NorthMet Project

Mine Plan

Version 4

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Acronyms, Abbreviations and Units

Acronym	Stands For
%S	Percent sulfur
ANFO	Ammonium Nitrate Fuel Oil
ARD	Acid Rock Drainage
AWMP	Adaptive Water Management Plan
cfs	cubic feet per second
CPS	Central Pumping Station
cy	cubic yard
FTB	Flotation Tailings Basin
ft-MSL	feet above mean sea level
hp	horsepower
LTVSMC	LTV Steel Mining Company
MDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MSFMF	Mine Site Fueling and Maintenance Facility
MSHA	Mine Safety and Health Administration
OSLA	Overburden Storage and Laydown Area
OSP	Ore Surge Pile
PTM	Permit to Mine
RTH	Rail Transfer Hopper
SDS	State Disposal System
SWPPP	Storm Water Pollution Prevention Plan
TPD	Tons Per Day

Acronym	Stands For
TWP	Treated Water Pipeline
WWTF	Mine Site Waste Water Treatment Facility

1.0 Introduction

This document presents the Mine Plan for the NorthMet Project (Project). The Project is described in the Project Description (Reference (1)). The Mine Plan describes how the mine will be constructed and operated. This includes the development of the Mine Site, which will precede mining, as well as the sequence of mine pit and stockpile development and the facilities required.

Several other Management Plans contain information related to the development of the Mine Site. The management of waste rock and overburden is summarized in this document and detailed in the NorthMet Project Rock and Overburden Management Plan (Reference (2)), which also includes presentation of the Block Model of rock in the mine pit, classification of waste rock and overburden, stockpile design details and construction uses of waste rock and overburden. The management of water at the Mine Site is summarized in this document and detailed in the NorthMet Project Water Management Plan – Mine (Reference (3)) and the NorthMet Adaptive Water Management Plan (Reference (4)). The management of air quality at the Mine Site is summarized in this document and detailed in the NorthMet Project Air Quality Management Plan – Mine (Reference (5)).

Detailed reclamation plans for the mine pits are described in this document. The overall reclamation plan is described in the NorthMet Project Reclamation Plan (Reference (6)). Detailed reclamation plans for the stockpiles are described in Reference (2). Detailed reclamation plans for water management systems (ditches, dikes, water treatment facility, etc.) at the Mine Site are described in Reference (3). All of the Management Plans will evolve through the environmental review, permitting, operating, reclamation and long-term closure phases of the project.

1.1 Objective and Overview

The objective of the Mine Plan is to provide a steady and reliable stream of ore to the Process Plant and to dispose of mine waste (rock and overburden) in a manner that results in compliance with safety and environmental regulations.

Ore will be mined from the East Pit from Mine Year 1 to 11 and from the West Pit from Mine Year 2 through 11. During that period, the more reactive waste rock mined will be placed in temporary stockpiles, and the least reactive waste rock will be placed in a permanent stockpile. Ore will be mined from the West and Central Pits from Mine Year 11 to 16. As mining of the Central Pit progresses, it will be joined to the East Pit, and the combined pits will be referred to as the East Pit. Ore will be mined only from the West Pit from Mine Year 17 to 20. Beginning in Mine Year 11, the more reactive waste rock mined will be placed directly in the East Pit, after mining is completed in that pit. The more reactive waste rock in the temporary stockpiles will be relocated to the East Pit beginning in Mine Year 11. As the least reactive waste rock is mined, it will be placed in the permanent stockpile or the East Pit. The East Pit will flood with water after mining in the pit is completed, which results in the more reactive waste rock being permanently disposed of subaqueously.

The Mine Site layouts are presented for Mine Years 1, 2, 11, and 20 as Large Figure 1 through Large Figure 4. Mine Years 1 and 2 are provided because they are the first two years of mining. Mine Year 11 is included because there is a major change in operations – mining in the East Pit is completed, mining in the Central Pit has begun, and the temporary waste rock stockpiles have reached their maximum footprints. Mine Year 20 represents the end of mining, with pits and the permanent waste rock stockpile at their maximum extents and the material in the temporary waste rock stockpiles having been relocated to the East Pit. Cross-sections of the pits are shown on Large Figure 5, and cross-sections of the stockpiles up to maximum dimensions are shown in Large Figure 6 and Large Figure 7.

Some of the information provided in this document will be submitted annually to fulfill the Permit to Mine (PTM) annual reporting requirements, including documentation on the mining and reclamation activities completed during the past year and the mining and reclamation activities planned for the upcoming year. Attachment A (to be provided in permitting) is a draft of the report that will be submitted annually for the PTM.

1.2 Outline

The outline of this document is:

Section 1.0 Introduction, objective and overview

Section 2.0 Description of Mine Site development activities including a summary of the NorthMet Project Water Management Plan – Mine

Section 3.0 Description of the mine pit design with pit footprints and depths

Section 4.0 Description of operations including a summary of NorthMet Project Air Quality Management Plan – Mine

Section 5.0 Summary of the NorthMet Project Rock and Overburden Management Plan including stockpile design with stockpile footprints and heights

Section 6.0 Description of the reclamation of the mine pits

This document is intended to evolve through the environmental review, permitting, operating, reclamation and long-term closure phases of the Project. It will be reviewed and updated as necessary in conjunction with changes that occur in facility operating and maintenance methods or requirements. A Revision History is included at the end of the document.

2.0 Mine Site Development

This section describes the activities that will take place prior to the start of mining operations.

Clearing, grubbing, and harvesting of marketable timber and biomass will be completed as part of Mine Site development and mining. The surface overburden consists of glacial till and organic wetland soils (i.e., peat). Peat and other unsuitable soils will be removed from the pits and the footprints of the temporary stockpiles, including the Ore Surge Pile (OSP), and the permanent stockpile where necessary. Excavated peat will be reused for reclamation or stockpiled in the Overburden Storage and Laydown Area (OSLA) until it can be reused for off-site wetland restoration activities, stockpile reclamation in covers, and other on-site reclamation.

The remaining glacial till fraction of the overburden will also be removed from the pit footprints and, where necessary, within the stockpile liner footprints, separated based on being saturated or unsaturated, and hauled to the appropriate construction or disposal areas. Waste characterization has shown that the mineral overburden above the natural water table (Unsaturated Overburden) has been exposed to air long enough for reactions to be complete and that material will be usable as general on-site construction material, as described in Section 5.3.

Mineral overburden below the natural water table (Saturated Overburden) has not been exposed to air; therefore that material will only be usable for specific on-site construction applications approved by the Minnesota Department of Natural Resources (MDNR), as described in Section 5.3.

After exposure of bedrock, pre-production mine development will generate Category 1 waste rock that will be used for construction purposes, such as Mine Site haul roads and ramps, foundations for the Rail Transfer Hopper (RTH) and temporary stockpiles, fill below the Category 1 Waste Rock Stockpile and other applications, as approved by the MDNR.

The pre-production mine development will be followed by a gradual ramp-up of ore output over 6 to 12 months to reach the planned rate of mining. Because the Process Plant feed rate will progressively increase as plant operations ramp up, mining will be scheduled so that the excavated area in the mine pits will also progressively increase to provide an adequate supply of ore and ensure continuity of plant feed.

Construction at the Mine Site will use as much of the on-site excavated material as possible. On-site construction materials will include Category 1 waste rock, Unsaturated Overburden, Saturated Overburden, and Peat, as described in Sections 2.1.2.4 and 2.2.3 of Reference (2). Additional construction materials include waste rock from the state-owned waste rock stockpile (Stockpile 2012) located approximately 5 miles west of the Mine Site along Dunka Road and possibly waste rock and overburden from the inactive LTV Steel Mining Company (LTVSMC) Area 5 to the north and east of the Flotation Tailings Basin (FTB) (Large Figure 8). The state-owned stockpile (Stockpile 2012), located on the north side of Dunka Road, is waste rock from

LTVSMC Area 3 and/or 2. The need for and extent of waste characterization of off-site borrow material will be addressed in permitting.

Before mining operations can begin, the Mine Site infrastructure, facilities, and water management systems must be developed. Development is described in the following section and will take approximately 12 to 18 months.

2.1 Infrastructure

2.1.1 Dunka Road

Dunka Road will be upgraded to accommodate the anticipated traffic and to meet the requirements of Mine Safety and Health Administration (MSHA) Standard 56.9300 by widening the driving surface to 40 feet and constructing safety berms as needed. Road improvements are planned for the portion of Dunka Road between its junction with the Area 5 access road to the west and the Mine Site access road to the east. The finished road surface will be similar to the existing road profile with typical cross slopes of 2% from the centerline of the road. The road will follow the existing alignment with a few slight modifications to straighten the road and allow space to construct the Treated Water Pipeline (TWP) and safety berms. Safety berms, as required by MSHA, will be constructed along the road to accommodate the travel of the largest piece of mobile equipment that will be using the road. The required berm height is the mid-axle height of the largest self-propelled piece of mobile equipment that usually travels the roadway, which is approximately 6 feet for a two axle, rear dump haul truck with a payload of 240 tons. Existing culverts will be extended to accommodate road widening where necessary. Meeting bays will be constructed at select locations to allow for the haul trucks used for mine development traveling in opposite directions to meet and pass each other. Meeting bay locations have been selected based on safety considerations and to avoid or minimize impacts to wetlands. Typical cross-sections for the Dunka Road upgrade work are provided in Attachment B (to be provided in permitting).

2.1.2 Site Access and Haul Roads

Haul roads will be constructed to transport ore, waste rock, and overburden between the mine pits, stockpiles, RTH, OSP, and OSLA. Source and destination of material moved between these facilities will depend on current mine activities and stage of mine development.

The main access to the Mine Site will be from Dunka Road, immediately west of the Mine Site Waste Water Treatment Facility (WWTF), connecting to the haul roads northwest of the WWTF. Typical cross-sections of the haul roads and site access road are provided in Attachment B (to be provided in permitting).

Haul roads will be designed to support the largest mobile equipment (240 ton haul truck) planned for use. Initial construction of the haul roads will be with material from the state-owned waste rock stockpile described in Section 2.0. Haul roads required after the initial construction period will be built with Category 1 waste rock, as approved by the MDNR. Haul roads will be

constructed with berms as required by MSHA. The roadway will be sloped to allow water to flow into constructed process water ditches running parallel to the roadway outside of the safety berms.

2.1.3 Railroad

Two new sections of railroad will be constructed to complete the track route between the Mine Site to the Process Plant (Large Figure 8). This will include a new approximately 5,300-foot long spur track at the Mine Site for the loading of rail cars at the RTH and the OSP. The second new track section is a connecting track approximately 5,750-feet-long between the existing Cliffs Erie track and existing NorthMet track that serves the Coarse Crusher Building at the Process Plant.

2.1.4 Mine Site to Plant Site Treated Water Pipeline

The TWP will transport the treated Mine Site process water from the Central Pumping Station (CPS) to the FTB for use as plant make-up water. Design and operation of the TWP is included in Section 2.1.7 of Reference (3). The TWP will generally run parallel to the existing Dunka Road alignment for a total length of approximately 40,000 feet (Large Figure 8). This route provides easy access for maintenance and regular inspection while limiting impacts on the surrounding area including wetlands and avoiding road and railroad crossings.

2.1.5 13.8 kV Mine Site Power Distribution System

Electrical service will be provided by a new Minnesota Power electrical substation located on Minnesota Power property southwest of the Mine Site near the Dunka Road. This substation will be fed from the existing 138 kV transmission line that passes just south of the Dunka Road and will feed the newly constructed 13.8 kV mine power distribution line that will supply electrical service to the mine pits, WWTF, CPS, RTH, pit dewatering pumps, process water pond pumps, stockpile foundation pumps, and the Mine Site Fueling and Maintenance Facility (MSFMF) (Large Figure 9).

2.1.6 Other

Heating fuel required by Mine Site facilities (WWTF, CPS, RTH, and MSFMF) and railroad switch heaters will be provided by propane suppliers. No natural gas service will be provided. No heating fuels oil tanks are required.

Domestic wastewater service will be provided at portable facilities serviced by a supplier. A bottled water supplier will provide drinking water.

2.2 Mine Site Facilities

2.2.1 Rail Transfer Hopper

The RTH will consist of a raised platform constructed of Category 1 waste rock as approved by MDNR from which haul trucks dump into a hopper over a pan feeder. The pan feeder will pass through an opening in a retaining wall and discharge into a rail car positioned under the feeder

outlet. The pan feeder and the control gate will be hydraulically powered and will be controlled by the locomotive operator using controls located in the RTH operator's cab. The locomotive will be controlled by the locomotive operator using remote controls. Loading time will be approximately one minute per 100-ton rail car or about 20 to 30 minutes to load a 16-car train due to car spotting and the operator moving between the locomotive and the RTH operator's cab.

The RTH will be located to the south of the mine pits and will be connected to the existing Cliffs Erie main line track by a new spur line. The RTH spur track will be designed to allow rail cars to be loaded directly by front-end loader at the OSP should the RTH be unavailable.

2.2.2 Mine Site Fueling and Maintenance Facility

Equipment fueling and minor service and repair work will be done at the MSFMF located northeast of the RTH. This facility will consist of two buildings, one for fueling mobile equipment (Fueling Station) and the second for mobile equipment maintenance (Maintenance Building). A site layout plan for the MSFMF is shown on Large Figure 10 (to be provided in permitting).

The Fueling Station will be a roofed structure with enclosed sides but open at each end to allow equipment to drive through. The structure will have a reinforced concrete floor sloped to drain to a sump to collect spillage of fuel, hydraulic oil, engine oil and coolant/antifreeze. A licensed disposal contractor will periodically pump out the sump. In addition to the fuel dispensing system, there will also be dispensing equipment for lubricating and hydraulic oils, antifreeze/coolant, windshield washer fluid, and compressed air for tires. The building will contain limited-capacity storage tanks containing lubricating and hydraulic oils and antifreeze. Two to three 12,000 gallon bulk storage tanks, enclosed within a spill containment system, will be located at a safe distance from the building. Interior and area lighting will be provided to enable safe operation at night. A metering system will record the amount of fuel dispensed to each vehicle, and emergency shut-off valves will be present at all necessary locations.

Stationary or slow-moving equipment such as excavators, dozers, drill rigs, and light plants will be fueled in the field from mobile fuel tankers equipped with pumping and metering devices. The fueling tankers will arrive at the Mine Site with fuel or be replenished at the Fueling Station.

Minor mobile equipment maintenance such as oil changes, filter changes, maintenance of fluid levels, tire changes, lamp changes, haul truck box welding, and other short duration maintenance that can be done without the need of a large overhead crane will be done at the Maintenance Building.

Major scheduled maintenance and repair work lasting several days on mobile equipment such as haul trucks, front end loaders, rubber tired dozers, and motor graders will be done in the refurbished and reactivated former LTVSMC Area 1 Shop, located about one mile west of the Process Plant. Because of the size and weight of the primary excavators and blast hole drill rigs, as well as the distance to the Area 1 Shop, most of their maintenance and repair work will be

done at the Mine Site in accordance with the facility's State Disposal System (SDS) Permit and associated Mine Site Stormwater Pollution Prevention Plan (SWPPP).

2.2.3 Overburden Storage and Laydown Area

The OSLA will be constructed to the west of the RTH. This area will be used to screen, sort and temporarily store Peat and Unsaturated Overburden that may be used for future construction or reclamation purposes. The OSLA will be graded to provide a relatively even, well-drained site for storage and processing of Unsaturated Overburden and Peat. Grading of the site will direct drainage to an unlined process water pond in the southwest corner. The OSLA will be unlined, but will be compacted sufficiently to support equipment operation in most areas of the site.

2.2.4 Waste Rock Stockpile and Ore Surge Pile Foundations/Liners/Containment

The initial foundation, liner, and water collection systems for the temporary Category 2/3 Waste Rock Stockpile, Category 4 Waste Rock Stockpile, and the OSP will be constructed to meet storage capacity requirements. These will be expanded as stockpile capacity requirements increase. Similarly, the initial Category 1 Waste Rock Stockpile Groundwater Containment System will be constructed to capture flow from the initial Category 1 Waste Rock Stockpile and will be expanded as stockpile capacity requirements increase. These activities are described further in Section 5.0.

