POLYMET
MINING

NorthMet Project

Comprehensive Water and Wetland Monitoring Plan

Version 1

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Acronyms, Abbreviations, and Units

Acronym	Stands For
AWMPP	Adaptive Water Management Process Plan
CD	Consent Decree
CWWMP	Comprehensive Water and Wetland Monitoring Plan
FEIS	Final Environmental Impact Statement
FTB	Flotation Tailings Basin
HRF	Hydrometallurgical Residue Facility
GW	Groundwater (prefix)
LTVSMC	LTV Steel Mining Company
MDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
NPDES	National Pollutant Discharge Elimination System
OSLA	Overburden Storage and Laydown Area
OSP	Ore Surge Pile
PTM	Permit to Mine
ROD	Record of Decision
SD	Surface Discharge (prefix)
SDS	State Discharge System
SW	Surface Water (prefix)
SWL	Static Water Level
TBD	To Be Determined
TUC	Transportation and Utility Corridors
USACE	United States Army Corps of Engineers
USGS	United States Geological Society
WA	Water Appropriation
WCA	Wetland Conservation Act
WS	Waste Stream (prefix)
WWTS	Waste Water Treatment System

1.0 Introduction

This document presents the Comprehensive Water and Wetland Monitoring Plan (CWWMP) for Poly Met Mining, Inc.'s (PolyMet's) NorthMet Project (Project). The NorthMet Project is a fully permitted copper-nickel-platinum group elements (PGE) mine and associated processing facilities. The Project primarily consists of a Mine Site, Plant Site and Transportation and Utility Corridors (TUC). The Plant Site and portions of the TUC were part of the LTV Steel Mining Company (LTVSMC) taconite processing facility which operated at the site until 2001.

The Project underwent environmental review beginning in 2005 when it was first proposed. Environmental review culminated in the joint publication of a Final Environmental Impact Statement (FEIS) by the United States Forest Service (USFS), the United States Army Corp of Engineers (USACE) and the Minnesota Department of Natural Resources (MDNR) in November of 2015. The MDNR issued an adequacy decision for the FEIS in March 2016 marking the end of the state's environmental review process. The USFS issued a Final Record of Decision (ROD) in January 2017, and the USACE issued its ROD and an individual Section 404 permit to PolyMet in March 2019. The Project also required various Minnesota state permits which are referenced as appropriate in subsequent sections of this document.

This CWWMP details the various water-related monitoring points and the associated analytical parameters and timeframes of monitoring for these locations. Monitoring is split in this CWWMP as either prior to and during environmental review and permitting, or after issuance of the Project permits.

2.0 Objective

One objective of the CWWMP is to summarize the monitoring locations used to assess impacts required for the environmental review and permitting processes. This included locations established by PolyMet within and adjacent to the Project areas, locations from previously existing LTVSMC permits, and prior non-Project related monitoring conducted by other governmental or private entities in and around the Project area.

A second objective is to assemble the monitoring locations required by the Project permits.

The CWWMP compiles the various water and wetland monitoring locations from these two objectives and incorporates other pertinent data for these sites to provide a comprehensive scope of required monitoring for the construction and operation of the permitted Project.

While this plan is intended to be a standalone plan to document the comprehensive water and wetland monitoring for the project, the details of water management, water-related infrastructure, and water and wetland monitoring, adaptive management, and mitigation are further detailed in a series of documents developed for permitting, which are living documents with changes to be coordinated with the regulatory agencies. These documents include the following:

- Water Management Plan – Mine: This plan, focused on the Mine Site and TUC, provides an overview of baseline monitoring data; details the design of the mine water

and stormwater management systems; provides the key environmental outcomes expected of Mine Site development for water quantity and quality; details the operating plan for Mine Site water infrastructure, including the response plan for spills, overflows, and dust suppression; summarizes the water quality and quantity monitoring around the Mine Site and TUC; and details the reporting requirements for the Project permits (including the comparison to modeled outcomes and compliance) and the adaptive management measures and contingency mitigations that could be undertaken or employed.

- Water Management Plan – Plant: This plan, focused on the Plant Site, provides an overview of baseline monitoring data; details the design of the plant water management systems (such as the Waste Water Treatment System (WWTS), sewage treatment systems, stormwater infrastructure, and stream augmentation); provides the key environmental outcomes expected of Plant Site development for water quantity and quality; details the operating plan for Plant Site water infrastructure (such as the seepage capture systems and WWTS), including the response plan for spills, overflows, and dust suppression; summarizes the water quality and quantity monitoring around the Plant Site; and details the reporting requirements for the Project permits (including the comparison to modeled outcomes and compliance) and the adaptive management measures and contingency mitigations that could be undertaken or employed.
- Adaptative Water Management Plan: This plan provides an overview of the Mine Site and Plant Site water management and treatment and adaptive management considerations; Category 1 Stockpile cover design and adaptive management considerations; FTB pond bottom cover system design and adaptive management considerations; and the non-mechanical treatment systems (for the Category 1 Stockpile, West Pit overflow, FTB runoff, and FTB pond overflow) and adaptive management considerations.
- Adaptive Water Management Process Plan (AWMPP; note, this plan was not used during permitting, but was required by Permit to Mine Special Condition 80 and submitted to the MDNR Jan. 29, 2019 with an updated version submitted Nov. 11, 2019 to address agency comments): This plan lays out the process required by the Permit to Mine, NorthMet NPDES Permit, Water Appropriation Permits, and the Section 401 Water Quality Certification to provide more detailed plans on how the adaptive management process would be implemented if water quality objectives are not met or if any issue is identified with water quality such that adaptive management systems can be implemented prior to reaching a water quality condition or limit. This plan goes beyond the water management plans listed above to provide more detailed plans on the decision processes PolyMet will use to determine whether adaptive management or contingency mitigation is needed, and on the associated agency review and approval, implementation, and reporting processes. This plan includes a description of the real-time adaptive management and mitigation processes, annual reporting, annual model verification and reporting, five-year model evaluation and reporting, and the process for updating this AWMPP.
- Monitoring Plan for Potential Indirect Wetland Impacts: This plan, required by the Section 404 Permit, Wetland Conservation Act decision, and Section 401 Water Quality Certification, details the required wetland hydrology monitoring, vegetation

monitoring, wetland boundary evaluation, and the annual potential indirect wetland impact assessment that are to be completed. It also includes adaptive management measures that could be undertaken or employed if changes are occurring that could lead to additional wetland impacts, and impact mitigations that would be required if additional impacts occur.

3.0 Site Conditions

The Project Plant Site was previously used as a taconite processing facility by LTVSMC. As such, existing infrastructure from that operation includes the plant site, tailings basin, mine pits, ancillary facilities such as shops and substations, and transportation, utility, and rail corridors. Portions of the existing infrastructure will be utilized by refurbishing and repurposing them, and new facilities will also be constructed. The Project Mine Site is located on forested, undeveloped land. The Transportation and Utility Corridors will connect the Project Plant Site and Mine Site. The Project features are highlighted in more detail below to introduce terms that are included in the CWWMP tables and descriptions.

The Plant Site includes:

- a Beneficiation Plant for processing ore within existing and new buildings
- the existing Plant Reservoir, pipeline from Colby Lake, and Colby Lake Pumphouse
- a Hydrometallurgical Plant
- a Hydrometallurgical Residue Facility (HRF)
- a Tailings Basin, which consists of the existing former LTV Steel Mining Company (LTVSMC) tailings basin with a new Flotation Tailings Basin (FTB) constructed atop
- an FTB South Seepage Management System and an FTB Seepage Containment System (collectively known as the FTB seepage capture systems) to manage seepage from the Tailings Basin
- a Waste Water Treatment System (WWTS)
- existing and new supporting infrastructure (such as roads, electrical supply, rail connections, Area 1 Shop, Area 2 Shop, and a Sewage Treatment System)
- in reclamation, cover systems on the FTB beaches and pond bottom, to manage seepage and oxygen infiltration

The Mine Site at its maximum footprint includes:

- East, Central and West Pits
- Category 1, 2/3, and 4 Waste Rock Stockpiles and Ore Surge Pile (OSP)

- An Overburden and Storage Laydown Area (OSLA)
- A Rail Transfer Hopper
- new supporting infrastructure (such as roads, electrical supply, rail connections, Mine Site Fueling and Maintenance Facility, mine water collection basins, pumping stations and conveyance pipelines and infrastructure, and stormwater ditches and ponds)

The TUC includes:

- railroads connecting the Mine Site and Plant Site, including rail connections and sidings
- water pipelines from the Mine Site to the FTB
- power transmission lines
- the Dunka Road, a private road providing transport of work vehicles, deliveries and equipment between the Mine Site and Plant Site

Several specifically defined types of water will be managed at the Plant Site, with definitions established in permitting. During the environmental review process, the following types of water were referred to as "process water:"

- "Process water" is water that has been used in the beneficiation process or hydrometallurgical process.
- "Tailings basin water" is water in the FTB Pond or in pores of the tailings, which includes the following sources: process water resulting from the beneficiation process; treated mine water routed from the WWTS; construction mine water conveyed from the Mine Site; Overburden Storage and Laydown Area (OSLA) runoff; tailings basin seepage collected by the FTB seepage capture systems and returned to the FTB Pond; treated water from the Sewage Treatment System; greensand filter backwash and clean-in-place wastes from the WWTS; and precipitation and runoff from within the FTB dams and tributary to the FTB Pond.
- "Tailings basin seepage" is tailings basin water that infiltrates through Flotation Tailings, LTVSMC tailings, and/or Tailings Basin dams and migrates through the base or the external dam faces of the Tailings Basin.
- "HRF water" is water collected and stored within the HRF, which includes the following: process water resulting from the hydrometallurgical process and routed to the HRF as part of the residue slurry, and precipitation and runoff from within the HRF dams.
- "Mine water" is water that has contacted surfaces disturbed by mining activities, such as drainage collected on stockpile liners, pit dewatering, and runoff contacting ore, waste rock, and Mine Site haul road surfaces. Mine water is

collected from areas of the Mine Site and conveyed by pipe to the Equalization Basin Area for further conveyance to the Plant Site (either the WWTS or FTB) via the Mine to Plant Pipelines, or, in later years, used in the flooding of the East and Central Pits.

- "Construction mine water" is a subset of mine water, which includes runoff from the OSLA and dewatering water from saturated mineral overburden from the Mine Site. Construction mine water is sent to the LTVSMC tailings basin/FTB during construction and operations.

In this document, Flotation Tailings are the Project bulk Flotation Tailings; the FTB is the newly constructed NorthMet Flotation Tailings impoundment; the Tailings Basin is the combined existing former LTVSMC tailings basin and the FTB; the Emergency Basin is the existing former LTVSMC Emergency Basin; and Residue is the Project combined hydrometallurgical residue stored in the HRF.

The Plant Site and existing tailings basin are shown on Figure 1. The area that contains the Beneficiation Plant, the Hydrometallurgical Plant and other auxiliary buildings and facilities is referred to as the Process Plant and is shown on Figure 2. Additional features located within the Plant Site, including the WWTS, the Plant Reservoir, Flotation Tailings Basin, and the Hydrometallurgical Residue Facility are also shown on Figure 2. The Mine Site at Mine Year 11 is shown on Figure 3; Mine Year 11 represents the year where most features at the Mine Site are at their largest footprint.

4.0 Environmental Review Monitoring

Water and wetland-related monitoring of various locations were conducted during Project environmental review and permitting to evaluate baseline conditions on and around the Project. This monitoring is broken into seven categories:

- Surface Water Monitoring
- Surface Discharge Monitoring
- Internal Waste Stream Monitoring
- Groundwater Monitoring
- Wetland Hydrology and Vegetation Monitoring
- Macroinvertebrate Monitoring
- Fish Monitoring

The locations for which water monitoring data was collected for environmental review and permitting assessments is shown on Figure 4.

4.1 Surface Water Monitoring Stations

Surface water monitoring sites for which data was used in environmental review and permitting are listed on Table 4-1. These are locations where streams, creeks or other water bodies were monitored for a variety of field conditions, such as flow, temperature, pH, and conductivity. Some sites were also sampled for laboratory analysis of various analytes. Monitoring data may have been collected by other private, state, or federal entities for other purposes, or by PolyMet to assess baseline conditions. In cases, where the data was collected by others, the data monitoring start and/or end dates may predate the beginning of PolyMet's environmental review.

The sample parameters and frequencies for these locations are not presented within this document. Results of the monitoring efforts are presented and discussed in the numerous data sets and documents that were assembled for environmental review and permitting.

If a surface water monitoring site is used in a NorthMet Project permit, the "NorthMet Permit Station ID" is listed in that column.

The locations of the surface water monitoring stations are shown on Figure 5 and Figure 6.

4.2 Surface Discharge Monitoring Stations

Surface Discharge (SD) water monitoring sites for which data was used in environmental review and permitting are listed on Table 4-2. Surface discharge sites are locations that were monitored under the NPDES/SDS permits that governed the former LTVSMC facility as managed by Cliffs Erie LLC. The locations of the surface discharge monitoring locations are shown on Figure 5 and Figure 6.

4.3 Internal Waste Stream Monitoring Stations

Internal Waste Stream (WS) monitoring stations for which data was used in environmental review and permitting are listed on Table 4-3. These are monitoring locations that were monitored under the NPDES/SDS permit that governed the former LTVSMC facility as managed by Cliffs Erie LLC. These stations are internal stations that monitored a discharge or location internal to the facility. They did not discharge to a stream or water body, but only to the LTVSMC tailings basin. The locations of the WS monitoring locations are shown on Figure 5.

4.4 Groundwater Monitoring Wells

Groundwater monitoring locations for which the data was used in environmental review and permitting are listed on Table 4-4. The locations of the groundwater monitoring locations are shown on Figure 7 and Figure 8.

4.5 Wetland Hydrology and Vegetation Monitoring Stations

Wetland hydrology and vegetation monitoring for which data was used in environmental review and permitting are listed on Table 4-5. The locations of the wetland hydrology and vegetation monitoring sites are shown on Figure 9 and Figure 10. Wetland hydrology wells were monitored during the statistical growing season for each year of monitoring, with monitoring typically taking place between late April to October. Water levels in the wells were recorded and data downloaded at the end of each monitoring season. Baseline

monitoring continued through environmental review and permitting, and after permit issuance.

4.6 Macroinvertebrate Monitoring Stations

Aquatic macroinvertebrate monitoring that was conducted as part of several aquatic biota surveys for environmental review and permitting are listed on Table 4-6. These are sites where biological surveys were conducted in the Partridge River and Embarrass River watersheds near the Mine Site and Plant Site. Monitoring included habitat assessments surveys including in-stream channel characteristics and habitat including macroinvertebrate surveys. Assessments were conducted by PolyMet consultants and the MPCA. The locations of the macroinvertebrate monitoring locations are shown on Figure 11.

4.7 Fish Monitoring Stations

Surveys of fish communities that were conducted as part of several aquatic biota survey s for environmental review and permitting are listed on Table 4-7. These sites assessed the fish populations in the Upper Partridge River watershed near and downstream of the Mine Site and the Embarrass River watershed near the Plant Site. The locations of the fish community assessments are shown on Figure 11. The assessments were conducted by PolyMet consultants, the MDNR or the MPCA.

4.8 Mussel Surveys

Mussel communities and habitats were surveyed during environmental review and permitting. This assessment was conducted in the Partridge River near the Mine Site, and in Trimble Creek and the Embarrass River near the Plant Site. These studies were performed in October of 2004 and September of 2009.The locations of the mussel surveys are shown on Figure 11.

Table 4-1 Environmental Review Surface Water Monitoring Stations

Env. Review Station ID	NorthMet Permit Station ID (if applicable)	Water Body	Description	Monitoring Start Date	Monitoring End Date	Comments
Plant Site Surface Water Monitoring Sites						
USGS Gage 04017000	SW043	Embarrass River	USGS gage station at the Embarrass River at Embarrass near Waisanen Road (H03153001); This is the location of the historical USGS gage 04017000	1942	1964	
USGS Gage 04018000		Embarrass River	USGS gage station at the Embarrass River near McKinley	1953	1962	
PM-7	SW020 SD026 (Cliffs NPDES Permit)	Second Creek	Monitor Second Creek downstream of LTVSMC Tailings Basin	7/1999	Ongoing	
PM-8	SD006 (Cliffs NPDES Permit)	Unnamed Creek headwaters	Monitoring location on west side of Cell 2W of the LTVSMC Tailings Basin	6/2001	6/2011	SD006 discharge stopped under Consent Decree
PM-9 UC-1	SD004 (Cliffs NPDES Permit)	Unnamed Creek	Monitoring location at the headwaters of Unnamed Creek, west of the LTVSMC Tailings Basin	6/2001	6/2011	SD004 discharge stopped under Consent Decree
PM-10	SD002 (Cliffs NPDES Permit)	Unnamed Creek headwaters	Monitoring location on northeast side of Cell 2W of the LTVSMC Tailings Basin	6/2001	Ongoing	
PM-11	SW003	Unnamed Creek	Monitoring of Unnamed Creek, tributary to Embarrass River. This site is downstream of LTVSMC tailings basin	4/12/2004	Ongoing	
PM-12 SW004	SW004 (Cliffs NPDES Permit)	Embarrass River	Monitoring of the Embarrass River at St. Louis County Road 620, upstream of Spring Mine Creek (Area 5)	4/13/2004	Ongoing	
PM-12.1		Spring Mine Creek	Monitoring of Spring Mine Creek near confluence with Embarrass River	8/25/2010	5/16/2018	
PM-12.2	SW008	Embarrass River	Monitor existing conditions upstream of the LTVSMC Tailings Basin, downstream of Area 5	8/25/2010	Ongoing	
PM-12.3		Embarrass River	Monitor existing conditions downstream of the LTVSMC Tailings Basin	8/25/2010	5/16/2018	
PM-12.4		Embarrass River	Monitor existing conditions downstream of the LTVSMC Tailings Basin	8/25/2010	5/16/2018	
PM-13	SW005	Embarrass River	Monitoring of the Embarrass River at MN State Highway 135 bridge downstream of the Tailings Basin	4/12/2004	Ongoing	
PM-17		Second Creek	Monitoring existing conditions downstream of the LTVSMC Tailings Basin	2004; 2006	2004; 2007	
PM-18		Second Creek	Monitoring existing conditions downstream of the LTVSMC Tailings Basin	2004; 2006	2004; 2007	
PM-19		Trimble Creek	Monitor existing conditions downstream of the LTVSMC Tailings Basin	7/9/2009	5/17/2018	
PM-20		Bear Creek	Monitor existing conditions in tributary to the Embarrass River. This is a reference monitoring location.	2009	2009	
PM-21		Sabin Lake	Monitor existing conditions downstream of the LTVSMC Tailings Basin	7/9/2009	10/21/2011	

Env. Review Station ID	NorthMet Permit Station ID (if applicable)	Water Body	Description	Monitoring Start Date	Monitoring End Date	Comments
PM-22		Wynne Lake	Monitor existing conditions downstream of the LTVSMC Tailings Basin	7/9/2009	10/21/2011	
PM-23		Sabin Lake	Monitor existing conditions downstream of the LTVSMC Tailings Basin	7/9/2009	10/21/2011	
PM-24		Wynne Lake	Monitor existing conditions downstream of the LTVSMC Tailings Basin	7/9/2009	10/21/2011	
TC-1		Trimble Creek	Monitor Trimble Creek downstream of the LTVSMC Tailings Basin	7/30/2012	10/18/2012	
TC-1a	SW006	Trimble Creek	Monitor Trimble Creek downstream of the LTVSMC Tailings Basin	7/30/2012	Ongoing	
EL-1		Embarrass Lake	Monitor Embarrass Lake downstream of the LTVSMC Tailings Basin	8/20/2009	10/21/2011	
EL-2		Embarrass Lake	Monitor Embarrass Lake downstream of the LTVSMC Tailings Basin	8/20/2009	10/21/2011	
Mine Site and Transportation and Utility Corridors (TUC) Surface Water Monitoring Sites						
Gage Station 04016000		Partridge River	Gage station at the Partridge River near St. Louis County Road 110	1956 1976 1979	1966 1977 ongoing	
Gage Station 04015455		South Branch Partridge River	Gage station on South Branch Partridge River	1973	1976	
Gage Station 04015475 SW006		Partridge River	Gage station on Partridge River above Colby Lake at Hoyt Lakes Monitor Partridge River, downstream of the NorthMet Mine Site	1978	1988	
Gage Station 04015500		Second Creek	Gage station on Second Creek upstream of the confluence with the Partridge River	1955	1980	
Gage Station 04016500		St. Louis River	Gage station on the St. Louis River, immediately downstream of the confluence with the Partridge River	1942	1987	
LN-1	SW408	Longnose Creek	Monitor Longnose Creek downstream of the TUC	3/24/2011	Ongoing	
LN-2		Longnose Creek	Monitor Longnose Creek headwaters upstream of the TUC	4/8/2016	12/12/2018	
MLC-1	SW007	Mud Lake Creek	Monitor Unnamed (Mud Lake) Creek downstream LTVSMC Tailings Basin	3/17/2011	Ongoing	
MLC-2		Mud Lake Creek	Monitor Unnamed (Mud Lake) Creek downstream LTVSMC Tailings Basin	5/24/2011	5/17/2018	
MLC-3		Mud Lake Creek	Monitor Unnamed (Mud Lake) Creek downstream LTVSMC Tailings Basin	11/19/2012	12/26/2012	
MLC-3A		Mud Lake Creek	Monitor Unnamed (Mud Lake) Creek downstream LTVSMC Tailings Basin	7/30/2012	12/26/2012	
PM-1 SW001		Partridge River	Monitor the headwaters of the Partridge River, downstream of Northshore Mining discharge and upstream of NorthMet Mine Site	4/14/2004	5/9/2008	
PM-2 SW002	SW402	Partridge River	Monitor Partridge River upstream of the NorthMet Mine Site	4/14/2004	Ongoing	

