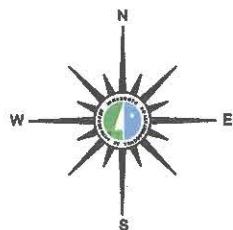
- Rail Crossing
- BNSF Rail Route
- Interstate
- US Highway
- State Highway
- City
- Major River





0 5 10 20 Miles

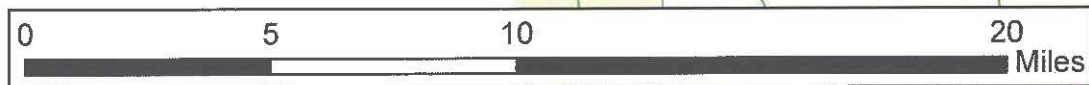
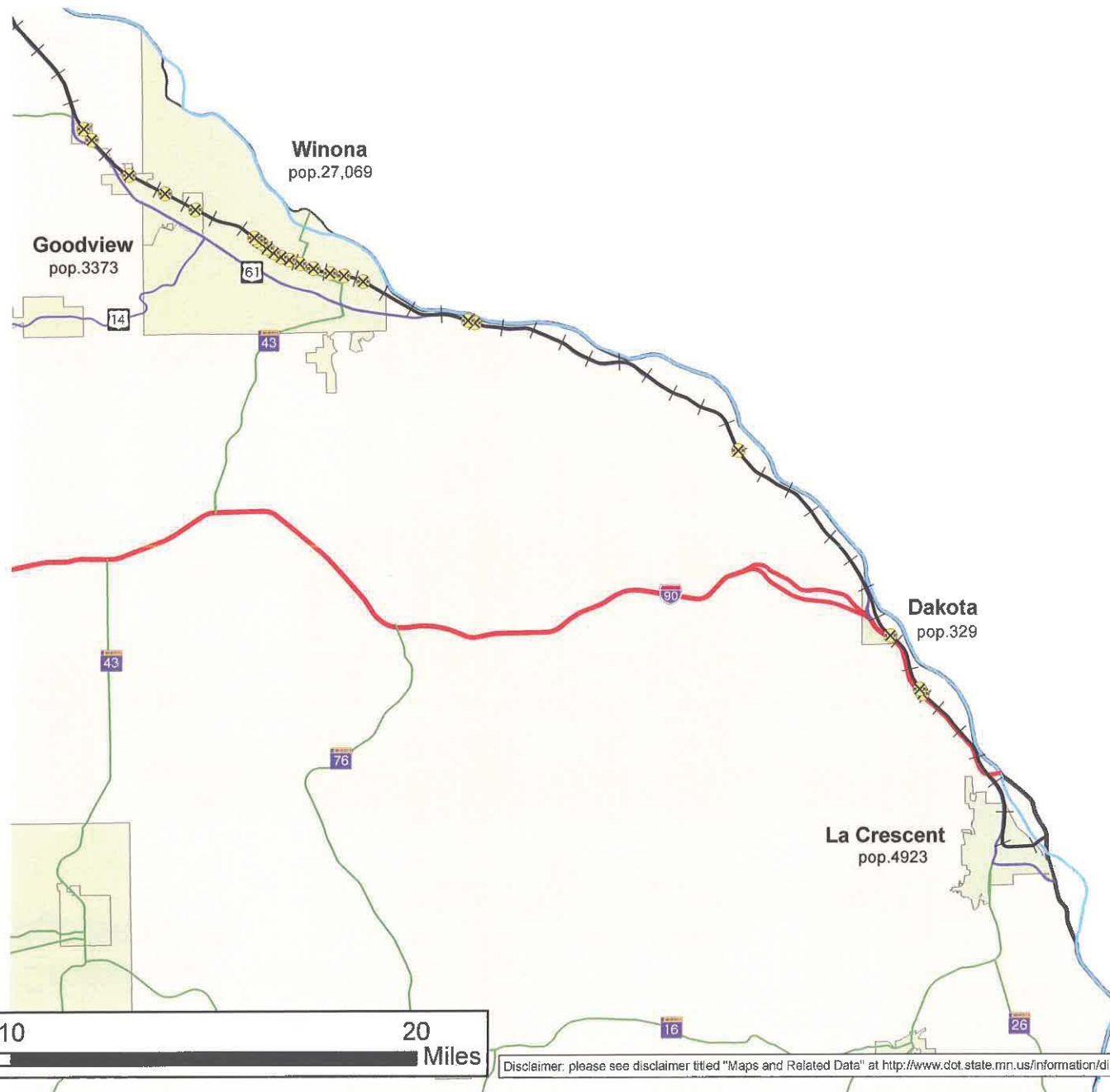


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

CP/SOO Rail Route and Crossings: Winona to La Crescent Segment

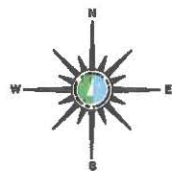



-  Rail Crossing
-  CP/SOO Rail Route
-  Interstate
-  US Highway
-  MN Highway
-  City
-  Major River

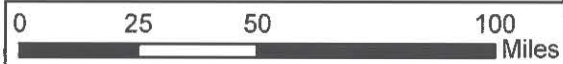


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

CP/SOO Rail Oil Corridor: North Dakota Border to La Crescent

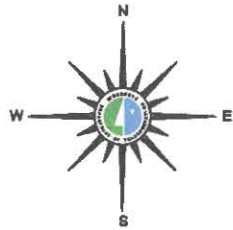


-  Rail Crossing
-  CP/SOO Rail Route
-  Interstate
-  Major River

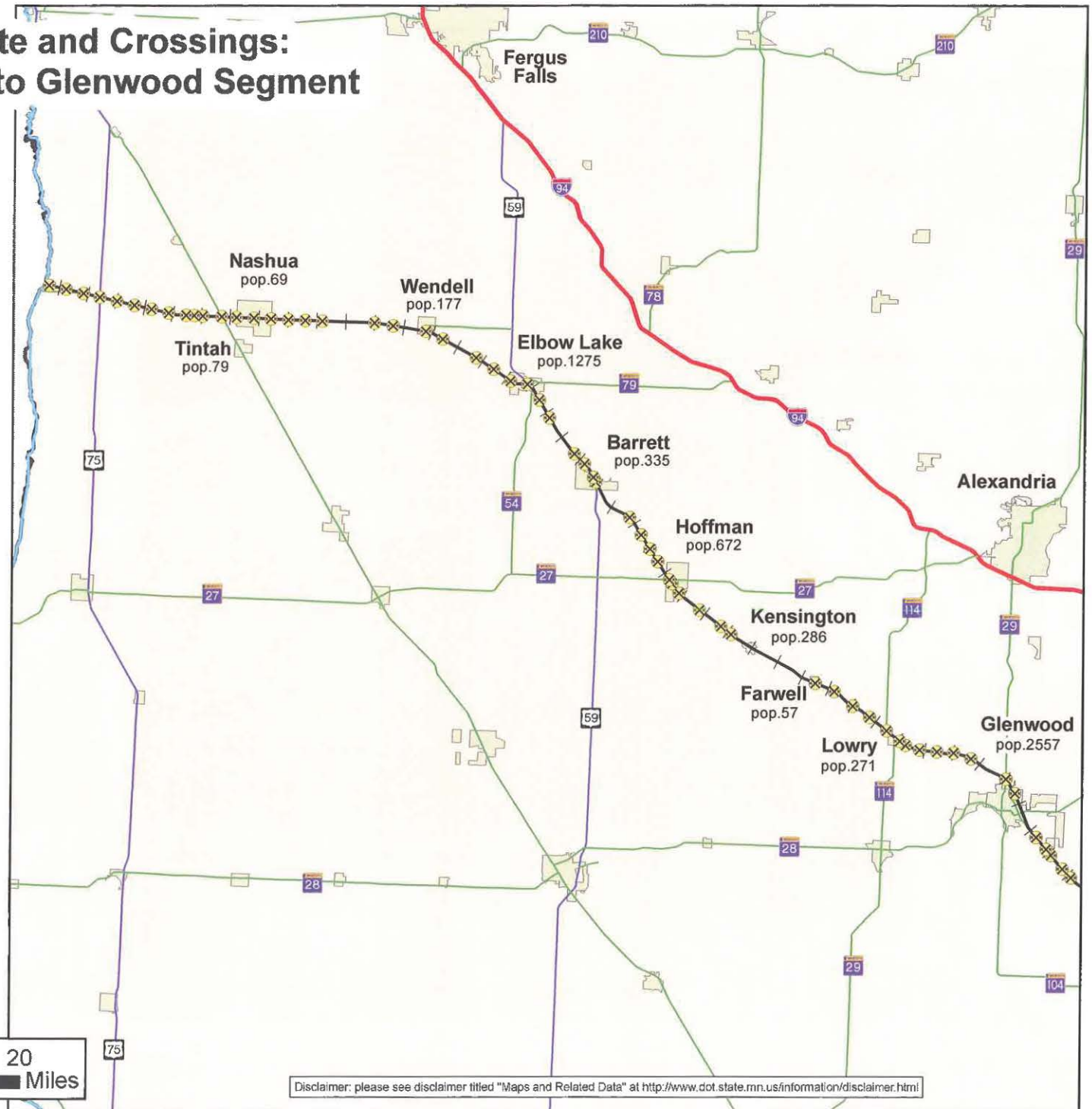
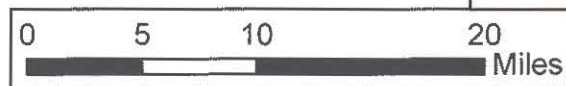


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

CP/SOO Rail Route and Crossings: North Dakota Border to Glenwood Segment

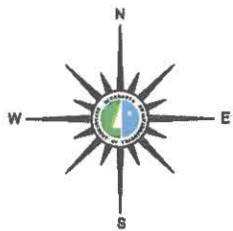


- Rail Crossing
- CP/SOO Rail Route
- Interstate
- US Highway
- MN Highway
- City
- Major River

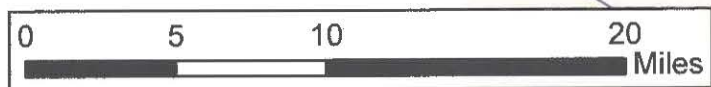


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

CP/SOO Rail Route and Crossings: Glenview to Eden Valley Segment

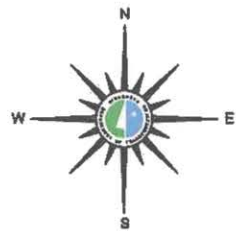


- Rail Crossing
- CP/SOO Rail Route
- Interstate
- US Highway
- MN Highway
- City
- Major River

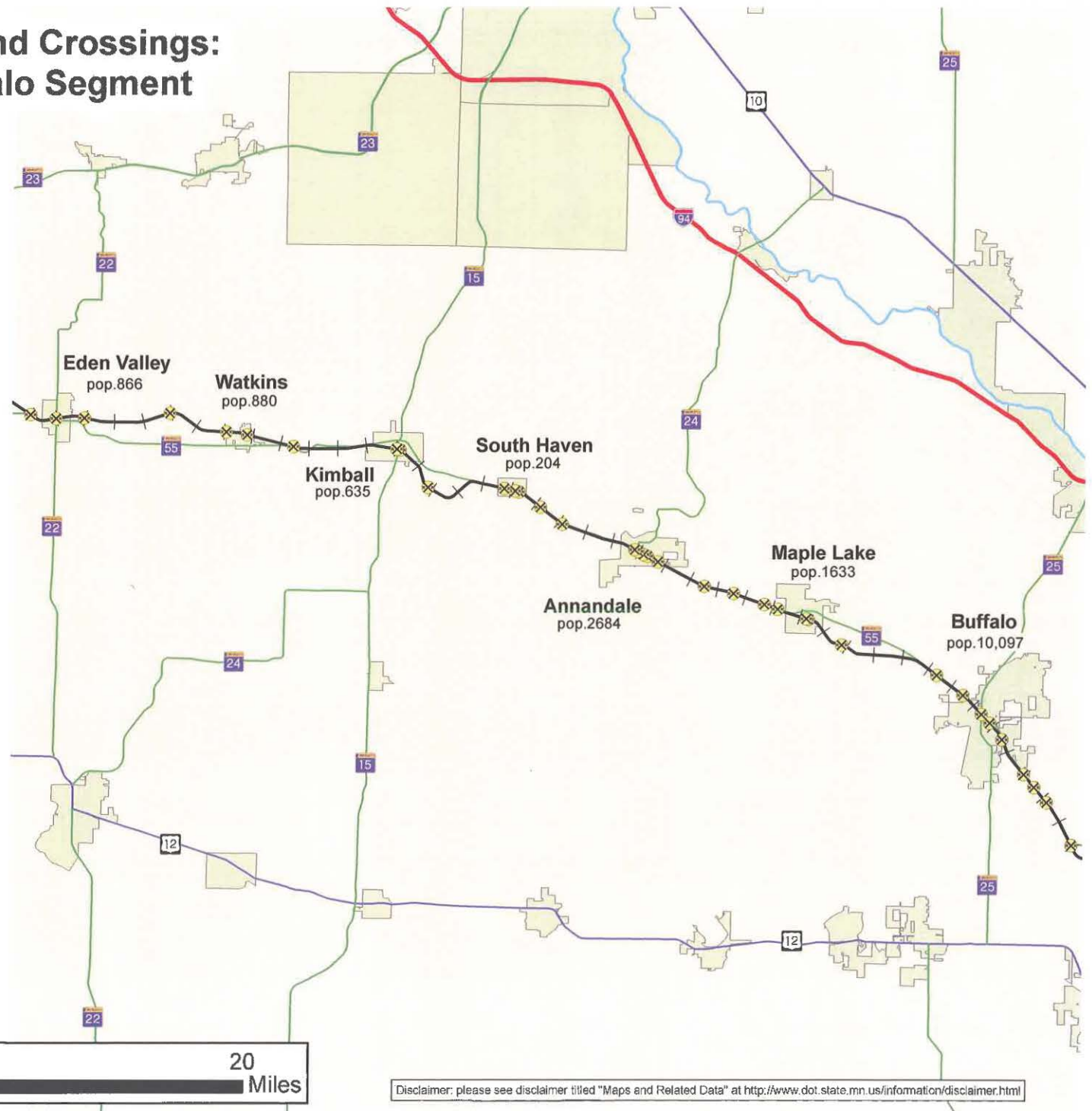
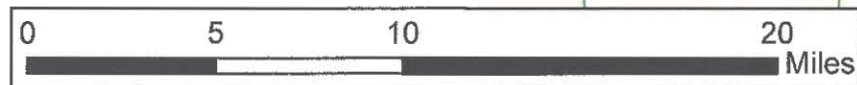


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

CP/SOO Rail Route and Crossings: Eden Valley to Buffalo Segment

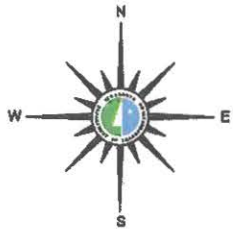


- Rail Crossing
- CP/SOO Rail Route
- Interstate
- US Highway
- MN Highway
- City
- Major River

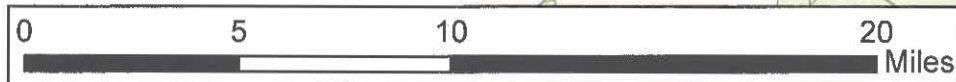


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

CP/SOO Rail Route and Crossings: Buffalo to Minneapolis Segment

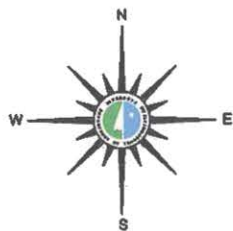


- ✕ Rail Crossing
- +— CP/SOO Rail Route
- Interstate
- US Highway
- MN Highway
- City
- Major River