2.3 Water Management System

This section summarizes information from the Water Management Plan – Mine (Reference (3)), which will become part of the MDNR PTM and Minnesota Pollution Control Agency (MPCA) SDS Permit applications. This plan includes water management system designs, operating and maintenance plans, preliminary water quality monitoring plans, preliminary reporting requirements and adaptive management approach. Final water quality monitoring and reporting requirements will be determined in the permits. Stormwater, construction water, and process water will be managed at the Mine Site.

Stormwater, the result of precipitation that falls on natural or reclaimed vegetated surfaces, will be routed through sedimentation ponds prior to discharge off-site to the Partridge River. Construction water, the result of construction area dewatering and runoff, will be managed according to its expected water quality, as described in Section 2.0 of Reference (3). Process water includes runoff and collected groundwater (pit dewatering water) that has contacted surfaces disturbed by mining operations, such as drainage collected on stockpile liners, and runoff from haul road surfaces, OSLA, and the RTH. Process water will be treated at the WWTF with the exception of process water from the OSLA, which will be routed directly to the CPS pond.

The WWTF will be constructed on approximately 40 acres and will include two process water equalization basins, a construction water equalization/treatment basin, and the building that will house the treatment equipment. The effluent from the WWTF will be pumped via the CPS

through the TWP to the FTB or used to supplement flooding of the East Pit during pit backfilling. Reuse of the Mine Site process water will eliminate the need to discharge process water to surface waters at the Mine Site during operations.

Large Figure 11 through Large Figure 13 show the process water management systems in Mine Years 1, 11 and 20, including the groundwater containment system around the Category 1 Waste Rock Stockpile and the pump and pipe networks that dewater the pits and collect process water from the temporary stockpiles, haul roads, RTH, and OSLA.

A series of dikes and ditches will be constructed around the Mine Site perimeter to minimize the amount of surface water flowing onto the site and to control stormwater flowing off-site prior to sedimentation in the ponds. A series of dikes and ditches will also be constructed around the mine pits to minimize the amount of surface runoff flowing into the mine pits. Large Figure 14 shows the existing subwatershed boundaries and drainage flows at the Mine Site, while Large Figure 15 through Large Figure 17 show the development of the stormwater features at the Mine Site in Mine Years 1, 11 and 20.

3.0 Pit Design

The overall pit design takes into account the existing rock conditions, safety, and efficiency of mining. Some of the design constraints include an operating bench height, maximum bench face angles in good quality rock, minimum catch-bench width, and the maximum ramp slope height. These guidelines, as outlined in Section 5.0 of Reference (7), may have exceptions with safety compensations, such as a higher inter-ramp slope height with the incorporation of a wider safety bench. Several basic parameters shape the final mine configuration:

- the northwest edge of the mine is constrained by the northward extent of the Duluth Complex, which hosts the mineral deposit
- the footwall (northwest) side of the pit will follow the mineralization, which dips southeast at about 25 degrees and roughly parallels the top of the Virginia Formation, maintaining a minimum of a 150-foot separation from the Biwabik Iron Formation below the Virginia Formation
- the overall slope of the south pit wall is based on geotechnical design data, which was collected during the drilling program

Mine Site maps showing the mine pits for Mine Years 1, 2, 11, and 20 are shown in Large Figure 1 through Large Figure 4. Cross-sections of the pits showing their maximum depths and maximum footprints for these same years are shown in Large Figure 5. At maximum size, each pit is projected to have the approximate maximum area and depth shown in Table 3-1.

Table 3-1 Maximum Pit Dimensions – Approximate

Mine Pit	Area (acres)	Maximum Depth (feet below ground surface)
West	321	630
Central	52	356
East	155	696

The pit configuration and mining plan are based on computer modeling using data from exploration drilling and included in the Block Model as described in detail in Attachment A of Reference (2). New data collected from drilling conducted prior to the start of mining and during mining operations will provide additional information that will be incorporated into the Block Model and, hence, mine scheduling. The pit configuration, staging, and stockpile layout will be progressively refined throughout the 20-year life of the mine. Prices of metals, energy, labor, and other factors determine the optimum mining schedule; as these change, the Mine Plan will be

adjusted, potentially on an annual basis. It is not expected that these changes will result in a significant change in environmental impact.

After overburden removal is completed, the mine will be developed in a series of benches that will be approximately 40 feet high. These benches will be accessed by ramps with a driving surface approximately 85 feet wide to accommodate mine traffic and having additional width for safety berms and possibly ditches, power lines/cables, and pipes on an as-required basis. The pit slope design indicates an overall pit slope angle of approximately 51 degrees. This will be continuously monitored and refined during the mine life.

The design of the East Pit backfill includes filling the pit with waste rock to an elevation that will allow a layer of overburden to be placed on top of the waste rock at an elevation near or just below the estimated final water elevation. The purpose of this top layer of overburden is to develop wetlands at the surface of the backfilled material. Section 2.1 of Reference (2) includes further details of the waste rock to be used for the East Pit backfilling.

4.0 Operations

During operations, Poly Met Mining Inc. (PolyMet) expects to mine 533 million tons of waste rock and ore over 20 years which will include 225 million tons of ore and 308 million tons of waste rock. After the initial ramp up period, the planned maximum annual average ore production rate will be 32,000 tons per day. Overburden will be stripped in campaigns as needed for mine development thereby minimizing the amount of bedrock exposed at any one time. After removal of overburden from the initial mining area, additional overburden stripping could take place concurrently with the mining of ore and waste rock. Approximately 32% of the required overburden stripping for the pit development will be done in the first two years of mine life. All of the overburden that needs to be stripped from the pits will be removed by the end of Mine Year 11.

Mining will start in the East Pit in Mine Year 1 and will exhaust that pit in Mine Year 11. Mining in the Central Pit will begin in Mine Year 11 with mining completed in that pit in Mine Year 16. During Central Pit mining, the East and Central pits will converge into one pit which will then be referred to as the East Pit. Mining in the West Pit begins in Mine Year 2 and continues until the end of the life of the mine in Mine Year 20. Mine pit cross-sections are shown in Large Figure 5 for Mine Years 1, 2, 11, and 20.

Because of the distribution of ore in the deposit, the need to develop access to the working faces of the pit, and the need to deliver a steady flow of ore at a uniform grade to the Process Plant, an OSP is required. The OSP will be located near the RTH to allow for temporary storage of ore until it could fit into the processing schedule or as needed due to mine operating, rail haulage, or process plant delays. Ore will flow into and out of this pile as needed to meet mine and plant operating conditions.

Mine Site maps, which include the mine pits, waste rock stockpiles, and mining infrastructure for Mine Years 1, 2, 11, and 20, are shown in Large Figure 1 through Large Figure 4. Cross-sections of the stockpiles with maximum heights and footprints are shown in Large Figure 6 and Large Figure 7.

4.1 Overburden Removal

Overburden removal, also referred to as surface stripping or pit pre-stripping, will be done to expose an area of the underlying rock that is large enough to safely accommodate ore and waste rock mining as well as provide adequate area to conform to reclamation rules. Final pre-stripping overburden bank slopes will be maintained at a slope that is not steeper than 2.5H:1V and will be shaped in conformance with Minnesota Rules, part 6132.2300, Overburden Portion of Pit Walls. Final grading of overburden bank slopes must be adequate to allow landscaping equipment to safely perform reclamation and prevent excessive erosion or pit wall collapses. A typical cross-section for pit pre-stripping and the pit pre-stripping limits are provided in Attachment B (to be provided in permitting). Table 4-1 provides the estimated overburden excavation volumes based on the pit and stockpile excavation needs as described in Section 2.2.3 of Reference (2).

Table 4-1 Estimated Overburden Excavation Volumes

Mine Feature	Area (acres)	Estimated Overburden Excavation Volume (bank cubic yards)			
		Saturated Overburden	Unsaturated Overburden	Peat	Total
Ore Surge Pile	31	21,000	202,000	4,000	227,000
Category 1 Waste Rock Stockpile(1)	526(1)	0	0	220,500	220,500
Category 2/3 Waste Rock Stockpile	180	27,000	274,000	462,000	763,000
Category 4 Waste Rock Stockpile(2)	57	3,000	53,000	43,000	99,000
West Pit	321	4,491,000	1,193,000	1,498,000	7,182,000
East/Central Pits(2)	207	1,047,000	1,450,000	227,000	2,724,000
TOTAL(2)	1,275(2)	5,589,000	3,172,000	2,454,500	11,215,500

(1) The Category 1 Waste Rock Stockpile overburden excavation volumes include excavation of peat within 100 feet from the outer edge of the stockpile for stockpile stability. The stockpile is 508 acres while active but will be regraded as part of reclamation, resulting in a final footprint of 526 acres. The 508-acre footprint was used for the 100-foot buffer for stockpile stability. The groundwater containment system will surround the final 526-acre footprint.

(2) The Category 4 Waste Rock Stockpile footprint overlaps with the Central Pit footprint. The individual areas are greater than the total, which takes into account the overlap. The volumes listed for the East/Central Pits only include the volumes in excess of the stockpile.

4.2 Drilling and Blasting

Although the details of the drilling and blasting design will be refined and optimized as the mining operation continues, the general blasting parameters, based on drilling and blasting models, are presented in Table 4-2. In addition, PolyMet will conduct blasting in accordance with Minnesota Rules, part 6132.2900 Air Overpressure and Ground Vibrations from Blasting.

Conventional electric or diesel powered rotary drilling rigs will be used. Because Project ore has physical characteristics very similar to Project waste rock, drilling and blasting will share a common drilling fleet and similar blast design specifications. Based on a planned annual ore movement rate of 11.7 million tons and a blast design as shown in Table 4-2, it is estimated that the total annual amount of blasting agent used for breaking ore will be 8.0 million pounds, not including initiators and blasting accessories. Secondary breaking of oversize pieces will be done using a wheel loader or excavator-mounted drop weight hammer. Blasting of ore and waste rock is anticipated to take place approximately every 2 to 3 days. This will usually include separate blasts of ore and waste rock benches totaling about 200,000 – 300,000 tons broken material per blast.

Table 4-2 Blasting Parameters

Blasting Parameter	Specifications
Blast hole diameter (range)	10 – 16 inch
Explosive type / blasting agent	ANFO, emulsion and emulsion blends (ANFO and emulsions)
Burden (distance from free face) and spacing (distance between holes)	Approximately 25 feet x 28 feet with five feet of subdrilling for ore and 29 feet x 33 feet with six feet of subdrilling for waste rock, based on a 12-¼ inch diameter blast hole.
Powder factor	Approximately 0.69 pounds per ton for ore and 0.45 pounds per ton for waste rock, based on a 12-¼ inch diameter blast hole
Drilling rate – approximate (Assumed drilling time / rig 24 hours / day)	50 to 70 feet / hour based on a 12-¼ inch diameter drill bit
Feet drilled / month	Average of 34,425 feet per month
Drilling rigs required	2 drills

4.3 Excavation and Haulage

After being drilled and blasted, the ore and waste rock will be loaded by excavators into haul trucks that will transport the ore to the RTH or OSP and the waste rock to stockpiles or the East Pit. Electric-hydraulic excavators with approximately 31 cubic yard (cy) capacity will be the primary rock loading tools in the mining fleet with a large diesel front-end loader (approximately 21.5 cy capacity) available to provide operational flexibility and additional loading capacity.

The haul truck fleet will initially consist of five conventional 240 ton diesel-powered rear dump trucks and grow to a maximum of nine trucks as hauls get longer and temporary stockpiles are relocated to the East Pit. Haul trucks will be able to be re-assigned between excavators loading ore and waste rock. Table 4-3 lists tons of waste rock and ore mined for Mine Years 1 through 20 by category.

Table 4-3 Waste Rock and Ore Mined (Current Estimate)

Mine Year	Category 1 (tons)	Category 2 (tons)	Category 3 (tons)	Category 4 (tons)	Total Waste Rock (tons)	Ore (tons)
1	18,707,500	4,674,400	564,300	1,489,200	25,435,500	4,285,400
2	15,016,700	3,821,800	611,100	762,500	20,212,000	11,680,000
3	16,139,000	3,739,800	557,300	1,127,700	21,563,900	11,680,000
4	12,796,600	3,275,700	379,900	827,500	17,279,700	11,680,000
5	11,741,300	2,384,800	30,300	441,900	14,598,200	11,680,000
6	16,842,200	3,914,200	434,800	665,600	21,856,800	11,680,000
7	10,405,000	2,382,800	183,200	549,000	13,520,100	11,680,000
8	16,939,800	3,883,900	448,300	110,600	21,382,700	11,680,000
9	12,556,200	4,147,800	512,400	133,500	17,349,800	11,680,000
10	12,974,200	3,589,900	480,600	76,800	17,121,600	11,680,000
11	10,180,400	3,717,400	286,500	22,400	14,206,700	11,680,000
12	10,773,100	4,253,100	531,600	50,100	15,607,800	11,680,000
13	8,133,600	5,050,000	662,900	36,300	13,882,700	11,680,000
14	8,474,200	3,258,300	378,200	66,900	12,177,700	11,680,000
15	6,166,000	4,288,500	401,300	94,100	10,949,900	11,680,000
16	4,444,100	2,875,900	912,900	866,300	9,099,300	11,680,000
17	4,022,300	1,841,900	563,100	528,200	6,955,500	11,680,000
18	5,592,500	2,628,000	321,000	300,200	8,841,600	11,680,000
19	6,944,600	4,296,300	483,000	220,300	11,944,200	11,680,000
20	7,845,300	5,303,900	711,400	267,400	14,128,000	10,754,600
Total	216,694,700	73,328,300	9,454,000	8,636,600	308,113,700	225,280,000

4.4 Mine Equipment

Mine operations will require drilling, excavating, hauling, auxiliary, and support equipment as shown in Table 4-4.

Table 4-4 Mine Auxiliary Equipment Fleet

Typical Machine Type	Power	Number	Duties
Cat D10R tracked dozer or equivalent	582 hp	2	Stockpile maintenance, construction, stockpile reclamation
Cat 834G wheel dozer or equivalent	450 hp	1	Clean-up at the pit loading faces and the RTH
Cat 16H Grader or equivalent	275 hp	2	Haul road maintenance
Cat 777D Water Truck or equivalent	937 hp	2	Haul road maintenance, dust suppression, auxiliary firefighting duties
Cat 992G Wheel Loader or equivalent	800 hp	1	General purpose loading, site reclamation
Cat 446D Backhoe with Hammer or equivalent	110 hp	1	Secondary breakage
Cat IT62H Integrated Tool Carrier or equivalent	230 hp	1	Miscellaneous tasks (e.g., snow plowing, fork lift, sweeper, etc.)
Field service trucks	114 hp	6(1)	Field maintenance flatbed trucks fitted with hydraulic arm lift
Fuel truck	150 hp	2(1)	Field fueling of mobile equipment and drills
Line truck	100 hp	1(1)	Powerline maintenance, excavator and RTH service
Off-road lowboy trailer and tractor	200 hp	1(1)	Transporting equipment around mine and to service area/workshops
Drills	Electric and/or 1,600 hp	2(2)	Blasthole drilling for waste rock and ore
Excavators	Electric	2(1)	Excavation of ore and waste materials (waste rock and overburden)
Haul Trucks	2,500 hp	Up to 9	Haulage of ore and waste materials (waste rock and overburden)
Haul truck retriever	1,120 hp	1(1)	Retrieving and transporting haul trucks unable to move under their own power
Light vehicles (pickups and SUVs)	150-250 hp	Up to 20(1)	Supervisors transport, general duties

(1) Tailpipe emissions from these units are not included individually in air emissions calculations.
(2) The air emissions calculations include 1 diesel drill and 1 electric drill.

4.5 Air Management Plan

This section summarizes information from Reference (5), which is a support document for the MPCA Air Emissions Permit application. This plan includes air quality management system design, air quality modeling outcomes, preliminary air quality monitoring, and preliminary reporting requirements. The final air quality monitoring and reporting requirements will be in the permit.

Fugitive dust sources will be the primary concern at the Mine Site. All active areas at the Mine Site will be subject to a Mine Site Fugitive Emissions Control Plan (Attachment A to Reference (5)) approved by the MPCA for managing fugitive dust generated from unpaved roads and at rock dumping and loading locations.

5.0 Rock and Overburden Management Plan

This section summarizes information from Reference (2), which will become part of the MDNR PTM and MPCA SDS Permit. This plan includes waste characterization, stockpile designs, operating plans, reporting requirements, and adaptive management approach. Incremental and final reclamation activities associated with stockpiles and related reclamation cost estimates are also included.