Env. Review Station ID	NorthMet Permit Station ID (if applicable)	Water Body	Description	Monitoring Start Date	Monitoring End Date	Comments
PM-3 SW003		Partridge River	Monitor the Partridge River at the Dunka Road	4/13/2004	5/24/2018	
PM-4 SW005		Partridge River	Monitor Partridge River, downstream of the NorthMet Mine Site	4/13/2004	5/24/2018	
PM-5	SW409	Wyman Creek	Monitor Wyman Creek downstream of the TUC	4/13/2004	Ongoing	
PM-6		Wyman Creek	Monitor Wyman Creek headwaters upstream of the TUC	4/13/2004	4/23/2013	
PM-6b	SW410	Wyman Creek	Monitor Wyman Creek headwaters upstream of the TUC	12/2018	Ongoing	
PM-16 SW-004		Partridge River	Monitor the Partridge River, downstream of the NorthMet Mine Site and upstream of the confluence with the South Branch Partridge River	4/14/2004	5/23/2018	
SW-004a		Partridge River	Monitor the Partridge River, downstream of the NorthMet Mine Site and the confluence with South Branch Partridge River	5/27/2010	5/23/2018	
SW-004b		Partridge River	Monitor the Partridge River, downstream of the NorthMet Mine Site and upstream of the confluence with Wetlegs Creek	7/1/1996	10/22/2014	
SW-004c	SW413	Partridge River	Monitor Partridge River, upstream of the South Branch and downstream of Unnamed Creek and the NorthMet Mine Site	6/25/2018	Ongoing	
WL-1 SW407	SW407	Wetlegs Creek	Monitor Wetlegs Creek downstream of the TUC	5/27/2010	Ongoing	
WL-2	SW412	Wetlegs Creek	Monitor Wetlegs Creek headwaters upstream of the TUC	4/29/2016	Ongoing	
WP-1		West Pit Outlet	Monitor Unnamed Creek near future West Pit outlet	4/25/2011	12/19/2017	
LCy-1		Colby Lake	Monitor on east side of Colby Lake near inlet of the Partridge River	4/21/2010	3/11/2014	
LCy-2		Colby Lake	Monitor Colby Lake on west side of Colby Lake	4/21/2010	5/24/2018	
LWr-1		Whitewater Reservoir	Monitor Whitewater Reservoir on north end near inlet to Colby Lake	4/21/2010	9/20/2010	
LWr-2		Whitewater Reservoir	Monitor Whitewater Reservoir	4/21/2010	9/20/2010	

Table 4-2 Environmental Review Surface Discharge Monitoring Stations

Station ID	Water Body	Description	Data Monitoring Start Date	Data Monitoring End Date	Comments
Stations listed under Cliffs Erie Tailings Basin NPDES/SDS Permit MN0054089					
SD001	Wetlands	NW Seepage Collection Ditch (existing LTVSMC Tailings Basin)	6/2001	Ongoing	
SD002	Wetlands	NE Seepage Collection Ditch (existing LTVSMC Tailings Basin)	6/2001	Ongoing	
SD004	Unnamed Creek	Tailings Basin Cell 2W Seep A	6/2001	6/2011	Pumped back to SD006 per Consent Decree
SD005	Wetlands	Tailings Basin Cell 2W Seep B	6/2001	Ongoing	
SD006	Unnamed Creek	Power Line Access Road Culvert	6/2001	6/2011	Pumped back to Cell 1E per Consent Decree
Stations listed under Cliffs Erie Mine Area NPDES/SDS Permit MN0042536					
SD033	Spring Mine Creek	Discharge culvert at Area 5 to headwaters of Spring Mine Creek	6/19/2001	Ongoing	

Table 4-3 Environmental Review Internal Waste Stream Monitoring Stations

Station ID	Water Body or Site Feature	Description	Monitoring Start Date	Data Monitoring End Date
Stations listed under Cliffs Erie Tailings Basin NPDES/SDS Permit MN0054089				
WS009	Tailings Basin	Culvert under RR Grade, NE side of Cell 1E	6/2001	Ongoing
WS011	Tailings Basin	Tailings Basin Seep 1	6/2001	Ongoing
WS012	Tailings Basin	Tailings Basin Seep 2	6/2001	Ongoing
WS013	Tailings Basin	Tailings Basin Seep 3	6/2001	Ongoing
Cell 1E	Tailings Basin Cell 1E Pond	Monitor surface water of LTVSMC Tailings Basin Cell 1E	4/24/2001	Ongoing
Cell 2E	Tailings Basin Cell 2E Pond	Monitor surface water of LTVSMC Tailings Basin Cell 2E	5/24/2001	Ongoing

Table 4-4 Environmental Review Groundwater Monitoring Wells

Env. Review Station ID	NorthMet Permit Station ID (if applicable)	Bedrock or Surficial Aquifer	Description	Monitoring Start Date	Monitoring End Date	MDH Unique Well No.	Comments (including Applicable Permit)
Plant Site Groundwater Monitoring Wells							
MW-6		Bedrock	Monitor groundwater north of an upgradient of the SW-619 landfill	1993	Ongoing	521262	Cliffs Erie Industrial Landfill Permit SW-619
MW-6S / GW002		Surficial Aquifer	Monitor groundwater west of the tailings basin and north and upgradient of SW-619 landfill	11/15/1993	Ongoing	521273	Cliffs Erie Industrial Landfill Permit SW-619 and Cliffs Erie Tailings Basin NPDES MN0054089
MW-7		Bedrock	Monitor groundwater upgradient / lateral to the SW-619 landfill	9/22/1993	Ongoing	521263	Cliffs Erie Industrial Landfill Permit SW-619
MW-8		Bedrock	Monitor groundwater south of and immediately downgradient of the SW-619 landfill	9/21/1993	Ongoing	521268	Cliffs Erie Industrial Landfill Permit SW-619
MW-8S		Surficial Aquifer	Monitor groundwater south of and immediately downgradient of the SW-619 landfill	11/15/1993	Ongoing	521274	Cliffs Erie Industrial Landfill Permit SW-619
MW-9		Surficial Aquifer	Monitor groundwater south of and immediately downgradient of the SW-619 landfill	9/23/1993	Ongoing	521269	Cliffs Erie Industrial Landfill Permit SW-619
MW-10		Surficial Aquifer	Monitor groundwater south of and 500 feet downgradient of the SW-619 landfill	9/30/2011	Ongoing	783752	Cliffs Erie Industrial Landfill Permit SW-619
GW001	GW001	Surficial Aquifer	Monitor groundwater downgradient of tailings basin, northeast of Cell 2E (former well ST-2)	7/13/2006	Ongoing	None	Cliffs Erie Tailings Basin NPDES MN0054089
GW003		Surficial (Tailings)	Located on top of Cell 2W, monitor water within tailings (former well H-1)	7/7/1998	Ongoing	597383	Cliffs Erie Tailings Basin NPDES MN0054089
GW004		Surficial (Tailings)	Located on top of Cell 2W, monitor water within tailings (former well H-2)	10/26/1994	Ongoing	551772	Cliffs Erie Tailings Basin NPDES MN0054089
GW005		Surficial (Tailings)	Located on top of Cell 2W, monitor water within tailings (former well H-3)	7/9/1998	Ongoing	597384	Cliffs Erie Tailings Basin NPDES MN0054089
GW006		Surficial Aquifer	Monitor groundwater downgradient of tailings basin, north-northwest of Cell 2W	4/10/2001	Ongoing	625042	Cliffs Erie Tailings Basin NPDES MN0054089
GW007		Surficial Aquifer	Monitor groundwater downgradient of tailings basin on west side of Cell 2W	4/10/2001	Ongoing	625043	Cliffs Erie Tailings Basin NPDES MN0054089
GW008		Surficial Aquifer	Monitor groundwater at the southwestern toe of Cell 2W of the tailings basin	4/9/2001	Ongoing	625044	Cliffs Erie Tailings Basin NPDES MN0054089
GW009		Surficial Aquifer	Monitor groundwater downgradient from FTB Cell 2E, beyond the property boundary	2/24/2009	Ongoing	767957	Cliffs Erie Tailings Basin NPDES MN0054089
GW010		Surficial Aquifer	Monitor groundwater at northern property boundary, downgradient of the tailings basin	5/4/2009	4/5/2018	767967	

Env. Review Station ID	NorthMet Permit Station ID (if applicable)	Bedrock or Surficial Aquifer	Description	Monitoring Start Date	Monitoring End Date	MDH Unique Well No.	Comments (including Applicable Permit)
GW011		Surficial Aquifer	Monitor groundwater near northern property boundary, downgradient of the tailings basin, north of Cell 2W	5/6/2009	4/3/2018	766966	
GW012		Surficial Aquifer	Monitor groundwater at the toe of the tailings basin, located near the northern intersection of Cell 2W and Cell 2E	5/6/2009	5/2/2018	767968	
GW013		Surficial Aquifer	Monitor groundwater at northern property boundary downgradient of the tailings basin, northwest of Cell 2W	7/27/2010	10/6/2014	769516	
GW014		Surficial Aquifer	Monitor groundwater at northwestern property boundary, downgradient of tailings basin Cell 2W	7/26/2010	10/15/2018	769517	This well has been permanently abandoned
GW015		Surficial Aquifer	Monitor baseline conditions west and downgradient of Cell 2W at the western property boundary. (This well has been shown to be unimpacted by tailings basin seepage, as documented in the Water Modeling Data Package - Plant Site.)	7/28/2010	10/4/2018	769518	
GW016		Surficial Aquifer	Monitor groundwater at northwestern property boundary, downgradient of tailings basin Cell 2W	8/1/2013	10/11/2018	762003	
GW017		Surficial Aquifer	Monitor groundwater near toe of the tailings basin, at northwest corner of Cell 2W	11/29/2011	10/2/2018	786386	This well is interior to tailings basin
Mine Site Groundwater Monitoring Wells							
MW-1		Surficial Aquifer	Monitor groundwater downgradient of East Pit	10/25/2011	4/30/2018	786714	Rotasonic boring RS-37
MW-2	GW402	Surficial Aquifer	Monitor groundwater downgradient of West Pit	10/26/2011	Ongoing	786713	Rotasonic boring RS-32
MW-3	GW403	Surficial Aquifer	Monitor groundwater downgradient of Category 2/3 Stockpile and East Pit	10/27/2011	Ongoing	786717	Rotasonic boring RS-48
MW-4		Surficial Aquifer	Monitor groundwater downgradient of Category 2/3 Stockpile and East Pit	10/27/2011	5/3/2018	786718	Rotasonic boring RS-49
MW-5	GW405	Surficial Aquifer	Monitor groundwater downgradient of West Pit	10/28/2011	Ongoing	786708	Rotasonic boring RS-33
MW-6S		Surficial Aquifer	Monitor groundwater downgradient of West Pit and Overburden Storage and Laydown Area (OSLA)	10/31/2011	4/3/2018	786709	
MW-6D		Surficial Aquifer	Monitor groundwater downgradient of West Pit and OSLA	10/31/2011	4/25/2018	786711	
MW-7	GW407	Surficial Aquifer	Monitor groundwater along the property boundary downgradient of the Ore Surge Pile (OSP), Category 2/3 Stockpile, and East Pit	11/01/2011	Ongoing	786726	Rotasonic boring RS-47
MW-8S	GW408	Surficial Aquifer	Monitor groundwater south of Category 1 Stockpile and southwest of West Pit	11/01/2011	Ongoing	786712	Rotasonic boring RS-31
MW-8D		Surficial Aquifer	Monitor groundwater south of Category 1 Stockpile and southwest of West Pit	12/13/2011	4/25/2018	786728	Rotasonic boring RS-31
MW-9		Surficial Aquifer	Monitor groundwater east of East Pit	12/14/2011	4/30/2018	786715	Rotasonic boring RS-38
MW-10S	GW409	Surficial Aquifer	Monitor groundwater along the property boundary downgradient of the Equalization Basin Area, OSLA, Category 4 Stockpile, and Central Pit	12/15/2011	Ongoing	786724	Rotasonic boring RS-50
MW-10D		Surficial Aquifer	Monitor groundwater along the property boundary downgradient of the Equalization Basin Area, OSLA, Category 4 Stockpile, and Central Pit	12-15-2011	4/18/2018	786725	Rotasonic boring RS-50
MW-11	GW411	Surficial Aquifer	Monitor groundwater downgradient of the OSLA and West Pit	12/16/2011	Ongoing	786710	Rotasonic boring RS-46

Env. Review Station ID	NorthMet Permit Station ID (if applicable)	Bedrock or Surficial Aquifer	Description	Monitoring Start Date	Monitoring End Date	MDH Unique Well No.	Comments (including Applicable Permit)
MW-12	GW412	Surficial Aquifer	Monitor groundwater downgradient and northeast of the Category 1 Stockpile	2/14/2012	Ongoing	786732	Rotasonic boring RS-43
MW-13		Surficial Aquifer	Monitor groundwater downgradient and east of East Pit	2/5/2012	5/1/2018	786720	Rotasonic boring RS-52
MW-14	GW414	Surficial Aquifer	Monitor groundwater downgradient and west of the Category 1 Stockpile	2/16/2012	Ongoing	786730	Rotasonic boring RS-41
MW-15	GW415	Surficial Aquifer	Monitor groundwater downgradient and north of the Category 1 Stockpile	2/16/2012	Ongoing	786731	Rotasonic boring RS-42
MW-16	GW416	Surficial Aquifer	Monitor groundwater along the property boundary downgradient of the West Pit and the Category 1 Stockpile	2/16/2012	Ongoing	786727	Rotasonic boring RS-45
MW-17	GW417	Surficial Aquifer	Monitor groundwater downgradient of the Category 2/3 Stockpile	2/8/2012	Ongoing	786719	
MW-18	GW418	Surficial Aquifer	Monitor groundwater downgradient of Category 1 Stockpile and west of West Pit	2/19/2012	Ongoing	786729	Rotasonic boring RS-44
MW-05-02		Surficial Aquifer	Monitor groundwater downgradient of OSP and Central Pit	3/15/2005	5/1/2018	722060	
MW-05-08		Surficial Aquifer	Monitor groundwater within West Pit footprint	3/16/2005	5/9/2018	722057	
MW-05-09		Surficial Aquifer	Monitor groundwater under the Category 1 Stockpile (until constructed)	3/13/2005	4/4/2018	722058	
P-1		Bedrock	Monitor groundwater near the Category 1 Stockpile, West Pit and East Pit	12/17/2005	12/13/2006	736114	
P-2		Bedrock	Monitor groundwater within East Pit footprint	12/13/2005	12/13/2006	736115	
P-3		Bedrock	Monitor groundwater within East Pit footprint	12/10/2005	12/13/2006	736116	
P-4 / P-4A		Bedrock	Monitor groundwater east of East Pit	12/18/2005	12/13/2006	736117	
OB-1		Bedrock	Monitor groundwater near the Category 1 Stockpile and West Pit	12/5/2005	11/20/2018	736121	
OB-2		Bedrock	Monitor groundwater within East Pit footprint	12/2/2005	9/24/2013	736120	
OB-3		Bedrock	Monitor groundwater within East Pit footprint	12/1/2005	9/24/2013	736123	
OB-3A		Bedrock	Monitor groundwater within East Pit footprint	12/6/2005	12/13/2006	736122	
OB-4		Bedrock	Monitor groundwater north of East Pit	11/19/2005	11/20/2018	736118	
OB-5		Bedrock	Monitor groundwater east of East Pit	11/20/2005	11/20/2018	736119	

Table 4-5 Wetland Hydrology and Vegetation Monitoring Stations

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Comments
Well 1	48	8	Coniferous bog	5/22/2008	
Well 2	100	8	Coniferous bog	5/22/2008	
Well 4	887	8	Coniferous bog	11/9/2005	
Well 4A	889	8	Coniferous bog	5/21/2008	
Well 6	54	6	Alder Thicket	5/23/2008	
Well 7	53	6	Alder Thicket	11/9/2005	
Well 8	106	8	Coniferous bog	5/23/2008	
Well 9	58	6	Alder Thicket	6/27/2008	
Well 10	888	8	Coniferous bog	5/22/2008	
Well 11	100	8	Coniferous bog	5/22/2008	
Well 12	888	8	Coniferous bog	11/9/2005	
Well 13	84	8	Coniferous bog	5/23/2008	
Well 14	90	8	Coniferous bog	5/23/2008	
Well 15	693	8	Coniferous bog	5/23/2008	
Well 16	90	8	Coniferous bog	5/22/2008	
Well 18	100	8	Coniferous bog	5/22/2008	Removed 10/29/2009
Well 19	107	8	Coniferous bog	5/21/2008	Removed 10/29/2009
Well 21	48	8	Coniferous bog	5/22/2008	
Well 22	48	8	Coniferous bog	5/22/2008	
Well 23	45	6	Alder thicket	5/10/2010	
Well 24	33A	6	Alder thicket	5/12/2010	
Well 25	68	7	Coniferous swamp	6/30/2014	
Well 26	315	6	Alder thicket	7/1//2014	
Well 27	48A	7	Coniferous swamp	6/30/2015	
Well 28	33A	6	Alder thicket	7/2/2014	
Well 29	90	8	Coniferous bog	7/2/2014	
Well 30	57	7	Coniferous swamp	6/30/2014	
Well 31	54G	7	Coniferous swamp	6/30/2014	
Well 32	107	8	Coniferous bog	7/2/2014	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Comments
Well 33	53D	6	Alder thicket	7/1/2014	
Well 34	53C	7	Coniferous swamp	7/1/2014	
Well 35	53D	6	Alder thicket	7/2/2014	
Well 36	53	6	Alder thicket	7/2/2014	
Well 37	58	6	Alder thicket	7/2/2014	
Well 38	11	8	Coniferous bog	7/1/2014	
Well 39	29	3	Shallow marsh	7/1/2014	
Well 40	571	7	Coniferous swamp	7/1/2014	
Well 41	R-7A	3	Shallow marsh	7/2/2014	
Well 42	1041	6	Shrub-carr	7/1/2014	
Well 43	48	8	Coniferous bog	7/2/2014	
Well 44	68	7	Coniferous swamp	7/1/2014	
Well 45	90A	8	Open bog	7/2/2014	
Well 46	68	7	Coniferous swamp	7/1/2014	
Well 47	315	6	Alder thicket	7/1/2014	
Well 48	53D	6	Alder thicket	7/2/2014	
Well Ref1	900	8	Coniferous bog	5/21/2008	
Well Ref2	897	6	Alder thicket	5/21/2008	
Well Ref3	394A	7	Coniferous swamp	7/1/2014	
Well TB1	923	2	Sedge meadow	4/26/2010	
Well TB2	917	8	Coniferous bog	4/26/2010	
Well TB3	260	3	Shallow marsh	4/26/2010	
Well TB4	260	3	Shallow marsh	4/27/2010	
Well TB5	868	7	Hardwood swamp	4/26/2010	
Well TB6	1151	7	Coniferous swamp	4/27/2010	
Well TB7	915	6	Alder thicket	4/27/2010	
Well TB9	1162	3	Shallow marsh	6/30/2014	
Well TB10	1176	7	Hardwood swamp	6/30/2014	
Well TB11	282A	3	Shallow marsh	7/3/2014	
Well TB12	968	7	Coniferous swamp	6/30/2014	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Comments
Well TB13	584	3	Shallow marsh	7/3/2014	
Well TB14	T13A	3	Shallow marsh	7/3/2014	
Well RefTB8	974	8	Coniferous bog	4/26/2010	
Well RefTB1	989	7	Coniferous swamp	7/3/2014	