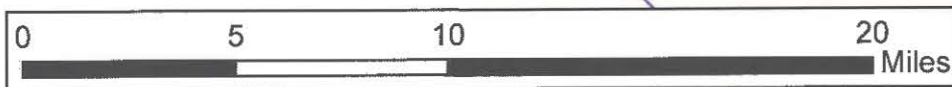


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

CP/SOO Rail Route and Crossings: Hastings to Lake City Segment

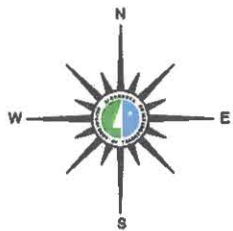


- Rail Crossing
- CP/SOO Rail Route
- Interstate
- US Highway
- MN Highway
- City
- Major River

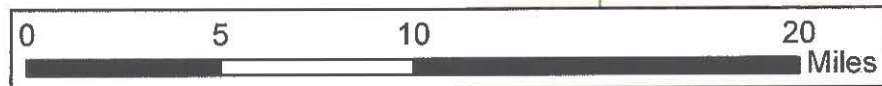


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

CP/SOO Rail Route and Crossings: Lake City to Winona Segment





















- Rail Crossing
- CP/SOO Rail Route
- Interstate
- US Highway
- MN Highway
- City
- Major River



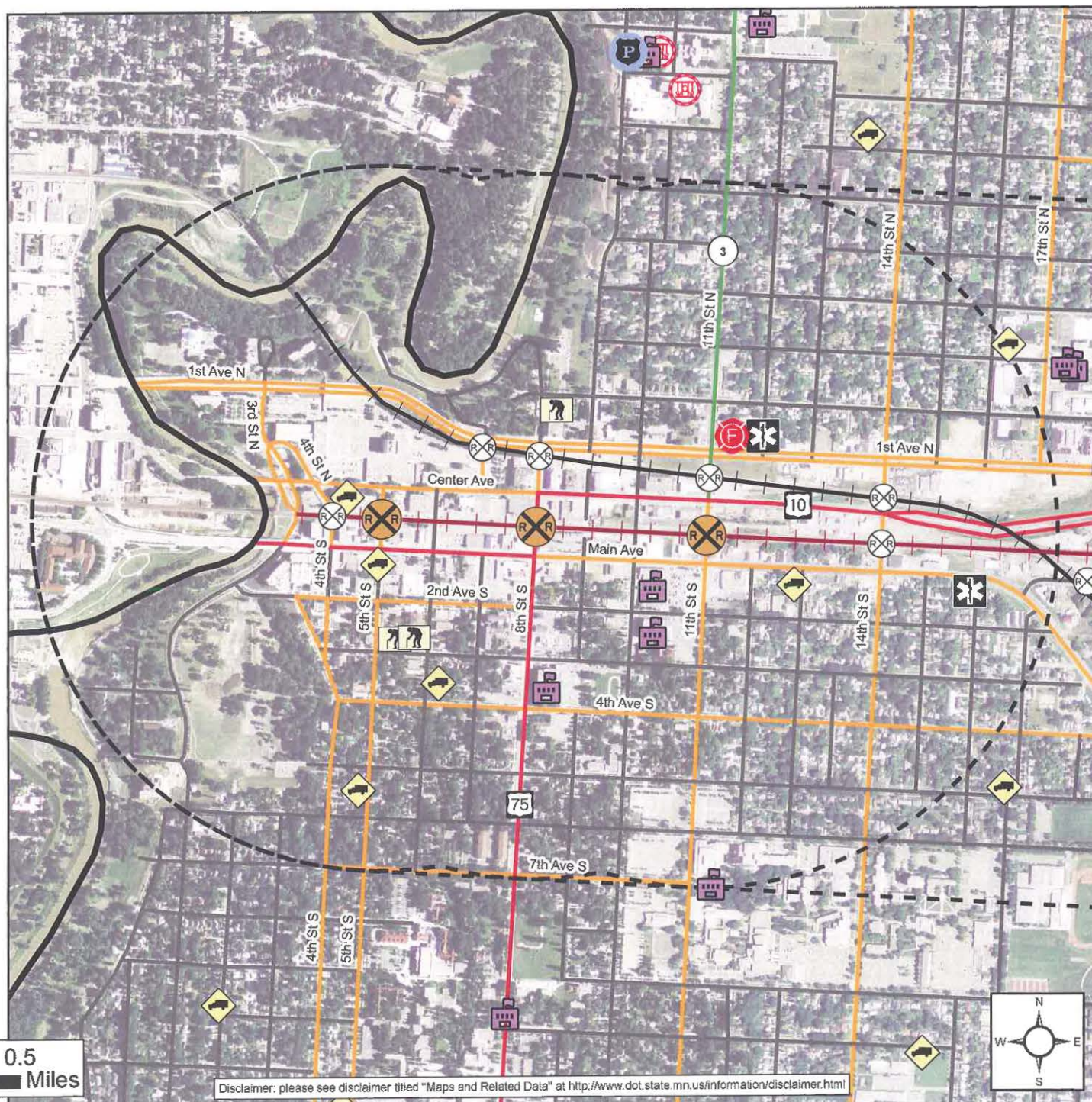
BNSF

5th St S, 8th St S (US 75), 11th St N
Moorhead, Clay County
USDOT# 070798D, 062952D, 062949V
Existing Warning Device(s):
4 Quad Gates, Ped Gates (5th St S)
4 Quad Gates, Cants, Ped Gates (8th St S)
4 Quad Gates, Cants, Ped Gates (11th St N)

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street

0 0.25 0.5
Miles



















Moorhead

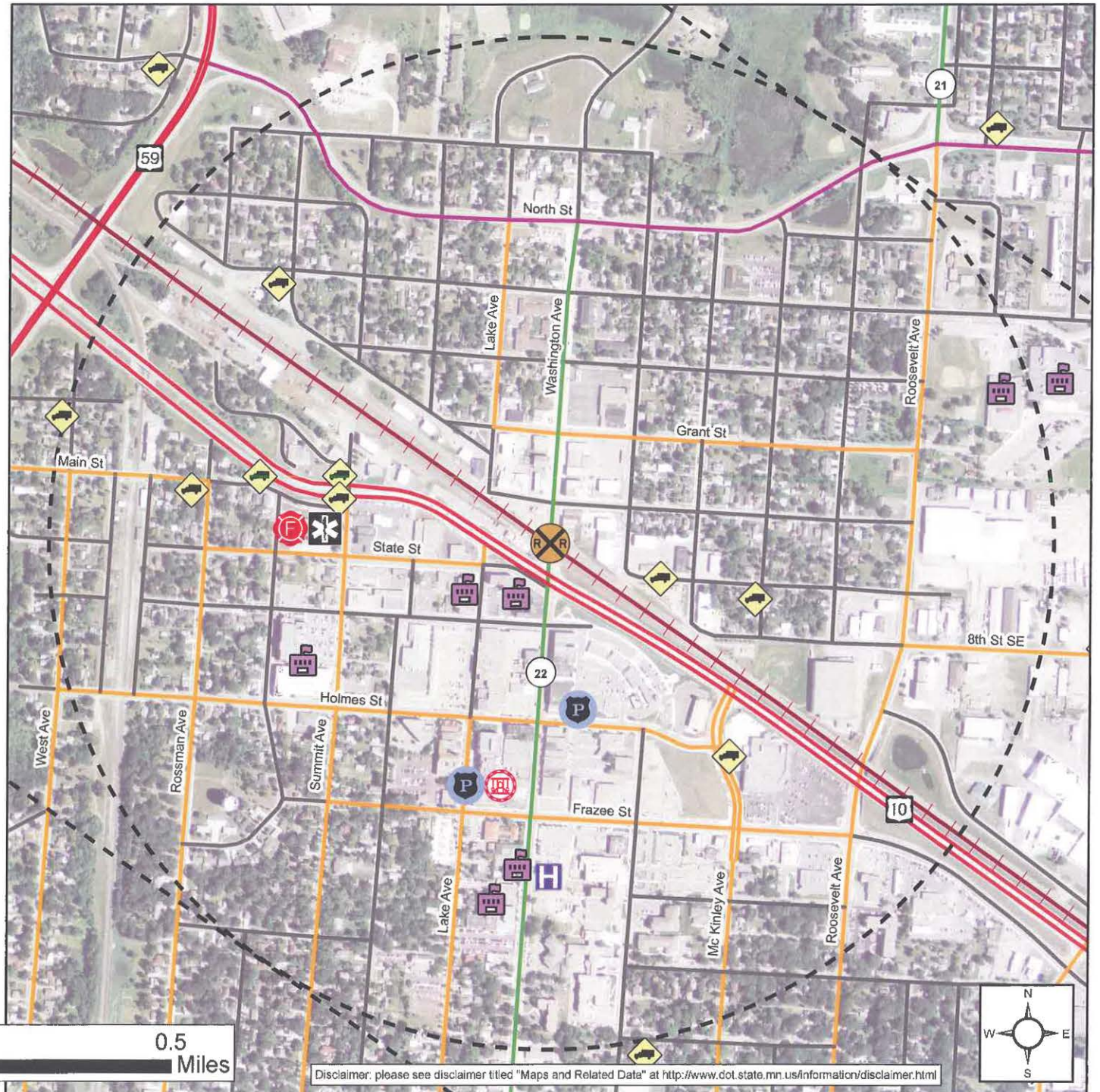


Detroit Lakes

BNSF

Washington Ave
Detroit Lakes, Becker County
USDOT# 081018G
Existing Warning Device(s):
Gates, Medians



















-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street



BNSF

Lake Street N (MN 87)
Frazee, Becker County
USDOT# 062847C
Existing Warning Device(s): Gates

Frazee

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street





















Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

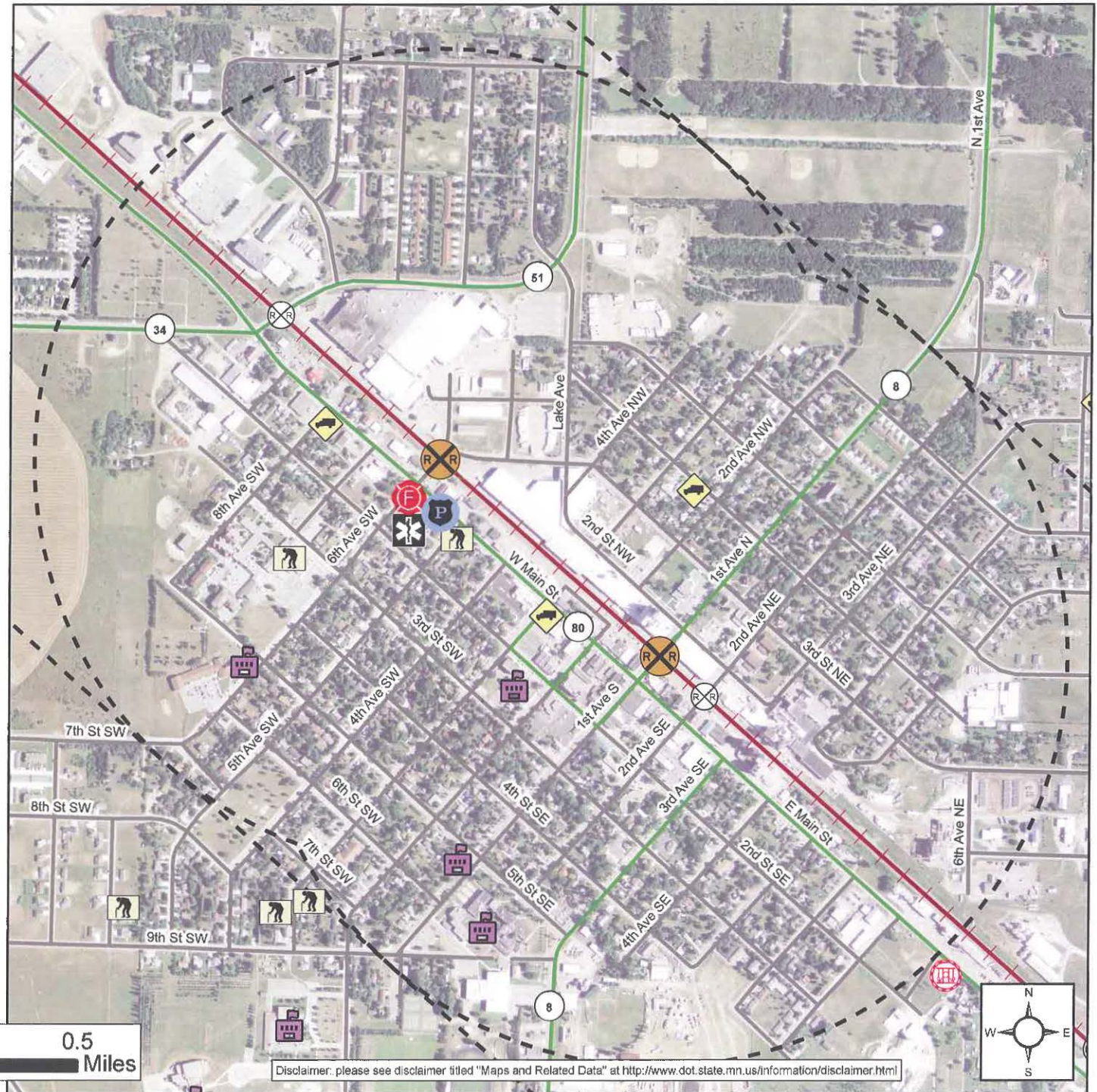
BNSF

NW 6th Ave, N 1st Ave
Perham, Otter Tail County
USDOT# 062826J, 062822G
Existing Warning Device(s): Gates

Perham

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 mile buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street



