5.1 Waste Rock Classification and Disposition

Based on work described in Section 4 of Reference (8), PolyMet has categorized waste rock into four categories defined according to its sulfur content, in ascending order of reactivity. These waste rock categories are summarized in Table 5-1.

Table 5-1 Summary of Waste Rock Properties

Waste Rock Categorization	Sulfur Content (%S)(1)	Approximate % of Waste Rock Mass	Applications(3)
Category 1	%S ≤ 0.12	70%	Construction and East Pit Backfill
Category 2	0.12 < %S ≤ 0.31	24%	East Pit Backfill
Category 3	0.31 < %S ≤ 0.6	3%	East Pit Backfill
Category 4(2)	0.6 < %S	3%	East Pit Backfill

(1) In general, the higher the rock's sulfur content, the higher its potential for generating Acid Rock Drainage (ARD) or leaching heavy metals.
(2) Includes all Virginia formation rock.
(3) Applications include uses of the material other than stockpile storage.

The decision on where to haul the waste rock will depend on the rock's waste category, which will have been determined through a sampling and analysis program approved by the MDNR.

As shown in Table 5-2, during Mine Years 1 through 11, Category 2, 3, and 4 waste rock will be placed on the temporary Category 2/3 or Category 4 Waste Rock Stockpiles (Large Figure 1 through Large Figure 3). Beginning in Mine Year 11, after mining of the East Pit is complete, Category 2, 3, and 4 waste rock will be placed directly in the East Pit. Category 2, 3, and 4 waste rock will also be used to backfill the Central Pit, after mining ceases in that pit. The material in the temporary Category 2/3 and Category 4 Waste Rock Stockpiles will be relocated to the combined East and Central Pit, after mining ceases in each pit. In addition, approximately 49 million tons of Category 1 waste rock mined after Mine Year 11 will be placed in the East Pit. This will result in backfilling the East Pit, which includes the Central Pit, with approximately 45% of the total waste rock mined.

Table 5-2 Waste Rock Placement (Current Estimate)

Mine Year	Category 1 Waste Rock Stockpile (tons)	Category 2/3 Waste Rock Stockpile (tons)	Category 4 Waste Rock Stockpile (tons)	East Pit[1] (tons)	Total Rock Moved[1] (tons)
0	0	0	0	0	0
1	18,707,500	5,238,800	1,489,200	0	25,435,500
2	15,016,700	4,432,900	762,500	0	20,212,100
3	16,139,000	4,297,100	1,127,700	0	21,563,800
4	12,796,600	3,655,600	827,500	0	17,279,700
5	11,741,300	2,415,000	441,900	0	14,598,200
6	16,842,200	4,349,000	665,600	0	21,856,800
7	10,405,000	2,566,000	549,000	0	13,520,000
8	16,939,800	4,332,200	110,600	0	21,382,600
9	12,556,200	4,660,200	133,500	0	17,349,900
10	12,974,200	4,070,500	76,800	0	17,121,500
11	10,180,400	4,003,900	22,400	6,206,800	20,413,500
12	10,773,100	0	0	10,574,200	21,347,300
13	2,850,000	0	0	16,772,200	19,622,200
14	0	0	0	17,917,200	17,917,200
15	0	0	0	16,689,400	16,689,400
16	0	0	0	14,838,800	14,838,800
17	0	0	0	12,695,000	12,695,000
18	0	0	0	14,581,100	14,581,100
19	0	0	0	15,788,600	15,788,600
20	0	0	0	14,128,000	14,128,000
Total	167,922,000[2]	44,021,200	6,206,700	140,191,300	358,341,200[1]
% Total Rock[1]	54.5%	14.3%	2.0%	45.5%	116.3%[1]

(1) The total rock listed includes movement of rock from the temporary Category 2/3 and Category 4 Waste Rock Stockpiles to the East Pit, and the movement of rock from the West and Central Pits to the East Pit. There will be approximately 308 million tons of waste rock, with about 50 million tons being double-handled for disposal in the East Pit. At reclamation, waste rock storage will be in either the Category 1 Waste Rock Stockpile or the East Pit.

(2) A portion of the Category 1 waste rock may be used for MDNR-approved on-site construction. The balance will be placed in the Category 1 Waste Rock Stockpile.

Stockpiles will be designed to comply with Minnesota Rules, parts 6132.2200 and 6132.2400. When at its maximum extent, based on the current stockpile footprint, each stockpile is projected to have the approximate area, height, and elevation shown Table 5-3.

Table 5-3 Maximum Stockpile Dimensions – Approximate

Stockpile	Mine Year of Maximum Footprint	Maximum Footprint (acres)	Volume (tons)		Height (feet)		Maximum Elevation (feet above sea level)
			Planned(1)	Maximum Capacity	Planned(1)	Maximum Capacity	
Category 1 (Permanent)	6/21(2)	508/526(2)	168.0M	178.0M	240	280	1880
Category 2/3 (Temporary)	6	180	44.0M	60.6M	160	200	1770
Category 4 (Temporary)	3	57	6.21M	15.0M	80	180	1790
Ore Surge Pile (Temporary)	N/A(3)	31	2.50M	4.37M	40	120	1690

(1) The planned volume of the stockpile is the volume of waste rock in the current Mine Plan. The maximum capacity reflects the full capacity of the stockpile based on its current footprint. Maximum capacities of the temporary stockpiles and planned capacity of the permanent stockpile were used for impact evaluations.
(2) The Category 1 Waste Rock Stockpile has a maximum footprint of 508 acres while active. It will reach this size by Mine Year 6. The stockpile will be re-graded as part of reclamation with a final footprint of 526 acres in Mine Year 21.
(3) The OSP is a surge pile that will have ore moving in and out as needed to meet mine and plant conditions.

5.2 Waste Rock Stockpile Liner and Cover Systems

With the exception of the Category 1 Waste Rock Stockpile, the waste rock stockpiles will include liner systems to capture water passing through the stockpile. In liner construction areas where the underlying soils may not be geotechnically stable, unsuitable material will be removed, and a stable foundation will be built with suitable construction material. Stockpiles will be constructed using foundation underdrains, if necessary, to provide gravity drainage where elevated groundwater is encountered to prevent or minimize the potential for excess pore pressures as the stockpile is loaded. In addition, all liner systems will consist of an impermeable barrier layer to limit the downward infiltration of water through the liner system and an overliner drainage layer constructed above the impermeable barrier layer to promote the conveyance of water that reaches the barrier layer to a collection and removal point along the barrier layer via gravity. These three design details (underdrains, impermeable barrier, and overliner drainage layer) enhance liner effectiveness and integrity.

Category 1 waste rock will be disposed in the only permanent stockpile at the Mine Site, which will be located north and west of the West Pit. The Category 1 Waste Rock Stockpile contains non-ARD generating rock; therefore it will be constructed differently than the temporary

Category 2/3 and Category 4 Waste Rock Stockpiles that will contain waste rock with potential to generate ARD. A groundwater containment system will be constructed incrementally with the stockpile and will ultimately surround the stockpile to collect stockpile drainage. Construction of the groundwater containment system will proceed in advance of (west of) the stockpile development to ensure capture of the stockpile drainage until the containment system is fully constructed. The groundwater containment system will consist of a low permeability compacted soil barrier combined with a drainage collection system along the toe of the stockpile (Section 2.1.2.2 of Reference (2)).

The Category 2/3 and Category 4 Waste Rock Stockpiles and OSP will be temporary and will not have cover systems. The material will be stockpiled at the natural angle of repose of the rock with approximately 40-foot lifts separated by 30-foot benches.

The Category 1 Waste Rock Stockpile will have a cover system to limit water infiltration through the stockpile during reclamation and long-term closure. The material will be stockpiled at the natural angle of repose of the waste rock; however, starting in Mine Year 14, portions of the stockpile will be progressively reclaimed with an interbench slope at a 3.75H:1V slope to facilitate placement of the geomembrane cover system that will support vegetation, as required by Minnesota Rules, part 6132.2400, as described in Section 3 of Reference (4). The stockpile reclamation will be complete by the end of Mine Year 21. The process water ditch associated with the groundwater containment system will also be incrementally covered during stockpile reclamation, diverting surface runoff from the stockpile cover to the adjacent stormwater ditch system.

Liner and cover system designs are based on the degree of heavy metal leaching and ARD expected from each waste rock classification. Liner and cover systems could be constructed with glacial till overburden soils removed from the Mine Site during overburden stripping and stockpile foundation construction. The planned liner and cover systems are shown in Table 5-4.

Table 5-4 Summary of Stockpile Liners and Covers

Stockpile	Stockpile Duration	Stockpile Area (Post-Reclamation)	Liner System	Cover System
Category 1 Waste Rock	Permanent	526 acres	No liner system; a groundwater containment system will collect and pump drainage to the WWTF	3-foot engineered cover system with 40-mil geomembrane barrier
Category 2/3 Waste Rock	Temporary	0 acres	12-inch compacted (1x10-5 cm/s) subgrade overlaid by 80-mil LLDPE geomembrane, covered by a 24-inch overliner drainage layer	No cover system; stockpile to be completely removed and reclaimed
Category 4 Waste Rock	Temporary	0 acres	12-inch compacted (1x10-6 cm/s) subgrade overlaid by 80-mil LLDPE geomembrane, covered by a 24-inch overliner drainage layer	No cover system; stockpile to be completely removed and reclaimed
Ore Surge Pile	Temporary	0 acres	12-inch compacted (1x10-6 cm/s) subgrade overlaid by 80-mil LLDPE geomembrane, covered by a 24-inch overliner drainage layer	No cover system; stockpile to be completely removed and reclaimed

Category 1 waste rock will be used as a construction material, depending on the application and availability of the material relative to when it is needed, as approved by the MDNR. The Category 1 waste rock may also be crushed and screened for use in Mine Site construction applications such as those shown in Table 5-4, as approved by the MDNR.

5.3 Overburden Classification and Disposition

Surface overburden (about 6% of the excavated volume for pits and stockpile foundations) is the material that lies on top of the ore body. Overburden at the Mine Site has been divided into three categories based on physical and chemical properties; saturated mineral overburden (Saturated Overburden), unsaturated mineral overburden (Unsaturated Overburden) and organic soils (Peat). The classification of the overburden as saturated or unsaturated is based primarily on the location of the water table; Unsaturated Overburden located above the water table and Saturated Overburden located below the water table.

As described in Section 3 of Reference (8), waste characterization indicates that some of the Saturated Overburden contains iron sulfides and produces lower pH water in laboratory tests indicating that Saturated Overburden should be managed as a reactive mine waste. Based on the

samples tested, the Peat and Unsaturated Overburden are expected to generate leachates with lower sulfate and dissolved metal concentrations than the leachates generated from the Saturated Overburden.

Saturated Overburden will be used for MDNR-approved construction applications. Proposed applications include locations where drainage water will be collected for treatment or drains to the mine pits, where the overburden will be placed back in a saturated location, or where site-specific modeling has demonstrated that applicable surface and groundwater standards will be met. Saturated Overburden not used for construction will be commingled with waste rock in temporary waste rock stockpiles that have membrane liners and ultimately relocated to the East Pit.

Unsaturated Overburden will be used as general purpose construction material on-site, as needed. At times when the construction demands are not as great as the supply, the excess Unsaturated Overburden will be temporarily stored in the OSLA. In reclamation and long-term closure, excess Unsaturated Overburden will be utilized in the East Pit wetland development or placed on the upper benches of the West Pit lake.

Peat will be used for restoration and reclamation activities at the Mine Site. This may include the development of wetlands in the East Pit and within the reclaimed temporary stockpile footprints. Peat will also be mixed with Unsaturated Overburden to increase the organic content for restoration material across the Mine Site, including over the geomembrane cover of Category 1 Waste Rock Stockpile. Excess Peat will be stored in the OSLA until it is can be used for reclamation.

6.0 Reclamation and Long-Term Closure of Mine Pits

Upon completion of mining operations (after 20 years of operation), the mine pits will be closed in accordance with Minnesota Rules, part 6132.3200.

6.1 Incremental Reclamation

As ultimate pit limits are reached, the overburden banks will be sloped and vegetated as described in Section 6.2.2.

When the East Pit is exhausted in Mine Year 11, East Pit dewatering systems will be removed as described in Section 6.2.1 with the exception of temporary pumps needed during pit backfilling.

The waste rock and overburden in the temporary Category 2/3 and Category 4 Waste Rock Stockpiles will be relocated to East Pit as described in Section 7.1.2 of Reference (2).

6.1.1 Borrow Area Reclamation

As described in Section 2.0, construction materials may be obtained from areas off the Mine Site, such as the state-owned waste rock stockpile (Stockpile 2012) or the Area 5 stockpiles. If these material sources are used, the disturbed areas will be reclaimed in accordance with the applicable Minnesota reclamation rules once the need for this material is exhausted.

6.2 Final Reclamation

The following paragraphs describe the reclamation of the mine pits once operations cease.

As part of site restoration, a wetland may be constructed on the backfilled East Pit as described in Section 3.0, and the East Pit will be flooded.

6.2.1 Removal of Dewatering System

All power lines, substations, pumps, hoses, pipes, and appurtenances used for dewatering the pits will be removed, and the pits will be allowed to flood with water. Some temporary pumps may remain in these pits for selected dewatering that will need to be performed during reclamation. Large Figure 18 and Large Figure 19 show the pumps and pipes to be removed or maintained. The pipes from the pits to the CPS and the WWTF will also be removed, although the following piping could remain:

- the water pipes between the WWTF and the East Pit could be used during reclamation to convey treated water to the East Pit if insufficient water was otherwise available to maintain water levels or to convey East Pit water to the WWTF for treatment

- the water pipes between the West Pit and the WWTF will be used in reclamation to convey treated water from the WWTF to the West Pit if insufficient water was

otherwise available to maintain water levels and to convey West Pit water to the WWTF for treatment

All areas disturbed during pipe removal will be graded and revegetated.

6.2.2 Pit Wall Sloping and Revegetation

The toe of the overburden portion of the pit walls will be set back at least 20 feet from the crest of the rock portion of the pit wall. The overburden portions of the pit walls will be sloped and graded at no greater than 2.5H: 1V. The sloped areas will be vegetated to conform to Minnesota Rules, part 6132.2700.

6.2.3 Pit Perimeter Barrier

A pit perimeter barrier system will be installed. The system will consist of fences, rock barricades, ditches, stockpiles, and berms. The barrier system plan will be submitted to and approved by the St. Louis County Mine Inspector before construction. Fencing will consist of barbed wire in most locations, but when roads will remain adjacent to the fences, non-climbable mesh fencing will be installed.

6.2.4 Access to Pit Lake

Safe access to the water in each mine pit lake (Minnesota Rules, part 6132.3200) will be provided by selected haul roads built during pit development and mine operation. A gated entrance will be placed at each of the pit lake access locations. The access road will be selected such that, as pit lake water level rises, there will always be a clear path to the water surface.

6.2.5 Mine Pit Lake Level Management

An evaluation of the surface topography along the pit rims was conducted to determine where and at what elevation natural overflow from the pits will occur if unmanaged. Evaluations were conducted using the available maps with 2-foot contours.

- The low point in the ground surface along the rim of the East Pit is approximately 1,594 feet above mean sea level (ft-MSL), located along the southeast corner of the pit. Water leaving the pit at this location will overflow toward the Partridge River to the southeast.

- The low point in the ground surface along the rim of the West Pit is approximately 1,579 ft-MSL, located near the southwest corner of the pit. Water leaving the pit at this location will overflow toward the Partridge River to the south.

Because the estimated water levels for both the East and West Pits are higher than the natural overflow elevations, both of these pits are estimated to have a net outflow to surface water. The actual steady-state water level in the West Pit in long-term closure will be established by pumping of the pit water to the WWTF for treatment and discharging to the Partridge River, as

described in Section 6.3.2. The actual steady-state water level in the East Pit will be established by an outlet structure described below.

A channel will be excavated from the southwest corner of the East Pit to the northeast corner of the West Pit during operations or shortly thereafter to control overflows from the East Pit during reclamation and for water management during long-term closure. The overflow for the East Pit will be set at elevation 1,592 ft-MSL to provide an adequate buffer between this overflow and the natural overflow elevation of 1,594 ft-MSL in the southeast corner of the pit. Based on available bedrock data, it is anticipated that the East Pit overflow structure will be excavated in bedrock. The annual average overflow from the East Pit to the West Pit will vary depending on the sources used to flood the pits with water. The outlet structure was designed for the expected peak overflow rate of 187 cubic feet per second (cfs), based on removal of 10% of the runoff from a 100-year, 24-hour rainfall event (5.2 inches of precipitation) within one hour. This is a conservative estimate based on total runoff volume and does not consider the potential reductions in peak flow due to the specific characteristics of the East Pit watershed.