Table 4-6 Aquatic Biota and Macroinvertebrate Monitoring Stations

Location	Waterbody	Study Year
PR-B1 / 97LS077	South Branch Partridge River	2004, 2009 as 97LS077
PR-B2	Partridge River	2004
PR-B3	Partridge River	2004
PR-east	Partridge River	2009
PR-west	Partridge River	2009
SD026	Second Creek	2011
USFS-CCk	Colvin Creek	2011, 2012, 2013
USFS-PR	Partridge River	2011, 2012, 2013
USFS-SBPR	South Branch Partridge River	2011, 2012, 2013
B-5	Embarrass River wetland (upstream)	2004
B-6	Trimble Creek	2004
B-7	Unnamed Creek	2004
PM-11	Unnamed Creek	2010
PM-12.1	Spring Mine Creek	2010
PM-19	Trimble Creek	2010
PM-20	Bear Creek	2010
09LS098	Bear Creek	2009
09LS100	Embarrass River	2009
09LS101	Spring Mine Creek	2009
97LS005	Embarrass River	1997, 2009
10EM045	Embarrass River	2009, 2010

Table 4-7 Fish Monitoring Stations

Location	Waterbody	Study Year
PR-BI / 97LS077	South Branch Partridge River	2004, 2009 as 97LS077
PR-B2	Partridge River	2004
PR-B3	Partridge River	2004
PR-east	Partridge River	2009
PR-west	Partridge River	2009
09LS10	Partridge River	2009
USFS-SBPR	South Branch Partridge River	2011, 2012, 2014
81LS008	Wyman Creek	2009
Reach 1	Partridge River	2014
Reach 2	Partridge River	2014
Reach 3	Partridge River	2014
Reach 4	Partridge River	2014
B-5	Embarrass River wetland (upstream)	2004
B-6	Trimble Creek	2004
B-7	Unnamed Creek	2004
PM-11	Unnamed Creek	2010
PM-12.1	Spring Mine Creek	2010
PM-19	Trimble Creek	2010
PM-20	Bear Creek	2010
09LS098	Bear Creek	2009
09LS100	Embarrass River	2009
09LS101	Spring Mine Creek	2009
97LS005	Embarrass River	1997
10EM045	Embarrass River	2009, 2010

5.0 Operational Monitoring

The sections under operational monitoring document the water monitoring locations that are required by the various Project permits. These locations are broken down into the following categories:

- Surface Water Monitoring
- Surface Discharge Monitoring
- Internal Waste Stream Monitoring
- Stormwater Benchmark Monitoring
- Groundwater Monitoring
- Wetland Hydrology, Vegetation, and Water Quality Monitoring
- Macroinvertebrate Monitoring
- Fish Monitoring

The operational monitoring locations, as required by the NorthMet permits, are shown on Figure 12. These permits, which dictate the monitoring locations presented in the following tables, are:

- MPCA NPDES/SDS Permit MN0071013 (NorthMet NPDES Permit)
- MPCA NPDES/SDS Permit MN0054089 (Legacy NPDES Permit, formerly Cliffs Erie Tailings Basin Permit)
- MPCA Consent Decree and associated Long-Term Plan (CD Long-Term Plan)
- MPCA 401 Water Quality Certification (401 Certification)
- MDNR Permit to Mine (PTM)
- MDNR Wetland Conservation Act Notice of Decision (WCA)
- MDNR Water Appropriation Permit 2016-1363 (WA-1363)
- MDNR Water Appropriation Permit 2016-1364 (WA-1364)
- MDNR Water Appropriation Permit 2016-1365 (WA-1365)

- MDNR Water Appropriation Permit 2016-1367 (WA-1367)
- MDNR Water Appropriation Permit 2016-1369 (WA-1369)
- MDNR Water Appropriation Permit 2017-0260 (WA-0260)
- USACE Permit No. MVP-1999-05528-TJH under Section 404 (404 Permit)
- MPCA Industrial Stormwater Coverage under Permit ID MNR053DNJ for the Plant Site with related Stormwater Pollution Prevention Plan [SWPPP] (Plant Site Industrial SWPPP)
- MPCA Industrial Stormwater Coverage under Permit ID MNR053DNH for the Mine Site with related Stormwater Pollution Prevention Plan [SWPPP] (Mine Site Industrial SWPPP)
- MPCA Industrial Stormwater Coverage under Permit ID MNR053DNJ for the Transportation and Utility Corridors (TUC) with related Stormwater Pollution Prevention Plan [SWPPP] (TUC Industrial SWPPP)

5.1 Surface Water Monitoring Stations

Surface water (SW) monitoring stations are locations where streams or creeks are monitored for a combination of field conditions, such as flow, temperature, pH, and conductivity and sampled for laboratory analysis of various analytes per the respective permit requirements. The SW monitoring stations are shown in Table 5.1. The locations of the surface water monitoring stations are shown on Figures 13 and Figure 14. The analytical and field sampling lists for the SW monitoring stations are shown on Tables 5-5 to 5-44.

5.2 Surface Discharge Monitoring Stations

Surface discharge (SD) monitoring stations are locations where the WWTS discharges at the Plant Site to a receiving water or stream and after reclamation, at the Mine Site for the West Pit discharge. The SD stations assess the condition of the discharge waters per the permits. The SD monitoring stations are shown on Table 5.2. The locations of the SD stations are shown on Figure 14 and Figure 15. The analytical and field sampling lists for the SD monitoring stations are shown on Tables 5-5 to 5-44.

5.3 Internal Waste Stream Monitoring Stations

Internal Waste Stream (WS) monitoring stations are locations where there are discharges from locations within the Plant Site or Mine Site discharge to internal receiving locations, with no discharge to a receiving water at that location. The WS stations assess the condition of the discharge waters per the permits. The WS monitoring stations are shown on Table 5.3. The locations of the WS stations are shown on Figure 16 and Figure 17. The analytical and field sampling lists for the SW monitoring stations are shown on Tables 5-5 to 5-44.

5.4 Stormwater Benchmark Monitoring Stations

The industrial stormwater benchmark monitoring stations are shown on Table 5.4. The locations of the stations are shown on Figure 18, Figure 19, and Figure 20. The analytical and field sampling lists for the SW monitoring stations are shown on Tables 5-45 to 5-47.

5.5 Groundwater Monitoring Wells

The groundwater (GW) monitoring wells are shown on Table 5.48. The locations of the wells are shown on Figure 21 and Figure 22. The analytical and field sampling lists for the SW monitoring stations are shown on Tables 5-49 to 5-54.

5.6 Wetland Monitoring Stations

The wetland monitoring locations are shown on Table 5-55. The locations of the wells are shown on Figure 23 and Figure 24. The wetland monitoring wells are monitored for hydrology and vegetation as discussed in Section 5.6.1. A subset of 22 of the wetland monitoring wells are monitored for water quality as discussed in Section 5.6.2.

5.6.1 Wetland Hydrology and Vegetation Monitoring

PolyMet has established various wetland hydrology and vegetation monitoring locations in wetlands at the Mine Site, the Transportation and Utility Corridors, and Plant Site. The wetland monitoring sites are shown on Table 5-55.

As required by the 404 Permit, the WCA Permit and the 401 Certification, PolyMet is required to conduct wetland hydrology and vegetation monitoring. The monitoring required is as described in *Monitoring Plan for Potential Indirect Wetland Impacts*, as prepared by Barr Engineering.

5.6.2 Wetland Water Quality Monitoring

As required by the 401 Certification, water quality monitoring of wetlands is to be conducted to provide data regarding sulfate, mercury, and methylmercury in addition to other analytes. Baseline monitoring started in 2019, to be conducted for not less than two years, and continue until the commencement of project mining operations. Project operations are defined in the 401 Certification as production blasting within the open pit. Surficial groundwater will be sampled from 22 wetland monitoring locations, a subset of the monitoring locations as identified on Table 5-55 and shown on Figure 23 and Figure 24. The sample parameter list for the water quality monitoring is shown on Table 5-56.

5.6.3 Wetland of Interest Monitoring

As required by the 401 Certification, monitoring of the Wetland of Interest is required to provide data regarding sulfate, copper, cobalt, and hardness. The Wetland of Interest, located south of the Rail Transfer Hopper, is defined in PolyMet's Cross-Media Analysis to Assess Potential Effects on Water Quality from Project-Related Deposition of Sulfur and Metal Air Emissions, dated October 31, 2017. PolyMet began monitoring upon issuance of all state permits for the Project, in 2019. Monitoring will continue through one year after cessation of Project mining operations. The two sampling locations are shown on Figure 23. The sample parameter list for this sampling is identified on Table 5-57.

5.7 Macroinvertebrate Monitoring Stations

Permit-required macroinvertebrate monitoring locations and frequencies are shown in Table 5-58. The macroinvertebrate monitoring locations are shown on Figure 25.

5.8 Fish Community Monitoring Stations

Permit-required fish community monitoring locations and frequencies are shown on Table 5-58. The fish community monitoring locations are shown on Figure 25.

Table 5-1 Surface Water Monitoring Stations

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit with Reporting Requirements	Permit Monitoring Start Date	Prior Station ID	Comments
Plant Site Surface Water Monitoring Sites							
SW003	Unnamed Creek	Monitor downstream of stream augmentation and the FTB Seepage Containment System. Only sulfate will be monitored after the FTB Seepage Containment System is in place.	Legacy NPDES Permit/NorthMet NPDES Permit • List 1 + Temp: Monthly Legacy NPDES Permit • List 9: Quarterly (Mar, Jun, Sep, Dec) NorthMet NPDES Permit • List 2: May, Sept	Legacy NPDES Permit Quarterly DMR NorthMet NPDES Permit Monthly DMR Consent Decree Quarterly Progress Report	12/2018	PM-11	Monitoring per NorthMet NPDES Permit lists/frequency required by CD Long-Term Plan
SW004	Embarrass River	Monitor at County Road 620 (Salo Road)	Legacy NPDES Permit • List 11: Quarterly (Mar, Jun, Sep, Dec)	Legacy NPDES Permit Quarterly DMR	12/2018		
SW005	Embarrass River	Monitor downstream of the Tailings Basin to assess changes from background conditions at SW008 after the performance of the FTB Seepage Containment System and stream augmentation. Only sulfate will be monitored after the FTB Seepage Containment System is in place. Monitor near MN135.	Legacy NPDES Permit /NorthMet NPDES Permit • List 1 + Temp: Monthly Legacy NPDES Permit • List 10: Quarterly (Mar, June, Sept, Dec) NorthMet NPDES Permit • List 2: May, Sep 401 Certification • List 3: Jan, Apr, July, Oct WA-1369 • Flow – year-round. • Manual stage measurement every 4-6 weeks- year-round	Legacy NPDES Permit Quarterly DMR NorthMet NPDES Permit Monthly DMR Consent Decree Quarterly Progress Report WA-1369 Annual Report 401 Certification Annual Report	12/2018	PM-13	
SW006	Trimble Creek	Monitor Trimble Creek downstream of stream augmentation and the FTB Seepage Containment System. Only sulfate will be monitored after the FTB Seepage Containment System is in place.	NorthMet NPDES Permit • List 1: Monthly • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR Consent Decree: Quarterly Progress Report	12/2018	TC-1a	

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit with Reporting Requirements	Permit Monitoring Start Date	Prior Station ID	Comments
SW007	Unnamed (Mud Lake) Creek	Monitor downstream of the swale and the FTB Seepage Containment System. Only sulfate will be monitored after the FTB Seepage Containment System is in place.	NorthMet NPDES Permit • List 1: Monthly • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR Consent Decree: Quarterly Progress Report	12/2018	MLC-1	
SW008	Embarrass River	Monitor upstream of the FTB and downstream of Area 5 as background conditions	NorthMet NPDES Permit • List 1: Monthly • List 2: May, Sep 401 Certification • List 3: Jan, Apr, July, Oct	NorthMet NPDES Permit: Monthly DMR Consent Decree: Quarterly Progress Report 401 Certification: Annual Report	12/2018	PM-12.2	
SW020	Second Creek	Monitor Second Creek downstream of FTB	Legacy NPDES Permit • List 4: Sep • List 5: Mar, Dec • List 6: Jun • List 7: Apr, Aug, Oct • List 8: Jan, Feb, May, Jul, Nov NorthMet NPDES Permit • List 1: Monthly • List 2: May, Sep 401 Certification • List 3: Jan, Apr, Jul, Oct	Legacy NPDES Permit: Monthly DMR (SD026) NorthMet NPDES Permit: Monthly DMR Consent Decree: Quarterly Progress Report 401 Certification: Annual Report	12/2018	PM-7/ SD026	List 1/List 2 will begin 18 months after the NorthMet WWTP is operational.
SW041	Embarrass River	Monitor Embarrass River upstream of the Plant Site near Kaunonen Lake Road (H03157002)	WA-1369 • Flow: year-round • Manual stage measurement every 4-6 weeks- year-round	WA-1369: Annual Report	6/2021		
SW042	Unnamed (Mud Lake) Creek	Monitor Unnamed (Mud Lake) Creek near Mattson Road (H013158002)	WA-1369 • Flow: year-round • Manual stage measurement every 4-6 weeks- year-round	WA-1369: Annual Report	6/2021		
SW043	Embarrass River	Monitor Embarrass River near Raisanen Road (H03153001) downstream of the Plant Site	WA-1369 • Flow: year-round • Manual stage measurement every 4-6 weeks- year-round	WA-1369: Annual Report	6/2021		This is the location of the historical USGS gage 04017000.

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit with Reporting Requirements	Permit Monitoring Start Date	Prior Station ID	Comments
SW044	Second Creek	Monitor Second Creek downstream of Pit 2W Mining Road	WA-1369 • Flow: year-round • Manual stage measurement every 4-6 weeks- year-round	WA-1369: Annual Report	6/2021		
SW045	Trimble Creek	Monitor Trimble Creek near County Road 615 (H03158001)	WA-1369 • Manual stage measurement every 4-6 weeks- year-round • Streamflow monitoring during season of interest or as needed during high/low flows	WA-1369: Annual Report	6/2021		Manual streamflow gaging station
SW046	Bear Creek	Monitor Bear Creek near County Road 21 (H03160001) – reference site	WA-1369 • Manual stage measurement every 4-6 weeks- year-round • Streamflow monitoring during season of interest or as needed during high/low flows	WA-1369: Annual Report	6/2021		Manual streamflow gaging station
SW050	Unnamed (Mud Lake) Creek	Monitor flow at Unnamed (Mud Lake) Creek via swale	WA-1369 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	WA-1369: Annual Report	6/2021		WA-1369 discusses alternative methods to record instantaneous rates and total monthly volumes at this station
Mine Site and Transportation and Utility Corridors (TUC) Surface Water Monitoring Sites							
SW047	Colby Lake	Monitor Colby Lake water withdrawals	WA-0260 • Instantaneous rates, continuous, year-round • Total monthly volume, continuous, year-round	WA-0260: Annual Report	No pumping enacted		
SW402	Partridge River	Monitor Partridge River upstream of the Mine Site	NorthMet NPDES Permit • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep 401 Certification • List 3: Jan, Apr, Jul, Oct	NorthMet NPDES Permit: Monthly DMR 401 Certification: Annual Report	12/2018	PM-2/ SW002	
SW407	Wetlegs Creek	Monitor Wetlegs Creek downstream of the TUC	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018	WL-1	PTM monitoring is to evaluate rail ore car spillage

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit with Reporting Requirements	Permit Monitoring Start Date	Prior Station ID	Comments
SW408	Longnose Creek	Monitor Longnose Creek downstream of the TUC	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018	LN-1	PTM monitoring is to evaluate rail ore car spillage
SW409	Wyman Creek	Monitor Wyman Creek downstream of the TUC	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018	WL-1	PTM monitoring is to evaluate rail ore car spillage
SW410	Wyman Creek	Monitor Wyman Creek upstream of the TUC	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018	PM-6b	PTM monitoring is to evaluate rail ore car spillage
SW411	Longnose Creek	Monitor Longnose Creek upstream of the TUC	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018	LN-2	PTM monitoring is to evaluate rail ore car spillage
SW412	Wetlegs Creek	Monitor Wetlegs Creek upstream of the TUC	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018	WL-2	PTM monitoring is to evaluate rail ore car spillage
SW413	Partridge River	Monitor Partridge River upstream of the South Branch and downstream of Unnamed (future West Pit Outlet) Creek	NorthMet NPDES Permit • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep 401 Certification • List 3: Jan, Apr, Jul, Oct • List 21 : Monthly	NorthMet NPDES Permit: Monthly DMR 401 Certification: Annual Report	12/2018	SW-004c	
SW414	Unnamed (West Pit Outlet) Creek	Monitor Unnamed (future West Pit Outlet) Creek downstream of West Pit, downstream of the railroad	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018		PTM monitoring is to evaluate rail ore car spillage
SW415	Unnamed (West Pit Outlet) Creek	Monitor Unnamed (future West Pit Outlet) Creek downstream of West Pit, downstream of Dunka Road	PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	PTM: Annual Report	12/2018		PTM monitoring is to evaluate rail ore car spillage

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit with Reporting Requirements	Permit Monitoring Start Date	Prior Station ID	Comments
SW430	Partridge River	Monitor Partridge River upstream of Mine Site, 0.5 mile downstream of Peter Mitchell Pit Road (H03155005)	WA-1363, 1364, 1365, 1367 • Flow, year-round • Manual discharge and stage measurement every 4-6 weeks year-round • Monitor during season of interest or as needed during high/low flows	WA-1363, 1364, 1365, 1367: Annual Reports	11/2018		
SW431	Partridge River	Monitor Partridge River downstream of the confluence with the South Branch of the Partridge River and downstream of Mine Site	WA-1363, 1364, 1365, 1367 • Flow, year-round • Manual discharge and stage measurement every 4-6 weeks year-round • Monitor during season of interest or as needed during high/low flows	WA-1363, 1364, 1365, 1367: Annual Reports	11/2018		
SW432	South Branch of Partridge River	Monitor South Branch of Partridge River downstream of the Mine Site	WA-1363, 1364, 1365, 1367 • Flow, year-round • Manual discharge and stage measurement every 4-6 weeks year-round • Monitor during season of interest or as needed during high/low flows	WA-1363, 1364, 1365, 1367: Annual Reports	11/2018		
SW433	Unnamed (West Pit Overflow) Creek	Monitor Unnamed (West Pit Outfall) Creek	WA-1363, 1364, 1365, 1367 • Flow, year-round • Manual discharge and stage measurement every 4-6 weeks year-round • Monitor during season of interest or as needed during high/low flows	WA-1363, 1364, 1365, 1367: Annual Reports	11/2018		
H03155002	Partridge River	Monitor Partridge River (H03155002)	WA-1363, 1364, 1365, 1367 • Flow, year-round • Manual discharge and stage measurement every 4-6 weeks year-round • Monitor during season of interest or as needed during high/low flows	WA-1363, 1364, 1365, 1367: Annual Reports	11/2018		

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit with Reporting Requirements	Permit Monitoring Start Date	Prior Station ID	Comments
Colby Lake (DNR Lake ID# 69-0249)	Colby Lake	Monitor Colby Lake water level	WA-0260 • Water level, daily, year-round • Volume of water moved Colby Lake to Whitewater Reservoir	WA-0260: Annual Report	11/2018		Minnesota Power performs this monitoring
Whitewater Reservoir (DNR Lake ID# 69-0376)	Whitewater Reservoir	Monitor Whitewater Reservoir water level	WA-0260 • Water level, daily, year-round • Volume of water moved Whitewater Reservoir to Colby Lake	WA-0260: Annual Report	11/2018		Minnesota Power performs this monitoring
Water Fill Stations		Monitor flow rates and monthly volumes from truck water fill stations	WA-1367 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	WA-1367: Annual Report	Not constructed		
Mud Lake (DNR Lake ID# 69-0148)	Mud Lake	Monitor Mud Lake water level	WA-1367 Water Level: Required if nearby groundwater and surface water levels show mining impacts from PolyMet	WA-1367: Annual Report	Mining operations not started		