0 0.25 0.5
Miles

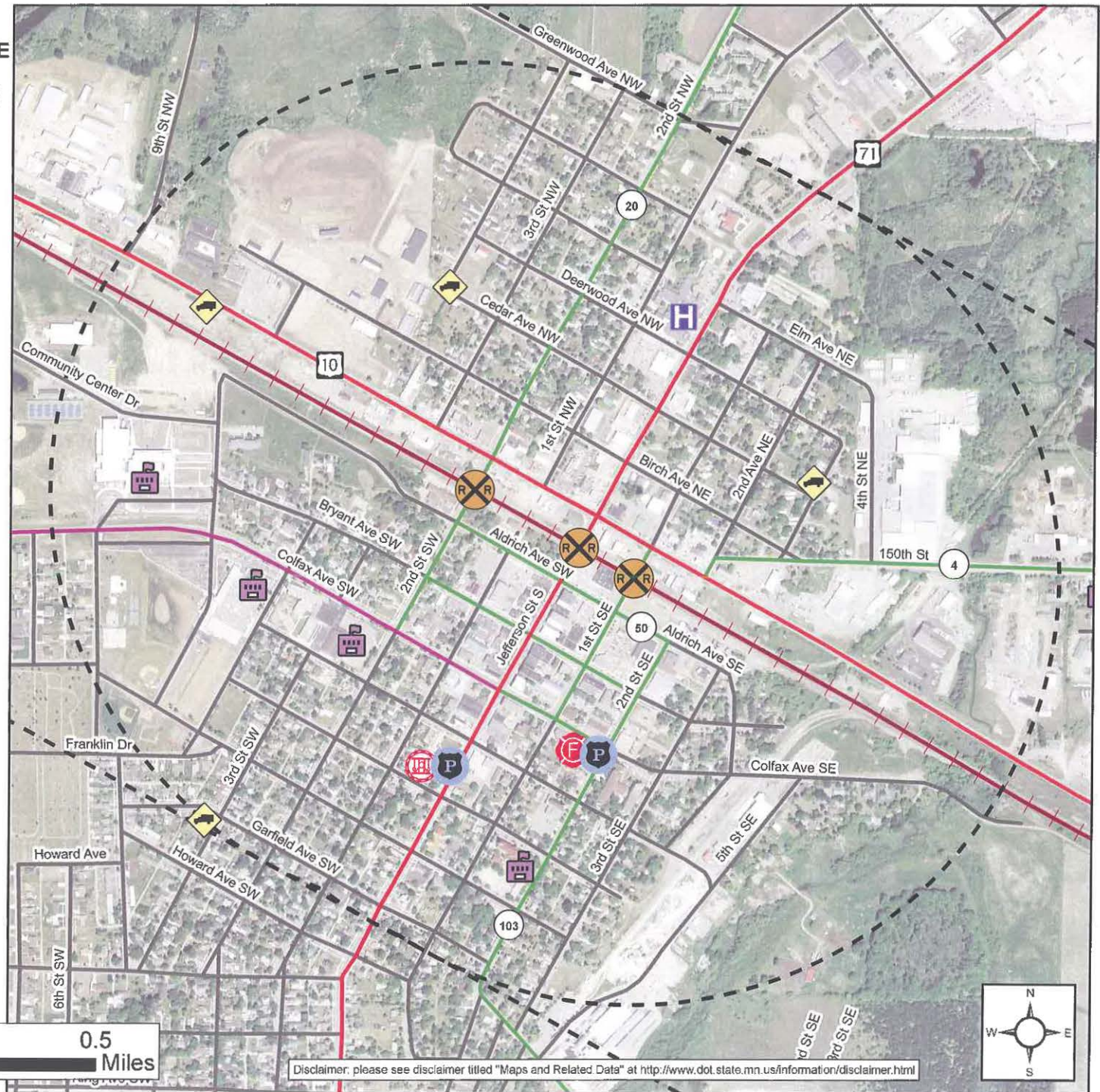


Wadena

BNSF

2nd St SW, Jefferson St S (US 71), 1st St SE
Wadena, Wadena County
USDOT# 062779D, 062775B, 062773M
Existing Warning Device(s): Gates

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street





















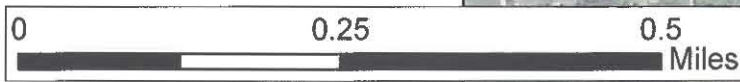
Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

BNSF

6th Street NE (MN 210)
Staples, Todd County
USDOT# 097617A
Existing Warning Device(s):
Cants & Gates, Medians

Staples

-  Rail Oil Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street

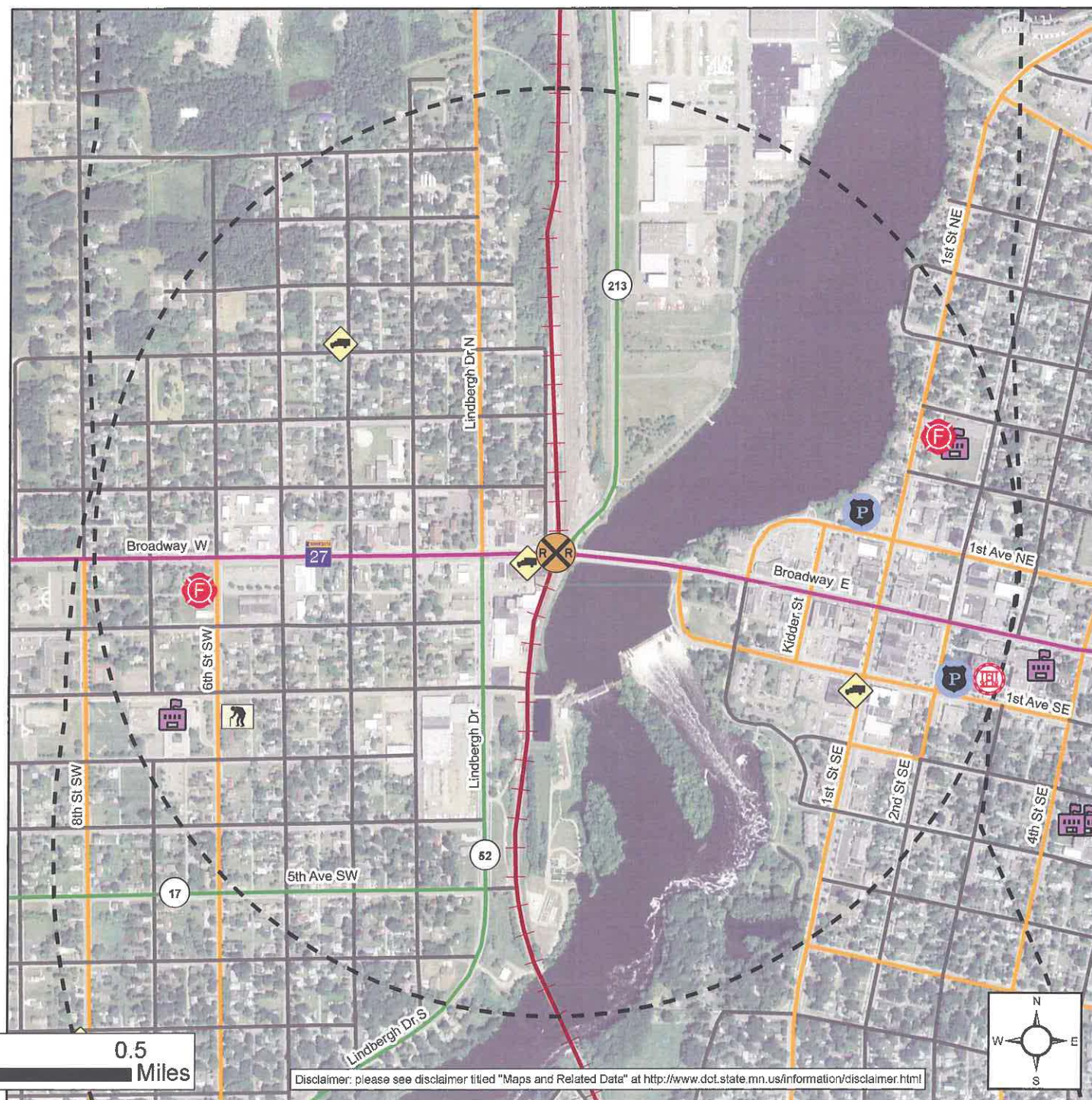


Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>



Broadway W (MN 27)
Little Falls, Morrison County
USDOT# 097668K
Existing Warning Device(s):
Cants & Gates

-
- 0 0.25 0.5 Miles





















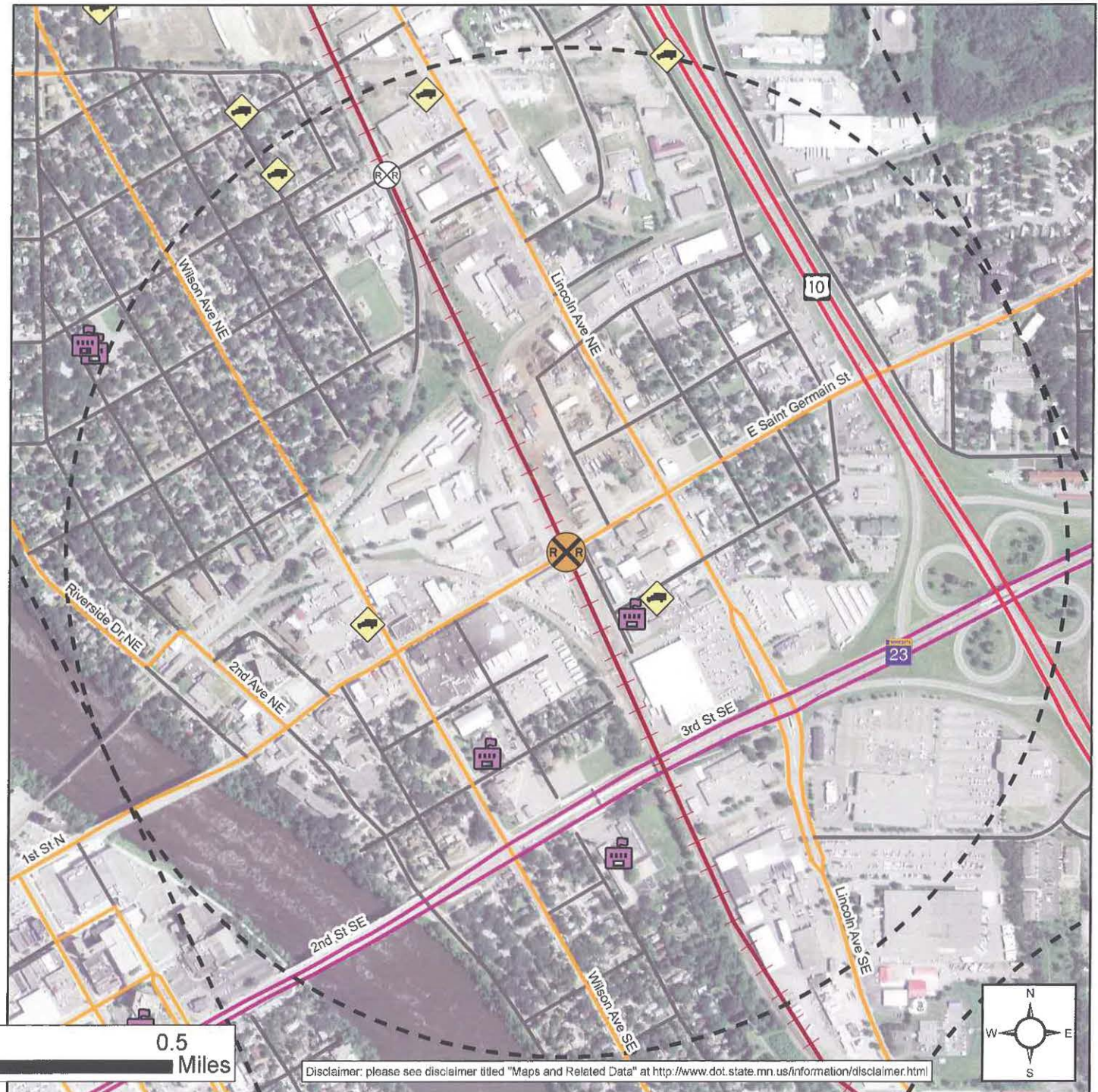
Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

Saint Cloud

BNSF

Saint Germain Street
Saint Cloud, Sherburne County
USDOT# 067248Y
Existing Warning Device(s):
Cants & Gates

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street



0 0.25 0.5 Miles



















Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>



Saint Cloud

BNSF

15th Ave SE
Saint Cloud, Sherburne County
USDOT# 067245D
Existing Warning Device(s):
Gates, Medians

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street





















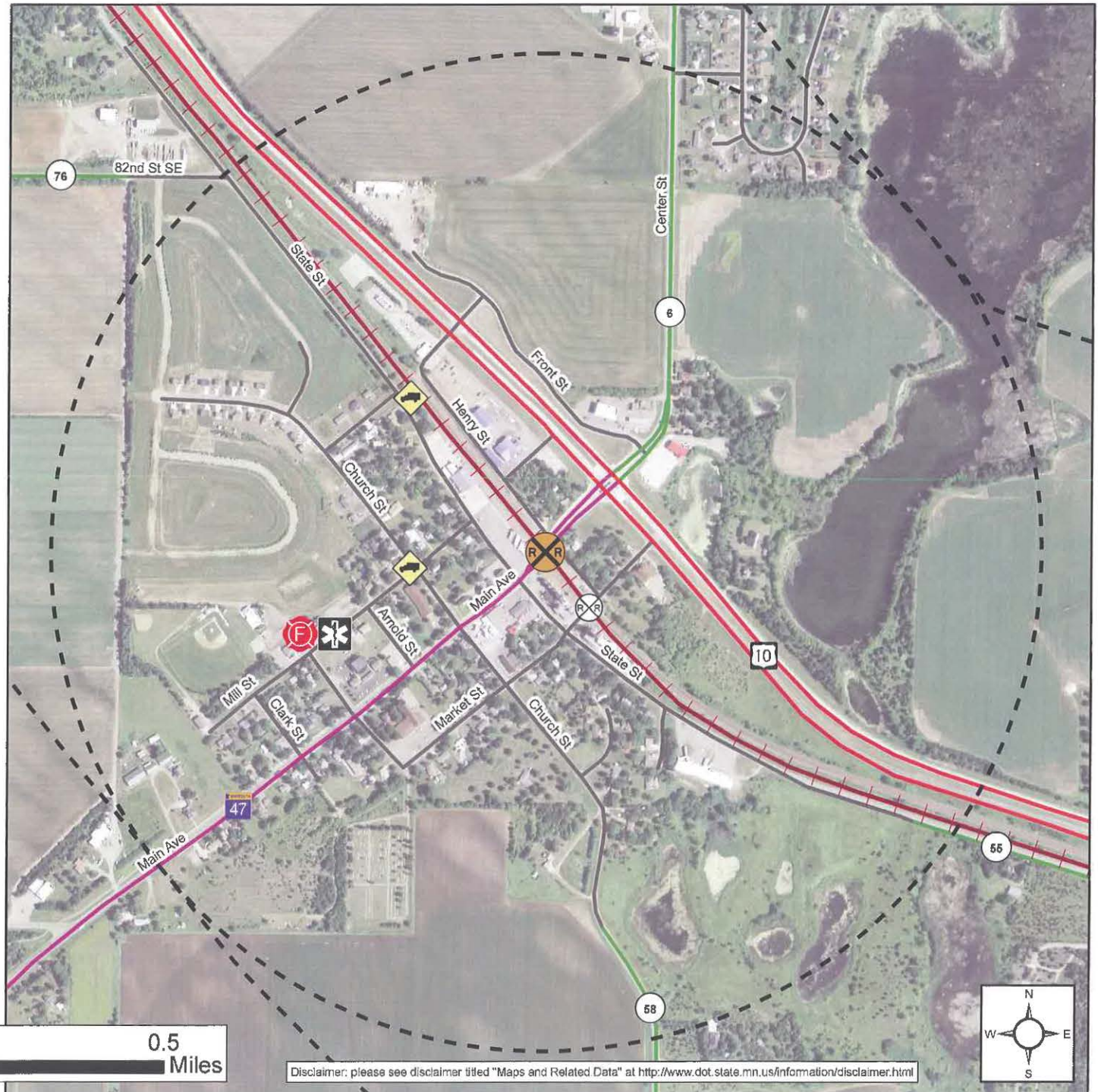
Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

Clear Lake

BNSF

Main Ave (MN 24)
Clear Lake, Sherburne County
USDOT# 067230N
Existing Warning Device(s):
Cants & Gates