The East Pit outlet structure will be formed out of bedrock (assuming bedrock conditions are stable) or a reinforced concrete weir will be cast-in-place; the invert of the outlet will be set at the East Pit overflow elevation previously described. The weir will be 20 feet wide, resulting in 2 feet of water over the weir during the 100-year storm event. A 425-foot-long channel with a bottom slope of about 1% will connect the East Pit overflow to the West Pit. The channel will have a 6-foot-wide bottom with side slopes of 3H:1V, resulting in a maximum flow velocity of 6 feet per second during the 100-year overflow. Based on available bedrock elevations, it is expected the entire length of the channel will be excavated in bedrock.

The final locations of the intake and discharge of the connection channel will be determined once more detailed investigations of the bedrock topography along the proposed route are completed prior to the end of operations.

6.2.6 Water Management During Reclamation

Upon completion of mining operations in the West Pit, after pit dewatering systems are removed, the pit will begin to flood naturally with water from groundwater inflows, precipitation and stormwater runoff from the tributary watershed. The flooding process will be augmented with the addition of treated and untreated seepage water from the FTB. Treated water from the WWTF will also be discharged to the West Pit during reclamation as described in Section 2 of Reference (4). The management of water flowing into the pits during reclamation is described in Section 7.2 of Reference (3) and Section 2 of Reference (4). Monitoring of the water level and the water quality in the pits during reclamation is described in Section 5.1.1 of Reference (3).

6.3 Long-Term Closure

Once reclamation activities described in Section 6.2 are complete, a long-term closure period will begin. The following paragraphs describe the long-term closure activities.

6.3.1 Reclamation Maintenance

Reclaimed mine overburden slope erosion will be corrected and re-vegetated as needed. In areas where excess erosion is a repetitive problem, channels and/or outfall structures will be designed for those specific locations.

6.3.2 Water Management During Long-Term Closure

During long-term closure, the water level in the West Pit will be maintained below the natural overflow elevation by discharging treated water to a small watercourse south of the West Pit that flows off-site to the Partridge River. The discharged water will have been pumped from the West Pit to the WWTF for treatment to meet the appropriate water discharge limits as described in Section 2 of Reference (4) prior to discharge. The ultimate objective is to transition from the mechanical treatment provided by the WWTF to a non-mechanical treatment system once the non-mechanical treatment system has been demonstrated to provide the required water treatment. Potential non-mechanical treatment systems, including construction of an outlet structure from the West Pit, are described in Section 6 of Reference (4).

6.4 Reclamation Estimates

The following section provides an overview of the contingency reclamation plan for Mine Year 0 and Mine Year 1. For more specific details on reclamation and the associated cost estimates, see the Reclamation Plan and Contingency Reclamation Estimates that will be part of the Permit to Mine application.

6.4.1 Contingency Reclamation Plan (Mine Year 0 and 1)

6.4.1.1 Mine Year 0 (end of construction/development)

If closure were to occur at the end of Mine Year 0, the activities described in 6.2 and 6.3 will be implemented. The mine pits will not be developed.

This plan is used to develop the Mine Year 0 Contingency Reclamation Estimate that will be the basis for financial assurance required by Minnesota Rules, part 6132.1200, which is required before a PTM can be granted.

6.4.1.2 Mine Year 1 (end of first year of operations)

If closure were to occur at the end of Mine Year 1, the activities described in 6.2 and 6.3 will be implemented. The mine pits will be as shown on Large Figure 1.

The mine pit overburden bank slope area requiring reclamation will be approximately 10 acres and the length of pit fencing will be approximately 12,100 feet.

This plan is used to develop the Mine Year 1 Contingency Reclamation Estimate that will be the basis for financial assurance required by Minnesota Rules part 6132.1200 the first or second

calendar year (depending on construction progress) after the issuance of the PTM. Financial assurance will be required before operations can begin. This plan and estimate will be updated annually to include contingency reclamation for the site conditions representative of the end of the upcoming year of operation.

Revision History

Date	Version	Description
11/30/2011	1	Initial release to provide requested information
12/14/2012	2	Significant changes to incorporate project changes related to the decisions made in the AWMP Version 5. These project changes include the use of a geomembrane cover on the Category 1 Waste Rock Stockpile, the use of long-term mechanical treatment, and the potential for non-mechanical treatment in long-term closure.
11/10/2014	3	Minor editorial changes were made to incorporate response to agency comments and nuances made to the project, as follows: Clarify in Section 2.0 the need for removal of other unsuitable soils, use of peat, and the name and source of the state-owned stockpile used for borrow Update in Section 2.1.3 the length of the spur at the Mine Site Update in Section 2.1.4 the appropriate section for the reference Clarify in Section 2.3 the future use of the management plans Simplify in Section 2.3 the discussion of construction water Corrected Table 3-1 maximum depths Corrected Table 4-1 area and associated overburden excavation volumes associated with the Category 1 Waste Rock Stockpile Clarified in Table 4-3 and 5-2 that quantities provided are current estimates Refined Section 5.1 method of rock categorization Updated Table 5-3 to include planned and maximum volumes for stockpiles Clarified in Section 5.2 the description of the Category 1 Stockpile Groundwater Containment System build out Added Section 6.1.1. on borrow area reclamation Updated the Section 6.2 reference to the East Pit wetland description Added text in Section 6.4 to clarify that cost estimates will be in the Permit to Mine application and not in this document Deleted Sections 6.3.4 through 6.3.5, which were placeholders
12/10/2014	4	Minor editorial changes were made to incorporate response to agency comments and provide clarification, as follows: Clarification to text in Sections 2.0, 2.3, and 6.1.1 and Tables 5-2 and 5-3

References

1. **Poly Met Mining Inc.** NorthMet Project Project Description (v8). December 2014.

2. —. NorthMet Project Rock and Overburden Management Plan (v7). December 2014.

3. —. NorthMet Project Water Management Plan - Mine Site (v3). January 2015.

4. —. NorthMet Project Adaptive Water Management Plan (v6). January 2015.

5. —. NorthMet Project Air Quality Management Plan - Mine (v5). December 2014.

6. —. NorthMet Project Reclamation Plan (v4). December 2014.

7. **Golder Associates Ltd.** RS09 - Geotechnical Pit Slope Analysis. June 2006.

8. **Poly Met Mining Inc.** NorthMet Project Waste Characterization Data Package (v11). November 2014.

List of Tables

List of Large Figures

List of Attachments

Attachment A Draft Annual Permit to Mine Report – PLACEHOLDER
Attachment B Earthwork Design Drawings – PLACEHOLDER

Large Figures

PETER MITCHELL OPEN PIT
TACONITE MINE

Partridge River

Yelp Creek

EAST PIT

CATEGORY 1

CATEGORY 4

CATEGORY 2/3

ORE SURGE PILE

CPS
POND

MINE SITE FUELING AND MAINTENANCE FACILITY

RAIL TRANSFER HOPPER

WWTF PONDS

WASTEWATER TREATMENT FACILITY

CENTRAL PUMPING STATION

OVERBURDEN STORAGE
& LAYDOWN AREA

DUNKA ROAD

TREATED WATER PIPELINE

MINNESOTA POWER
SUBSTATION

Minnesota Power 138 kV Existing Transmission Line

Partridge River

Stubble Creek

A
A'
B
B'
C
C'
D
D'

Mine Site
Mine Pit
Active Stockpile
Haul Roads
Mine Pit Cross-Sections
Stockpile Cross-Sections
Proposed Transmission Line
Existing Private Railroad
Proposed Railroad Track

0 750 1,500 3,000
Feet

Large Figure 1
MINE PLAN - MINE YEAR 1
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

Barr Footer: ArcGIS 10.0 2012-10-31 11:52 File: I:\Client\PolyMet_Mining\Work_Orders\Agency_Preferred_Alternative\Maps\Project_Description\Large Figure 7 Mine Plan Year 01.mxd User: arm2

PETER MITCHELL OPEN PIT
TACONITE MINE

Partridge River

Yelp Creek

EAST PIT

CATEGORY 1

CATEGORY 4

CATEGORY 2/3

WEST PIT

ORE SURGE PILE

OVERBURDEN STORAGE
& LAYDOWN AREA

CPS
POND

MINE SITE FUELING AND MAINTENANCE FACILITY

RAIL TRANSFER HOPPER

WWTF PONDS

WASTEWATER TREATMENT FACILITY

CENTRAL PUMPING STATION

MINNESOTA POWER
SUBSTATION

TREATED WATER PIPELINE

DUNKA ROAD

Minnesota Power 138 kV Existing Transmission Line

Partridge River

Stubble Creek

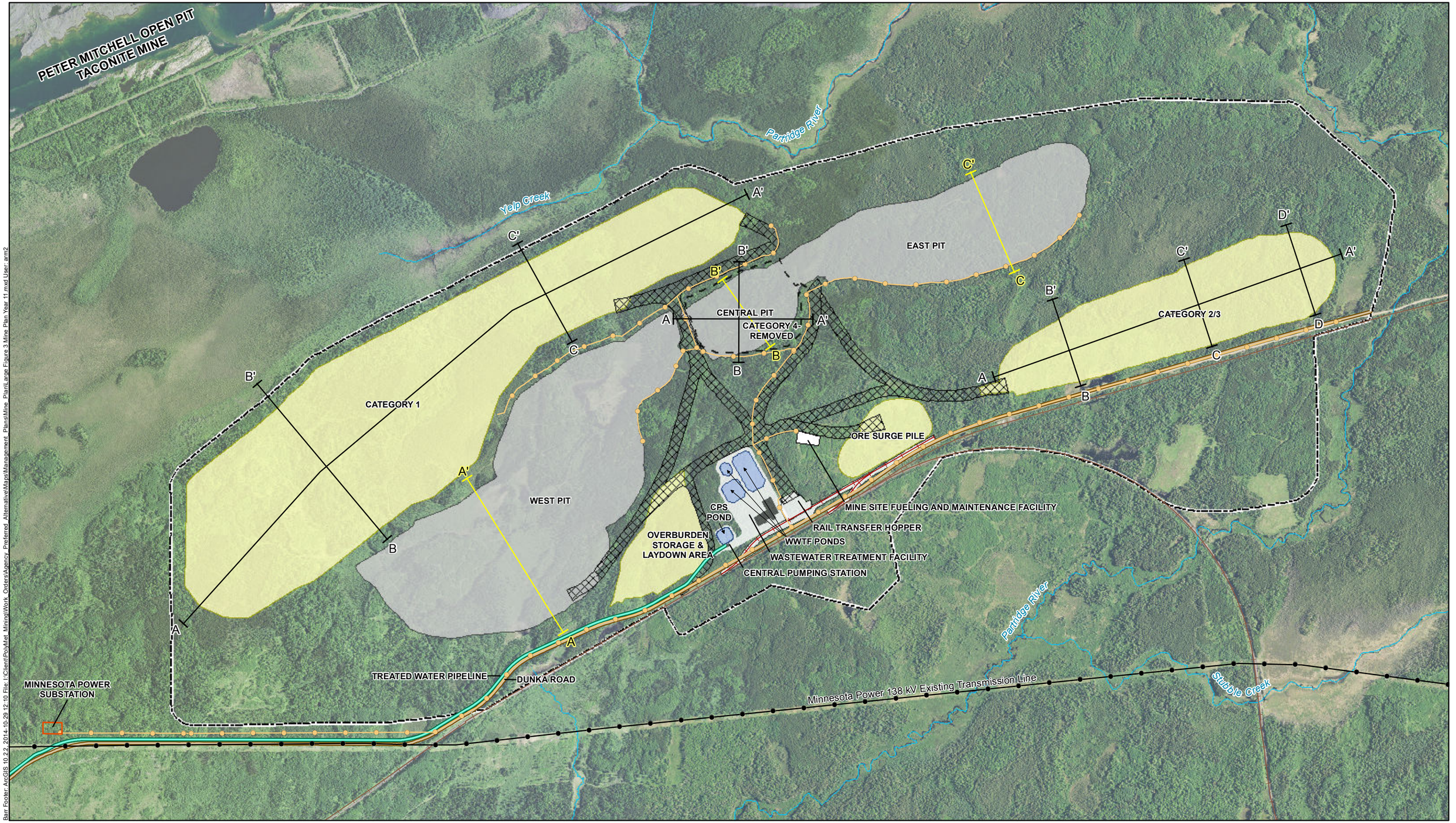
A
A'
B
B'
C
C'
D
D'

Mine Site
Mine Pits
Active Stockpiles
Haul Roads
Mine Pit Cross-Sections
Stockpile Cross-Sections
Proposed Transmission Line
Existing Private Railroad
Proposed Railroad Track

0 750 1,500 3,000
Feet

Large Figure 2
MINE PLAN - MINE YEAR 2
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

Barr Footer: ArcGIS 10.0 2012-12-05 09:22 File: I:\Client\Poly\Met_Mining\Work_Orders\Agency_Preferred_Alternative\Maps\Management_Plans\Mine_Plan\Large Figure 2 Mine Plan Year 02.mxd User: arm2



Mine Site
Mine Pits
Active Stockpiles
Removed Stockpiles
Haul Roads
Mine Pit Cross-Sections
Stockpile Cross-Sections
Proposed Transmission Lines
Existing Private Railroad
Proposed Railroad Track

0 750 1,500 3,000
Feet

Large Figure 3
MINE PLAN - MINE YEAR 11
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

Barr Footer: ArcGIS 10.2.2 2014-10-29 12:10 File: I:\Client\PolyMet Mining\Work Orders\Agency Preferred Alternative\Maps\Management Plans\Mine Plan\Large Figure 3 Mine Plan Year 11.mxd User: arm2

PETER MITCHELL OPEN PIT
TACONITE MINE

Partridge River

Yelp Creek

EAST PIT

CATEGORY 4 -
REMOVED

CATEGORY 2/3 -
REMOVED AND RECLAIMED

CATEGORY 1

WEST PIT

ORE SURGE PILE

CPS
POND

MINE SITE FUELING AND MAINTENANCE FACILITY

RAIL TRANSFER HOPPER

WWTF PONDS

WASTEWATER TREATMENT FACILITY

CENTRAL PUMPING STATION

OVERBURDEN STORAGE
& LAYDOWN AREA

TREATED WATER PIPELINE

DUNKA ROAD

MINNESOTA POWER
SUBSTATION

Minnesota Power 138 kV Existing Transmission Line

Partridge River

Stubble Creek

A
A'
B
B'
C
C'
D
D'

Bar Footer: ArcGIS 10.2.2 2014-10-29 12:13 File: I:\Client\PolyMet Mining\Work Orders\Agency Preferred Alternative\Maps\Management Plans\Mine Plan\Large Figure 4 Mine Plan Year 20.mxd User: am2

Mine Site
Open Stockpile
Covered Stockpile
Active Stockpile
Removed and Reclaimed Stockpiles
Removed Stockpile