Table 5-2 Surface Discharge Monitoring Stations

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
Plant Site Stations listed under NPDES/SDS Permit MN0054089 (Legacy NPDES Permit)						
SD001		NW Seepage Collection Ditch (existing LTVSMC Tailings Basin)	• List 12 – Mar, Dec • List 13 - Sep • List 14 – Apr, Aug, Oct • List 15 – Jun	5/2001	Legacy NPDES Permit: Monthly DMR	Monitoring ceases once NorthMet FTB Seepage Containment System installed
SD002		NE Seepage Collection Ditch (existing Tailings Basin)	• List 12 – Mar, Dec • List 13 - Sep • List 14 – Apr, Aug, Oct • List 15 – Jun	5/2001	Legacy NPDES Permit: Monthly DMR	Monitoring ceases once NorthMet FTB Seepage Containment System installed
SD004		Tailings Basin Cell 2W Seep A	No sampling required	5/2001	Legacy NPDES Permit: Monthly DMR	Pumped back to SD006 per Consent Decree; monitoring ceases once NorthMet FTB Seepage Containment System installed
SD005		Tailings Basin Cell 2W Seep B	No sampling required	5/2001	Legacy NPDES Permit: Monthly DMR	Monitoring ceases once NorthMet FTB Seepage Containment System installed
SD006		Power Line Access Road Culvert	No sampling required	5/2001	Legacy NPDES Permit: Monthly DMR	Pumped back to Cell 1E per Consent Decree; monitoring ceases once NorthMet FTB Seepage Containment System installed
Plant Site Stations listed under other permits						
SD001	WWTS Discharge	Monitor water quality discharge from the Waste Water Treatment System (WWTS) for stream augmentation. Monitoring point is at WWTS.	NorthMet NPDES Permit: • List 29: 24 hr. composite, quarterly • List 39: 24 hr. composite, monthly, Jan-Dec • List 40: 24 hr. composite, weekly, Jan-Dec • Flow, daily, Jan-Dec	Not constructed	NorthMet NPDES Permit: • Monthly DMR • Quarterly Chronic Toxicity Results	List 40: pH is continuous measurement with: • Calendar month minimum of 6.0 • Calendar month maximum of 9.0 Zinc is: • Calendar month average of 500 microgram • Daily maximum 1000 micrograms/liter Total Mercury is: • Calendar month average of 1000 nanograms/liter • Daily maximum of 2000 nanograms/liter

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
SD002	Headwater Wetlands of Unnamed Creek	Monitor discharge of treated effluent from the WWTS to the headwater wetlands of Unnamed Creek for stream augmentation. Monitor associated WWTS discharge flow at the WWTS or applicable splitter structure.	NorthMet NPDES Permit: • Flow, monthly, Jan-Dec • Flow, daily, Jan-Dec WA-1369 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	Not constructed	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	
SD003	Headwater Wetlands of Unnamed Creek	Monitor discharge of treated effluent from the WWTS to the headwater wetlands of Unnamed Creek for stream augmentation. Monitor associated WWTS discharge flow at the WWTS or applicable splitter structure.	NorthMet NPDES Permit: • Flow, monthly, Jan-Dec • Flow, daily, Jan-Dec WA-1369 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	Not constructed	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	
SD004	Headwater Wetlands of Trimble Creek	Monitor discharge of treated effluent from the WWTS to the headwater wetlands of Trimble Creek for stream augmentation. Monitor associated WWTS discharge flow at the WWTS or applicable splitter structure.	NorthMet NPDES Permit: • Flow, monthly, Jan-Dec • Flow, daily, Jan-Dec WA-1369 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	Not constructed	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	
SD005	Headwater Wetlands of Trimble Creek	Monitor discharge of treated effluent from the WWTS to the headwater wetlands of Trimble Creek for stream augmentation. Monitor associated WWTS discharge flow at the WWTS or applicable splitter structure.	NorthMet NPDES Permit: • Flow, monthly, Jan-Dec • Flow, daily, Jan-Dec WA-1369 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	Not constructed	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	
SD006	Headwater Wetlands of Trimble Creek	Monitor discharge of treated effluent from the WWTS to the headwater wetlands of Trimble Creek for stream augmentation. Monitor associated WWTS discharge flow at the WWTS or applicable splitter structure.	NorthMet NPDES Permit: • Flow, monthly, Jan-Dec • Flow, daily, Jan-Dec WA-1369 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	Not constructed	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
SD007	Headwater Wetlands of Trimble Creek	Monitor discharge of treated effluent from the WWTS to the headwater wetlands of Trimble Creek for stream augmentation. Monitor associated WWTS discharge flow at the WWTS or applicable splitter structure.	NorthMet NPDES Permit: • Flow, monthly, Jan-Dec • Flow, daily, Jan-Dec WA-1369 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	Not constructed	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	
SD008	Headwater Wetlands of Trimble Creek	Monitor discharge of treated effluent from the WWTS to the headwater wetlands of Trimble Creek for stream augmentation. Monitor associated WWTS discharge flow at the WWTS or applicable splitter structure.	NorthMet NPDES Permit: • Flow, monthly, Jan-Dec • Flow, daily, Jan-Dec WA-1369 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	Not constructed	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	
SD009	Headwater Wetlands of Trimble Creek	Monitor discharge of treated effluent from the WWTS to the headwater wetlands of Trimble Creek for stream augmentation. Monitor associated WWTS discharge flow at the WWTS or applicable splitter structure.	NorthMet NPDES Permit: • Flow, monthly, Jan-Dec • Flow, daily, Jan-Dec WA-1369 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	Not constructed	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	
SD010	Headwater Wetlands of Trimble Creek	Monitor discharge of treated effluent from the WWTS to the headwater wetlands of Trimble Creek for stream augmentation. Monitor associated WWTS discharge flow at the WWTS or applicable splitter structure.	NorthMet NPDES Permit: • Flow, monthly, Jan-Dec • Flow, daily, Jan-Dec WA-1369 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	Not constructed	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	
SD011	Second Creek	Monitor discharge of treated effluent from WWTS to Second Creek for stream augmentation. Monitor associated WWTS discharge flow at the WWTS or applicable splitter structure.	NorthMet NPDES Permit: • Flow, monthly, Jan-Dec • Flow, daily, Jan-Dec WA-1369 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	Not constructed	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	
Mine Site Stations						
SD401	Unnamed (West Pit Outlet) Creek	Monitor the overflow from the West Pit to Unnamed Creek	WA-1365 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	Not constructed	WA-1365: Annual Report	

Table 5-3 Internal Waste Stream Monitoring Stations

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
Plant Site Stations listed under NPDES/SDS Permit MN0054089 (Legacy NPDES Permit)						
WS009	Tailings Basin	Culvert under RR Grade, NE side of Cell 1E	List 16: Apr, Jul, Oct	5/2001	Legacy NPDES Permit: Monthly DMR	
WS011	Tailings Basin	Tailings Basin Seep 1	List 17: Apr, Jul, Oct	5/2001	Legacy NPDES Permit: Monthly DMR	
WS012	Tailings Basin	Tailings Basin Seep 2	List 17: Apr, Jul, Oct	5/2001	Legacy NPDES Permit: Monthly DMR	
WS013	Tailings Basin	Tailings Basin Seep 3	List 18: Apr, Jul, Oct	5/2001	Legacy NPDES Permit: Monthly DMR	
Plant Site Stations listed under other permits						
WS001	FTB Pond	Monitor waste stream into Flotation Tailings Basin (FTB) Pond (sampled at pond intake)	NorthMet NPDES Permit • List 20: Jan, Feb, Mar, May, Jun, Jul, Aug, Sep, Nov, Dec • List 19: Apr, Oct	TBD	NorthMet NPDES Permit: Monthly DMR	Monitor once water movement is initiated
WS002	FTB Seepage Containment System	Monitor waste stream from FTB Seepage Containment System (sampled at the Waste Water Treatment System (WWTS) intake)	NorthMet NPDES Permit • List 38: Monthly, Jan-Dec • List 23: Monthly, Apr, Oct	TBD	NorthMet NPDES Permit: Monthly DMR	Monitor once water movement is initiated
WS003	FTB South Seepage Management System; Second Creek	Monitor waste stream from FTB South Seepage Management System (sampled at the WWTS intake); amount of seepage extracted from Second Creek watershed	NorthMet NPDES Permit: • List 38: Monthly, Jan-Dec • List 23: Monthly, Apr, Oct WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Monitor once water movement is initiated
WS004	HRF Pond	Monitor waste stream in Hydrometallurgical Residue Facility (HRF) Pond (sampled at pond intake)	NorthMet NPDES Permit: • List 24: Monthly, Jan-Dec • List 25: Monthly, Jul WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Monitor once water movement is initiated; WA-1369 discusses alternative methods to record instantaneous rates and total monthly volumes at this station
WS005	HRF Leachate	Monitor waste stream from HRF Leakage Collection System (underliner leakage)	NorthMet NPDES Permit • List 24: Monthly, Jan-Dec • List 25: Monthly, Jul	TBD	NorthMet NPDES Permit: Monthly DMR	Monitor once water movement is initiated
WS006	Unnamed (Mud Lake) Creek	Monitor amount of seepage extracted from Unnamed (Mud Lake) Creek	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once water movement is initiated

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
WS007	Trimble Creek	Monitors amount of seepage extracted from Trimble Creek	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once water movement is initiated
WS008	Unnamed Creek	Monitors amount of seepage extracted from Unnamed Creek	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once water movement is initiated
WS009	Sewage Treatment Stabilization Ponds	Monitor waste stream from the southeast corner of the Sewage Treatment Stabilization Ponds	NorthMet NPDES Permit List 26: Two times per week, Jan-Dec WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Monitor once water movement is initiated; WA-1369 discusses alternative methods to record instantaneous rates and total monthly volumes at this station
WS010	Tailings Basin	Monitor Flotation Tailings Basin Cell 1E levels and volume	WA-1369 • Water Level: Daily, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once water movement is initiated
WS011	Tailings Basin	Monitor Flotation Tailings Basin Cell 2E levels and volumes	WA-1369 • Water Level: Daily, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once water movement is initiated
WS012	Tailings Discharge to FTB	Monitor tailings discharge flow to FTB	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once dewatering is initiated
WS013	FTB to Beneficiation Plant	Monitor water flow from FTB to Beneficiation Plant	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once pumping begins
WS014	FTB Seepage Capture System to FTB	Monitor water flow from FTB Seepage Capture System to FTB	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once pumping begins

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
WS015	FTB Seepage Capture Systems	Monitor waste stream into the WWTS, which includes the combined influent from FTB Seepage Containment System and FTB South Seepage Management System	NorthMet NPDES Permit • List 27: 24 hr. composite, monthly, Jan-Dec • List 28: 24 hr. composite, weekly, Jan-Dec • List 29: 24 hr. composite, quarterly, Mar, Jun, Sep, Dec • List 30: 24 hr. composite, quarterly, Jan-Dec WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Monitor once pumping begins
WS016	HydroMet Residue Facility	Monitor HRF Pond levels and volumes	WA-1369 • Water Level: Daily, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once water movement is initiated
WS031	Plant Reservoir	Monitor flow to Plant Reservoir	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins; WA-1369 discusses alternative methods to record instantaneous rates and total monthly volumes at this station
WS051	WWTS Basin	Monitor flow to WWTS Basin	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins; WA-1369 discusses alternative methods to record instantaneous rates and total monthly volumes at this station
WS061	WWTS	Monitor pumping from WWTS to FTB	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins
WS072	Mine Water Chemical Precipitation Treatment Train	Monitor effluent from the mine water chemical precipitation treatment train	NorthMet NPDES Permit: • List 31: Monthly, Jan-Dec • List 32: Monthly, Apr, Oct	TBD	NorthMet NPDES Permit: Monthly DMR	Monitor once outfall begins
WS073	Mine Water Membrane Filtration Treatment Train	Monitor effluent from the mine water membrane filtration treatment train to the FTB Pond	NorthMet NPDES Permit: • List 33: Monthly, Jan-Dec • List 32: Monthly, Apr, Oct	TBD	NorthMet NPDES Permit: Monthly DMR	Monitor once outfall begins

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
WS074	Tailings Basin Seepage Treatment Train	Monitor blended effluents from the reverse osmosis and nanofiltration membranes of the tailings basin seepage treatment train, upstream of discharge stabilization	NorthMet NPDES Permit: • List 34: 24 hr. composite, weekly, Jan-Dec	TBD	NorthMet NPDES Permit: Monthly DMR	Monitor once outfall begins
WS081	Plant Reservoir	Plant Reservoir to Beneficiation Plant	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins
WS082	Plant Reservoir	Plant Reservoir to Hydrometallurgical Plant	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins
WS083	Plant Reservoir	Plant Reservoir to FTB	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins
WS084	Plant Reservoir	Plant Reservoir to Potable Water Treatment Plant	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins
WS085	Plant Reservoir	Plant Reservoir to Fire Water System	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins
WS086	Plant Reservoir	Plant Reservoir to air emission scrubber system	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins
WS087	Plant Reservoir	Plant Reservoir to miscellaneous water needs	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins
WS089	Plant Reservoir	Plant Reservoir to truck fill stations	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins
Mine Site Stations						
WS062	WWTS	Monitor pumping from WWTS to East Pit	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
WS063	WWTS	Monitor pumping from WWTS to West Pit	WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1369: Annual Report	Monitor once appropriation begins
WS401	East Pit Dewatering	Monitor waste stream from East Pit dewatering	NorthMet NPDES Permit: • List 35: Twice monthly, Jan-Dec • Water Level: Twice monthly, Jan-Dec WA-1363: • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round • Water Level (East Pit): Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	Monitor once pit dewatering begins
WS402	West Pit Dewatering	Monitor waste stream from West Pit dewatering	NorthMet NPDES Permit: • List 35: Twice monthly, Jan-Dec • Water Level: Twice monthly, Jan-Dec WA-1365: • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round • Water Level (East Pit): Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	Monitor once pit dewatering begins
WS403	West Pit Dewatering	Monitor waste stream from West Pit dewatering	NorthMet NPDES Permit: • List 35: Twice monthly, Jan-Dec • Water Level: Twice monthly, Jan-Dec WA-1365: • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round • Water Level (East Pit): Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	Monitor once pit dewatering begins
WS404	Central Pit Dewatering	Monitor waste stream from Central Pit dewatering	NorthMet NPDES Permit: • List 35: Twice monthly, Jan-Dec • Water Level: Twice monthly, Jan-Dec WA-1364: • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round • Water Level: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1364: Annual Report	Monitor once pit dewatering begins

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
WS411	Category 1 Stockpile Groundwater Containment System	Monitor waste stream from Category 1 Stockpile Groundwater Containment System sump	NorthMet NPDES Permit: • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec WA-1367: • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS412	Category 1 Stockpile Groundwater Containment System	Monitor waste stream from Category 1 Stockpile Groundwater Containment System sump	NorthMet NPDES Permit: • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec • Water Level (East Pit): Twice monthly, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS413	OSLA Runoff	Monitor waste stream from Overburden Storage and Laydown Area (OSLA) runoff (from OSLA Pond)	NorthMet NPDES Permit: List 37: Monthly, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS414	Construction Mine Water Basin	Monitor waste stream from the Construction Mine Water Basin. This is the combined flow of construction mine water and OSLA drainage that goes to the FTB via the Construction Mine Water Pipeline	NorthMet NPDES Permit: List 37: Monthly, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS415	Low Concentration Mine Water	Monitor waste stream from the Low Concentration Equalization Basins (LCEQ Basins) that goes to the Waste Water Treatment System (WWTS) via the Low Concentration Pipeline	NorthMet NPDES Permit • List 33: Monthly, Jan-Dec • List 32: Monthly, Apr, Oct WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
WS416	High Concentration Mine Water	Monitor waste stream from the High Concentration Equalization Basin (HCEQ Basin) that goes to the WWTS via the High Concentration Pipeline.	NorthMet NPDES Permit: • List 33: Monthly, Jan-Dec • List 32: Monthly, Apr, Oct WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS421	Category 2/3 Waste Rock Stockpile Mine Water Drainage	Monitor waste stream collected on the Category 2/3 Waste Rock Stockpile liner	NorthMet NPDES Permit • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS422	Category 2/3 Waste Rock Stockpile Mine Water Drainage	Monitor waste stream collected on the Category 2/3 Waste Rock Stockpile liner	NorthMet NPDES Permit: • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS423	Category 2/3 Waste Rock Stockpile Mine Water Drainage	Monitor waste stream collected on the Category 2/3 Waste Rock Stockpile liner	NorthMet NPDES Permit: • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS424	Category 4 Waste Rock Stockpile Mine Water Drainage	Monitor waste stream collected on the Category 4 Waste Rock Stockpile liner	NorthMet NPDES Permit: • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
WS425	Ore Surge Pile Mine Water Drainage	Monitor waste stream collected on the Ore Surge Pile liner	NorthMet NPDES Permit: • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS441	Construction Mine Water and OLSA Runoff	Monitor combined waste stream of Construction Mine Water and OLSA Runoff	WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1367: Annual Report	Monitor once outfall begins
WS442	Inflow to Construction Mine Water Basin	Monitor Low Concentration Mine Water	WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1367: Annual Report	Monitor once outfall begins
WS443	Inflow into Low Concentration EQ Basin	Monitor Low Concentration Mine Water	WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1367: Annual Report	Monitor once outfall begins
WS444	Inflow into Low Concentration EQ Basin	Monitor Low Concentration Mine Water	WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1367: Annual Report	Monitor once outfall begins
WS900	East Pit	Monitor East Pit outfall structure to West Pit	WA-1363 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	WA-1363: Annual Report	Monitor once outfall begins

Table 5-4 Stormwater Benchmark Monitoring Stations

Station ID	Location	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) with Reporting Requirements
Plant Site Stations				
BML01	Plant Site	Monitors industrial stormwater discharge from the western portion of the Plant Site	Plant Site Industrial SWPPP: List 42: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually
BML02	Plant Site	Monitors industrial stormwater discharge from the east-central portion of the Plant Site	Plant Site Industrial SWPPP: List 42: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually
BML03	Plant Site	Monitors industrial stormwater discharge from the east-central portion of the Plant Site	Plant Site Industrial SWPPP: List 42: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually
BML04	Plant Site	Monitors industrial stormwater discharge from the Area 1 Shops	Plant Site Industrial SWPPP: List 42: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually
BML05	Plant Site	Monitors industrial stormwater discharge from the Area 2 Shops	Plant Site Industrial SWPPP: List 42: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually
Mine Site Stations				
BML40	Mine Site	Monitors industrial stormwater discharge from Pond A to the Partridge River	Mine Site Industrial SWPPP: List 41: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually
BML41	Mine Site	Monitors industrial stormwater discharge from Pond B to a wetland complex/drainageway tributary to the Partridge River	Mine Site Industrial SWPPP: List 41: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually
BML42	Mine Site	Monitors industrial stormwater discharge from Pond C to an unnamed creek tributary to the Partridge River	Mine Site Industrial SWPPP: List 41: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually
BML43	Mine Site	Monitors industrial stormwater discharge from Pond D to a ditch tributary to the Partridge River	Mine Site Industrial SWPPP: List 41: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually
BML44	Mine Site	Monitors industrial stormwater discharge southeast of the Rail Transfer Hopper to a ditch tributary to the Partridge River	Mine Site Industrial SWPPP: List 41: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually
Transportation and Utility Corridors (TUC) Stations				
BML47	TUC	Monitor wetlands adjacent to Wetlegs Creek downstream of the TUC	TUC Industrial SWPPP: List 43: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually
BML48	TUC	Monitor wetlands adjacent to Longnose Creek downstream of the TUC	TUC Industrial SWPPP: List 43: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually
BML49	TUC	Monitor wetlands adjacent to Wyman Creek downstream of Dunka Road	TUC Industrial SWPPP: List 43: Once per quarter, at least four calendar qtrs	ISW General Permit: SWMR Form: Quarterly and Annually

Table 5-5 List 1 Surface Water Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Aluminum	EPA 200.8
Aluminum, Dissolved	EPA 200.8
Arsenic	EPA 200.8
Calcium	EPA 200.7
Chloride	EPA 300.0
Cobalt	EPA 200.8
Copper	EPA 200.8
Hardness, Total	EPA 200.7
Lead	EPA 200.8
Magnesium	EPA 200.7
Mercury	EPA 1631E
Nickel	EPA 200.8
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
Zinc	EPA 200.8
Conductance, Specific, Field	Field Measurement
Flow, Field	Field Measurement
pH, Field	Field Measurement