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street





















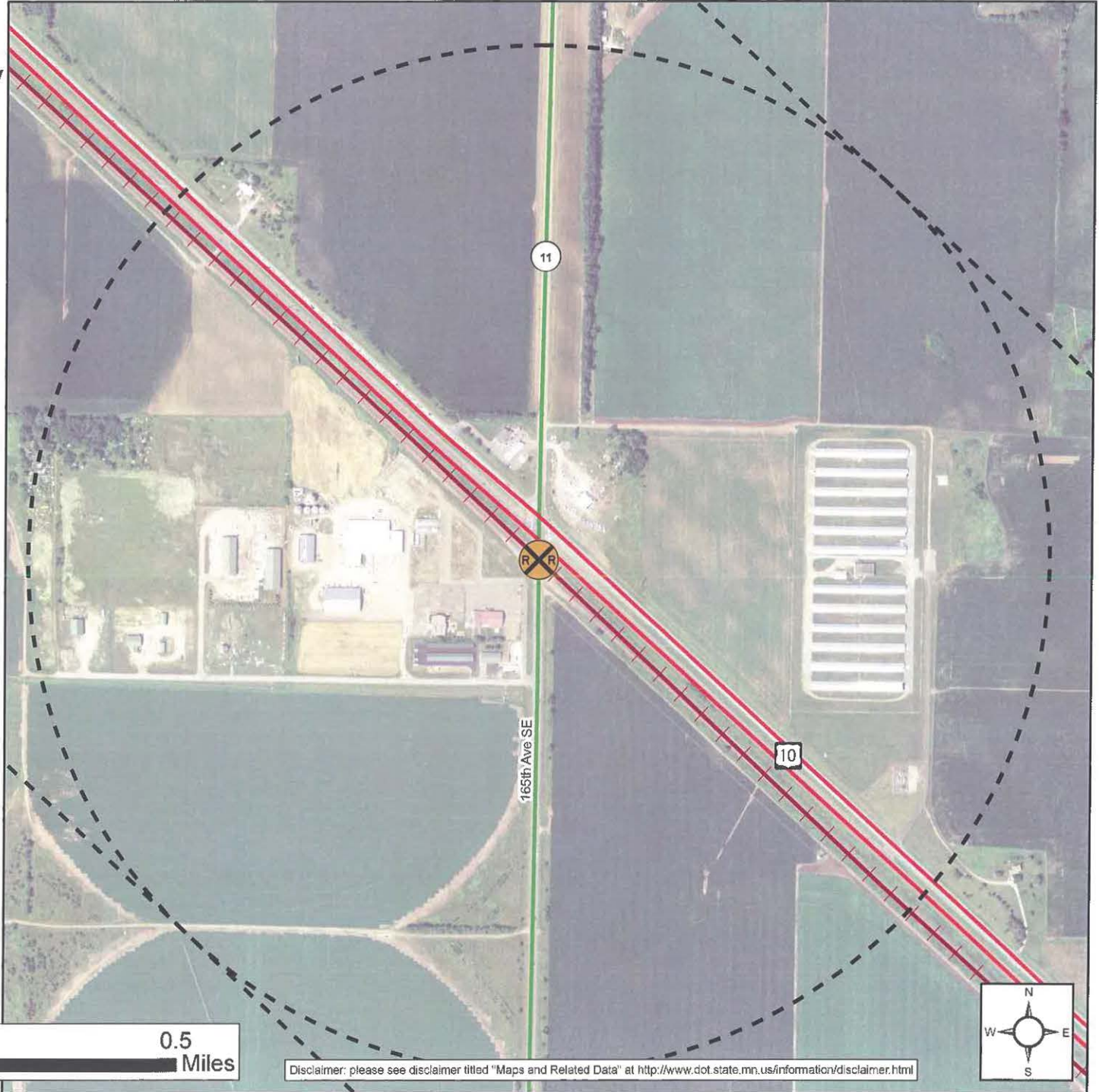
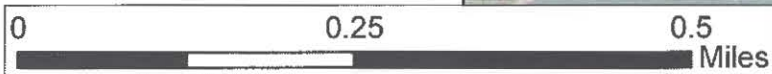
Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

Becker Township

BNSF

165th Ave SE
Becker Township, Sherburne County
USDOT# 082517B
Existing Warning Device(s):
Gates

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street





















Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

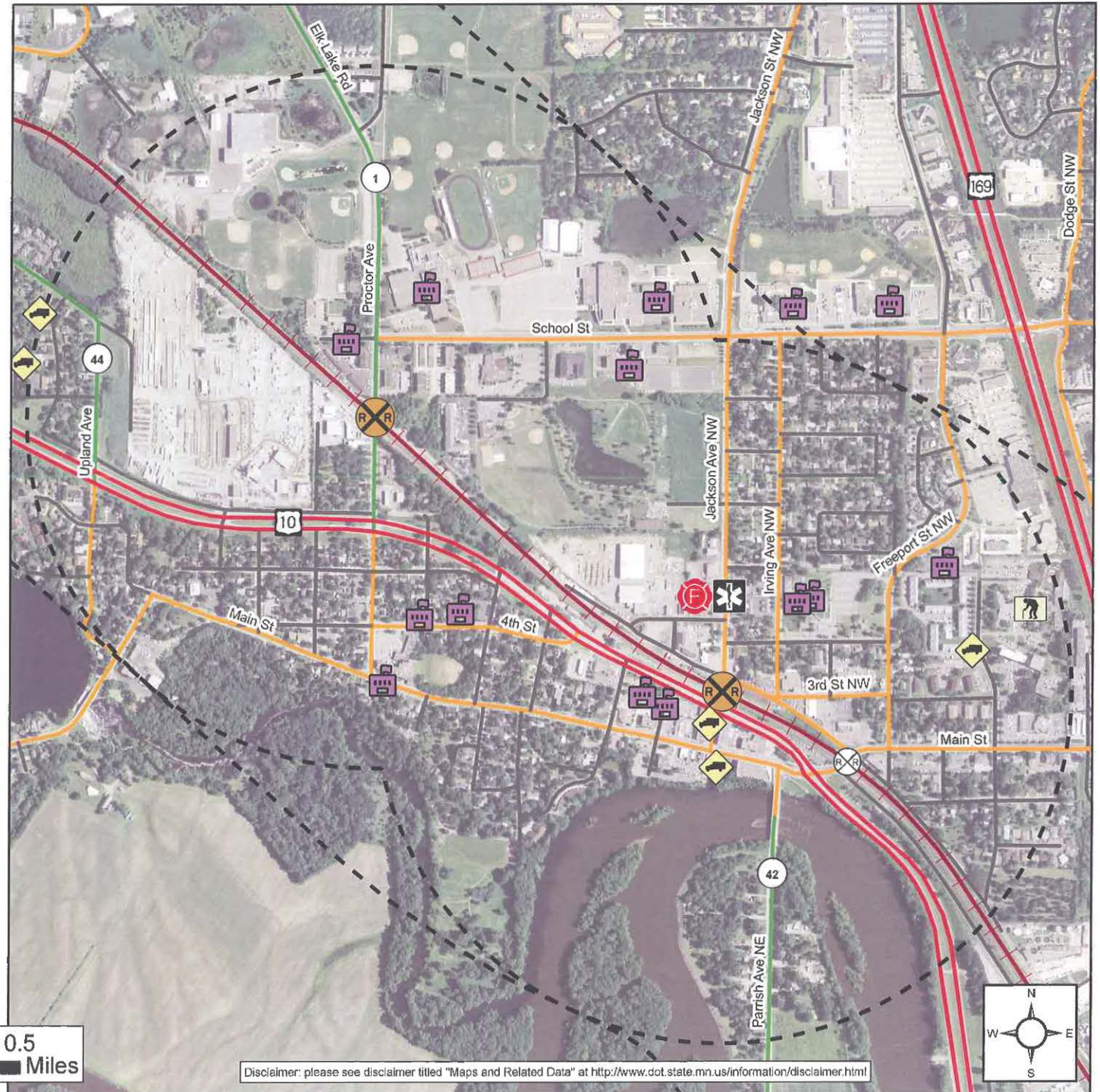
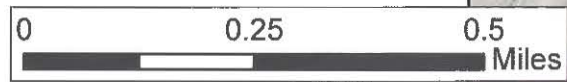


Elk River

BNSF

Proctor Ave, Jackson St NW
Elk River, Sherburne County
USDOT# 082946E, 082944R
Existing Warning Device(s):
Cants & Gates (Proctor Ave)
Gates (Jackson St NW)

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street



Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>



BNSF

Ferry Street N (MN 47)



















Anoka, Anoka County

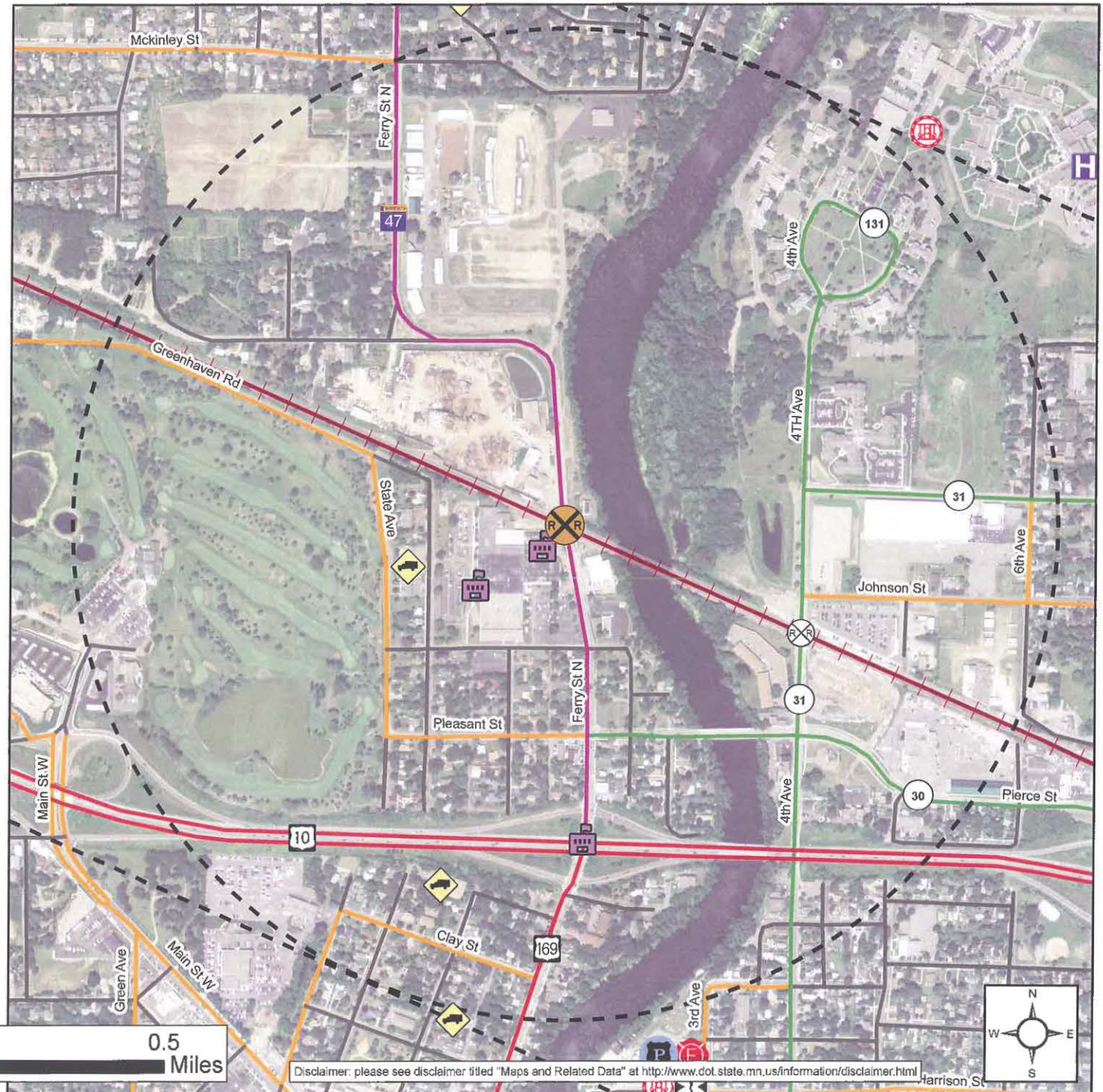
USDOT# 082926T

Existing Warning Device(s):

Cants & Gates, Medians

Anoka



















-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street

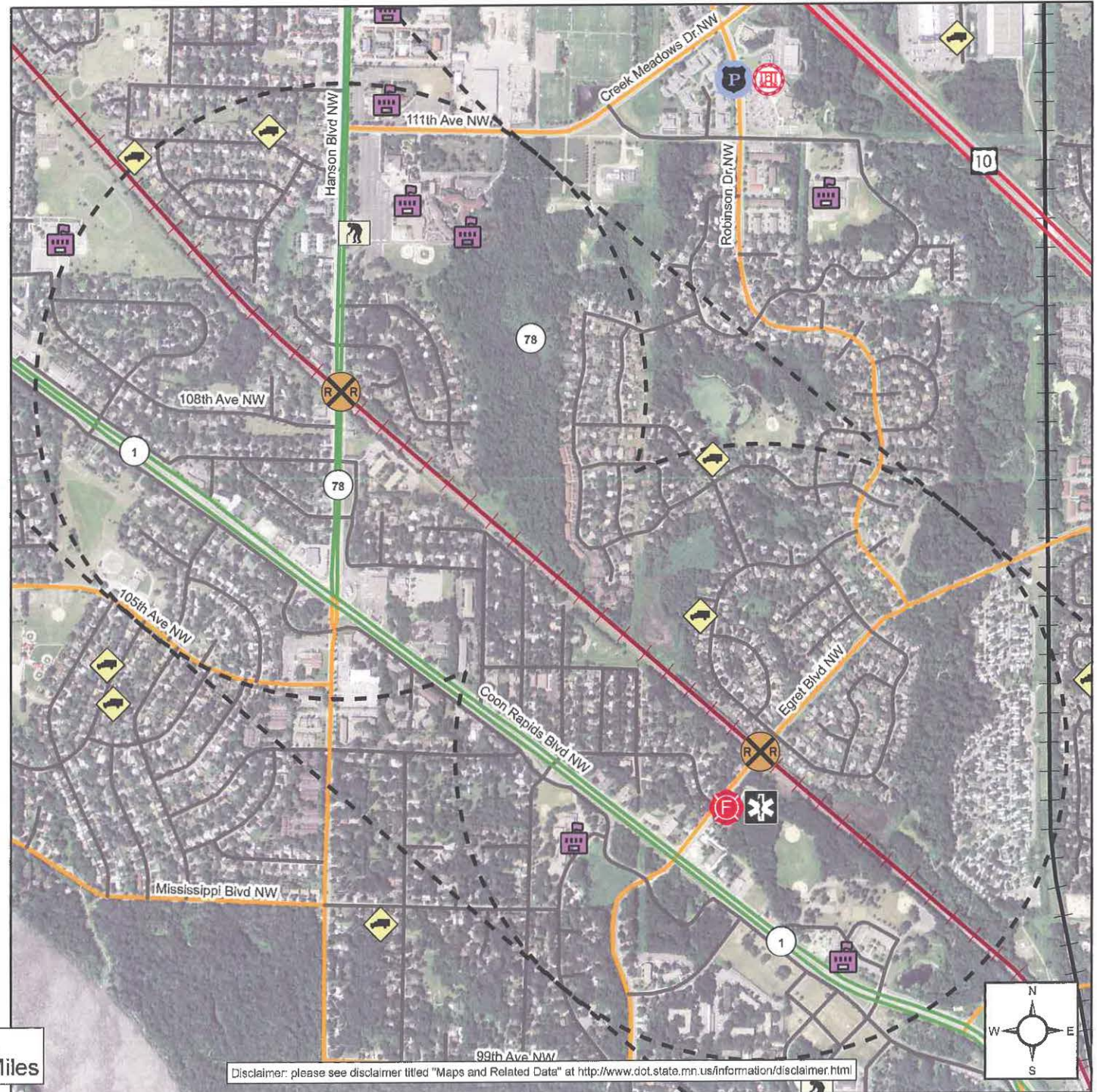


Coon Rapids

BNSF

Hanson Blvd, Egret Blvd
Coon Rapids, Anoka County
USDOT# 082811Y, 082810S
Existing Warning Device(s):
Cants & Gates, Medians



