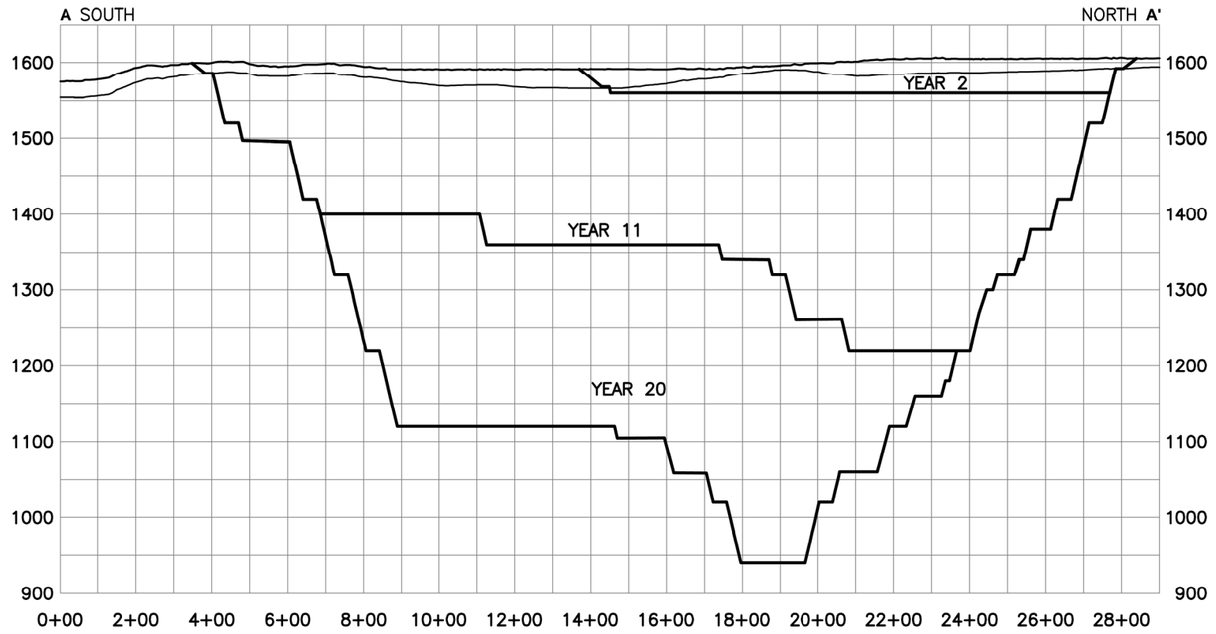
Mine Pits
Haul Roads
Reclaimed Haul Roads
Stockpile Cross-Sections
Mine Pit Cross-Sections

Proposed Transmission Lines
Existing Private Railroad
Proposed Railroad Track

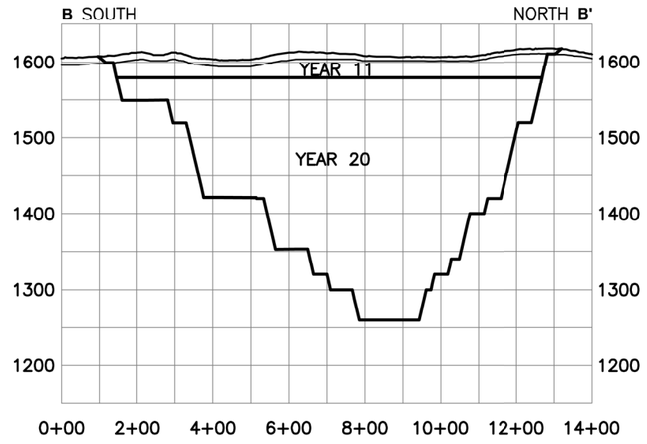
N

0 750 1,500 3,000
Feet

Large Figure 4
MINE PLAN - MINE YEAR 20
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

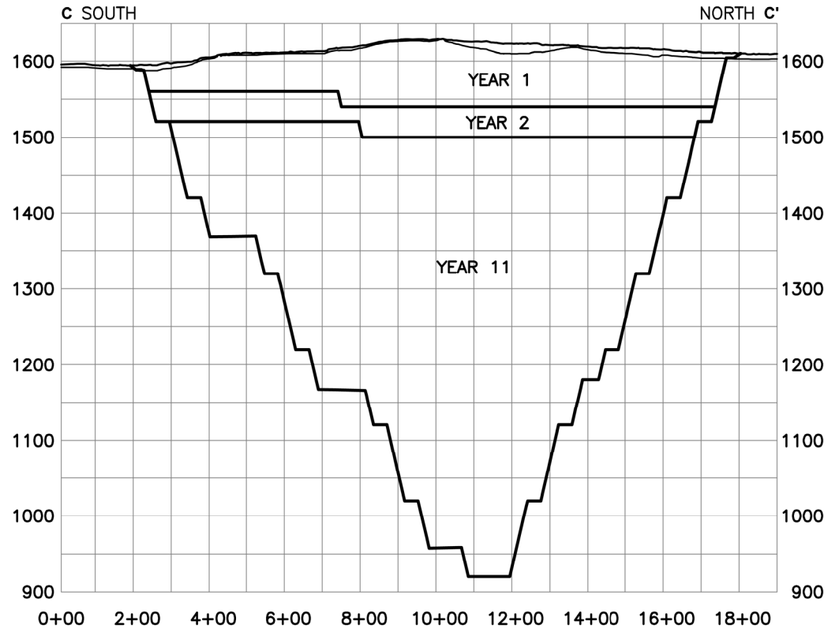


A — SECTION: WEST PIT
2:1 VERTICAL EXAGGERATION

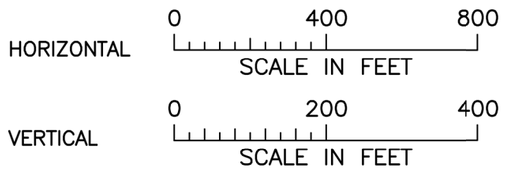


B — SECTION: CENTRAL PIT
2:1 VERTICAL EXAGGERATION

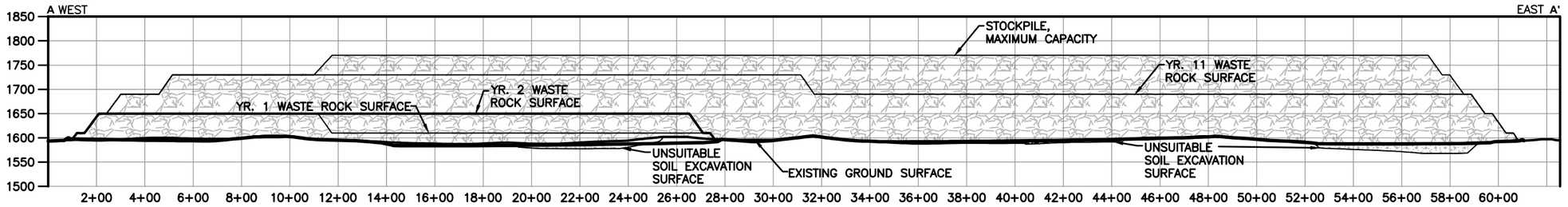
NOTE: CENTRAL PIT MINING WILL BE COMPLETED IN MINE YEAR 16.



C — SECTION: EAST PIT
2:1 VERTICAL EXAGGERATION

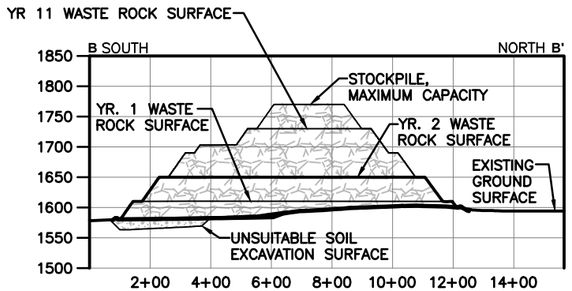


Large Figure 5
PIT CROSS–SECTIONS
NorthMet Project
PolyMet Mining Inc.
Hoyt Lakes, MN



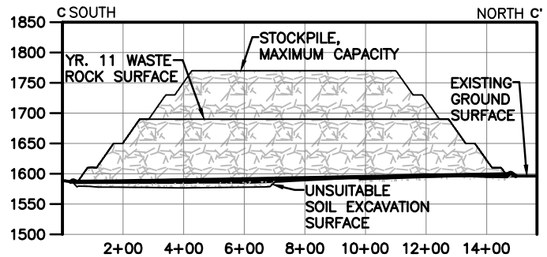
A — SECTION: CATEGORY 2/3 STOCKPILE

2:1 VERTICAL EXAGGERATION



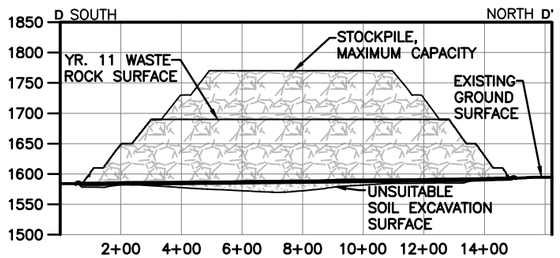
B — SECTION: CATEGORY 2/3 STOCKPILE

2:1 VERTICAL EXAGGERATION



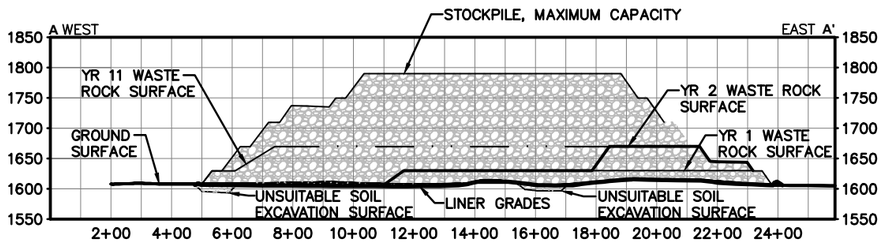
C — SECTION: CATEGORY 2/3 STOCKPILE

2:1 VERTICAL EXAGGERATION



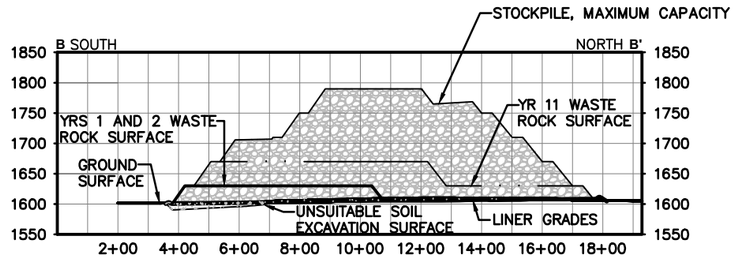
D — SECTION: CATEGORY 2/3 STOCKPILE

2:1 VERTICAL EXAGGERATION



A — SECTION: CATEGORY 4 STOCKPILE

2:1 VERTICAL EXAGGERATION



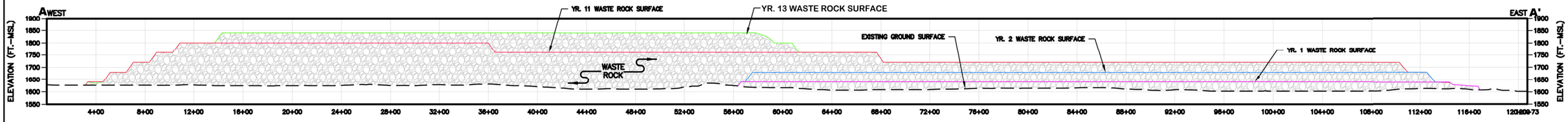
B — SECTION: CATEGORY 4 STOCKPILE

2:1 VERTICAL EXAGGERATION

HORIZONTAL 0 500 1000 SCALE IN FEET

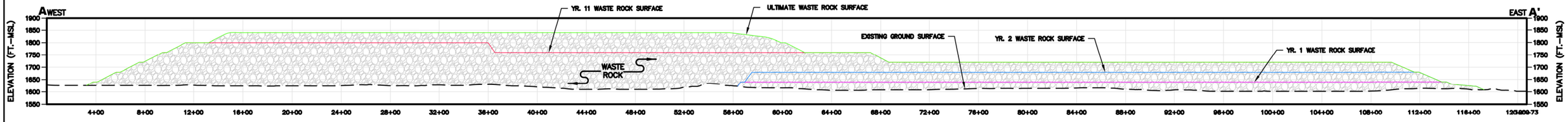
VERTICAL 0 250 500 SCALE IN FEET

Large Figure 14
STOCKPILE CROSS-SECTIONS
NorthMet Project
PolyMet Mining Inc.
Hoyt Lakes, MN



A/8 OPERATIONAL CONFIGURATION SECTION
CATEGORY 1 STOCKPILE

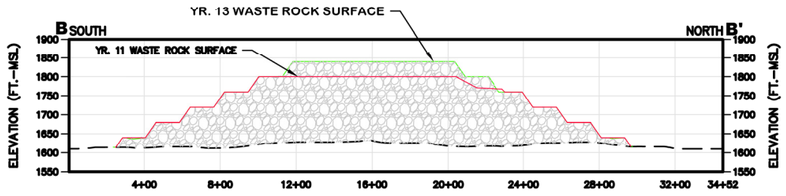
0 400 800
HORIZONTAL SCALE IN FEET
2X VERTICAL EXAGGERATION



A/8 RECLAMATION CONFIGURATION SECTION – INTERBENCH SLOPES 3.75H:1V
CATEGORY 1 STOCKPILE

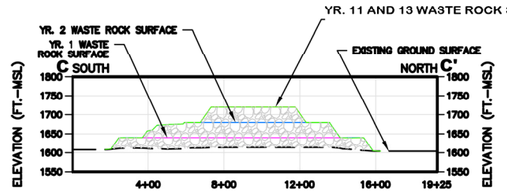
0 400 800
HORIZONTAL SCALE IN FEET
2X VERTICAL EXAGGERATION

NOTE: THE RECLAMATION CONFIGURATION IS SHOWN FOR EACH MINE PLAN FIGURE YEAR FOR ESTIMATION OF CONTINGENCY CLOSURE AND FINANCIAL ASSURANCE.



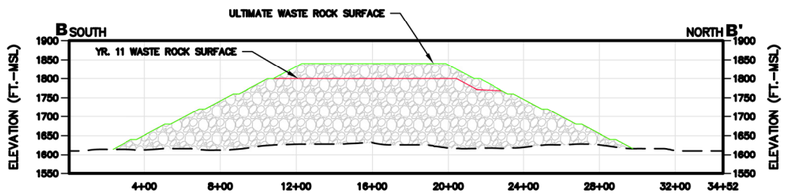
B/8 OPERATIONAL CONFIGURATION – WEST SECTION
CATEGORY 1 STOCKPILE

0 400 800
HORIZONTAL SCALE IN FEET
2X VERTICAL EXAGGERATION



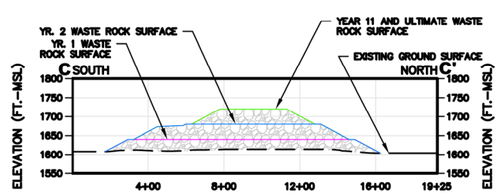
C/8 OPERATIONAL CONFIGURATION – EAST SECTION
CATEGORY 1 STOCKPILE

0 400 800
HORIZONTAL SCALE IN FEET
2X VERTICAL EXAGGERATION



B/8 RECLAMATION CONFIGURATION – WEST SECTION, INTERBENCH SLOPES 3.75H:1V
CATEGORY 1 STOCKPILE

0 400 800
HORIZONTAL SCALE IN FEET
2X VERTICAL EXAGGERATION



C/8 RECLAMATION CONFIGURATION – EAST SECTION, INTERBENCH SLOPES 3.75H:1V
CATEGORY 1 STOCKPILE

0 400 800
HORIZONTAL SCALE IN FEET
2X VERTICAL EXAGGERATION

LEGEND

- YEAR 1 LIMITS
- YEAR 2 LIMITS
- YEAR 11 LIMITS
- YEAR 12, ULTIMATE LIMITS
- EXISTING GROUND SURFACE

DRAFT

0 500 1000
SCALE IN FEET

VER NO	DATE	DESCRIPTION
A	06/05/12	ISSUED FOR CLIENT REVIEW
B	09/21/12	ISSUED FOR CLIENT REVIEW

DRAWING STATUS

ISSUED	VERSION	DATE
FOR PERMITTING		
FOR CONSTRUCTION		

PERMIT DRAWINGS – NOT APPROVED FOR CONSTRUCTION.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNATURE _____
PRINTED NAME _____
DATE _____ REG. NO. _____

DRAWN: MTM 06/05/12
CHECKED: GG 06/05/12
GOLDER PROJECT NO.: 113-2209
SCALE: AS SHOWN

PLANT DRAWING NUMBER:

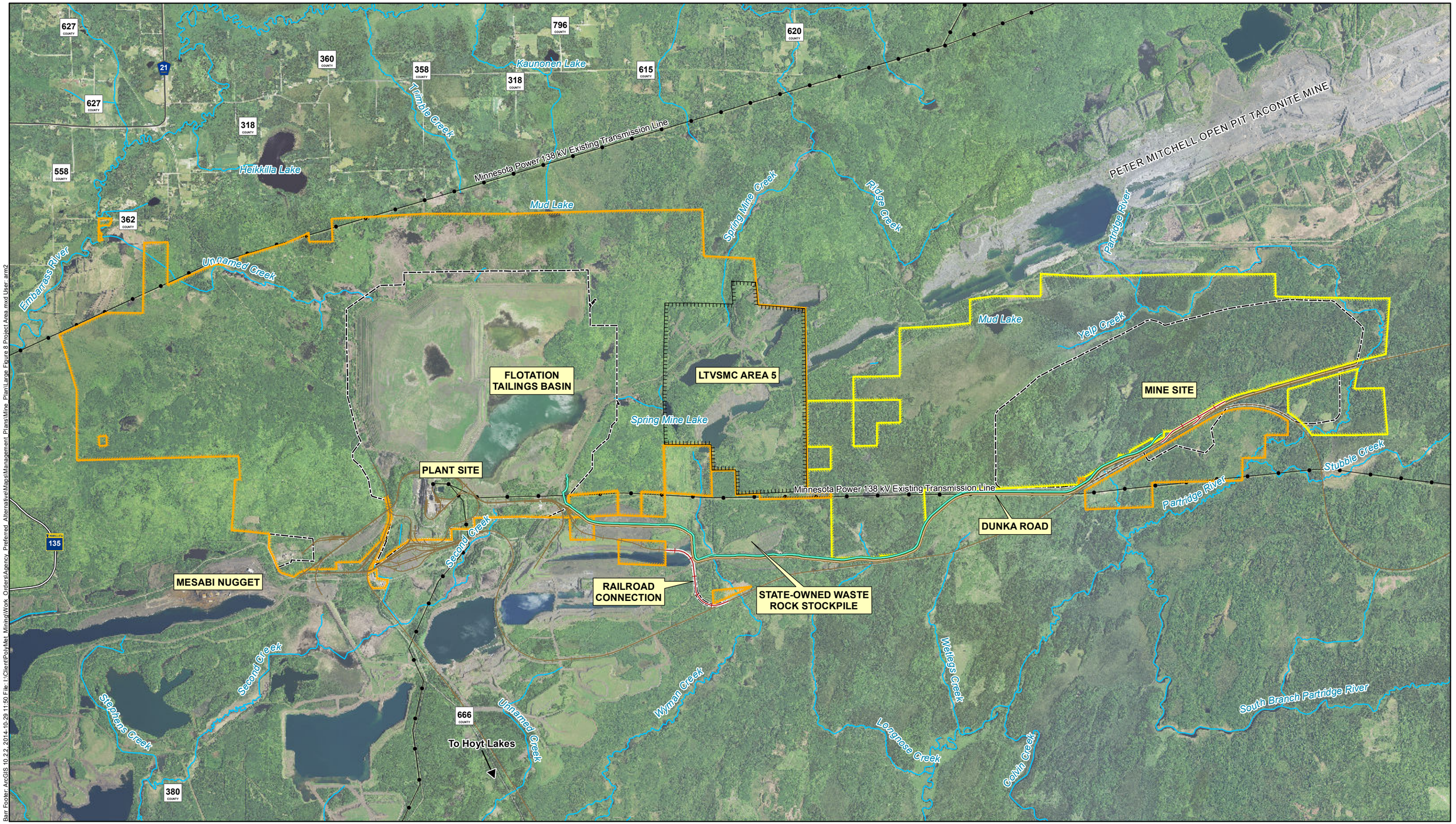
STOCKPILE CROSS-SECTIONS
CATEGORY 1 STOCKPILE

POLYMET MINING CORPORATION
NORTHMET PROJECT
HOYT LAKES, MINNESOTA

GOLDER ASSOCIATES INC.
44 UNION BOULEVARD, SUITE 300
LAKEWOOD, CO USA 80233
Ph: (303) 980-0540
Fax: (303) 985-2080
www.golder.com

DWG. NO. 8 Mine Plan Large Figure 7 REV B

INCHES 1 2

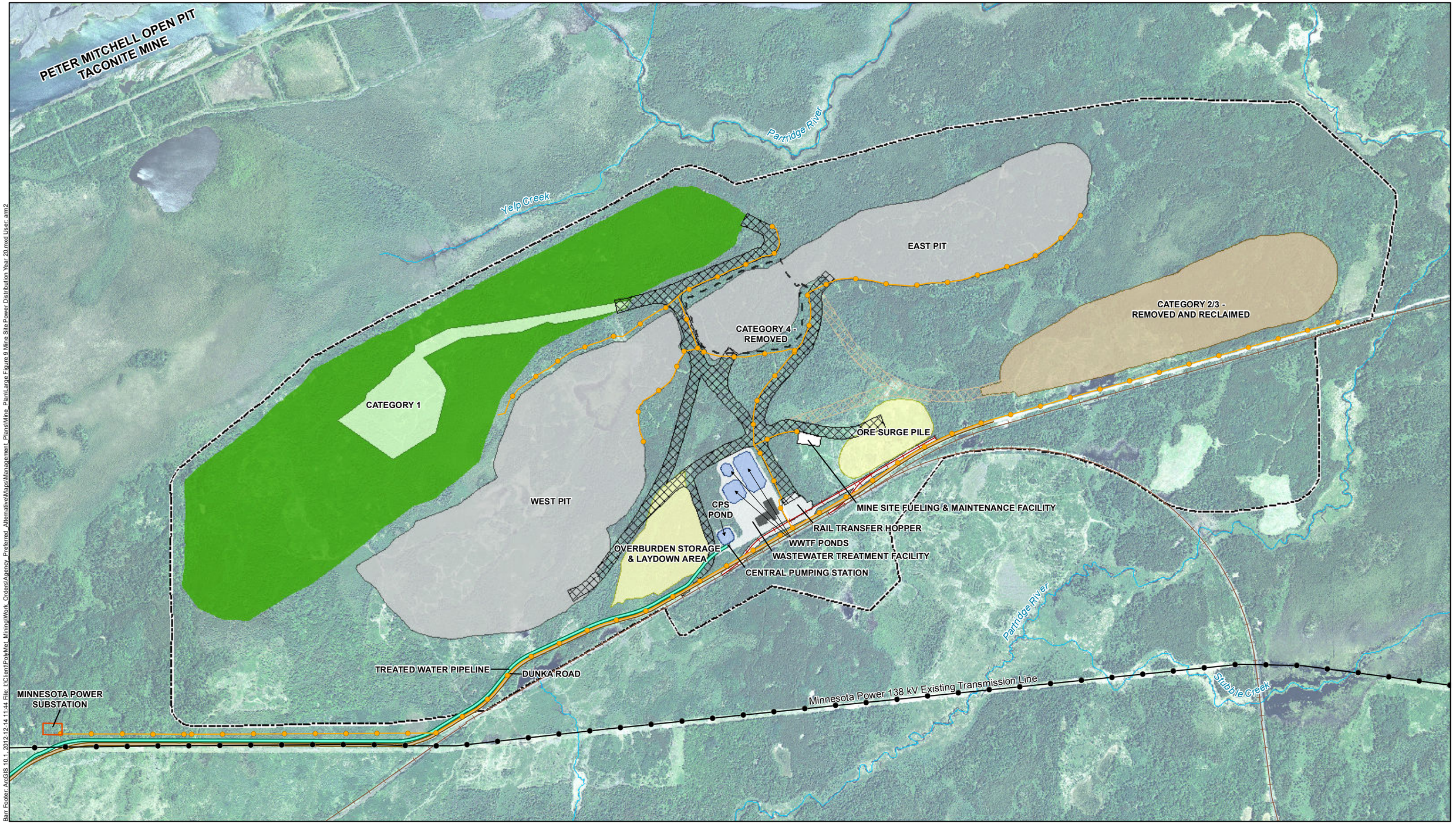


PolyMet Owned/Leased Area
Land Exchange Area
LTVSMC Area 5
Dunka Road
Treated Water Pipeline
Rivers & Streams
Proposed Railroad Track
Existing Railroad Track

0 0.5 1 2
Miles

Large Figure 8
PROJECT AREA
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

Barr Footer: ArcGIS 10.2.2, 2014-10-29 11:50 File: I:\Client\PolyMet Mining\Work Orders\Agency_Preferred_Alternative\Maps\Management_Plans\



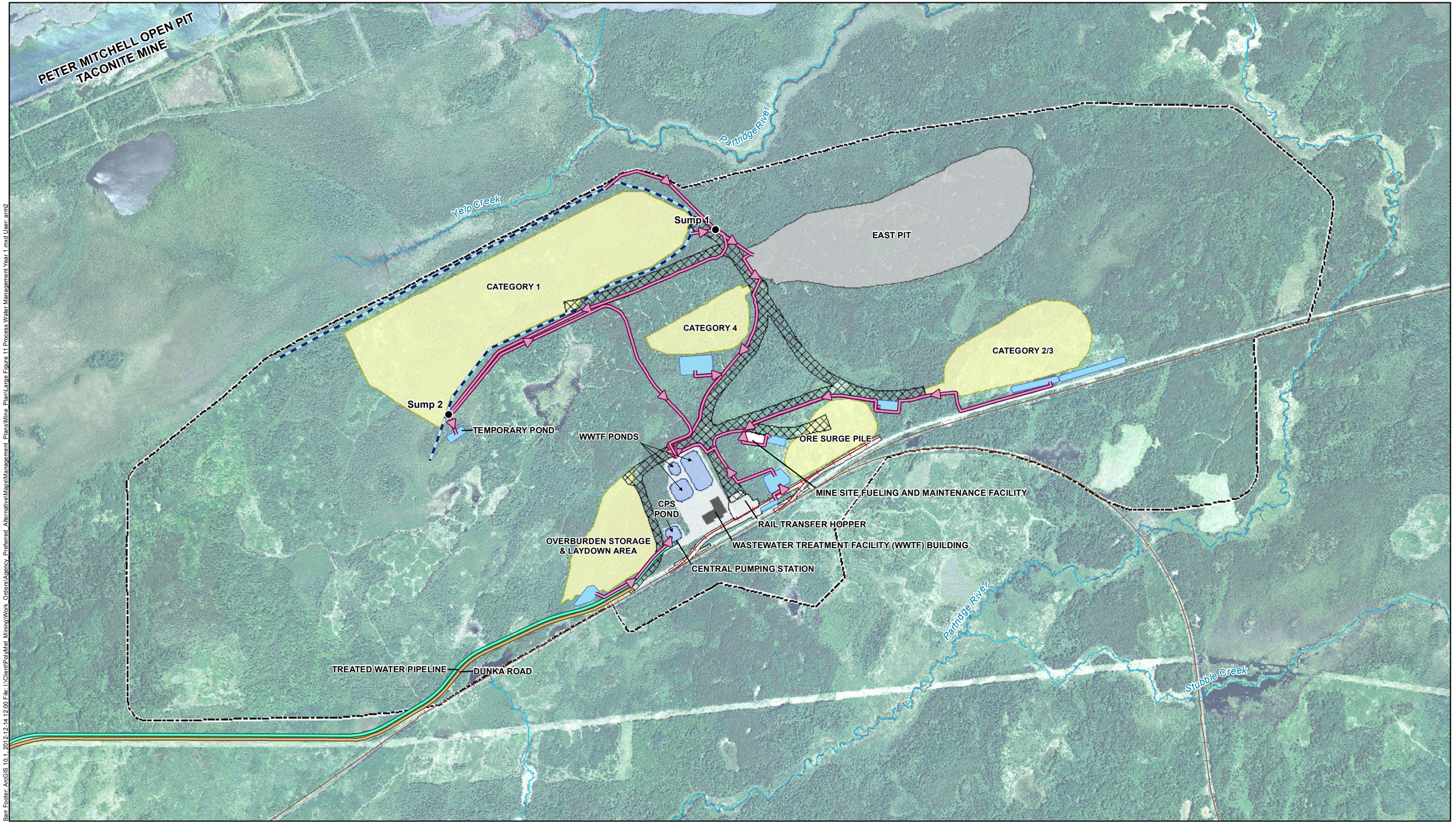
Barr Footer: ArcGIS 10.1, 2012-12-14 11:44 File: I:\Client\PolyMet_Mining\Work_Orders\Agency_Preferred_Alternative\Maps\Management_Plans\Mine_Plan\Large Figure 9 Mine Site Power Distribution Year 20.mxd User: arm2

- Mine Site
- Open Stockpile
- Covered Stockpile
- Active Stockpile
- Removed and Reclaimed Stockpile
- Removed Stockpile
- Mine Pits
- Haul Roads
- Reclaimed Haul Roads
- Proposed Transmission Lines

0 750 1,500 3,000
Feet

Large Figure 9
MINE SITE POWER DISTRIBUTION
MINE YEAR 20
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

Large Figure 10 Mine Site Fueling and Maintenance Facility (PLACEHOLDER)

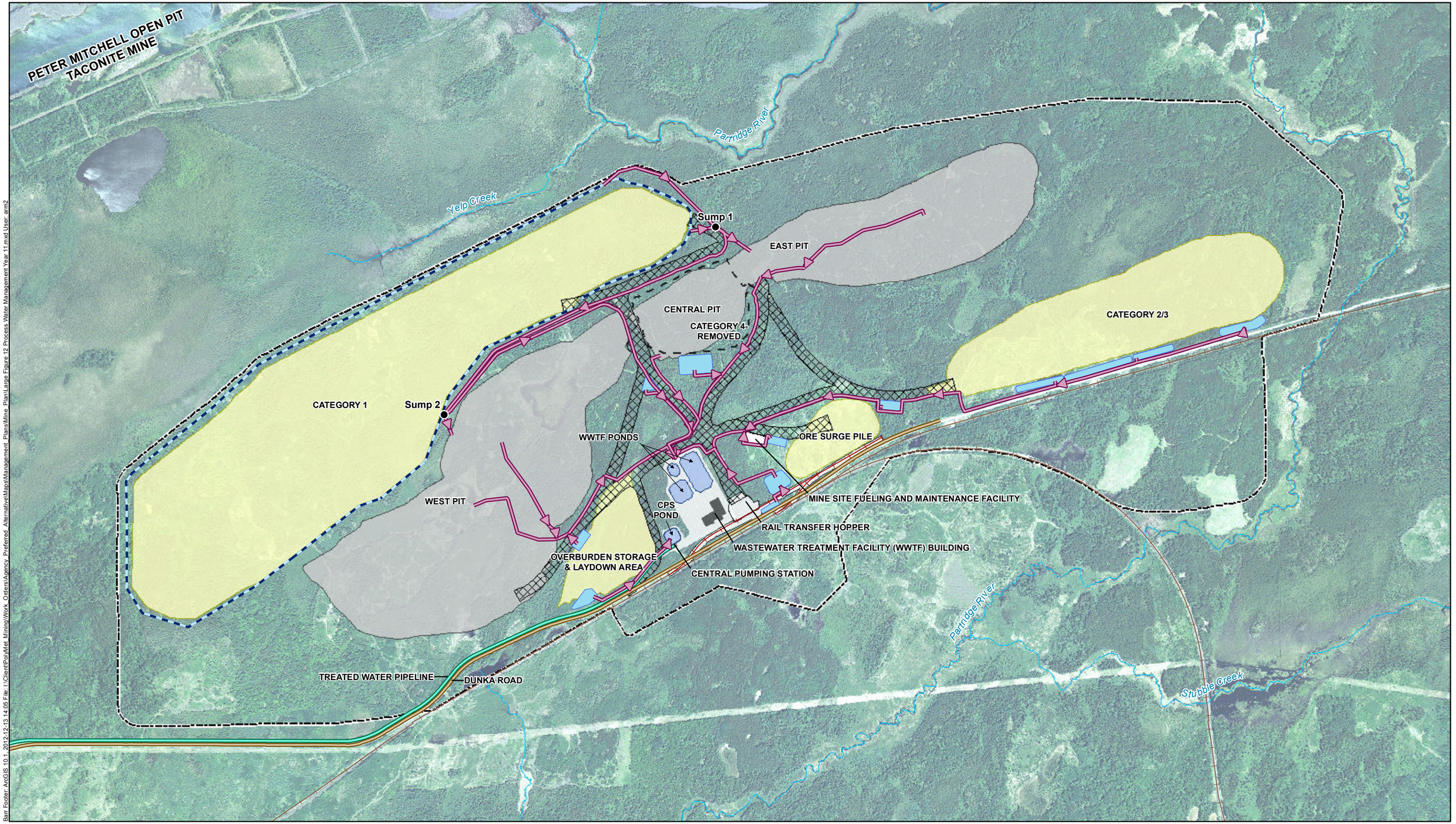


Barr Footer: ArcGIS 10.1, 2012-12-14 12:00 File: I:\Client\PolyMet Mining\Work Orders\Agency Preferred Alternative\Maps\Management Plans\Mine Plan\Large Figure 11 Process Water Management Year 1.mxd User: arm2