Table 5-6 List 2 Surface Water Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Aluminum	EPA 200.8
Aluminum, Dissolved	EPA 200.8
Antimony	EPA 200.8
Arsenic	EPA 200.8
Cadmium	EPA 200.8
Calcium	EPA 200.7
Chloride	EPA 300.0
Chromium	EPA 200.8
Cobalt	EPA 200.8
Copper	EPA 200.8
Hardness, Total	EPA 200.7
Lead	EPA 200.8
Magnesium	EPA 200.7
Mercury	EPA 1631E
Nickel	EPA 200.8
Selenium	EPA 200.8
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
*Thallium	EPA 200.8
Zinc	EPA 200.8
Conductance, Specific, Field	Field Measurement
Flow, Field	Field Measurement
pH, Field	Field Measurement

Table 5-7 List 3 Surface Water Monitoring

Parameter	Method
Mercury, Dissolved	EPA 1631E
Methyl Mercury, Dissolved	EPA 1630

Table 5-8 List 4 Surface Water Monitoring

Parameter	Method
1,2-Dichloroethylene (cis-)	EPA 8260B
Alkalinity, Bicarbonate as HCO3	SM 2320B
Benzene	EPA 8260B
Boron	EPA 200.8
Calcium	EPA 200.7
Cations, % Sodium	Calculation
Cations, Total	SM 1030E
Chloride	EPA 300.0
Chloroform	EPA 8260B
Cobalt	EPA 200.8
Diesel Range Organics	WI DRO
Ethylbenzene	EPA 8260B
Fluoride	EPA 300.0
Hardness, Carbonate	Calculation
Hardness, Total	EPA 200.7
Magnesium	EPA 200.7
Manganese	EPA 200.8
Molybdenum	EPA 200.8
Potassium	EPA 200.7
Sodium	EPA 200.7
Solids, Total Dissolved (TDS)	SM 2540C
Solids, Total Suspended (TSS)	USGS-I-3765
Sulfate	EPA 300.0
Tetrachloroethylene	EPA 8260B
Toluene	EPA 8260B
Trichloroethylene	EPA 8260B
Xylene	EPA 8260B
Conductance, Specific	Field Measurement
Flow	Field Measurement
pH	Field Measurement

Table 5-9 List 5 Surface Water Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Boron	EPA 200.8
Calcium	EPA 200.7
Chloride	EPA 300.0
Cobalt	EPA 200.8
Diesel Range Organics	WI DRO
Fluoride	EPA 300.0
Hardness, Carbonate	Calculation
Hardness, Total	EPA 200.7
Magnesium	EPA 200.7
Manganese	EPA 200.8
Molybdenum	EPA 200.8
Solids, Total Dissolved (TDS)	SM 2540C
Solids, Total Suspended (TSS)	USGS-I-3765
Sulfate	EPA 300.0
Conductance, Specific	Field Measurement
Flow	Field Measurement
pH	Field Measurement

Table 5-10 List 6 Surface Water Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Boron	EPA 200.8
Calcium	EPA 200.7
Chloride	EPA 300.0
Cobalt	EPA 200.8
Diesel Range Organics	WI DRO
Fluoride	EPA 300.0
Hardness, Carbonate	Calculation
Hardness, Total	EPA 200.7
Magnesium	EPA 200.7
Manganese	EPA 200.8
Mercury	EPA 1631E
Molybdenum	EPA 200.8
Solids, Total Dissolved (TDS)	SM 2540C
Solids, Total Suspended (TSS)	USGS-I-3765
Sulfate	EPA 300.0
Conductance, Specific	Field Measurement
Flow	Field Measurement
pH	Field Measurement

Table 5-11 List 7 Surface Water Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Calcium	EPA 200.7
Chloride	EPA 300.0
Diesel Range Organics	WI DRO
Hardness, Carbonate	Calculation
Hardness, Total	EPA 200.7
Magnesium	EPA 200.7
Mercury	EPA 1631E
Solids, Total Dissolved (TDS)	SM 2540C
Solids, Total Suspended (TSS)	USGS-I-3765
Sulfate	EPA 300.0
Conductance, Specific	Field Measurement
Flow	Field Measurement
pH	Field Measurement

Table 5-12 List 8 Surface Water Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Calcium	EPA 200.7
Chloride	EPA 300.0
Diesel Range Organics	WI DRO
Hardness, Carbonate	Calculation
Hardness, Total	EPA 200.7
Magnesium	EPA 200.7
Solids, Total Dissolved (TDS)	SM 2540C
Solids, Total Suspended (TSS)	USGS-I-3765
Sulfate	EPA 300.0
Conductance, Specific	Field Measurement
Flow	Field Measurement
pH	Field Measurement

Table 5-13 List 9 Surface Water Monitoring

Parameter	Method
Chloride	EPA 300.0
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
Conductance, Specific	Field Measurement
Flow	Field Measurement
pH	Field Measurement
Temperature, Water	Field Measurement

Table 5-14 List 10 Surface Water Monitoring

Parameter	Method
Chloride	EPA 300.0
Sulfate	EPA 300.0
Conductance, Specific	Field Measurement
Flow	Field Measurement
pH	Field Measurement
Temperature, Water	Field Measurement

Table 5-15 List 11 Surface Water Monitoring

Parameter	Method
Chloride	EPA 300.0
Manganese	EPA 200.8
Sulfate	EPA 300.0
Conductance, Specific	Field Measurement
Flow	Field Measurement
pH	Field Measurement
Temperature, Water	Field Measurement

Table 5-16 List 12 Surface Discharge Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Boron	EPA 200.8
Calcium	EPA 200.7
Cobalt	EPA 200.8
Fluoride	EPA 300.0
Hardness, Carbonate	Calculation
Hardness, Total	EPA 200.7
Iron, Dissolved	EPA 200.8
Magnesium	EPA 200.7
Manganese	EPA 200.8
Salinity	SM 2520B
Solids, Total Suspended (TSS)	USGS-I-3765
Turbidity	EPA 180.1
Conductance, Specific	Field Measurement
pH	Field Measurement

Table 5-17 List 13 Surface Discharge Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Boron	EPA 200.8
Calcium	EPA 200.7
Cations	SM 1030E
Cations, % Sodium	Calculation
Cobalt	EPA 200.8
Fluoride	EPA 300.0
Hardness, Carbonate	Calculation
Iron, Dissolved	EPA 200.8
Magnesium	EPA 200.7
Manganese	EPA 200.8
Potassium	EPA 200.8
Salinity	SM 2520B
Sodium	EPA 200.7
Solids, Total Suspended (TSS)	USGS-I-3765
Turbidity	EPA 180.1
Conductance, Specific	Field Measurement
pH	Field Measurement

Table 5-18 List 14 Surface Discharge Monitoring

Parameter	Method
Mercury, Total	EPA 1631E

Table 5-19 List 15 Surface Discharge Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Boron	EPA 200.8
Calcium	EPA 200.7
Cobalt	EPA 200.8
Fluoride	EPA 300.0
Hardness, Carbonate	Calculation
Hardness, Total	EPA 200.7
Iron, Dissolved	EPA 200.8
Magnesium	EPA 200.7
Manganese	EPA 200.8
Mercury	EPA 1631E
Salinity	SM 2520B
Solids, Total Suspended (TSS)	USGS-I-3765
Turbidity	EPA 180.1
Conductance, Specific	Field Measurement
pH	Field Measurement

Table 5-20 List 16 Waste Stream Monitoring

Parameter	Method
Boron	EPA 200.8
Molybdenum	EPA 200.8
Sulfate	EPA 300.0
Conductance, Specific	Field Measurement
Flow	Field Measurement

Table 5-21 List 17 Waste Stream Monitoring

Parameter	Method
pH	Field Measurement
Conductance, Specific	Field Measurement
Flow	Field Measurement

Table 5-22 List 18 Waste Stream Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Alkalinity, Total as CaCO3	SM 2320B
Boron	EPA 200.8
Calcium	EPA 200.7
Cations	SM 1030E
Cations, % Sodium	Calculation
Cobalt	EPA 200.8
Copper	EPA 200.8
Fluoride	EPA 300.0
Hardness, Carbonate	Calculation
Hardness, Total	EPA 200.7
Magnesium	EPA 200.7
Manganese	EPA 200.8
Mercury	EPA 1631E
Molybdenum	EPA 200.8
Nickel	EPA 200.8
Potassium	EPA 200.8
Salinity	SM 2520B
Sodium	EPA 200.7
Solids, Total Suspended (TSS)	USGS-I-3765
Sulfate	EPA 300.0
Turbidity	EPA 180.1
Conductance, Specific	Field Measurement
Flow	Field Measurement
pH	Field Measurement

Table 5-23 List 19 Waste Stream Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Aluminum	EPA 200.8
Arsenic	EPA 200.8
Boron	EPA 200.7
Cadmium	EPA 200.8
Calcium	EPA 200.7
Chloride	EPA 300.0
Cobalt	EPA 200.8
Copper	EPA 200.8
Hardness, Total	Calculation
Lead	EPA 200.8
Magnesium	EPA 200.7
Mercury	EPA 1631E
Nickel	EPA 200.8
Selenium	EPA 200.8
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
Zinc	EPA 200.8
Conductance, Specific	Field Measurement
pH	Field Measurement

Table 5-24 List 20 Waste Stream Monitoring

Parameter	Method
Arsenic	EPA 200.8
Calcium	EPA 200.7
Chloride	EPA 300.0
Copper	EPA 200.8
Hardness, Total	Calculation
Magnesium	EPA 200.7
Nickel	EPA 200.8
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
Conductance, Specific	Field Measurement
pH	Field Measurement

Table 5-25 List 21 Surface Water Monitoring

Parameter	Method
Arsenic	EPA 200.8
Cobalt	EPA 200.8
Conductance, Specific, Field	Field Measurement
pH, Field	Field Measurement

Table 5-26 List 22 Waste Stream Monitoring

Parameter	Method
Arsenic	EPA 200.8
Calcium	EPA 200.7
Chloride	EPA 300.0
Copper	EPA 200.8
Hardness, Total	Calculation
Magnesium	EPA 200.7
Nickel	EPA 200.8
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
Conductance, Specific	Field Measurement
pH	Field Measurement

Table 5-27 List 23 Waste Stream Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Aluminum	EPA 200.8
Boron	EPA 200.7
Cadmium	EPA 200.8
Cobalt	EPA 200.8
Lead	EPA 200.8
Mercury, total	EPA 1631E
Selenium	EPA 200.8
Sulfate	EPA 300.0
Zinc	EPA 200.8

Table 5-28 List 24 Waste Stream Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Aluminum	EPA 200.8
Arsenic	EPA 200.8
Calcium	EPA 200.7
Chloride	EPA 300.0
Cobalt	EPA 200.8
Copper	EPA 200.8
Hardness, Total	EPA 200.7
Lead	EPA 200.8
Magnesium	EPA 200.7
Mercury	EPA 1631E
Nickel	EPA 200.8
Sulfate	EPA 300.0
Zinc	EPA 200.8
Conductance, Specific, Field	Field Measurement
pH, Field	Field Measurement

Table 5-29 List 25 Waste Stream Monitoring

Parameter	Method
Antimony	EPA 200.8
Barium	EPA 200.8
Beryllium	EPA 200.8
Cadmium	EPA 200.8
Chromium	EPA 200.8
Fluoride	EPA 300.0
Iron	EPA 200.7
Manganese	EPA 200.8
Selenium	EPA 200.8
Thallium	EPA 200.8

Table 5-30 List 26 Waste Stream Monitoring

Parameter	Method
BOD, Carbonaceous 5day	Hach 10360
Fecal Coliform, MPN or Membrane Filter	SM 9223B
Flow, Field	Field Measurement
pH, Field	Field Measurement
Total Suspended Solids (TSS)	USGS-I-3765

Table 5-31 List 27 Waste Stream Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Aluminum	EPA 200.8
Antimony	EPA 200.8
Beryllium	EPA 200.8
Boron	EPA 200.7
Chloride	EPA 300.0
Chromium	EPA 200.8
Cobalt	EPA 200.8
Fluoride	EPA 300.0
Iron	EPA 200.7
Manganese	EPA 200.8
Selenium	EPA 200.8
Silver	EPA 200.8
Sodium	EPA 200.7
Solids, Total Dissolved (TDS)	SM 2540C
Thallium	EPA 200.8

Table 5-32 List 28 Waste Stream Monitoring

Parameter	Method
Arsenic	EPA 200.8
Cadmium	EPA 200.8
Calcium	EPA 200.7
Copper	EPA 200.8
Hardness, Total	Calculation
Lead	EPA 200.8
Magnesium	EPA 200.7
Mercury, Total	EPA 1631E
Nickel	EPA 200.8
Sulfate	EPA 300.0
Zinc	EPA 200.8
Conductance, Specific	Field Measurement
pH	Field Measurement

Table 5-33 List 29 Waste Stream Monitoring

Parameter	Method
Mercury, Dissolved	EPA 1631E

Table 5-34 List 30 Waste Stream Monitoring

Parameter	Method
Total Suspended Solids (TSS)	USGS-I-3765

Table 5-35 List 31 Waste Stream Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Aluminum	EPA 200.8
Arsenic	EPA 200.8
Cadmium	EPA 200.8
Calcium	EPA 200.7
Chloride	EPA 300.0
Cobalt	EPA 200.8
Copper	EPA 200.8
Hardness, Total	EPA 200.7
Iron	EPA 200.7
Magnesium	EPA 200.7
Mercury, total	EPA 1631E
Nickel	EPA 200.8
Sulfate	EPA 300.0
Zinc	EPA 200.8
Conductance, Specific, Field	Field Measurement
Total Dissolved Solids (TDS)	SM 2540C
pH, Field	Field Measurement

Table 5-36 List 32 Waste Stream Monitoring

Parameter	Method
Antimony	EPA 200.8
Beryllium	EPA 200.8
Boron	EPA 200.8
Chromium	EPA 200.8
Fluoride	EPA 300.0
Manganese	EPA 200.8
Selenium	EPA 200.8
Silver	EPA 200.8
Sodium	EPA 200.7
Thallium	EPA 200.8

Table 5-37 List 33 Waste Stream Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Aluminum	EPA 200.8
Arsenic	EPA 200.8
Cadmium	EPA 200.8
Calcium	EPA 200.7
Chloride	EPA 300.0
Cobalt	EPA 200.8
Copper	EPA 200.8
Hardness, Total	EPA 200.7
Iron	EPA 200.7
Lead	EPA 200.8
Magnesium	EPA 200.7
Mercury, total	EPA 1631E
Nickel	EPA 200.8
Sulfate	EPA 300.0
Zinc	EPA 200.8
Conductance, Specific, Field	Field Measurement
Total Dissolved Solids (TDS)	SM 2540C
pH, Field	Field Measurement

Table 5-38 List 34 Waste Stream Monitoring

Parameter	Method	Operating Limit (Calendar month avg. unless noted)
Arsenic	EPA 200.8	53 micrograms/liter
Cobalt	EPA 200.8	5.0 micrograms/liter
Copper	EPA 200.8	9.3 micrograms/liter
Lead	EPA 200.8	3.2 micrograms/liter
Mercury, total	EPA 1631E	1.3 nanograms/liter
Nickel	EPA 200.8	52 micrograms/liter
Sulfate	EPA 300.0	10.0 milligram/liter (12 mo. moving average) 9.0 milligrams/liter (cal. Mo. Average) Intervention limit

Table 5-39 List 35 Waste Stream Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Arsenic	EPA 200.8
Cadmium	EPA 200.8
Cobalt	EPA 200.8
Lead	EPA 200.8
Mercury	EPA 1631E
Solids, Total Dissolved (TDS)	SM 2540C
Zinc	EPA 200.8

Table 5-40 List 36 Waste Stream Monitoring

Parameter	Method
Chloride	EPA 300.0
Copper	EPA 200.8
Hardness, Total	EPA 200.7
Nickel	EPA 200.8
Sulfate	EPA 300.0
Conductance, Specific, Field	Field Measurement
Flow, Field	Field Measurement
pH, Field	Field Measurement

Table 5-41 List 37 Waste Stream Monitoring

Parameter	Method
Mercury	EPA 1631E
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
Conductance, Specific, Field	Field Measurement

Table 5-42 List 38 Waste Stream Monitoring

Parameter	Method
Arsenic	EPA 200.8
Calcium	EPA 200.7
Chloride	EPA 300.0
Copper	EPA 200.8
Hardness, Total	EPA 200.7
Magnesium	EPA 200.7
Nickel	EPA 200.8
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
Conductance, Specific	Field Measurement
pH	Field Measurement

Table 5-43 List 39 Waste Stream Monitoring

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Aluminum	EPA 200.8
Aluminum, dissolved	EPA 200.8
Antimony	EPA 200.8
Beryllium	EPA 200.8
Boron	EPA 200.7
Chloride	EPA 300.0
Chromium	EPA 200.8
Cobalt	EPA 200.8
Fluoride	EPA 300.0
Manganese	EPA 200.8
Nitrite + Nitrate, Total	EPA 353.2
Nitrogen, Kjeldal, Total (TKN)	EPA 351.2
Nitrogen, Total	Calculation (Nitrite + Nitrate and TKN)
Phosphorus	EPA 365.1
Selenium	EPA 200.8
Silver	EPA 200.8
Sodium	EPA 200.7
Solids, Total Dissolved (TDS)	SM 2540C
Thallium	EPA 200.8

Table 5-44 List 40 Surface Discharge Monitoring

Parameter	Method
Arsenic	EPA 200.8
Cadmium	EPA 200.8
Calcium	EPA 200.7
Copper	EPA 200.8
Hardness, Total	Calculation
Iron, dissolved	EPA 200.7
Lead	EPA 200.8
Magnesium	EPA 200.7
Mercury, total	EPA 1631E
Nickel	EPA 200.8
Solids, Total Suspended	USGS-I-3765
Zinc	EPA 200.8
Conductance, Specific	Field Measurement
pH	Field Measurement

Table 5-45 List 41 Benchmark Parameters and Monitoring Values - Mine Site

Parameter	Benchmark Monitoring Value	Units
COD (Chemical Oxygen Demand)	120	mg/L
Nitrite plus Nitrate-Nitrogen, total	0.68	mg/L
Total Suspended Solids	100	mg/L
Antimony, total	0.18	mg/L
Arsenic, total	0.680	mg/L
Cadmium, total(1)	0.0078(2)	mg/L
Copper, total(1)	0.028(2)	mg/L
Iron, total	1.0	mg/L
Lead, total(1)	0.164(2)	mg/L
Nickel, total(1)	0.938(2)	mg/L
pH(3)	6.0 to 9.0	SU
Selenium, total	0.040	mg/L
Silver, total(1)	0.0041(2)	mg/L
Zinc, total(1)	0.234(2)	mg/L

(1) The benchmark values of some metals are dependent on water hardness. For these parameters, determine the hardness of the receiving water to identify the applicable "hardness range" for determining the appropriate benchmark value. Refer to Appendix C of the ISW General Permit for hardness dependent benchmark values in accordance with Minn. R. 7050.0222 and Minn. R. 7052.0100.

(2) Values given are for total hardness of 100 mg/L only.