-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street

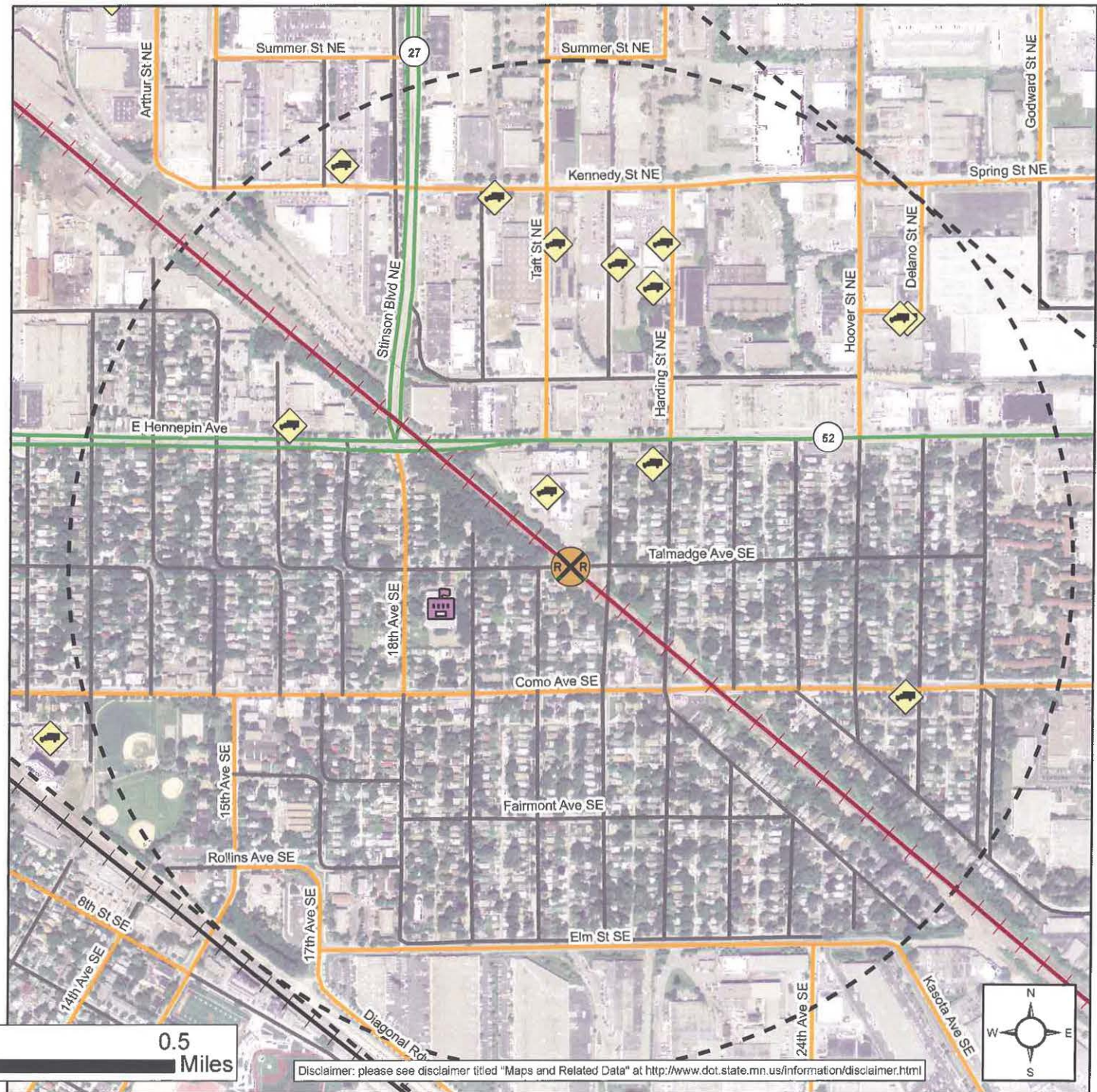


Minneapolis

BNSF

Talmadge Avenue SE
Minneapolis, Hennepin County
USDOT# 082978K
Existing Warning Device(s):
Gates, Medians

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 mile buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street



0 0.25 0.5 Miles

Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>



Saint Paul

BNSF



















Como Avenue

St. Paul, Ramsey County

USDOT# 082992F

Existing Warning Devices:

4 Quad Gates, Ped Gates

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street



Disclaimer, please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

Saint Paul Park / Newport

BNSF

Hastings Avenue

Saint Paul Park / Newport, Washington Co

USDOT# 061138T

Existing Warning Device(s):

Flashers



High Risk Crossing



Other crossing



Oil Train Route



1/2 Mile Buffer



Police Station



Fire Station



EMS



Hospital



School



Nursing Home



Trucking Company



Prison

Interstate Highway

U.S. Highway

MN State Highway

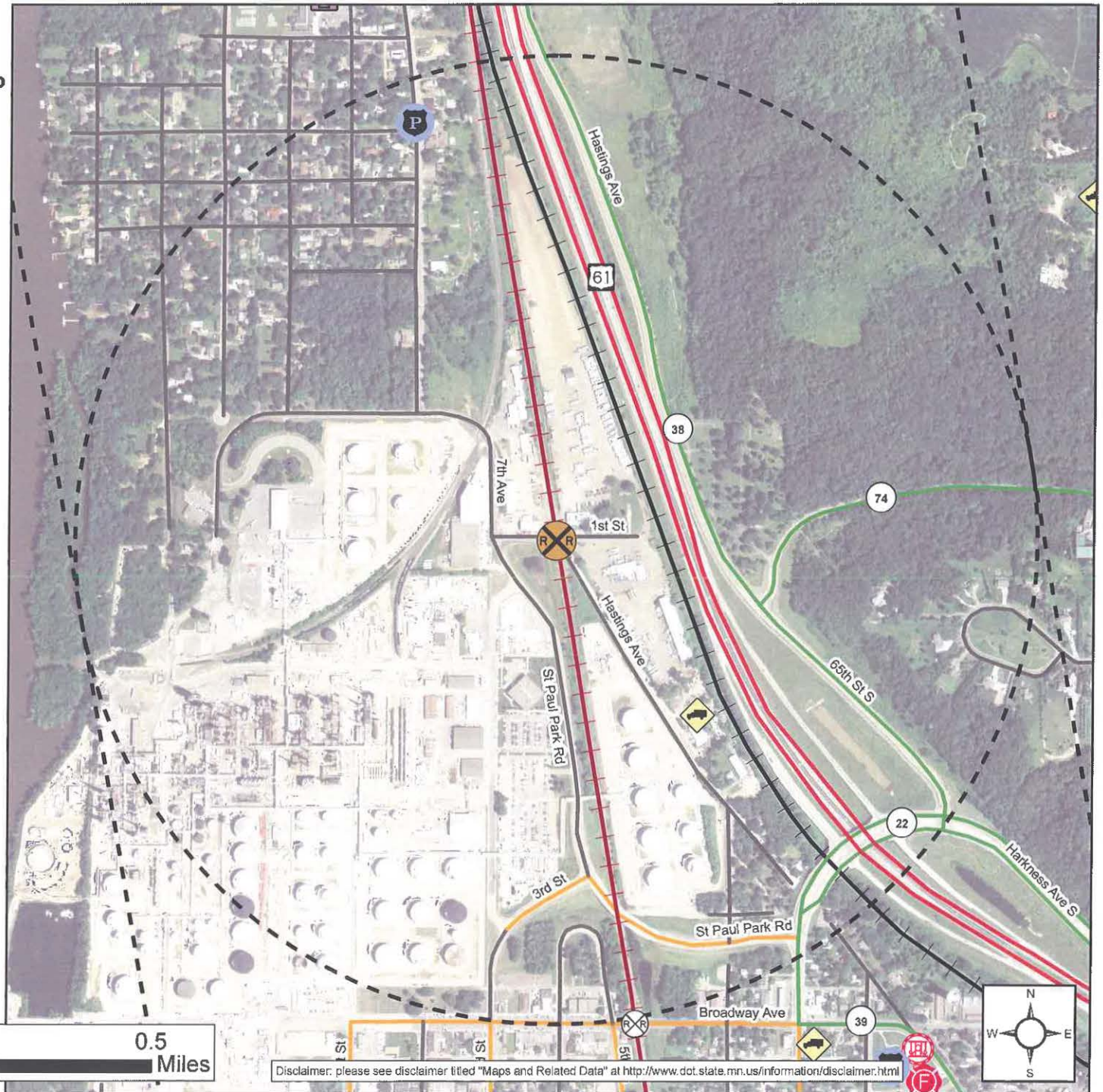
County Highway

MSAS

City Street





















Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>



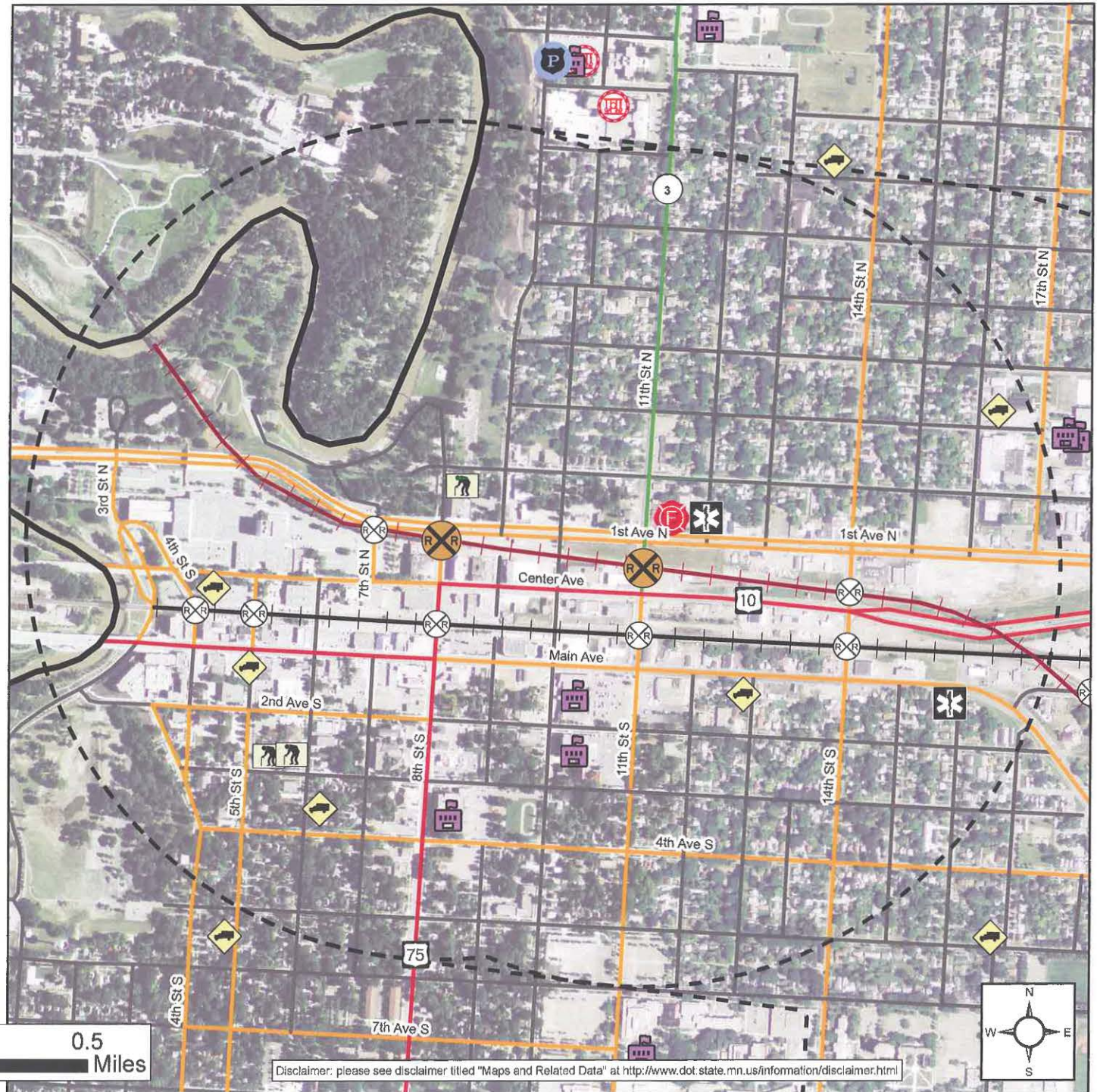
BNSF

8th St N, 11th St N
Moorhead, Clay County
USDOT# 062936U, 062930D
Existing Warning Device(s):
4 Quad Gates, Cants, Ped Gates

Moorhead

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street



















0 0.25 0.5
Miles

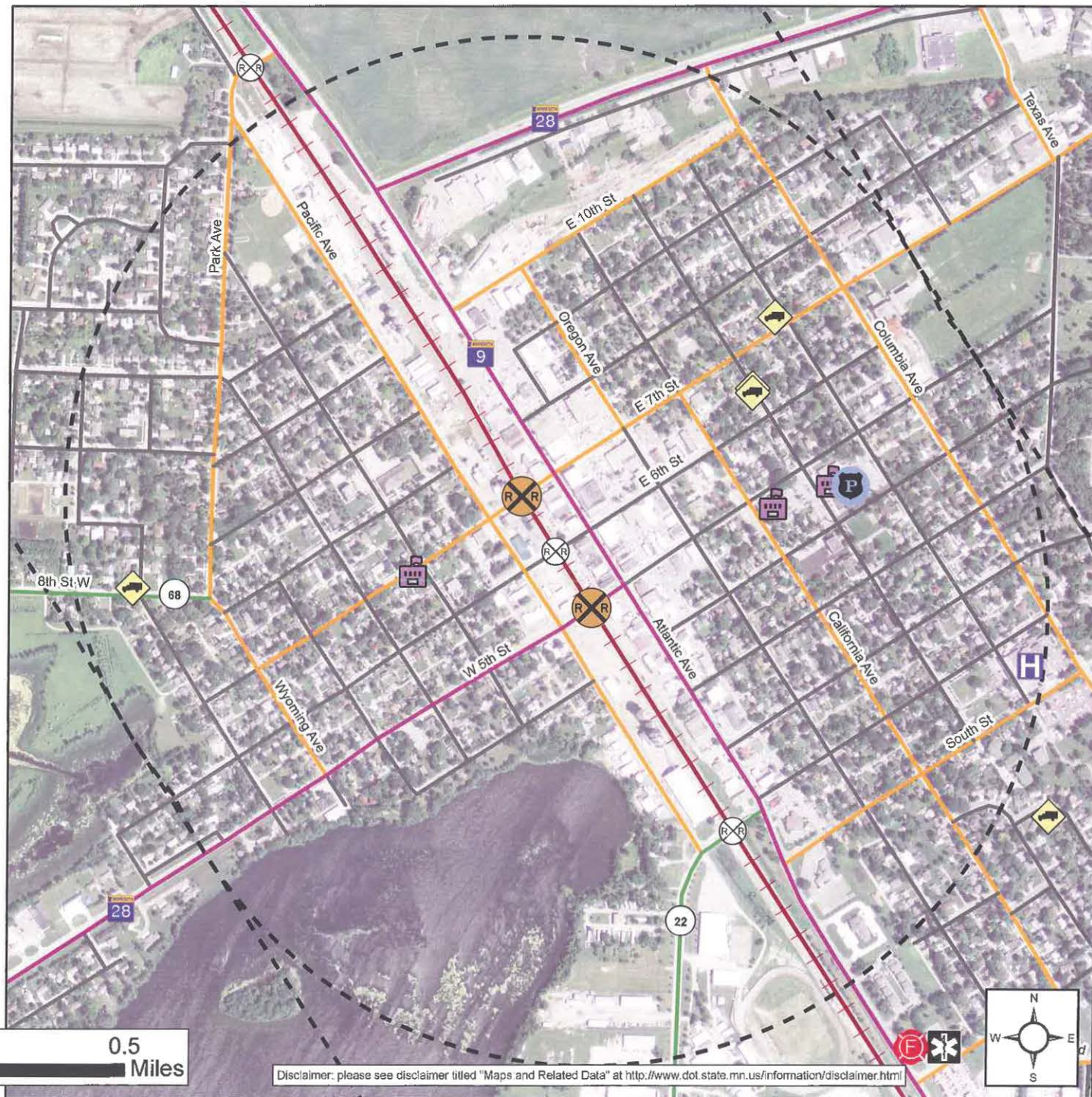


BNSF

W 7th S, W 5th St (MN 28)
 Morris, Stevens County
 USDOT# 067931C, 067933R
 Existing Warning Device(s):
 Gates (W 7th St)
 Cants & Gates (W 5th St)