Mine Site
Mine Pit
Active Stockpile
Haul Roads
Process Water Pipe
Groundwater Containment System
Ponds and Sumps

0 750 1,500 3,000
Feet

Large Figure 11
PROCESS WATER MANAGEMENT
MINE YEAR 1
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN



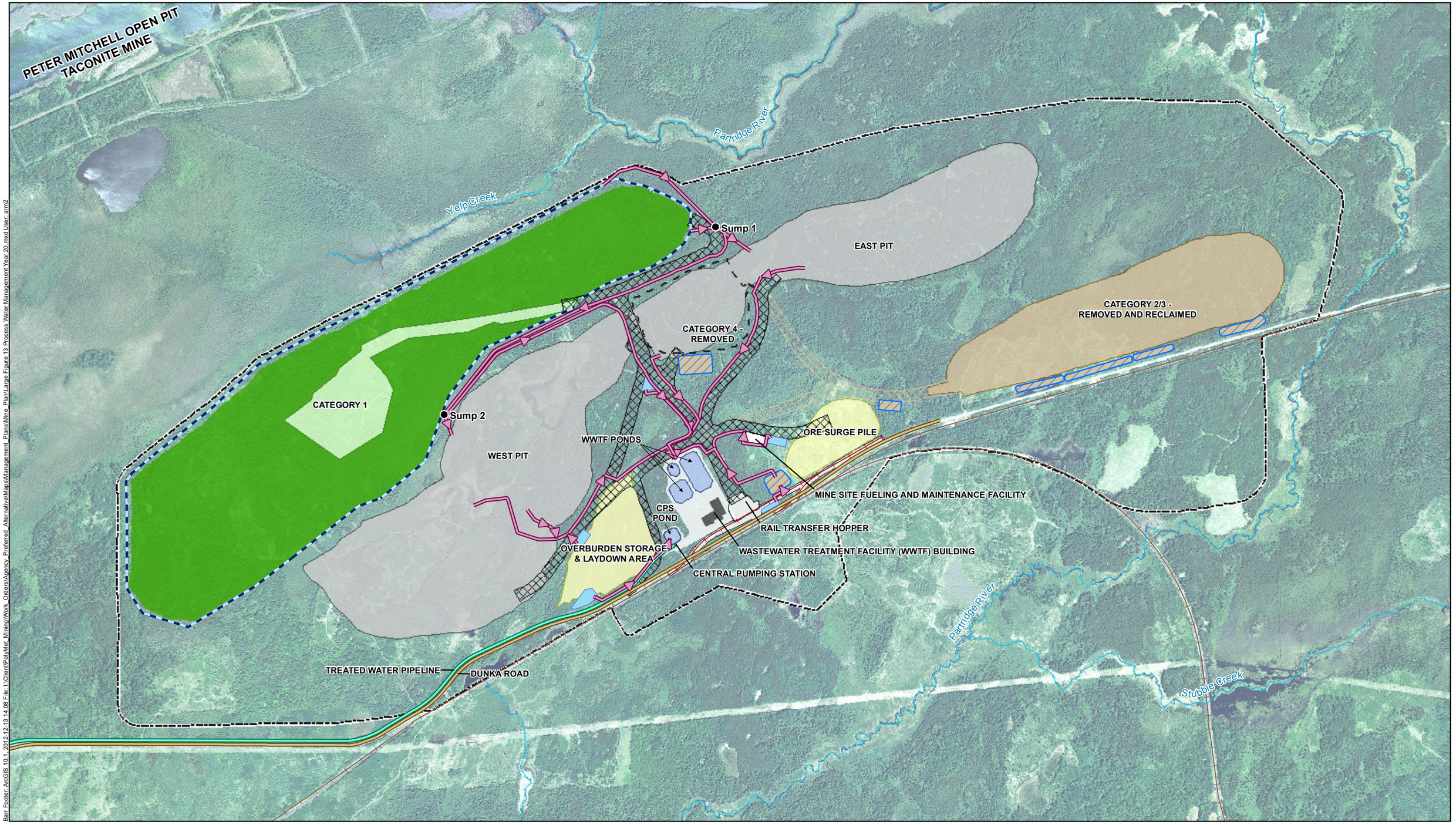
Barr Footer: ArcGIS 10.1 2012-12-13 14:05 File: I:\Client\PolyMet Mining\Work Orders\Agency Preferred Alternative\Maps\Management Plans\Mine Plan\Large Figure 12 Process Water Management Year 11.mxd User: amn2

Mine Site
Mine Pits
Active Stockpiles
Removed Stockpile
Haul Roads
Process Water Pipe
Groundwater Containment System
Ponds and Sumps

N

0 750 1,500 3,000
Feet

Large Figure 12
PROCESS WATER MANAGEMENT
MINE YEAR 11
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

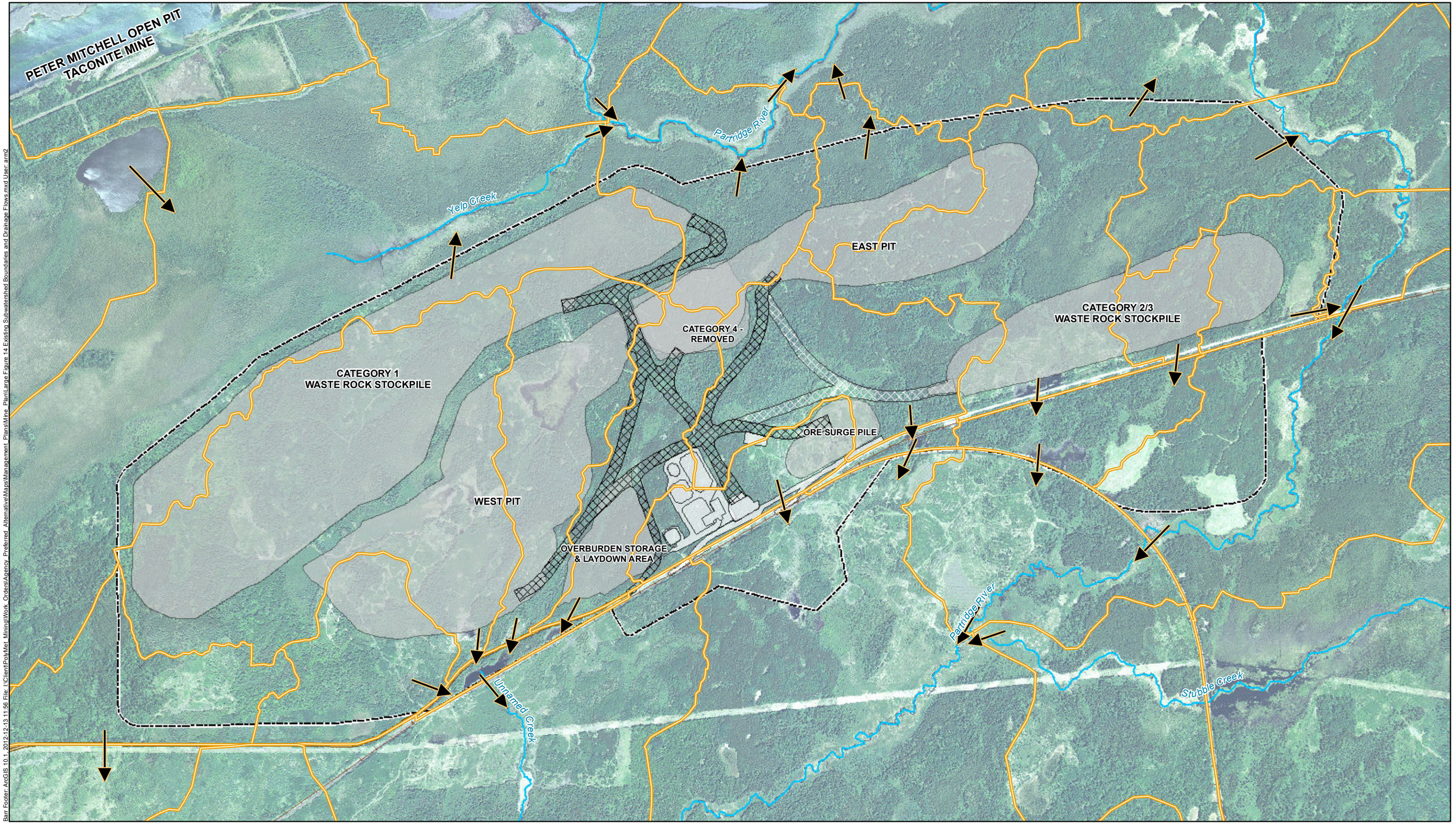


Barr Footer: ArcGIS 10.1, 2012-12-13 14:08 File: I:\Client\PolyMet Mining\Work Orders\Agency Preferred Alternative\Maps\Management Plans\Mine Plan\Large Figure 13 Process Water Management Year 20.mxd User: amn2

- Mine Site
- Active Stockpile
- Removed and Reclaimed Stockpile
- Removed Stockpile
- Open Stockpile
- Covered Stockpile
- Mine Pits
- Haul Roads
- Reclaimed Haul Roads
- Process Water Pipe
- Groundwater Containment System
- Ponds and Sumps
- Reclaimed Ponds

0 750 1,500 3,000
Feet

Large Figure 13
PROCESS WATER MANAGEMENT
MINE YEAR 20
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

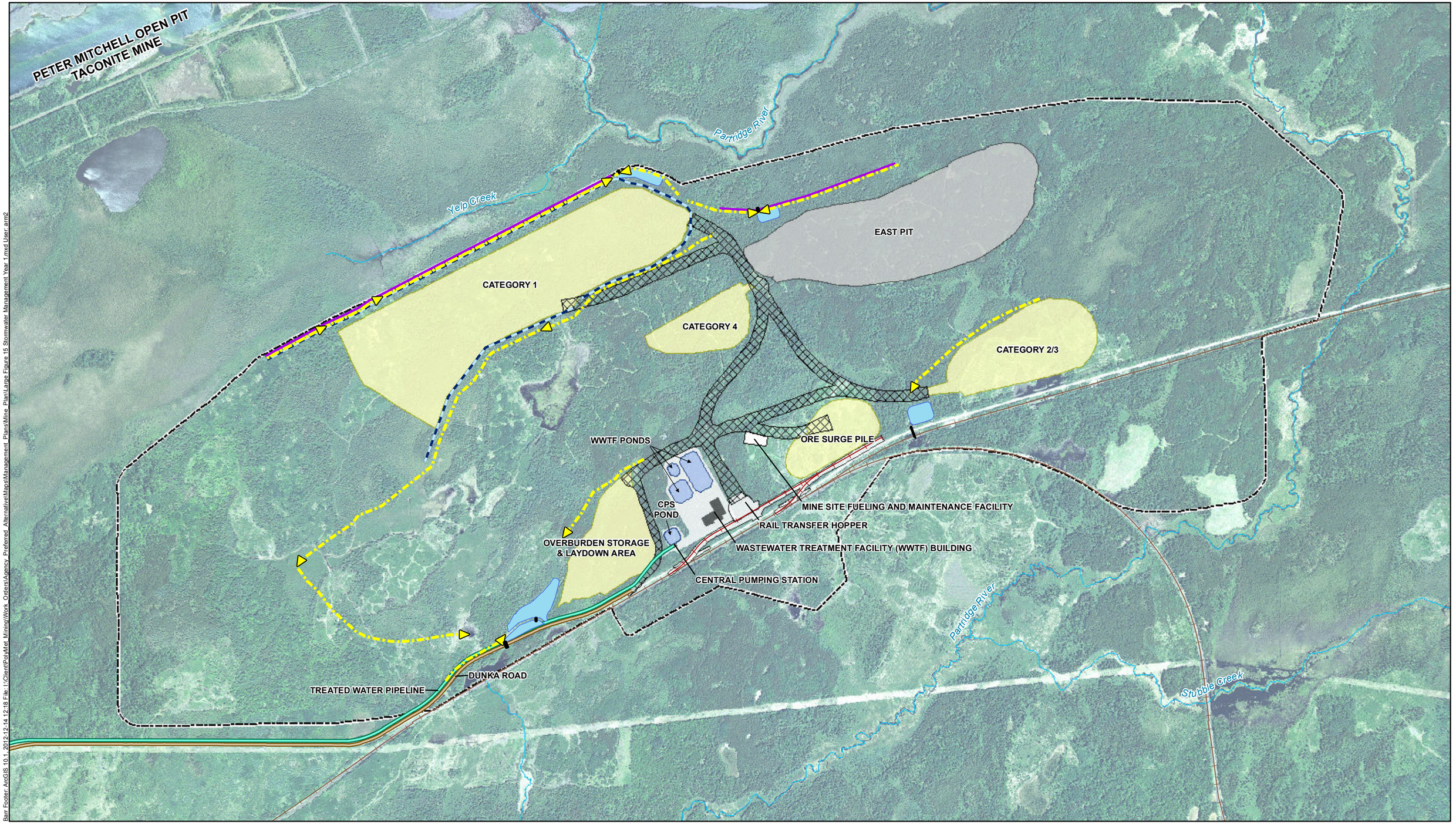


Barr Footer: ArcGIS 10.1 2012-12-13 11:56 File: I:\Client\PolyMet Mining\Work Orders\Agency Preferred Alternative\Maps\Management Plans\Mine Plan\Large Figure 14 Existing Subwatershed Boundaries and Drainage Flows.mxd User: arm2

- Drainage Flow Direction
- Rivers and Streams
- Existing Subwatersheds
- Mine Site
- Mine Footprint - Year 20
- Haul Roads

0 750 1,500 3,000
Feet

Large Figure 14
EXISTING SUBWATERSHED BOUNDARIES
AND DRAINAGE FLOWS
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

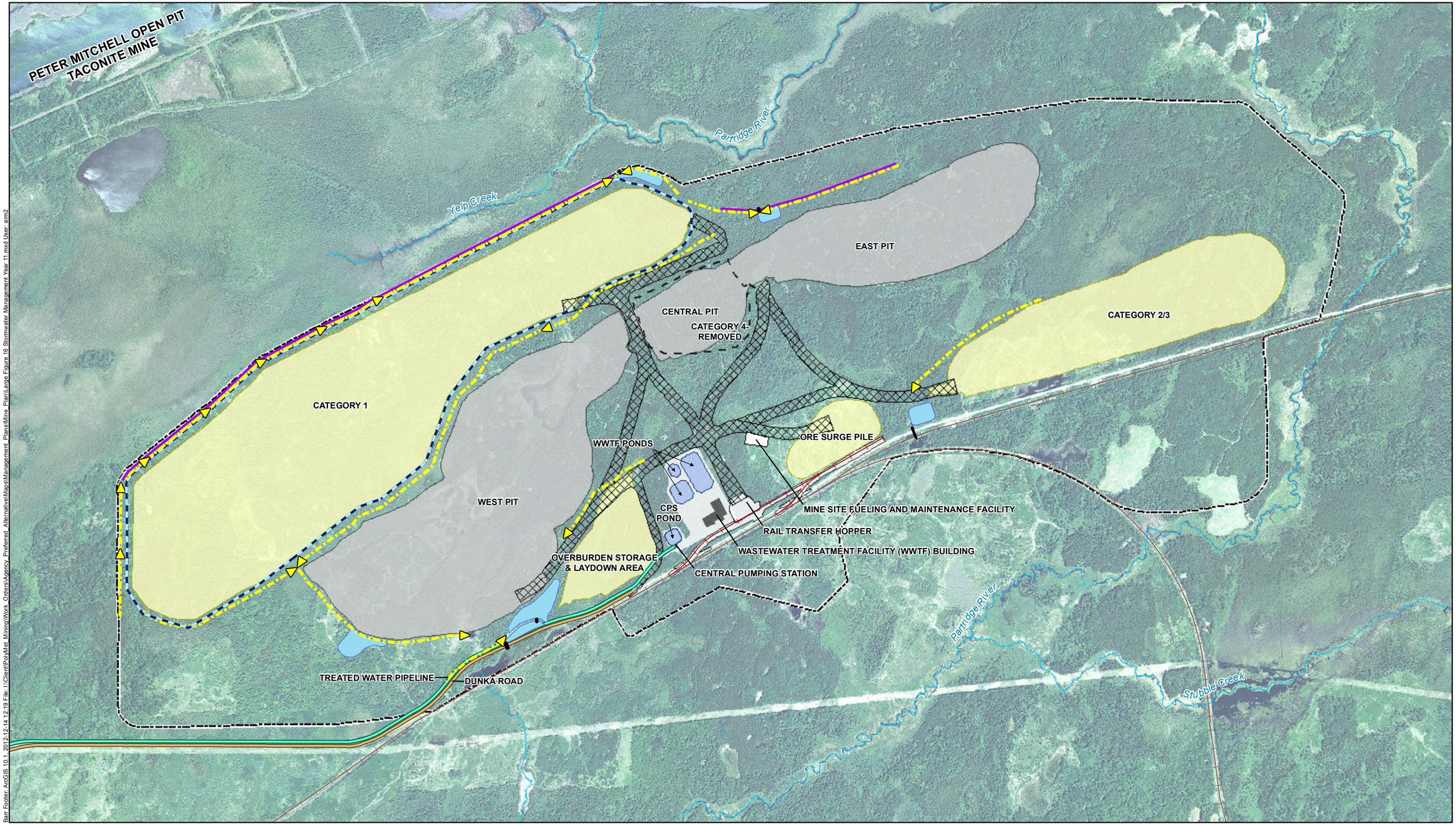


Barr Footer: ArcGIS 10.1, 2012-12-14 12:18 File: I:\Client\PolyMet Mining\Work Orders\Agency Preferred Alternative\Maps\Management Plans\Mine Plan\Large Figure 15 Stormwater Management Year 1.mxd User: arm2