Table 5-46 List 42 Benchmark Parameters and Monitoring Values - Plant Site

Parameter	Benchmark Monitoring Value	Units
Nitrite plus Nitrate-Nitrogen, Total (N)	0.68	mg/L
Chemical Oxygen Demand (COD)	120	mg/L
Total Suspended Solids (TSS)	100	mg/L

Table 5-47 List 43 Benchmark Parameters and Monitoring Values - Transportation and Utility Corridor

Parameter	Benchmark Monitoring Value	Units
Total Suspended Solids (TSS)	100	mg/L

Table 5-48 Groundwater Monitoring Wells

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
Plant Site Stations								
GW001	Surficial Aquifer	Monitor groundwater downgradient of tailings basin, northeast of Cell 2E (former well ST-2)	Legacy NPDES Permit: List 46: Apr, Jul, Oct	Legacy NPDES Permit: Monthly DMR	12/2018		GW001 / Well ST-2	Monitored until the NorthMet Project Seepage Containment is constructed
GW002	Surficial Aquifer	Monitor background conditions west and upgradient of the Flotation Tailings Basin (FTB) and Hydrometallurgical Residue Facility (HRF)	Legacy NPDES Permit: List 46: Apr, Jul, Oct NorthMet NPDES Permit: • List 44: Apr, Oct • List 45: Jul	Legacy NPDES Permit: Monthly DMR NorthMet NPDES Permit: Monthly DMR	12/2018	521273		Well MW-6S, North of SW-619/Private Landfill
GW003	Surficial (Tailings)	Located on top of Cell 2W, monitor water within tailings (former well H-1)	Legacy NPDES Permit: List 47: Apr, Jul, Oct	Legacy NPDES Permit: Monthly DMR	12/2018	597383		
GW004	Surficial (Tailings)	Located on top of Cell 2W, monitor water within tailings (former well H-2)	Legacy NPDES Permit: List 47: Apr, Jul, Oct	Legacy NPDES Permit: Monthly DMR	12/2018	551772		
GW005	Surficial (Tailings)	Located on top of Cell 2W, monitor water within tailings (former well H-3)	Legacy NPDES Permit: List 47: Apr, Jul, Oct	Legacy NPDES Permit: Monthly DMR	12/2018	597384		
GW006	Surficial	Monitor groundwater downgradient of tailings basin, north-northwest of Cell 2W	Legacy NPDES Permit: List 46: Apr, Jul, Oct	Legacy NPDES Permit: Monthly DMR	12/2018	625042		Monitored until the NorthMet Project Seepage Containment is constructed
GW007	Surficial	Monitor groundwater downgradient of tailings basin on west side of Cell 2W	Legacy NPDES Permit: List 46: Apr, Jul, Oct	Legacy NPDES Permit: Monthly DMR	12/2018	625043		Monitored until the NorthMet Project Seepage Containment is constructed
GW008	Surficial	Monitor groundwater at the southwestern toe of Cell 2W of the tailings basin	Legacy NPDES Permit: List 46: Apr, Jul, Oct	Legacy NPDES Permit: Monthly DMR	12/2018	625044		Monitored until the NorthMet Project Seepage Containment is constructed
GW009	Surficial Aquifer	Monitor groundwater downgradient from FTB Cell 2E, beyond the property boundary	NorthMet NPDES Permit and Consent Decree: • List 44: Apr, Oct • List 45: Jul	NorthMet NPDES Permit: Monthly DMR Consent Decree: Annually	12/2018	767957		
GW010	Surficial Aquifer	Monitor groundwater at northern property boundary, downgradient of the tailings basin	NorthMet NPDES Permit and Consent Decree: • List 44: Apr, Oct • List 45: Jul	NorthMet NPDES Permit: Monthly DMR Consent Decree: Annually	12/2018	767966		

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW015	Surficial Aquifer	Monitor baseline conditions west and downgradient of Cell 2W at the western property boundary. (This well has been shown to be unimpacted by tailings basin seepage, as documented in the Water Modeling Data Package - Plant Site.)	NorthMet NPDES Permit and Consent Decree: • List 44: Apr, Oct • List 45: Jul	NorthMet NPDES Permit: Monthly DMR Consent Decree: Annually	12/2018	769518		
GW016	Surficial Aquifer	Monitor groundwater at northwestern property boundary, downgradient of tailings basin Cell 2W	NorthMet NPDES Permit and Consent Decree: • List 44: Apr, Oct • List 45: Jul	NorthMet NPDES Permit: Monthly DMR Consent Decree: Annually	12/2018	762003		
GW017	Surficial Aquifer	Monitor groundwater adjacent to the tailings basin	CD Long-Term Monitoring Plan: List 4: Apr, Jul, Oct			786386		This well is interior of tailings basin.
PZ010	Surficial Aquifer	Piezometer monitoring the hydraulic gradient between wetland deposits and GW010	CD Long-Term Monitoring Plan: SWL: Apr, Jul, Oct					
GW109	Bedrock	Monitor groundwater downgradient from FTB Cell 2E, beyond the property boundary	NorthMet NPDES Permit and Consent Decree: • List 44: Apr, Oct • List 45: Jul	NorthMet NPDES Permit: Monthly DMR Consent Decree: Annually	Not yet installed	TBD		To be nested with GW009
GW110	Bedrock	Monitor groundwater at northern property boundary, downgradient of the FTB	NorthMet NPDES Permit: • List 44: Apr, Oct • List 45: Jul	NorthMet NPDES Permit: Monthly DMR	12/2018	762036		
GW115	Bedrock	Monitor baseline conditions west and downgradient of Cell 2W at western property boundary	NorthMet NPDES Permit: • List 44: Apr, Oct • List 45: Jul	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be nested with GW015
GW116	Bedrock	Monitor groundwater at northwestern property boundary, downgradient of Cell 2W	NorthMet NPDES Permit: • List 44: Apr, Oct • List 45: Jul	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be nested with GW016

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW117	Bedrock	Monitor groundwater along and downgradient of the northern side of FTB Cell 2E. (This well is outside the FTB Containment System but within the property boundary.)	NorthMet NPDES Permit: • List 44: Apr, Oct • List 45: Jul	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		
GW118	Bedrock	Monitor groundwater along and downgradient of the northern side of FTB Cell 2E. (This well is outside the FTB Containment System but within the property boundary.)	NorthMet NPDES Permit: • List 44: Apr, Oct • List 45: Jul	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		
GW119	Bedrock	Monitor groundwater along and downgradient of the northern toe of Cell 2W and outside the FTB Containment System	NorthMet NPDES Permit: • List 44: Apr, Oct • List 45: Jul	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		
GW120	Bedrock	Monitor groundwater along and downgradient of the western toe of Cell 2W and outside the FTB Containment System	NorthMet NPDES Permit: • List 44: Apr, Oct • List 45: Jul	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		
GW200	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW200-201) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit: List 49: Jan, Apr, Jul, Oct WA-1369: Static Water Level: Feb, Mar, May, Jun, Aug, Sep, Nov, Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW201	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW200-201) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit: List 49: Jan, Apr, Jul, Oct WA-1369: Static Water Level: Feb, Mar, May, Jun, Aug, Sep, Nov, Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW202	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW202-203) to evaluate the performance of the FTB Seepage Containment System.	NorthMet NPDES Permit & WA-1369: Static Water Level- Monthly	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW203	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW202-203) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit & WA-1369: Static Water Level: Monthly	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW204	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW204-205) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit: List 49: Jan, Apr, Jul, Oct WA-1369: Static Water Level: Feb, Mar, May, Jun, Aug, Sep, Nov, Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW205	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW204-205) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit: List 49: Jan, Apr, Jul, Oct WA-1369: Static Water Level: Feb, Mar, May, Jun, Aug, Sep, Nov, Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW206	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW206-207) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit & WA-1369: Static Water Level- Monthly	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW207	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW206-207) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit & WA-1369: Static Water Level: Monthly	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW208	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW208-209) to evaluate the performance of the FTB Seepage Containment System.	NorthMet NPDES Permit: List 49: Jan, Apr, Jul, Oct WA-1369: Static Water Level: Feb, Mar, May, Jun, Aug, Sep, Nov, Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW209	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW208-209) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit: List 49: Jan, Apr, Jul, Oct WA-1369: Static Water Level: Feb, Mar, May, Jun, Aug, Sep, Nov, Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW210	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW210-211) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit & WA-1369: Static Water Level- Monthly	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW211	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW210-211) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit & WA-1369: Static Water Level: Monthly	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW212	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW212-213) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit: List 49: Jan, Apr, Jul, Oct WA-1369: Static Water Level: Feb, Mar, May, Jun, Aug, Sep, Nov, Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW213	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW212-213) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit: List 49: Jan, Apr, Jul, Oct WA-1369: Static Water Level: Feb, Mar, May, Jun, Aug, Sep, Nov, Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW214	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW214-215) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit & WA-1369: Static Water Level- Monthly	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW215	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW214-215) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit & WA-1369: Static Water Level: Monthly	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW216	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW216–217) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit: List 49: Jan, Apr, Jul, Oct WA-1369: Static Water Level: Feb, Mar, May, Jun, Aug, Sep, Nov, Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW217	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW216–217) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit: List 49: Jan, Apr, Jul, Oct WA-1369: Static Water Level: Feb, Mar, May, Jun, Aug, Sep, Nov, Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW218	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW218-219) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit & WA-1369: Static Water Level- Monthly	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW219	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW218-219) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit & WA-1369: Static Water Level: Monthly	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW220	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW220-221) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit: List 49: Jan, Apr, Jul, Oct WA-1369: Static Water Level: Feb, Mar, May, Jun, Aug, Sep, Nov, Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW221	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW220-221) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit: List 49: Jan, Apr, Jul, Oct WA-1369: Static Water Level: Feb, Mar, May, Jun, Aug, Sep, Nov, Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW222	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW222-223) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit & WA-1369: Static Water Level- Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW223	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW222-223) to evaluate the performance of the FTB Seepage Containment System	NorthMet NPDES Permit & WA-1369: Static Water Level: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Not yet installed	TBD		To be installed during construction of the seepage containment system
GW236	Surficial Aquifer	Monitor water level near the East Dam to confirm that flow is entering the Tailings Basin	NorthMet NPDES Permit and WA-1369: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	3/2018	811043		
GW237	Surficial Aquifer	Monitor water level near the East Dam to confirm that flow is entering the Tailings Basin	NorthMet NPDES Permit and WA-1369: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit and WA-1369: Data Logger -SWL: Jan-Dec	3/2018	811044		
MW-6	Bedrock	Monitor groundwater upgradient SW-619 Landfill	SW-619: SWL: Jul 1-31, One event	SW-619 Permit: Annual Report	1993	521262		
MW-6S	Surficial Aquifer	Monitor groundwater upgradient SW-619 Landfill	SW-619: SWL: Jul 1-31, One event	SW-619 Permit: Annual Report	11/15/1993	521273		
MW-7	Bedrock	Monitor groundwater upgradient / lateral to the SW-619 Landfill	SW-619: SWL: Jul 1-31, One event	SW-619 Permit: Annual Report	9/22/1993	521263		
MW-8	Bedrock	Monitor groundwater south of and immediately downgradient of the SW-619 Landfill	SW-619: SWL: Jul 1-31, One event	SW-619 Permit: Annual Report	9/21/1993	521268		

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
MW-8S	Surficial Aquifer	Monitor groundwater south of and immediately downgradient of the SW-619 Landfill	SW-619: SWL: Jul 1-31, One event	SW-619 Permit: Annual Report	11/15/1993	521274		
MW-9		Monitor groundwater south of and immediately downgradient of the SW-619 Landfill	SW-619: SWL: Jul 1-31, One event	SW-619 Permit: Annual Report	9/23/1993	521269		
MW-10	Surficial Aquifer	Monitor groundwater south of and 500 feet downgradient of the SW-619 Landfill	SW-619: SWL: Jul 1-31, One event	SW-619 - 2012 Workplan: Annual Report	9/30/2011	783752		
Mine Site Stations								
GW402	Surficial Aquifer	Monitor groundwater downgradient of West Pit to provide information prior to compliance point	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1365: DL-SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	12/2018	786713	MW-2/ RS-32	
GW403	Surficial Aquifer	Monitor groundwater downgradient of Category 2/3 Waste Rock Stockpile and the East Pit	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1363: DL-SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	12/2018	786717	MW-3	
GW405	Surficial Aquifer	Monitor groundwater downstream of the Equalization Basin Area. Data will provide information on the performance of the Equalization Basin Area liner system.	NorthMet NPDES Permit: List: Apr, Jul, Oct	NorthMet NPDES Permit: Monthly DMR	12/2018	786708	MW-5	
GW407	Surficial Aquifer	Monitor groundwater along the property boundary downgradient of the Ore Surge Pile (OSP), the Category 2/3 Waste Rock Stockpile, and the East Pit	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1364: DL-SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1364: Annual Report	12/2018	786726	MW-7	
GW408	Surficial Aquifer	Monitor groundwater south of Category 1 Stockpile Groundwater Containment System and southwest of the West Pit	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1365: DL-SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	12/2018	786712	MW-8S	
GW409	Surficial Aquifer	Monitor groundwater along the property boundary downgradient of the Equalization Basin Area, Overburden Storage and Laydown Area (OSLA), Category 4 Waste Rock Stockpile, and the Central Pit	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1365: DL-SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	12/2018	786724	MW-10S	

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW411	Surficial Aquifer	Monitor groundwater downgradient of the OSLA to provide information prior to compliance point	NorthMet NPDES Permit: List: Apr, Jul, Oct	NorthMet NPDES Permit: Monthly DMR	12/2018	786710	MW-11	
GW412	Surficial Aquifer	Monitor groundwater downgradient and northeast of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1367: DL-SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	12/2018	786732	MW-12	
GW414	Surficial Aquifer	Monitor groundwater downgradient and west of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1367: DL-SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	12/2018	786730	MW-14	
GW415	Surficial Aquifer	Monitor groundwater downgradient and north of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1367: DL-SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	12/2018	786731	MW-15	
GW416	Surficial Aquifer	Monitor groundwater along the property boundary downgradient of the West Pit and the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1365: DL-SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	12/2018	786727	MW-16	
GW417	Surficial Aquifer	Monitor groundwater downgradient of the Category 2/3 Waste Rock Stockpile.	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1363: DL-SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	12/2018	786719	MW-17	
GW418	Surficial Aquifer	Monitor groundwater downgradient of Category 1 Stockpile Groundwater Containment System and west of the West Pit	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1365: DL-SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	12/2018	786729	MW-18	
GW419	Surficial Aquifer	Monitor groundwater downgradient of the Category 4 Waste Rock Stockpile and the Central Pit	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1364: DL-SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1364: Annual Report	12/2018	837781	GW-M001	
GW420	Surficial Aquifer	Monitor groundwater downgradient of the Rail Transfer Hopper (RTH)/Ore Loading Area to provide information prior to compliance point.	NorthMet NPDES Permit: List: Apr, Jul, Oct	NorthMet NPDES Permit: Monthly DMR	12/2018	811047	GW-M002	

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW421	Surficial Aquifer	Monitor groundwater downgradient of the OSP	NorthMet NPDES Permit: List: Apr, Jul, Oct	NorthMet NPDES Permit: Monthly DMR	12/2018	811048	GW-M003	
GW422	Surficial Aquifer	Monitor groundwater along the property boundary, south of the Category 2/3 Waste Rock Stockpile	NorthMet NPDES Permit: List: Apr, Jul, Oct	NorthMet NPDES Permit: Monthly DMR	3/2019	837782		
GW430	Surficial Aquifer	Monitor groundwater downgradient from the East Pit	WA-1363: DL-SWL	WA-1363: Annual Report	3/2019	837783		
GW468	Surficial Aquifer	Monitor groundwater between the West Pit and the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1367: DL-SWL	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	3/2019	837785		
GW470	Surficial Aquifer	Monitor groundwater north of the East Pit and north of the Mine Site boundary	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	3/2019	837786		
GW471	Surficial Aquifer	Monitor groundwater north of the East Pit and north of the Mine Site boundary	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	3/2019	837787		
GW472	Surficial Aquifer	Monitor groundwater north of the East Pit and north of the Mine Site boundary	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	4/2019	837810		
GW473	Surficial Aquifer	Monitor groundwater north of the East Pit and north of the Mine Site boundary	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	4/2019	837811		
GW477	Surficial Aquifer	Monitor groundwater downgradient of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit and WA-1365: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	3/2019	837788		
GW478	Surficial Aquifer	Monitor groundwater north of the West Pit and north of the Mine Site boundary	NorthMet NPDES Permit and WA-1365: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	3/2019	837789		
GW479	Surficial Aquifer	Monitor groundwater north of the West Pit and north of the Mine Site boundary	NorthMet NPDES Permit and WA-1365: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	3/2019	837790		

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW491	Surficial Aquifer	Monitor groundwater collected by underdrain system (if underdrain is installed)	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1367: Rate / volume	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Not yet installed	TBD		Data collected will document performance of the stockpile liner system by comparing underdrain groundwater quality with the overliner drainage quality.
GW492	Surficial Aquifer	Monitor groundwater collected by underdrain system (if underdrain is installed)	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1367: Rate / volume	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Not yet installed	TBD		Data collected will document performance of the stockpile liner system by comparing underdrain groundwater quality with the overliner drainage quality.
GW493	Surficial Aquifer	Monitor groundwater collected by underdrain system (if underdrain is installed)	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1367: Rate / volume	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Not yet installed	TBD		Data collected will document performance of the stockpile liner system by comparing underdrain groundwater quality with the overliner drainage quality.
GW494	Surficial Aquifer	Monitor groundwater collected by underdrain system (if underdrain is installed)	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1367: Rate / volume	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Not yet installed	TBD		Data collected will document performance of the stockpile liner system by comparing underdrain groundwater quality with the overliner drainage quality.
GW495	Surficial Aquifer	Monitor groundwater collected by underdrain system (if underdrain is installed)	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1367: Rate / volume	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Not yet installed	TBD		Data collected will document performance of the stockpile liner system by comparing underdrain groundwater quality with the overliner drainage quality.
GW499	Surficial Aquifer	Monitor groundwater north of the East Pit	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	3/2019	837791		
GW501	Bedrock	Monitor groundwater for compliance along the property boundary downgradient and southeast of the Category 2/3 Waste Rock Stockpile	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1363: DL-SWL	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	3/2019	762045	BR-1	
GW502	Bedrock	Monitor groundwater downgradient of the West Pit	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1365: DL-SWL	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	2/2019	811049		
GW504	Bedrock	Monitor groundwater adjacent to and north of the East Pit	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	12/2018	736118	OB-4	
GW505	Bedrock	Monitor groundwater adjacent to and northeast of the East Pit	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	12/2018	736119	OB-5	

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW506	Bedrock	Monitor groundwater along the property boundary downgradient and south of the Category 2/3 Waste Rock Stockpile	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1363: DL-SWL	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	2/2019	762041	BR-6	
GW507	Bedrock	Monitor groundwater between the West Pit and the Category 1 Stockpile	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1365: DL-SWL	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	12/2018	736121	OB-1	
GW508	Bedrock	Monitor groundwater between the West Pit and the Category 1 Stockpile	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	3/2019	840460		
GW509	Bedrock	Monitor groundwater north of the East Pit	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	2/2020	840461		
GW510	Bedrock	Monitor groundwater north of the East Pit and north of the Mine Site boundary	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	2/2020	840462		
GW512	Bedrock	Monitor groundwater downgradient and northeast of the Category 1 Stockpile	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1367: DL-SWL	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	2/2020	840464		
GW514	Bedrock	Monitor groundwater downgradient and west of the Category 1 Stockpile	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1367: DL-SWL	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	3/2019	840465		
GW515	Bedrock	Monitor groundwater downgradient and north of the Category 1 Stockpile	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1367: DL-SWL	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	3/2019	840466		
GW516	Bedrock	Monitor groundwater along the property boundary downgradient of the West Pit and the Category 1 Stockpile	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1365: DL-SWL	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	3/2019	762043		
GW517	Bedrock	Monitor groundwater downgradient of the Category 1 Stockpile	NorthMet NPDES Permit and WA-1365: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	3/2020	840467		
GW518	Bedrock	Monitor groundwater north of the West Pit and north of the Mine Site boundary	NorthMet NPDES Permit and WA-1365: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	3/2019	840468		