Morris

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street





















0 0.25 0.5 Miles

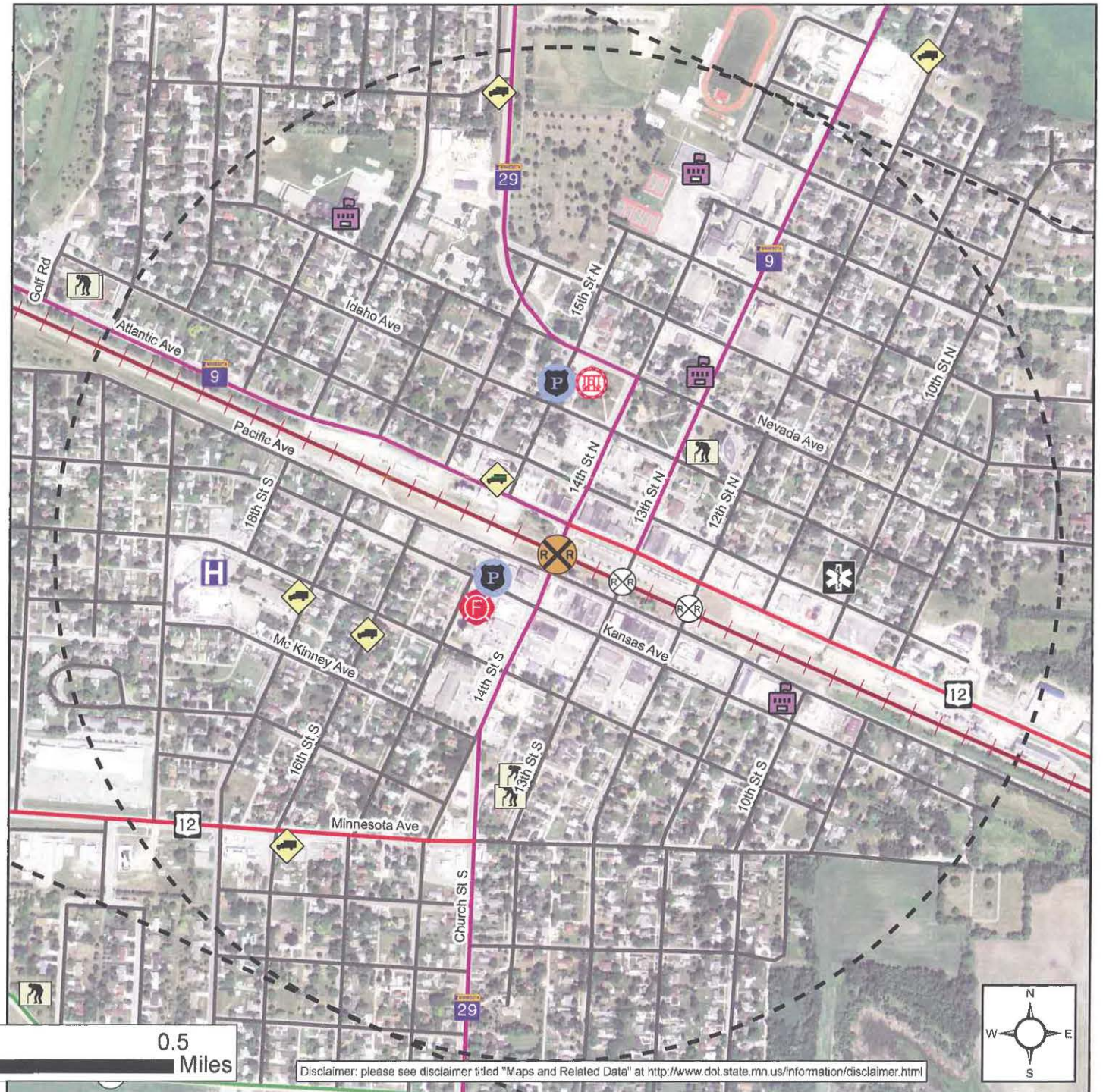
Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

BNSF

14th Street S (MN 29)
Benson, Swift County
USDOT# 067927M
Existing Warning Device(s):
Cants & Gates

Benson

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street





















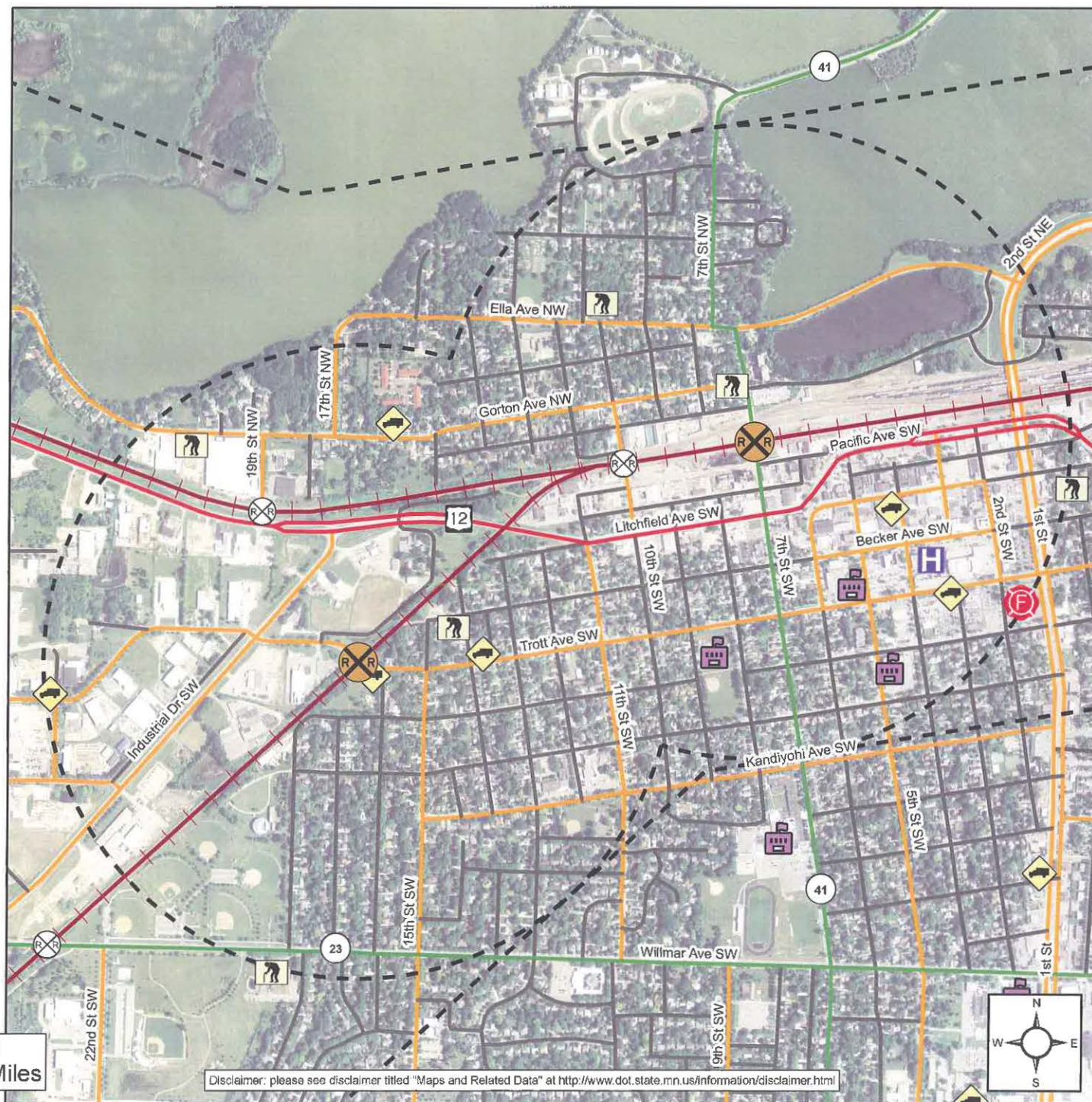
Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

BNSF

Trott Ave SW, 7th St SW
Willmar, Kandiyohi County
USDOT# 367709F, 067834T
Existing Warning Device(s):
Gates, Medians (Trott Ave SW)
Cants & Gates (7th St SW)

Willmar

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street





















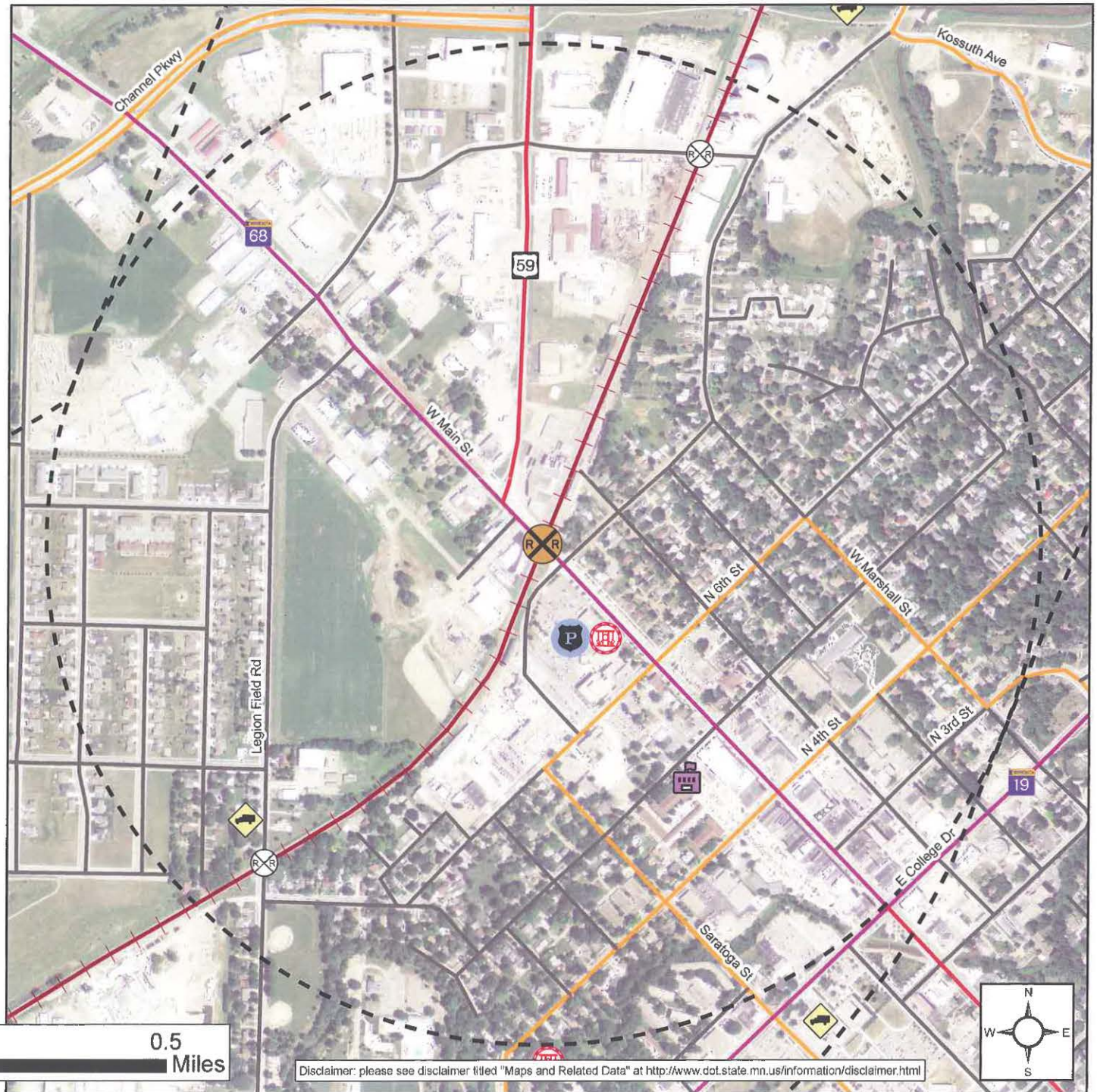
Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

BNSF

W Main Street (MN 68)
Marshall, Lyon County
USDOT# 067292F
Existing Warning Device(s):
Cants & Gates, Medians

Marshall

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street





















Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

BNSF

E Main Street
Pipestone, Pipestone Co
USDOT# 097910R
Existing Warning Device(s):
Cants & Gates