Mine Site
Mine Pit
Active Stockpile
Haul Roads
Stormwater Ditch
Perimeter Dike
Groundwater Containment System
Culverts
Stormwater Pond

0 750 1,500 3,000
Feet

Large Figure 15
STORMWATER MANAGEMENT
MINE YEAR 1
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

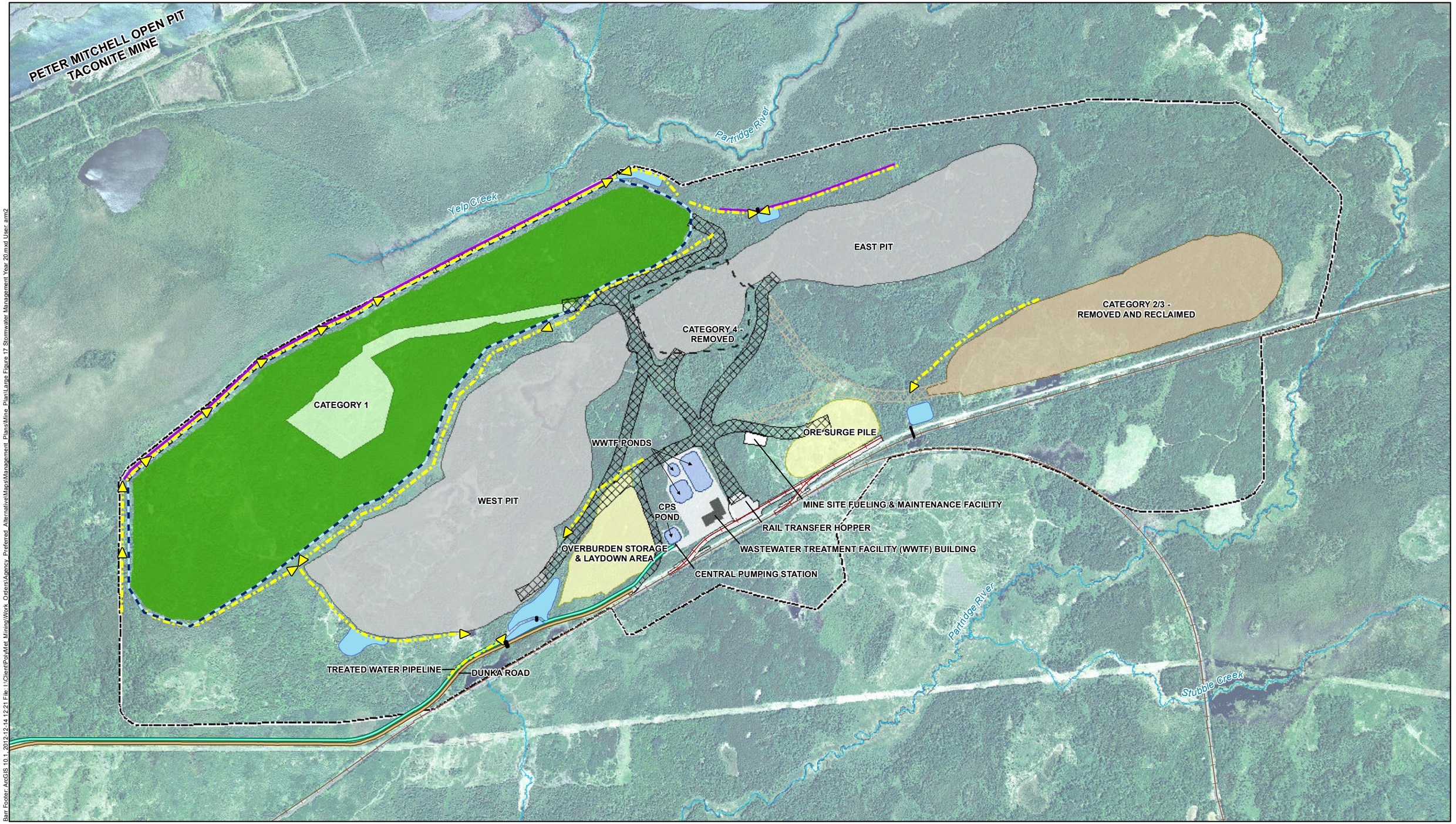


Barr Footer ArcGIS 10.1, 2012-12-14 12:19 File: I:\Client\PolyMet Mining\Work Orders\Agency Preferred Alternative\Maps\Management Plans\Mine Plan\Large Figure 16 Stormwater Management Year 11.mxd User: amn2

Mine Site
Mine Pits
Active Stockpiles
Removed Stockpile
Haul Roads
Stormwater Ditch
Perimeter Dike
Groundwater Containment System
Culverts
Stormwater Pond

0 750 1,500 3,000
Feet

Large Figure 16
STORMWATER MANAGEMENT
MINE YEAR 11
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

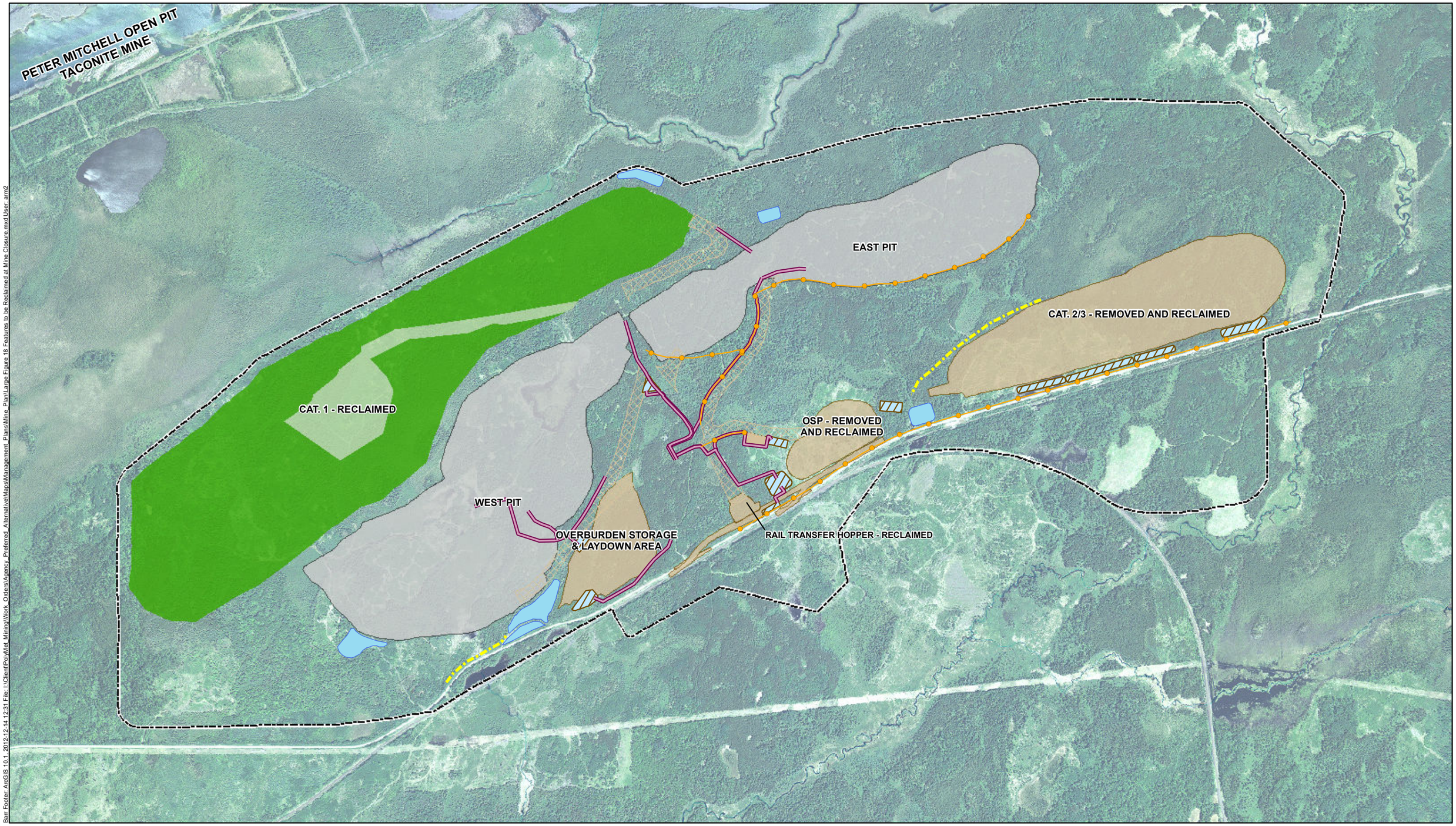


Barr Footer: ArcGIS 10.1 2012-12-14 12:21 File: I:\Client\PolyMet Mining\Work Orders\Agency Preferred Alternative\Maps\Management Plans\Mine Plan\Large Figure 17 Stormwater Management Year 20.mxd User: amr2

- Mine Site
- Open Stockpile
- Covered Stockpile
- Active Stockpile
- Removed & Reclaimed Stockpiles
- Removed Stockpile
- Mine Pits
- Haul Roads
- Reclaimed Haul Roads
- Stormwater Ditch
- Perimeter Dike
- Groundwater Containment System
- Culverts
- Stormwater Pond

0 750 1,500 3,000
Feet

Large Figure 17
STORMWATER MANAGEMENT
MINE YEAR 20
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN



Barr Footer: ArcGIS 10.1, 2012-12-14 12:31 File: i:\Client\PolyMet Mining\Work Orders\Agency Preferred Alternative\Maps\Management Plans\Mine Plan\Large Figure 18 Features to be Reclaimed at Mine Closure.mxd User: arm2

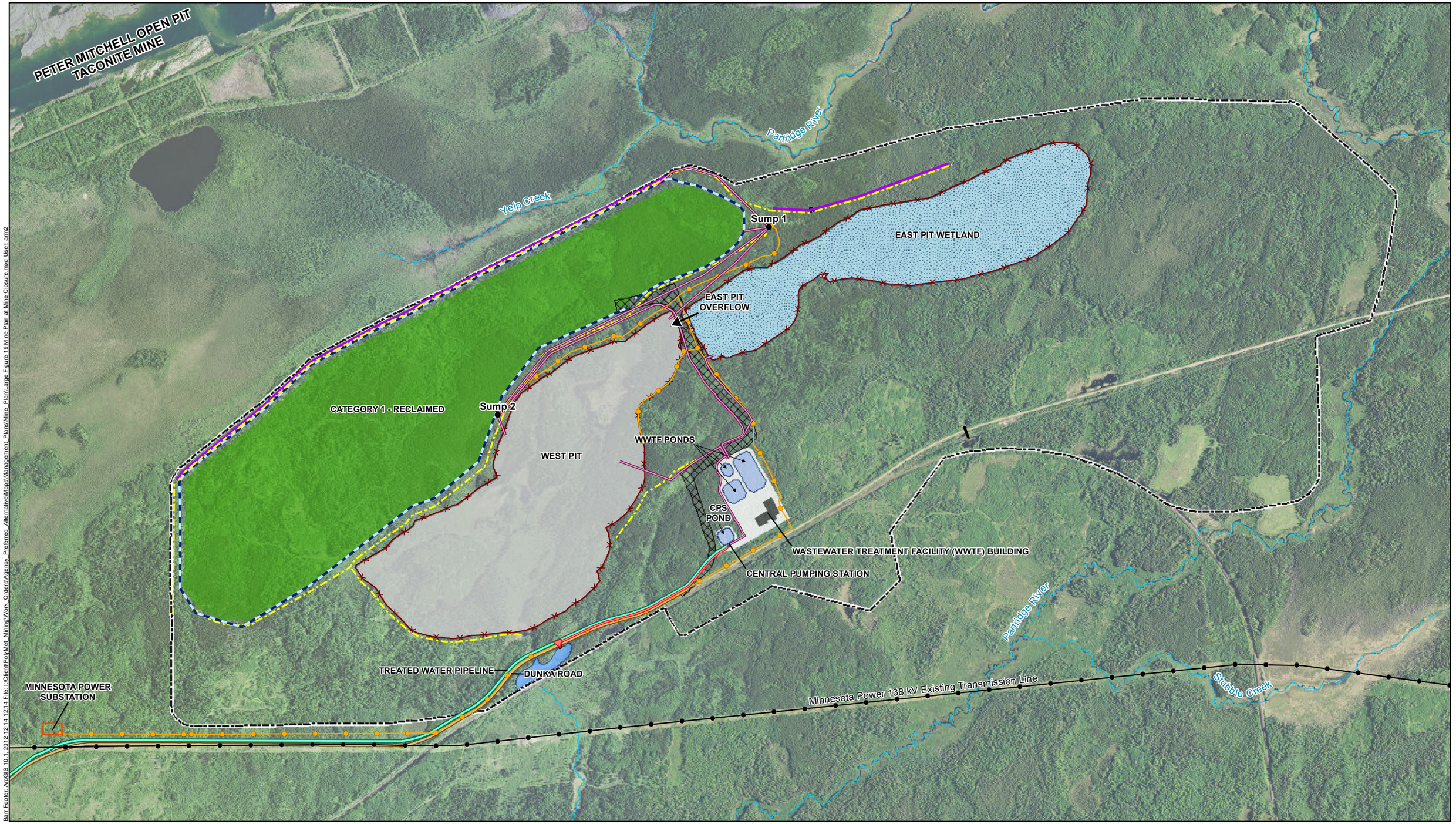
Mine Site
Mine Pits
Stockpile Covered in Previous Years
Stockpile Covered Upon Mine Closure
Removed and Reclaimed Features

Haul Roads - Reclaimed
Removed Transmission Lines
Stormwater System
Stormwater Collection Ditches - Reclaimed
Stormwater Ponds - Reclaimed

Process Water Systems - Removed/Reclaimed
Process Water Ponds and Sumps - Reclaimed

0 750 1,500 3,000
Feet

Large Figure 18
FEATURES TO BE REMOVED/ RECLAIMED AT MINE CLOSURE
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN



Barr Foster; ArcGIS 10.1; 2012-12-14 12:14 File: I:\Client\PolyMet Mining\Work Orders\Agency Preferred Alternative\Maps\Management Plans\Mine Plan\Large Figure 19 Mine Plan at Mine Closure.mxd User: amf2

Mine Site
Covered Stockpile
West Pit
East Pit Wetland
Haul Roads
Groundwater Containment System
Stormwater Collection Ditch
Perimeter Dike
Process Water Pipe
Discharge Pipe
Treated Water Pipeline
Culverts
Fence
Proposed Transmission Lines

0 750 1,500 3,000
Feet

Large Figure 19
FEATURES TO REMAIN AT MINE CLOSURE
NorthMet Project
Poly Met Mining Inc.
Hoyt Lakes, MN

Attachments

Attachment A Draft Annual Permit to Mine Report – PLACEHOLDER

Attachment B Earthwork Design Drawings – PLACEHOLDER