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW519	Bedrock	Monitor groundwater north of the West Pit and north of the Mine Site boundary	NorthMet NPDES Permit and WA-1365: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	4/2019	840469		
GW521	Bedrock	Monitor groundwater north of the East Pit and north of the Mine Site boundary	NorthMet NPDES Permit and WA-1363: SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1364: Annual Report	To be installed	TBD		To be installed prior to start of earthmoving activities for construction of infrastructure at the Mine Site
GW522	Bedrock	Monitor groundwater north of the East Pit and north of the Mine Site boundary	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	4/2019	840463		
GW523	Bedrock	Monitor groundwater north of the East Pit and north of the Mine Site boundary	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	4/2019	840473		
GW524	Bedrock	Monitor groundwater along the property boundary downgradient of the Equalization Basin Area, Overburden Storage and Laydown Area (OSLA), Category 4 Waste Rock Stockpile, and the Central Pit	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1365: DL-SWL	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	3/2019	762042		
GW525	Bedrock	Monitor groundwater downgradient of the Category 4 Waste Rock Stockpile and the Central Pit	NorthMet NPDES Permit: List 44: Apr, Jul, Oct WA-1364: DL-SWL	NorthMet NPDES Permit: Monthly DMR WA-1364: Annual Report	3/2019	762038		
GW530	Bedrock	Monitor groundwater downgradient from the East Pit	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	3/2019	762039		
GW531	Bedrock	Monitor groundwater adjacent to the Category 2/3 Waste Rock Stockpile	NorthMet NPDES Permit and WA-1363: Data Logger -SWL: Jan-Dec	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	2/2019	762040		
GW532	Bedrock	Monitor groundwater adjacent to the West Pit	WA-1365: DL-SWL: Jan-Dec, Monthly	WA-1365: Annual Report	3/2019	762037		
GW600	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW600-601) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW601	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW600-601) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW602	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW602-603) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: • List 48: Jan, Apr, Jul, Oct • SWL – Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW603	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW602-603) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: • List 48: Jan, Apr, Jul, Oct • SWL – Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW604	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW64-605) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW605	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW64-605) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW606	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW606-607) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: • List 48: Jan, Apr, Jul, Oct • SWL – Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW607	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW606-607) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: • List 48: Jan, Apr, Jul, Oct • SWL – Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW608	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW608-609) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW609	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW608-609) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW610	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW610-611) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: • List 48: Jan, Apr, Jul, Oct • SWL – Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW611	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW610-611) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: • List 48: Jan, Apr, Jul, Oct • SWL – Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW612	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW612-613) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW613	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW612-613) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW614	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW614-615) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: • List 48: Jan, Apr, Jul, Oct • SWL – Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW615	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW614-615) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System.	NorthMet NPDES Permit: • List 48: Jan, Apr, Jul, Oct • SWL – Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW616	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW616-617) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW617	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW616-617) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW618	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW618-619) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: • List 48: Jan, Apr, Jul, Oct • SWL – Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW619	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW618-619) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: • List 48: Jan, Apr, Jul, Oct • SWL – Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW620	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW620-621) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW621	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW620-621) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system

Location ID	Bedrock or Surficial Aquifer	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Permit Monitoring Start Date	MDH Unique Well No.	Prior Station ID	Comments
GW622	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW622-623) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: • List 48: Jan, Apr, Jul, Oct • SWL – Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW623	Surficial Aquifer	Monitor water quality downstream of barrier and monitor water levels for hydraulic head with paired wells (GW622-623) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: • List 48: Jan, Apr, Jul, Oct • SWL – Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW624	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW624-625) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system
GW625	Surficial Aquifer	Monitor water levels for hydraulic head with paired piezometers (GW624-625) to evaluate the performance of the Category 1 Stockpile Groundwater Containment System	NorthMet NPDES Permit: SWL: Jan-Dec, Monthly	NorthMet NPDES Permit: Monthly DMR	Not yet installed	TBD		To be installed during construction of the groundwater containment system

Table 5-49 List 44 Groundwater Monitoring: Surficial & Bedrock

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Arsenic, Dissolved	EPA 200.8
Calcium, Dissolved	EPA 200.7
Chloride	EPA 300.0
Copper, Dissolved	EPA 200.8
Hardness, Total Dissolved	EPA 200.7
Magnesium, Dissolved	EPA 200.7
Manganese, Dissolved	EPA 200.8
Nickel, Dissolved	EPA 200.8
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
Elevation, GW (MSL), Field	Field Measurement
Conductance, Specific, Field	Field Measurement
pH, Field	Field Measurement
ORP	Field Measurement
Oxygen, Dissolved	Field Measurement
Temperature, Water	Field Measurement
Turbidity	Field Measurement

Table 5-50 List 45 Groundwater Monitoring: Surficial Aquifer

Parameter	Method
Alkalinity, Bicarbonate as HCO3	SM 2320B
Aluminum, Dissolved	EPA 200.8
Antimony, Dissolved	EPA 200.8
Arsenic, Dissolved	EPA 200.8
Barium, Dissolved	EPA 200.8
Beryllium, Dissolved	EPA 200.8
Boron, Dissolved	EPA 200.8
Cadmium, Dissolved	EPA 200.8
Calcium, Dissolved	EPA 200.7
Chloride	EPA 300.0
Chromium, Dissolved	EPA 200.8
Cobalt, Dissolved	EPA 200.8
Copper, Dissolved	EPA 200.8
Fluoride	EPA 300.0
Hardness, Total Dissolved	EPA 200.7
Lead, Dissolved	EPA 200.8
Magnesium, Dissolved	EPA 200.7
Manganese, Dissolved	EPA 200.8
Nickel, Dissolved	EPA 200.8
Selenium, Dissolved	EPA 200.8
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
*Thallium, Dissolved	EPA 200.8
Zinc, Dissolved	EPA 200.8
Elevation, GW (MSL), Field	Field Measurement
Conductance, Specific, Field	Field Measurement
pH, Field	Field Measurement
ORP	Field Measurement
Oxygen, Dissolved	Field Measurement
Temperature, Water	Field Measurement
Turbidity	Field Measurement

Table 5-51 List 46 Groundwater Monitoring

Parameter	Method
Boron, Dissolved	EPA 200.8
Chloride	EPA 300.0
Fluoride	EPA 300.0
Manganese, Dissolved	EPA 200.8
Molybdenum, Dissolved	EPA 200.8
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
Elevation, GW (MSL), Field	Field Measurement
Conductance, Specific, Field	Field Measurement
pH, Field	Field Measurement
ORP	Field Measurement
Oxygen, Dissolved	Field Measurement
Temperature, Water	Field Measurement
Turbidity	Field Measurement

Table 5-52 List 47 Groundwater Monitoring

Parameter	Method
Copper, Dissolved	EPA 200.8
Nickel, Dissolved	EPA 200.8
Sulfate	EPA 300.0
Elevation, GW (MSL), Field	Field Measurement
Conductance, Specific, Field	Field Measurement
pH, Field	Field Measurement
ORP	Field Measurement
Oxygen, Dissolved	Field Measurement
Temperature, Water	Field Measurement
Turbidity	Field Measurement

Table 5-53 List 48 Groundwater Monitoring

Parameter	Method
Chloride	EPA 300.0
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
Elevation, GW (MSL), Field	Field Measurement
Conductance, Specific, Field	Field Measurement
pH, Field	Field Measurement
ORP	Field Measurement
Oxygen, Dissolved	Field Measurement
Temperature, Water	Field Measurement
Turbidity	Field Measurement

Table 5-54 List 49 Groundwater Monitoring

Parameter	Method
Chloride	EPA 300.0
Solids, Total Dissolved (TDS)	SM 2540C
Sulfate	EPA 300.0
Elevation, GW (MSL), Field	Field Measurement
Conductance, Specific, Field	Field Measurement
pH, Field	Field Measurement
ORP	Field Measurement
Oxygen, Dissolved	Field Measurement
Temperature, Water	Field Measurement
Turbidity	Field Measurement

Table 5-55 Wetland Hydrology, Vegetation, and Water Quality Monitoring Locations

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Plant Site / Tailings Basin								
Well TB1	923	2	Sedge meadow	4/26/2010		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB2	917	8	Coniferous bog	4/26/2010		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB3	260	3	Shallow marsh	4/26/2010		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB4	260	3	Shallow marsh	4/27/2010		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB5	868	7	Hardwood swamp	4/26/2010		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB6	1151	7	Coniferous swamp	4/27/2010		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well TB7	915	6	Alder thicket	4/27/2010		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB9	1162	3	Shallow marsh	6/30/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB10	1176	7	Hardwood swamp	6/30/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB11	282A	3	Shallow marsh	7/3/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB12	968	7	Coniferous swamp	6/30/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well TB13	584	3	Shallow marsh	7/3/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB14	T13A	3	Shallow marsh	7/3/2014	Well TB14	404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification ~~List 50: Monthly, May-Oct:~~ Approval to remove from water quality monitoring 5/6/2019	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	Ponded water; MPCA approval to remove this well from wetland water quality monitoring received 5/6/2019
Well RefTB8	974	8	Coniferous bog	4/26/2010		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well RefTB1	989	7	Coniferous swamp	7/3/2014		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Mine Site								
Well 1	48	8	Coniferous bog	5/22/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well 2	100	8	Coniferous bog	5/22/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 4	887	8	Coniferous bog	11/9/2005		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 4A	889	8	Coniferous bog	5/21/2008		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 6	54	6	Alder Thicket	5/23/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 7	53	6	Alder Thicket	11/9/2005		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 8	106	8	Coniferous bog	5/23/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well 9	58	6	Alder Thicket	6/27/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 10	888	8	Coniferous bog	5/22/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 11	100	8	Coniferous bog	5/22/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 12	888	8	Coniferous bog	11/9/2005		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 13	84	8	Coniferous bog	5/23/2008		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 14	90	8	Coniferous bog	5/23/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well 15	693	8	Coniferous bog	5/23/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 16	90	8	Coniferous bog	5/22/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 18	100	8	Coniferous bog	5/22/2008	10/29/2009			
Well 19	107	8	Coniferous bog	5/21/2008	10/29/2009			
Well 21	48	8	Coniferous bog	5/22/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 22	48	8	Coniferous bog	5/22/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 23	45	6	Alder thicket	5/10/2010		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 24	33A	6	Alder thicket	5/12/2010		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well 25	68	7	Coniferous swamp	6/30/2014		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 26	315	6	Alder thicket	7/1//2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 27	48A	7	Coniferous swamp	6/30/2015		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 28	33A	6	Alder thicket	7/2/2014		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 29	90	8	Coniferous bog	7/2/2014		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 30	57	7	Coniferous swamp	6/30/2014		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well 31	54G	7	Coniferous swamp	6/30/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 32	107	8	Coniferous bog	7/2/2014		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 33	53D	6	Alder thicket	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 34	53C	7	Coniferous swamp	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 35	53D	6	Alder thicket	7/2/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well 36 PM36WQ-N	53	6	Alder thicket	7/2/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification • List 50: Monthly, May-Oct • List 51: Once per month; Jan, Mar, May, Jul, Sep, Nov	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	PM36WQ-N for 401 Cert. Wetland of Interest sampling
Wetland of Interest (Outlet) PM36WQ-S	53	6	Alder thicket			401 Certification List 51: Once per month; Jan, Mar, May, Jul, Sep, Nov	401 Certification: Annual Report	PM36WQ-S for 401 Cert. Wetland of Interest sampling
Well 37	58	6	Alder thicket	7/2/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 38	11	8	Coniferous bog	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 39	29	3	Shallow marsh	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well 40	571	7	Coniferous swamp	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 41	R-7A	3	Shallow marsh	7/2/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 42	1041	6	Shrub-carr	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 43	48	8	Coniferous bog	7/2/2014		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 44	68	7	Coniferous swamp	7/1/2014		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well 45	90A	8	Open bog	7/2/2014		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 46	68	7	Coniferous swamp	7/1/2014		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 47	315	6	Alder thicket	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 48	53D	6	Alder thicket	7/2/2014		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well Ref1	900	8	Coniferous bog	5/21/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well Ref2	897	6	Alder thicket	5/21/2008		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well Ref3	394A	7	Coniferous swamp	7/1/2014		404 Permit, WCA Decision, 401 Certification: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Table 5-56 List 50 Wetland Water Quality Monitoring

Parameter	Method
Alkalinity, Total as CaCO3	SM 2320B
Calcium	EPA 200.8
Dissolved Organic Carbon (DOC)	SM 5310C
Magnesium	EPA 200.8
Mercury, Dissolved	EPA 1631E
Methyl Mercury, Dissolved	EPA 1630
Potassium	EPA 200.8
Sodium	EPA 200.8
Sulfate	EPA 300.0
Conductance, Specific, Field	Field Measurement
Oxygen, Dissolved	Field Measurement
pH, Field	Field Measurement
Temperature, Water	Field Measurement

Table 5-57 List 51 Wetland of Interest Monitoring

Parameter	Method
Calcium	EPA 200.8
Cobalt	EPA 200.8
Copper	EPA 200.8
Hardness, Total	EPA 200.8
Magnesium	EPA 200.8
Sulfate	EPA 300.0
Conductance, Specific, Field	Field Measurement
Oxygen, Dissolved	Field Measurement
pH, Field	Field Measurement
Temperature, Water	Field Measurement

Table 5-58 Macroinvertebrate and Fish Community Monitoring Stations

Location ID	Water Body	Macroinvertebrate Sampling Requirement and Frequency	Applicable Permit and Report Requirements
SW003	Unnamed Creek	Macroinvertebrate Sampling: • During Project construction, commence as soon as possible once Project construction (start of earthmoving activities at the Mine Site) begins and continue on an annual basis for 2-3 years of baseline data prior to the start of Project operations • During Project operations, monitoring shall continue on an annual basis Fish Community Monitoring • During Project construction, commence as soon as possible once Project construction (start of earthmoving activities at the Mine Site) begins and continue on an annual basis for 2-3 years of baseline data prior to the start of Project operations • During Project operations, monitoring shall occur once every two years	WA-1369: Annual Report
SW009	Bear Creek	Macroinvertebrate Sampling: • During Project construction, commence as soon as possible once Project construction (start of earthmoving activities at the Mine Site) begins and continue on an annual basis for 2-3 years of baseline data prior to the start of Project operations • During Project operations, monitoring shall continue on an annual basis Fish Community Monitoring • During Project construction, commence as soon as possible once Project construction (start of earthmoving activities at the Mine Site) begins and continue on an annual basis for 2-3 years of baseline data prior to the start of Project operations • During Project operations, monitoring shall occur once every two years	WA-1369: Annual Report
SW020	Second Creek	Macroinvertebrate Sampling: • During Project construction, commence as soon as possible once Project construction (start of earthmoving activities at the Mine Site) begins and continue on an annual basis for 2-3 years of baseline data prior to the start of Project operations • During Project operations, monitoring shall continue on an annual basis	WA-1369: Annual Report
SW048	Unnamed (Mud Lake Creek)	Macroinvertebrate Sampling: • During Project construction, commence as soon as possible once Project construction (start of earthmoving activities at the Mine Site) begins and continue on an annual basis for 2-3 years of baseline data prior to the start of Project operations • During Project operations, monitoring shall continue on an annual basis	WA-1369: Annual Report
SW049	Trimble Creek	Macroinvertebrate Sampling: • During Project construction, commence as soon as possible once Project construction (start of earthmoving activities at the Mine Site) begins and continue on an annual basis for 2-3 years of baseline data prior to the start of Project operations • During Project operations, monitoring shall continue on an annual basis Fish Community Monitoring • During Project construction, commence as soon as possible once Project construction (start of earthmoving activities at the Mine Site) begins and continue on an annual basis for 2-3 years of baseline data prior to the start of Project operations • During Project operations, monitoring shall occur once every two years	WA-1369: Annual Report

6.0 Permit-Required Mercury Monitoring

The sections under permit-required mercury monitoring document the monitoring locations that are required by the various Project permits. These locations are broken down into the following categories:

- Surface Water Monitoring
- Surface Discharge Monitoring
- Internal Waste Stream Monitoring
- Wetland Water Quality Monitoring

The mercury monitoring locations, as required by the NorthMet permits, are shown on Figure 26. While other permits are also listed, the permits that require mercury monitoring at the locations presented in the following tables are:

- MPCA NPDES/SDS Permit MN0071013 (NorthMet NPDES Permit)
- MPCA NPDES/SDS Permit MN0054089 (Legacy NPDES Permit, formerly Cliffs Erie Tailings Basin Permit)
- MPCA Consent Decree and associated Long-Term Plan (CD Long-Term Plan)
- MPCA 401 Water Quality Certification (401 Certification)
- MDNR Permit to Mine (PTM)

6.1 Surface Water Monitoring Stations

The SW monitoring stations where mercury is monitored in streams or creeks are shown in Table 6-1. The locations of the surface water monitoring stations where mercury is a part of the analyte list are shown on Figure 26. The analytical and field sampling lists for the SW monitoring stations are shown on Tables 5-5 to 5-14.

6.2 Surface Discharge Monitoring Stations

The SD stations assess the condition of the discharge waters per the permits. The SD monitoring stations are shown on Table 6-2. The locations of the SD stations are shown on Figure 26. The analytical and field sampling lists for the SD monitoring stations are shown on Tables 5-16 to 5-19, 5-22 to 5-24, 5-27 to 5-29 and 5-31 to 5-44.

6.3 Internal Waste Stream Monitoring Stations

The WS stations assess the condition of the discharge waters to the internal receiving locations per the permits. The WS monitoring stations where mercury is monitored are shown on Table 6-

3. The locations of the WS stations are shown on Figure 26. The analytical and field sampling lists for the WS monitoring stations are shown on Tables 5-22 to 5-24, 5-27 to 5-29 and 5-31 to 5-41.

6.4 Wetland Monitoring Stations

The wetland monitoring locations where mercury is monitored are shown on Table 6-4. The locations of the wells where mercury is monitored are shown on Figure 26. These 22 wetland monitoring wells are monitored for hydrology and vegetation as discussed in Section 5.6.1 and water quality as discussed in Section 5.6.2. The analytical and field sampling list for the wetland monitoring locations is shown on Table 5-56.

Table 6-1 Surface Water Monitoring Stations – Mercury Monitoring

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit with Reporting Requirements	Permit Monitoring Start Date	Prior Station ID	Comments
Plant Site Surface Water Monitoring Sites							
SW003	Unnamed Creek	Monitor downstream of stream augmentation and the FTB Seepage Containment System. Only sulfate will be monitored after the FTB Seepage Containment System is in place.	Legacy NPDES Permit/NorthMet NPDES Permit • List 1 + Temp: Monthly Legacy NPDES Permit • List 9: Quarterly (Mar, Jun, Sep, Dec) NorthMet NPDES Permit • List 2: May, Sept	Legacy NPDES Permit Quarterly DMR NorthMet NPDES Permit Monthly DMR Consent Decree Quarterly Progress Report	12/2018	PM-11	Monitoring per NorthMet NPDES Permit lists/frequency required by CD Long-Term Plan
SW005	Embarrass River	Monitor downstream of the Tailings Basin to assess changes from background conditions at SW008 after the performance of the FTB Seepage Containment System and stream augmentation. Only sulfate will be monitored after the FTB Seepage Containment System is in place. Monitor near MN135.	Legacy NPDES Permit /NorthMet NPDES Permit • List 1 + Temp: Monthly Legacy NPDES Permit • List 10: Quarterly (Mar, June, Sept, Dec) NorthMet NPDES Permit • List 2: May, Sep 401 Certification • List 3: Jan, Apr, July, Oct WA-1369 • Flow – year-round. • Manual stage measurement every 4-6 weeks- year-round	Legacy NPDES Permit Quarterly DMR NorthMet NPDES Permit Monthly DMR Consent Decree Quarterly Progress Report WA-1369 Annual Report 401 Certification Annual Report	12/2018	PM-13	
SW006	Trimble Creek	Monitor Trimble Creek downstream of stream augmentation and the FTB Seepage Containment System. Only sulfate will be monitored after the FTB Seepage Containment System is in place.	NorthMet NPDES Permit • List 1: Monthly • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR Consent Decree: Quarterly Progress Report	12/2018	TC-1a	
SW007	Unnamed (Mud Lake) Creek	Monitor downstream of the swale and the FTB Seepage Containment System. Only sulfate will be monitored after the FTB Seepage Containment System is in place.	NorthMet NPDES Permit • List 1: Monthly • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR Consent Decree: Quarterly Progress Report	12/2018	MLC-1	

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit with Reporting Requirements	Permit Monitoring Start Date	Prior Station ID	Comments
SW008	Embarrass River	Monitor upstream of the FTB and downstream of Area 5 as background conditions	NorthMet NPDES Permit • List 1: Monthly • List 2: May, Sep 401 Certification • List 3: Jan, Apr, July, Oct	NorthMet NPDES Permit: Monthly DMR Consent Decree: Quarterly Progress Report 401 Certification: Annual Report	12/2018	PM-12.2	
SW020	Second Creek	Monitor Second Creek downstream of FTB	Legacy NPDES Permit • List 4: Sep • List 5: Mar, Dec • List 6: Jun • List 7: Apr, Aug, Oct • List 8: Jan, Feb, May, Jul, Nov NorthMet NPDES Permit • List 1: Monthly • List 2: May, Sep 401 Certification • List 3: Jan, Apr, Jul, Oct	Legacy NPDES Permit: Monthly DMR (SD026) NorthMet NPDES Permit: Monthly DMR Consent Decree: Quarterly Progress Report 401 Certification: Annual Report	12/2018	PM-7/ SD026	List 1/List 2 will begin 18 months after the NorthMet WWTP is operational.
Mine Site and Transportation and Utility Corridors (TUC) Surface Water Monitoring Sites							
SW402	Partridge River	Monitor Partridge River upstream of the Mine Site	NorthMet NPDES Permit • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep 401 Certification • List 3: Jan, Apr, Jul, Oct	NorthMet NPDES Permit: Monthly DMR 401 Certification: Annual Report	12/2018	PM-2/ SW002	
SW407	Wetlegs Creek	Monitor Wetlegs Creek downstream of the TUC	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018	WL-1	PTM monitoring is to evaluate rail ore car spillage
SW408	Longnose Creek	Monitor Longnose Creek downstream of the TUC	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018	LN-1	PTM monitoring is to evaluate rail ore car spillage