Pipestone



















-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street

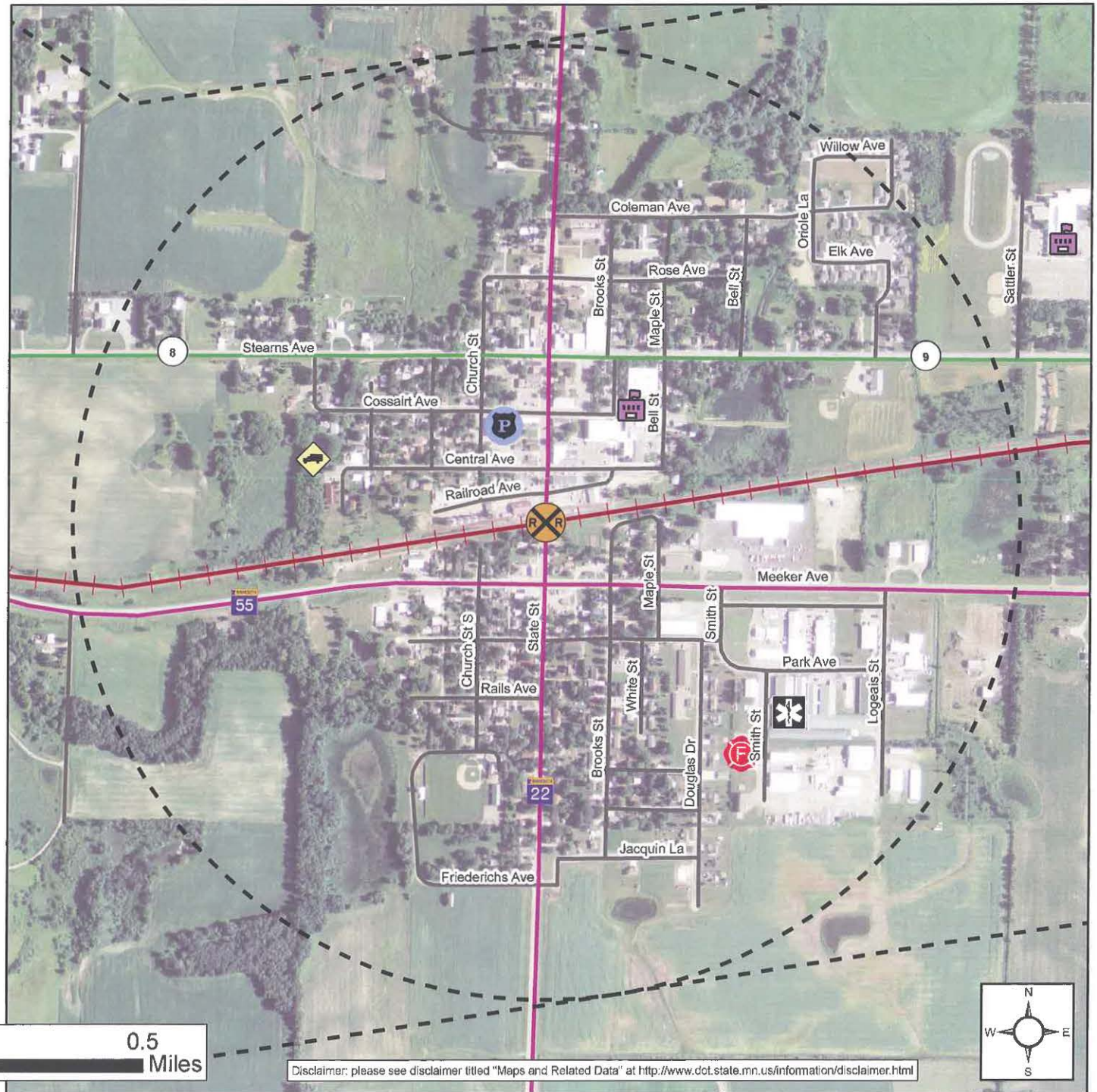


Eden Valley

Canadian Pacific / SOO

State Street (MN 22)
Eden Valley, Meeker County
USDOT# 689257R
Existing Warning Device(s):
Gates

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street





















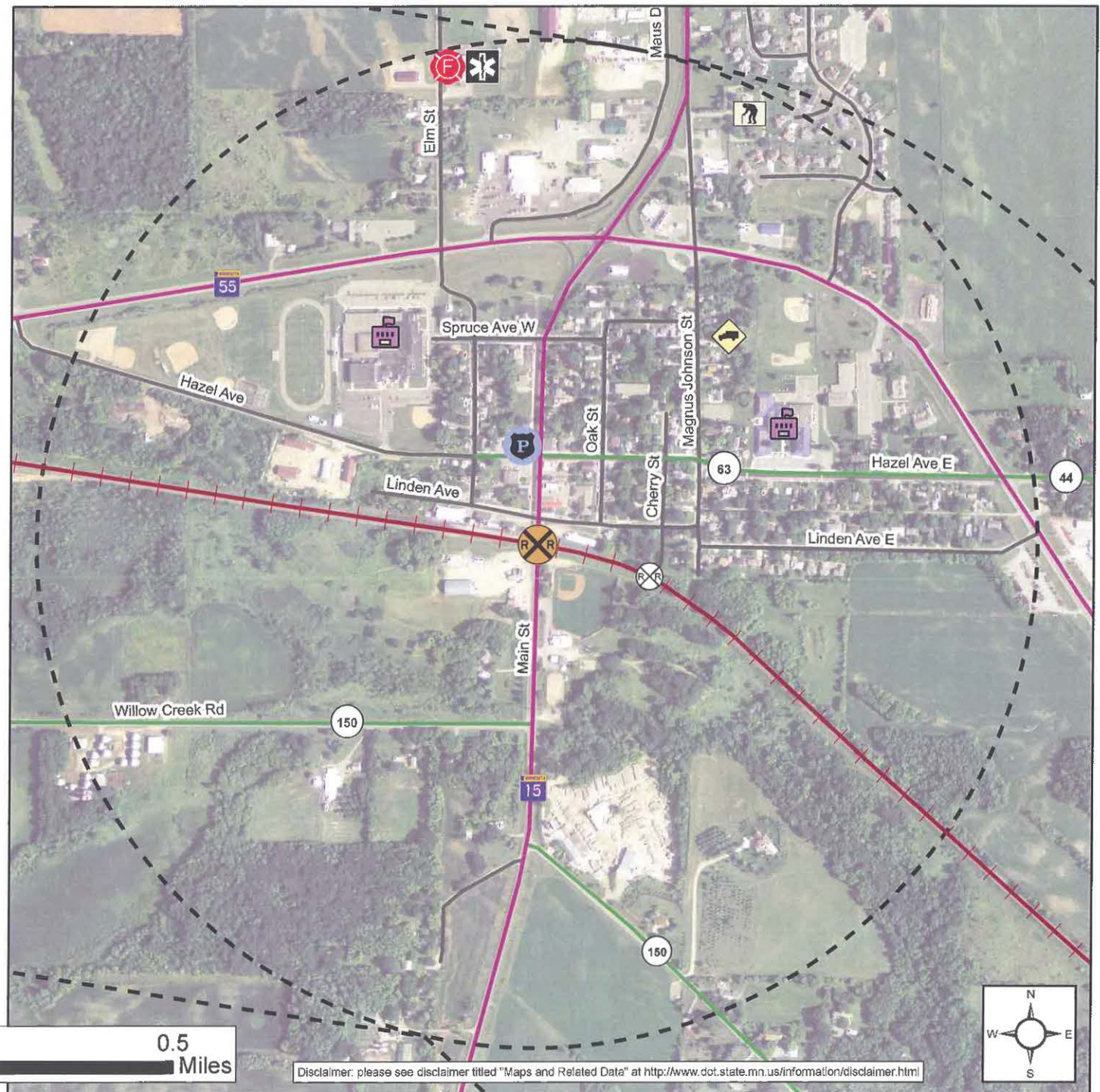
Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

Canadian Pacific / SOO

Main Street (MN 15)
Kimball, Stearns County
USDOT# 689233C
Existing Warning Device(s):
Cants & Gates

Kimball



















-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street



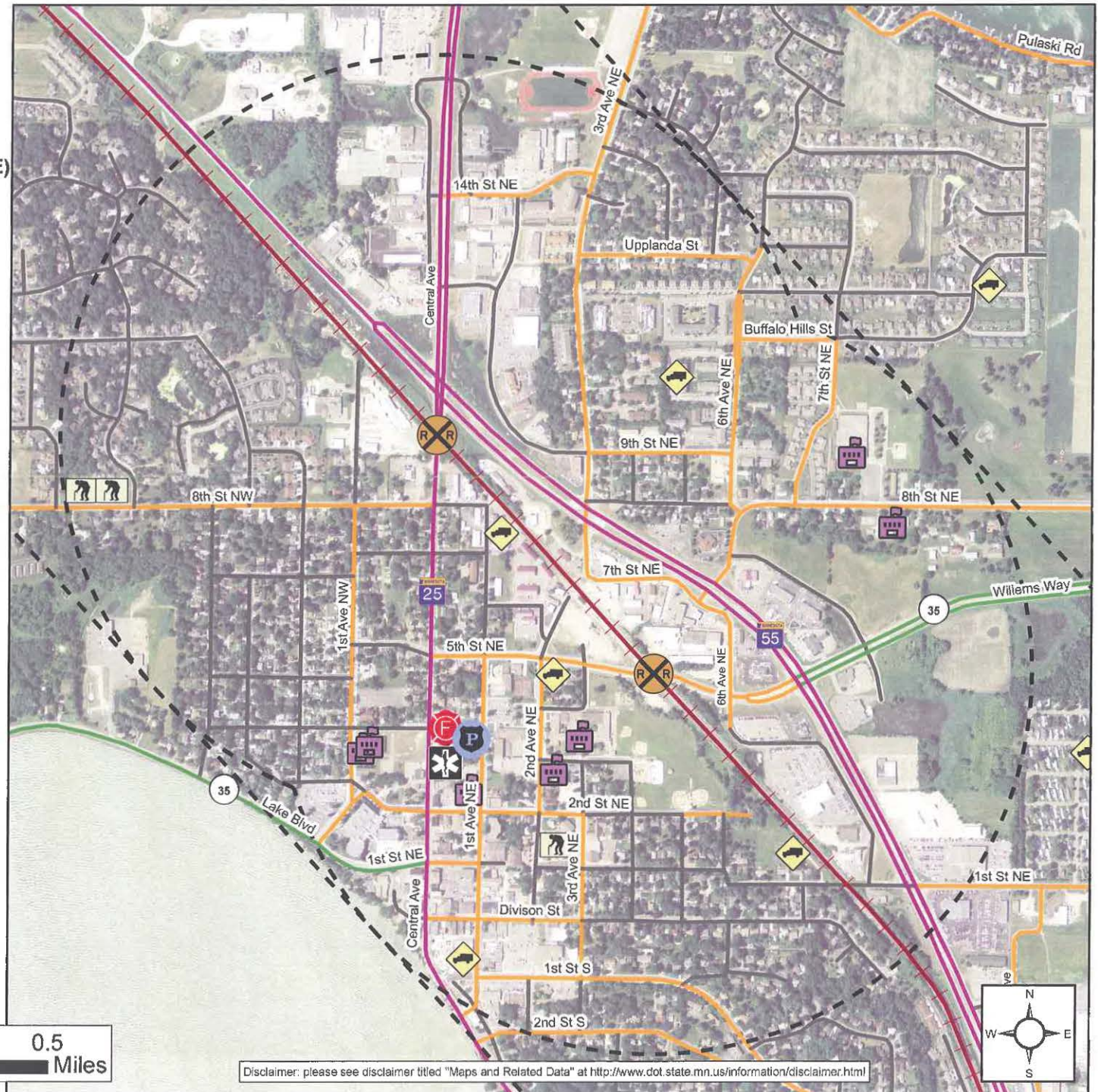
Canadian Pacific / SOO

Central Ave (MN 25), 5th Street NE
Buffalo, Wright County
USDOT# 689180F, 696288G
Existing Warning Device(s):
Cants & Gates (Central Ave)
Cands, Medians, Ped Gates (5th St NE)

Buffalo

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street



















0 0.25 0.5
Miles

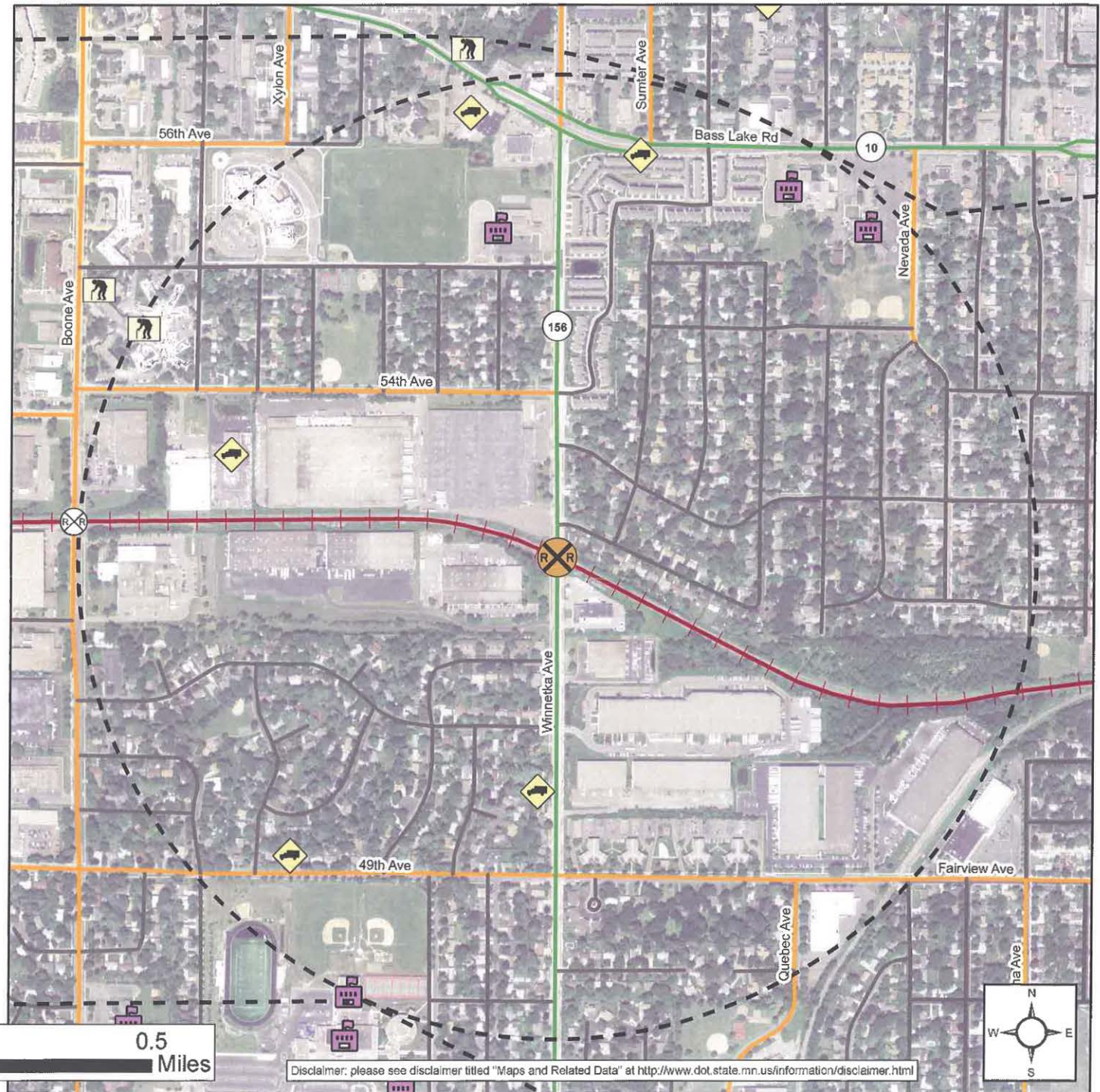


New Hope

Canadian Pacific / SOO

Winnetka Avenue
New Hope, Hennepin County
USDOT# 688954Y
Existing Warning Device(s):
Cants & Gates

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street





















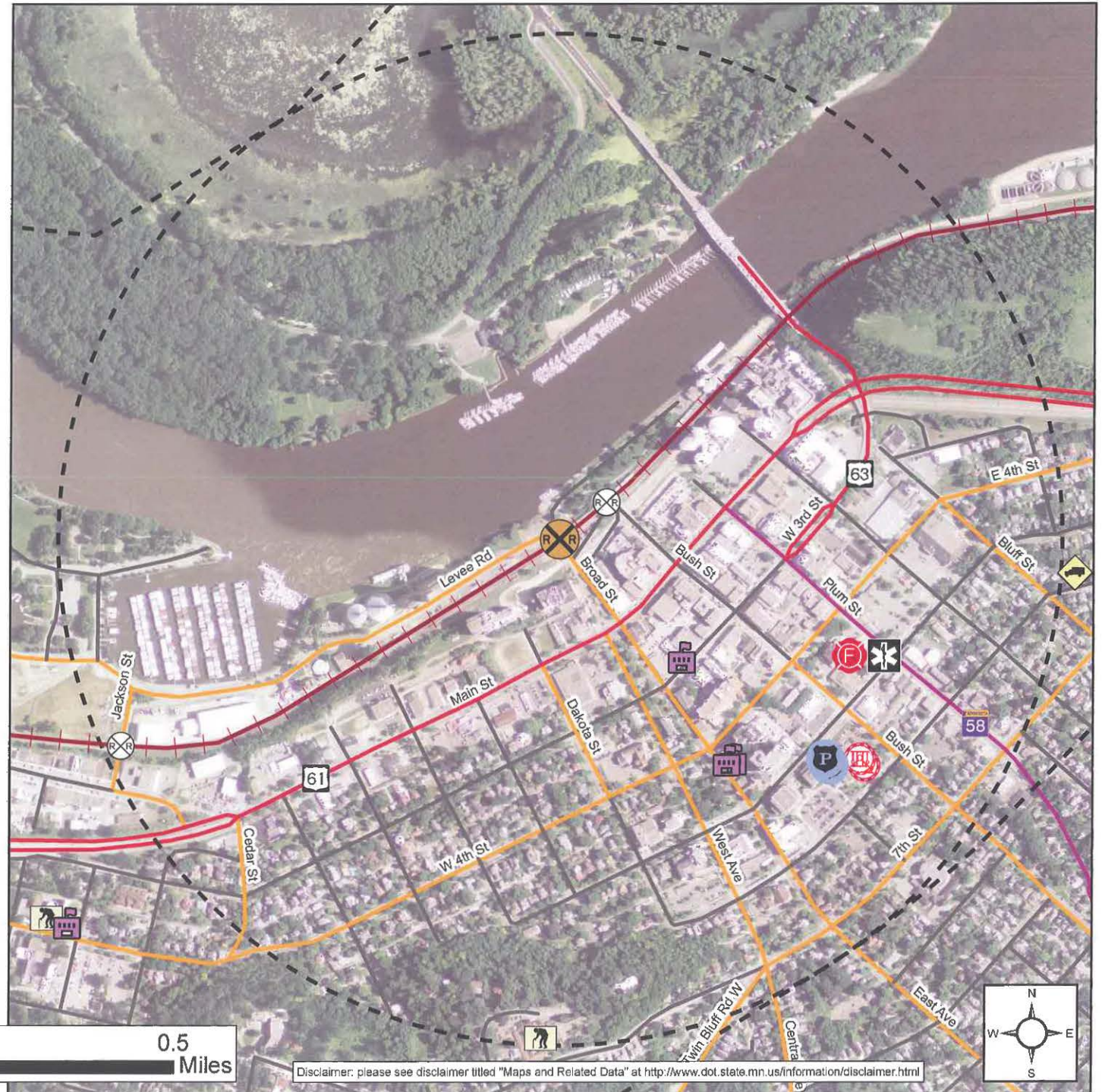
Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>

Canadian Pacific / SOO

Broad Street
Red Wing, Goodhue County
USDOT# 391204N
Existing Warning Device(s):
4 Quad Gates



















Red Wing

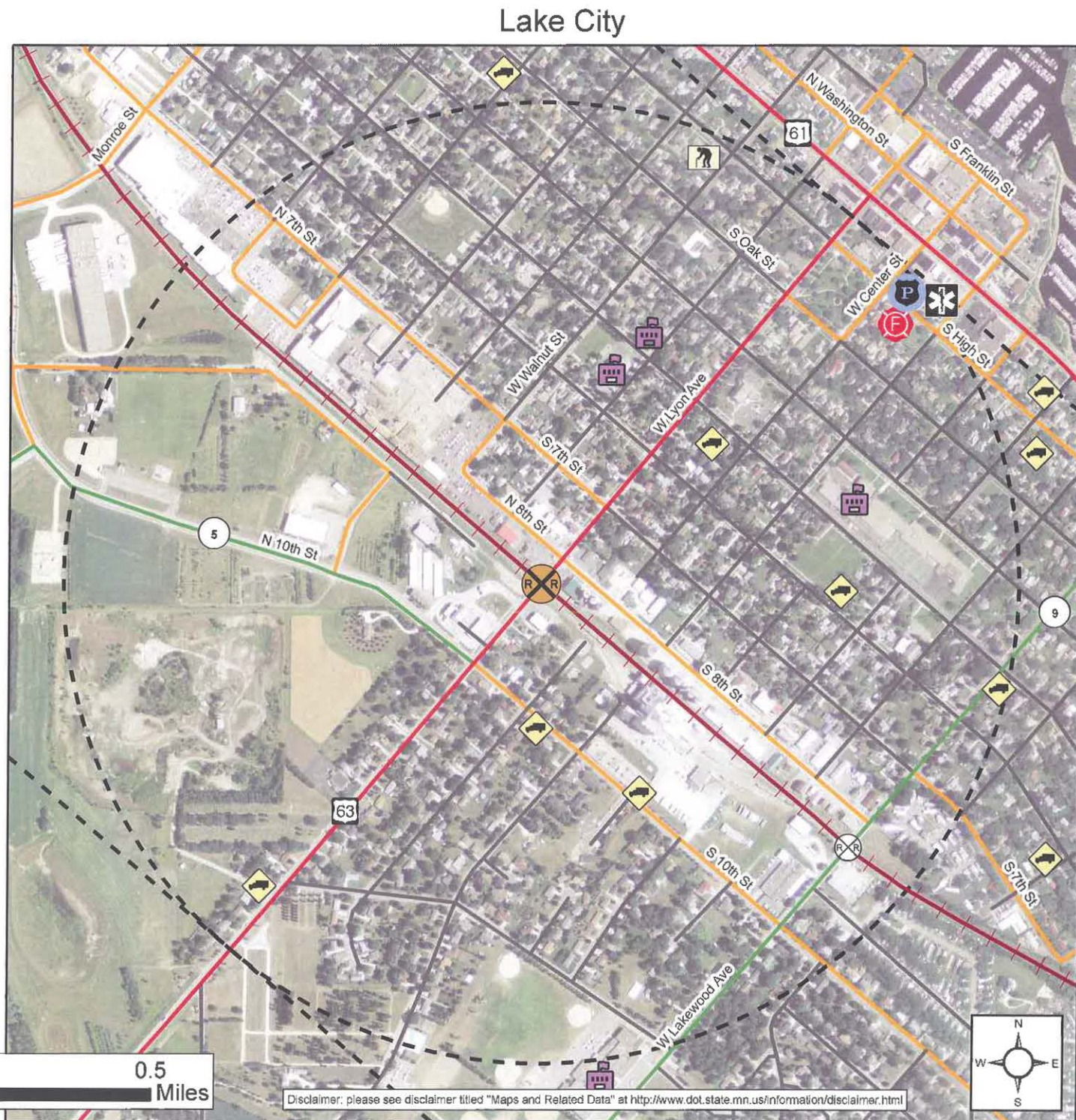
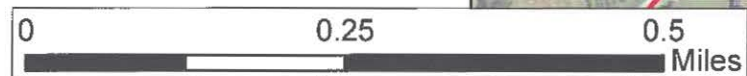
-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street



Canadian Pacific / SOO

W Lyon Avenue (US 63)
Lake City, Wabasha County
USDOT# 391174Y
Existing Warning Device(s):
Cants & Gates



















-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street

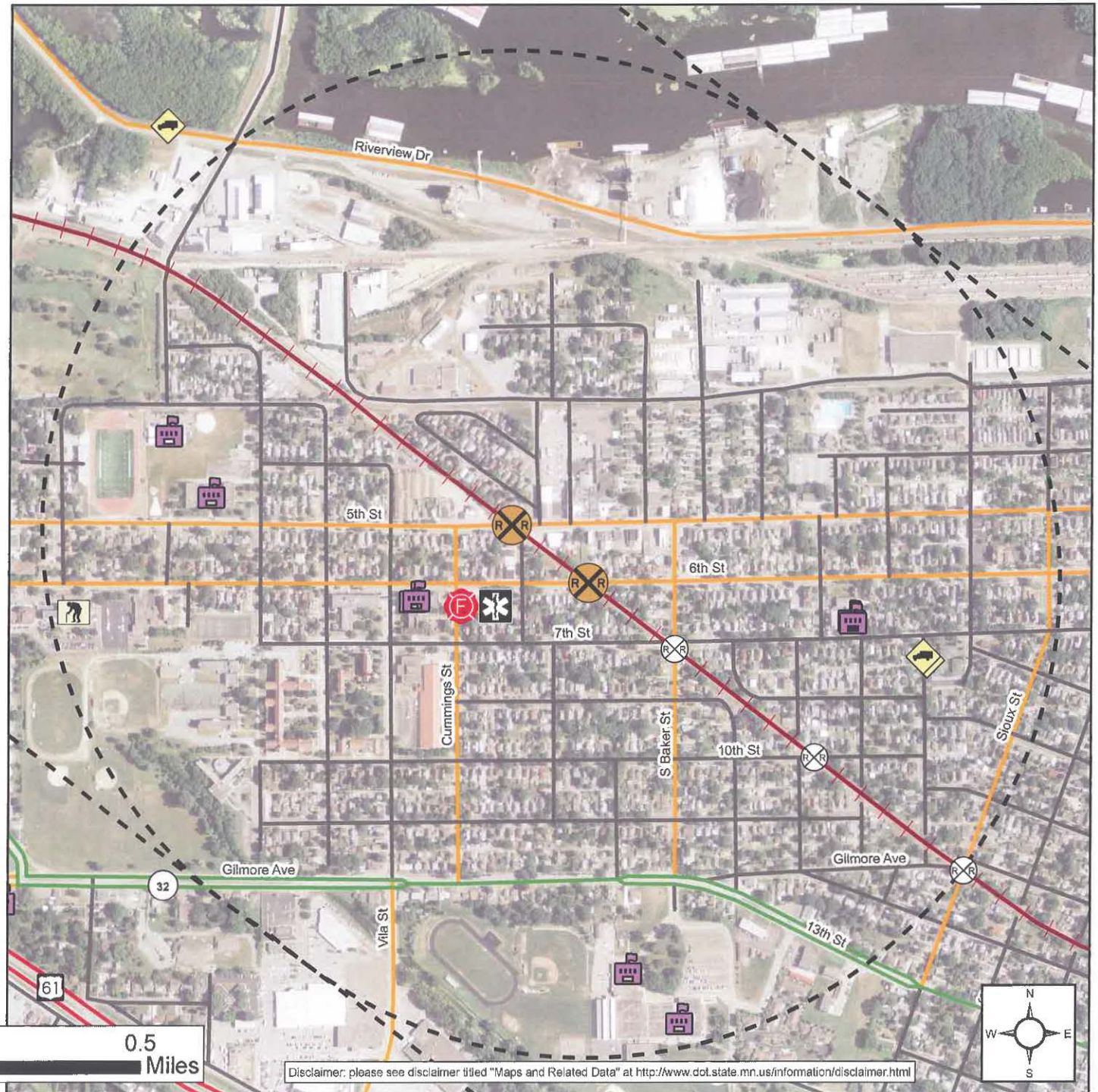


Winona

Canadian Pacific / SOO

5th St W, 6th S W
Winona, Winona County
USDOT# 391080X, 391079D
Existing Warning Device(s):
Cants & Gates, Medians (5th St W)
Cants & Gates (6th St W)

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street





















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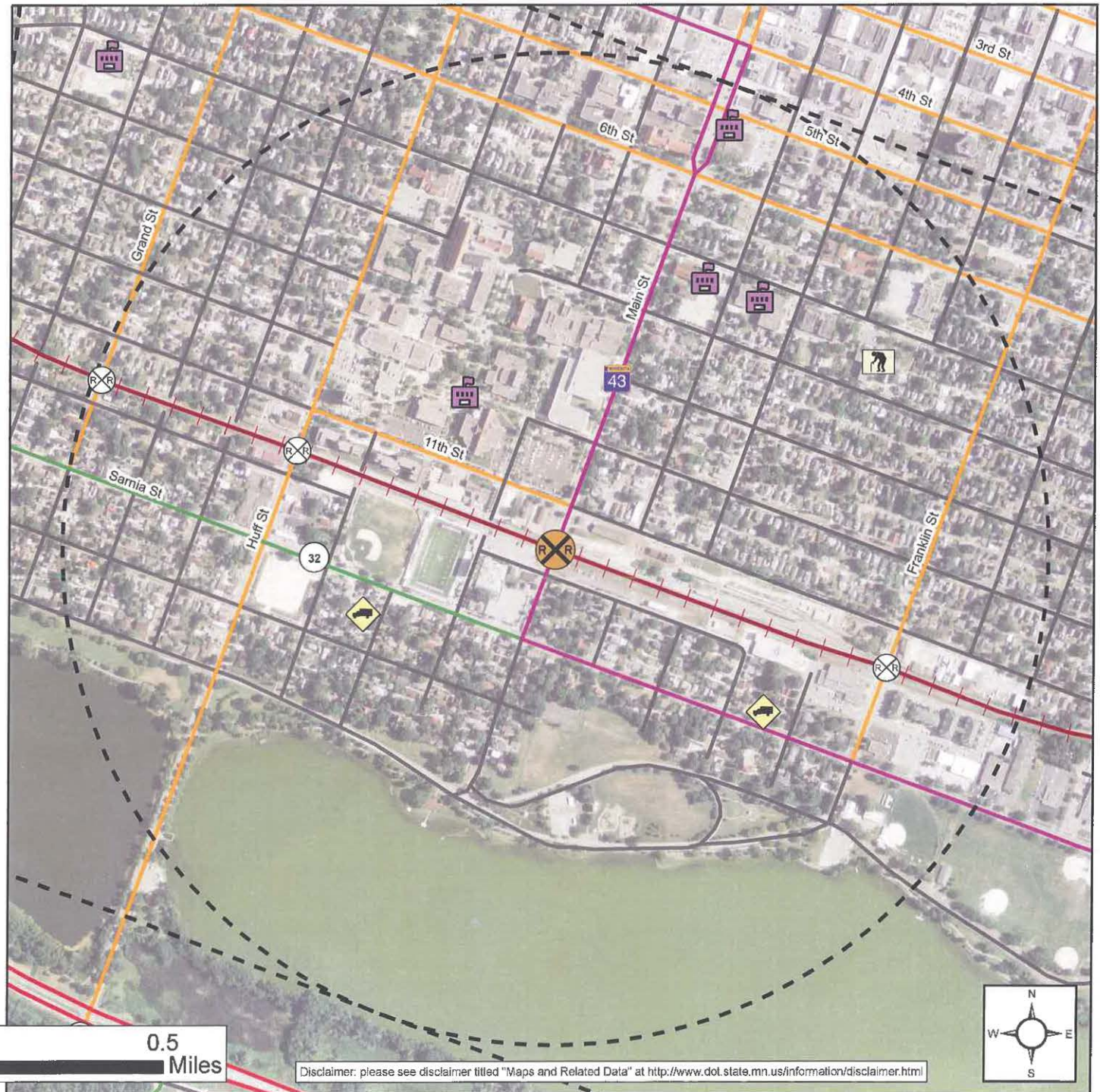
Canadian Pacific / SOO

Main Street (MN 43)
Winona, Winona County
USDOT# 391062A
Existing Warning Device(s):
Cants & Gates

Winona

-  High Risk Crossing
-  Other crossing
-  Oil Train Route
-  1/2 Mile Buffer
-  Police Station
-  Fire Station
-  EMS
-  Hospital
-  School
-  Nursing Home
-  Trucking Company
-  Prison
-  Interstate Highway
-  U.S. Highway
-  MN State Highway
-  County Highway
-  MSAS
-  City Street

0 0.25 0.5 Miles



Disclaimer: please see disclaimer titled "Maps and Related Data" at <http://www.dot.state.mn.us/information/disclaimer.html>