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Applicable Permit with Reporting Requirements	Permit Monitoring Start Date	Prior Station ID	Comments
SW409	Wyman Creek	Monitor Wyman Creek downstream of the TUC	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018	WL-1	PTM monitoring is to evaluate rail ore car spillage
SW410	Wyman Creek	Monitor Wyman Creek upstream of the TUC	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018	PM-6	PTM monitoring is to evaluate rail ore car spillage
SW411	Longnose Creek	Monitor Longnose Creek upstream of the TUC	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018	LN-2	PTM monitoring is to evaluate rail ore car spillage
SW412	Wetlegs Creek	Monitor Wetlegs Creek upstream of the TUC	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018	WL-2	PTM monitoring is to evaluate rail ore car spillage
SW413	Partridge River	Monitor Partridge River upstream of the South Branch and downstream of Unnamed (future West Pit Outlet) Creek	NorthMet NPDES Permit • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep 401 Certification • List 3: Jan, Apr, Jul, Oct • List 21 : Monthly	NorthMet NPDES Permit: Monthly DMR 401 Certification: Annual Report	12/2018	SW-004c	
SW414	Unnamed (West Pit Outlet) Creek	Monitor Unnamed (future West Pit Outlet) Creek downstream of West Pit, downstream of the railroad	NorthMet NPDES Permit and PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	NorthMet NPDES Permit: Monthly DMR PTM: Annual Report	12/2018		PTM monitoring is to evaluate rail ore car spillage
SW415	Unnamed (West Pit Outlet) Creek	Monitor Unnamed (future West Pit Outlet) Creek downstream of West Pit, downstream of Dunka Road	PTM • List 1: Jan, Feb, Mar, Apr, Jun, Jul, Aug, Oct, Nov, Dec • List 2: May, Sep	PTM: Annual Report	12/2018		PTM monitoring is to evaluate rail ore car spillage

Table 6-2 Surface Discharge Monitoring Stations – Mercury Monitoring

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
Plant Site Stations listed under NPDES/SDS Permit MN0054089 (Legacy NPDES Permit)						
SD001		NW Seepage Collection Ditch (existing LTVSMC Tailings Basin)	• List 12 – Mar, Dec • List 13 – Sep • List 14 – Apr, Aug, Oct • List 15 – Jun	5/2001	Legacy NPDES Permit: Monthly DMR	Monitoring ceases once NorthMet FTB Seepage Containment System installed
SD002		NE Seepage Collection Ditch (existing Tailings Basin)	• List 12 – Mar, Dec • List 13 - Sep • List 14 – Apr, Aug, Oct • List 15 – Jun	5/2001	Legacy NPDES Permit: Monthly DMR	Monitoring ceases once NorthMet FTB Seepage Containment System installed
Plant Site Stations listed under other permits						
SD001	WWTS Discharge	Monitor water quality discharge from the Waste Water Treatment System (WWTS) for stream augmentation. Monitoring point is at WWTS.	NorthMet NPDES Permit: • List 39: 24 hr. composite, monthly, Jan-Dec • List 40: 24 hr. composite, weekly, Jan-Dec • List 29: 24 hr. composite, quarterly • Flow, daily, Jan-Dec	Not constructed	NorthMet NPDES Permit: • Monthly DMR • Quarterly Chronic Toxicity Results	List 40: pH is continuous measurement with: • Calendar month minimum of 6.0 • Calendar month maximum of 9.0 Zinc is: • Calendar month average of 500 microgram Daily maximum 1000 micrograms/liter Total mercury measured once per week as a 24-hour composite limit is: • Calendar month average of 1000 nanograms/liter • Daily maximum of 2000 nanograms/liter

Table 6-3 Internal Waste Stream Monitoring Stations – Mercury Monitoring

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
Plant Site Stations listed under NPDES/SDS Permit MN0054089 (Legacy NPDES Permit)						
WS013			List 18: Apr, Jul, Oct	5/2001	Legacy NPDES Permit: Monthly DMR	
Plant Site Stations listed under other permits						
WS001	FTB Pond	Monitor waste stream into Flotation Tailings Basin (FTB) Pond (sampled at pond intake)	NorthMet NPDES Permit • List 20: Jan, Feb, Mar, May, Jun, Jul, Aug, Sep, Nov, Dec • List 19: Apr, Oct	TBD	NorthMet NPDES Permit: Monthly DMR	Monitor once water movement is initiated
WS002	FTB Seepage Containment System	Monitor waste stream from FTB Seepage Containment System (sampled at the Waste Water Treatment System (WWTS) intake)	NorthMet NPDES Permit • List 38: Monthly, Jan-Dec • List 23: Monthly, Apr, Oct	TBD	NorthMet NPDES Permit: Monthly DMR	Monitor once water movement is initiated
WS003	FTB South Seepage Management System; Second Creek	Monitor waste stream from FTB South Seepage Management System (sampled at the WWTS intake); amount of seepage extracted from Second Creek watershed	NorthMet NPDES Permit: • List 38: Monthly, Jan-Dec • List 23: Monthly, Apr, Oct WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Monitor once water movement is initiated
WS004	HRF Pond	Monitor waste stream in Hydrometallurgical Residue Facility (HRF) Pond (sampled at pond intake)	NorthMet NPDES Permit: • List 24: Monthly, Jan-Dec • List 25: Monthly, Jul WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Monitor once water movement is initiated; WA-1369 discusses alternative methods to record instantaneous rates and total monthly volumes at this station
WS005	HRF Leachate	Monitor waste stream from HRF Leakage Collection System (underliner leakage)	NorthMet NPDES Permit • List 24: Monthly, Jan-Dec • List 25: Monthly, Jul	TBD	NorthMet NPDES Permit: Monthly DMR	Monitor once water movement is initiated

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
WS015	FTB Seepage Capture Systems	Monitor waste stream into the WWTS, which includes the combined influent from FTB Seepage Containment System and FTB South Seepage Management System	NorthMet NPDES Permit • List 27: 24 hr. composite, monthly, Jan-Dec • List 28: 24 hr. composite, weekly, Jan-Dec • List 29: 24 hr. composite, quarterly, Mar, Jun, Sep, Dec • List 30: 24 hr. composite, quarterly, Jan-Dec WA-1369 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1369: Annual Report	Monitor once pumping begins
WS072	Mine Water Chemical Precipitation Treatment Train	Monitor effluent from the mine water chemical precipitation treatment train	NorthMet NPDES Permit: • List 31: Monthly, Jan-Dec • List 32: Monthly, Apr, Oct	TBD	NorthMet NPDES Permit: Monthly DMR	Monitor once outfall begins
WS073	Mine Water Membrane Filtration Treatment Train	Monitor effluent from the mine water membrane filtration treatment train to the FTB Pond	NorthMet NPDES Permit: • List 33: Monthly, Jan-Dec • List 32: Monthly, Apr, Oct	TBD	NorthMet NPDES Permit: Monthly DMR	Monitor once outfall begins
WS074	Tailings Basin Seepage Treatment Train	Monitor blended effluents from the reverse osmosis and nanofiltration membranes of the tailings basin seepage treatment train, upstream of discharge stabilization	NorthMet NPDES Permit: • List 34: 24 hr. composite, weekly, Jan-Dec	TBD	NorthMet NPDES Permit: Monthly DMR	Monitor once outfall begins
Mine Site Stations						
WS401	East Pit Dewatering	Monitor waste stream from East Pit dewatering	NorthMet NPDES Permit: • List 35 and List 36: Twice monthly, Jan-Dec • Water Level: Twice monthly, Jan-Dec WA-1363: • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round • Water Level (East Pit): Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1363: Annual Report	Monitor once pit dewatering begins

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
WS402	West Pit Dewatering	Monitor waste stream from West Pit dewatering	NorthMet NPDES Permit: • List 35 and List 36: Twice monthly, Jan-Dec • Water Level: Twice monthly, Jan-Dec WA-1365: • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round • Water Level (East Pit): Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	Monitor once pit dewatering begins
WS403	West Pit Dewatering	Monitor waste stream from West Pit dewatering	NorthMet NPDES Permit: • List 35 and List 36: Twice monthly, Jan-Dec • Water Level: Twice monthly, Jan-Dec WA-1365: • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round • Water Level (East Pit): Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1365: Annual Report	Monitor once pit dewatering begins
WS404	Central Pit Dewatering	Monitor waste stream from Central Pit dewatering	NorthMet NPDES Permit: • List 35 and List 36: Twice monthly, Jan-Dec • Water Level: Twice monthly, Jan-Dec WA-1364: • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round • Water Level: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1364: Annual Report	Monitor once pit dewatering begins
WS411	Category 1 Stockpile Groundwater Containment System	Monitor waste stream from Category 1 Stockpile Groundwater Containment System sump	NorthMet NPDES Permit: • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec WA-1367: • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
WS412	Category 1 Stockpile Groundwater Containment System	Monitor waste stream from Category 1 Stockpile Groundwater Containment System sump	NorthMet NPDES Permit: • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec • Water Level (East Pit): Twice monthly, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS413	OSLA Runoff	Monitor waste stream from Overburden Storage and Laydown Area (OSLA) runoff (from OSLA Pond)	NorthMet NPDES Permit: List 37: Monthly, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS414	Construction Mine Water Basin	Monitor waste stream from the Construction Mine Water Basin. This is the combined flow of construction mine water and OSLA drainage that goes to the FTB via the Construction Mine Water Pipeline	NorthMet NPDES Permit: List 37: Monthly, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS415	Low Concentration Mine Water	Monitor waste stream from the Low Concentration Equalization Basins (LCEQ Basins) that goes to the Waste Water Treatment System (WWTS) via the Low Concentration Pipeline	NorthMet NPDES Permit • List 33: Monthly, Jan-Dec • List 32: Monthly, Apr, Oct WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS416	High Concentration Mine Water	Monitor waste stream from the High Concentration Equalization Basin (HCEQ Basin) that goes to the WWTS via the High Concentration Pipeline.	NorthMet NPDES Permit: • List 33: Monthly, Jan-Dec • List 32: Monthly, Apr, Oct WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins

Station ID	Water Body	Description	Sample Parameter Group(s) and Sample Frequency	Monitoring Start Date	Applicable Permit(s) with Reporting Requirements	Comments
WS421	Category 2/3 Waste Rock Stockpile Mine Water Drainage	Monitor waste stream collected on the Category 2/3 Waste Rock Stockpile liner	NorthMet NPDES Permit • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec WA-1367 • Flow rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS422	Category 2/3 Waste Rock Stockpile Mine Water Drainage	Monitor waste stream collected on the Category 2/3 Waste Rock Stockpile liner	NorthMet NPDES Permit: • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS423	Category 2/3 Waste Rock Stockpile Mine Water Drainage	Monitor waste stream collected on the Category 2/3 Waste Rock Stockpile liner	NorthMet NPDES Permit: • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS424	Category 4 Waste Rock Stockpile Mine Water Drainage	Monitor waste stream collected on the Category 4 Waste Rock Stockpile liner	NorthMet NPDES Permit: • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins
WS425	Ore Surge Pile Mine Water Drainage	Monitor waste stream collected on the Ore Surge Pile liner	NorthMet NPDES Permit: • List 35: Monthly, Jan-Dec • List 36: Twice per month, Jan-Dec WA-1367 • Flow Rate: Continuous, year-round • Total Volume: Monthly, year-round	TBD	NorthMet NPDES Permit: Monthly DMR WA-1367: Annual Report	Monitor once outfall begins

Table 6-4 Wetland Water Quality Monitoring Locations – Mercury Monitoring

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Plant Site / Tailings Basin								
Well TB9	1162	3	Shallow marsh	6/30/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB10	1176	7	Hardwood swamp	6/30/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB11	282A	3	Shallow marsh	7/3/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB12	968	7	Coniferous swamp	6/30/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well TB13	584	3	Shallow marsh	7/3/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well TB14	T13A	3	Shallow marsh	7/3/2014	Well TB14	404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification ~~List 50: Monthly, May-Oct:~~ Approval to remove from water quality monitoring 5/6/2019	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	Ponded water; MPCA approval to remove this well from wetland water quality monitoring received 5/6/2019
Mine Site								
Well 4	887	8	Coniferous bog	11/9/2005		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 4A	889	8	Coniferous bog	5/21/2008		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well 13	84	8	Coniferous bog	5/23/2008		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 26	315	6	Alder thicket	7/1//2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 31	54G	7	Coniferous swamp	6/30/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 33	53D	6	Alder thicket	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well 34	53C	7	Coniferous swamp	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 35	53D	6	Alder thicket	7/2/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 36	53	6	Alder thicket	7/2/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification • List 50: Monthly, May-Oct • List 51: Once per month; Jan, Mar, May, Jul, Sep, Nov	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 37	58	6	Alder thicket	7/2/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well 38	11	8	Coniferous bog	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 39	29	3	Shallow marsh	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 40	571	7	Coniferous swamp	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 41	R-7A	3	Shallow marsh	7/2/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Well ID	Wetland ID	Circular 39 Type	Eggers and Read Wetland Type	Date Installed	Date Removed	Sample Parameter(s) and Sample Frequency	Applicable Permit(s) and Reporting Requirements	Comments
Well 42	1041	6	Shrub-carr	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	
Well 47	315	6	Alder thicket	7/1/2014		404 Permit, WCA Decision: • Water level: Continuous data logger during growing season, May-Oct • Veg. Monitoring: ○ Once every 2 years upon Project construction start ○ Once every 5 years upon maximum pit limits and stable hydrologic monitoring data 401 Certification List 50: Monthly, May-Oct	404 Permit: Annual Report WCA Decision: Annual Report 401 Certification: Annual Report	

Revision History

Date	Version	Description
April 29, 2022	1	Initial release

List of Tables

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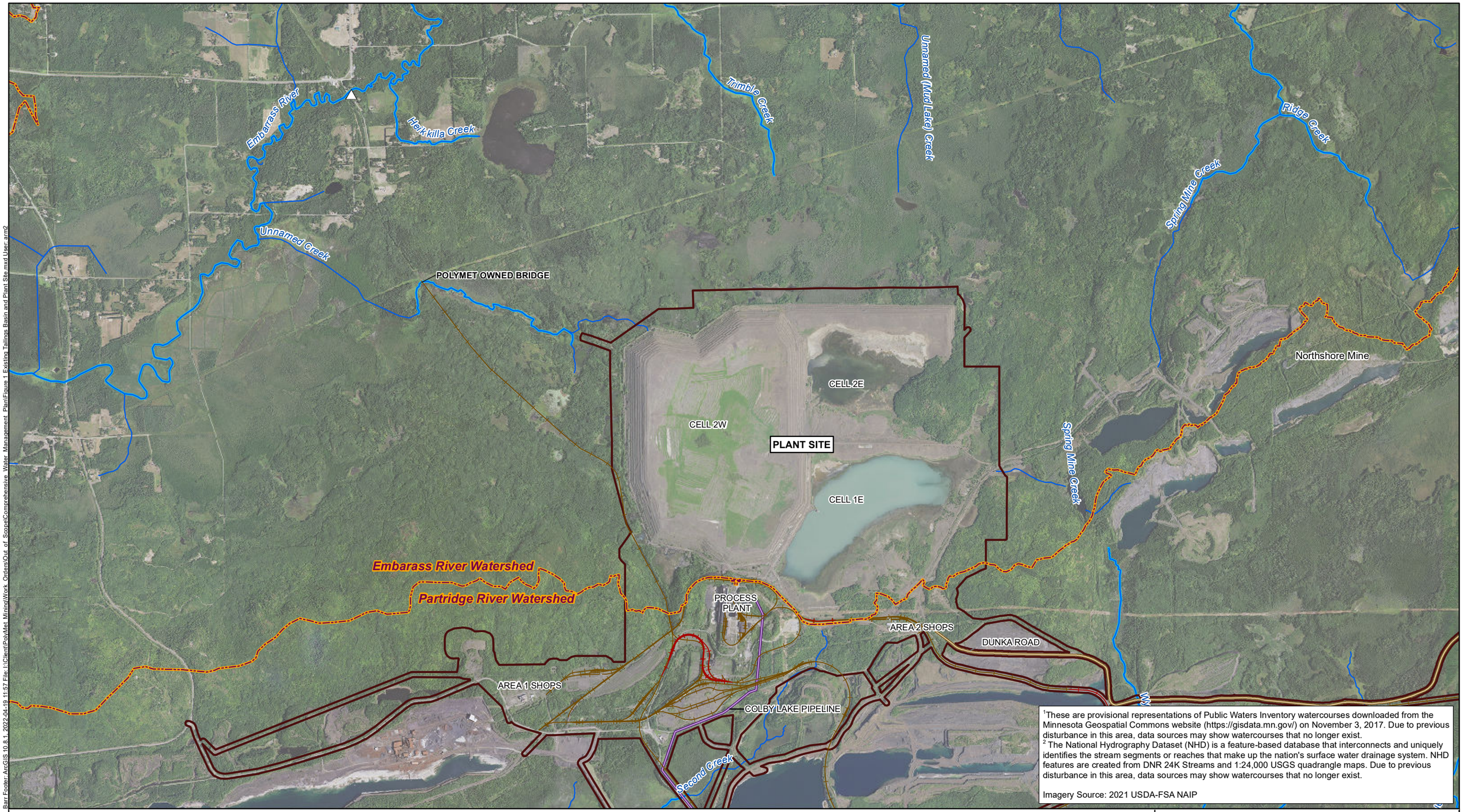
Figures



[1]These are provisional representations of Public Waters Inventory watercourses downloaded from the Minnesota Geospatial Commons website (https://gisdata.mn.gov/) on November 3, 2017. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.
[2] The National Hydrography Dataset (NHD) is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

- Mining Area
- Dunka Road
- Existing Railroad
- Proposed Railroad
- Colby Lake Pipeline
- USGS Gage
- Watershed Divide
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

0 3,500 7,000
Feet

EXISTING TAILINGS BASIN AND PLANT SITE
NorthMet Project
Poly Met Mining, Inc.

Figure 1
Comprehensive Water and Wetland Monitoring Plan

Barr Foster ArcGIS 10.8.1, 2022-04-19 11:57 File: I:\Client\PolyMet Mining\Work Orders\Out of Scope\Comprehensive Water Management Plan\Figure 1 Existing Tailings Basin and Plant Site.mxd User: amr2

Embarrass River Watershed

Partridge River Watershed

HYDROMETALLURGICAL RESIDUE FACILITY

FLOTATION TAILINGS BASIN

LINED PRETREATMENT BASIN

WASTEWATER TREATMENT SYSTEM (WWTS)

PROCESS PLANT

PLANT RESERVOIR

North Pond

Central Pond

Southwest Pond

SEWAGE TREATMENT SYSTEM PONDS

ADMINISTRATION BUILDING

MINE TO PLANT PIPELINES

AREA 2 SHOPS

FTB SOUTH SEEPAGE MANAGEMENT SYSTEM

COLBY LAKE PIPELINE

DUNKA ROAD

Second Creek

[1]The National Hydrography Dataset (NHD) is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

- Mining Area
- Dunka Road
- Existing Beneficiation Plant Building
- Existing Other Plant Building
- Proposed Beneficiation Plant Building
- Proposed Hydrometallurgical Plant Building
- Existing Railroads
- Proposed Railroads
- Proposed Access Road
- Colby Lake Pipeline
- Existing Sewer Pipe
- Proposed Sewer Pipe
- Mine to Plant Pipelines
- FTB Water Return Pipe
- FTB Tailings Discharge Pipe
- Tailings Basin Seepage Collection Pipe
- Plant Reservoir Overflow
- Treated Water Pipe
- Treated Mine Water Ppe
- Stormwater Culvert
- Stormwater Ditch
- Stormwater Ponds

Mine Year 20 Footprints

- Dam
- Beach
- South Buttress
- HRF Pond
- HRF Dam

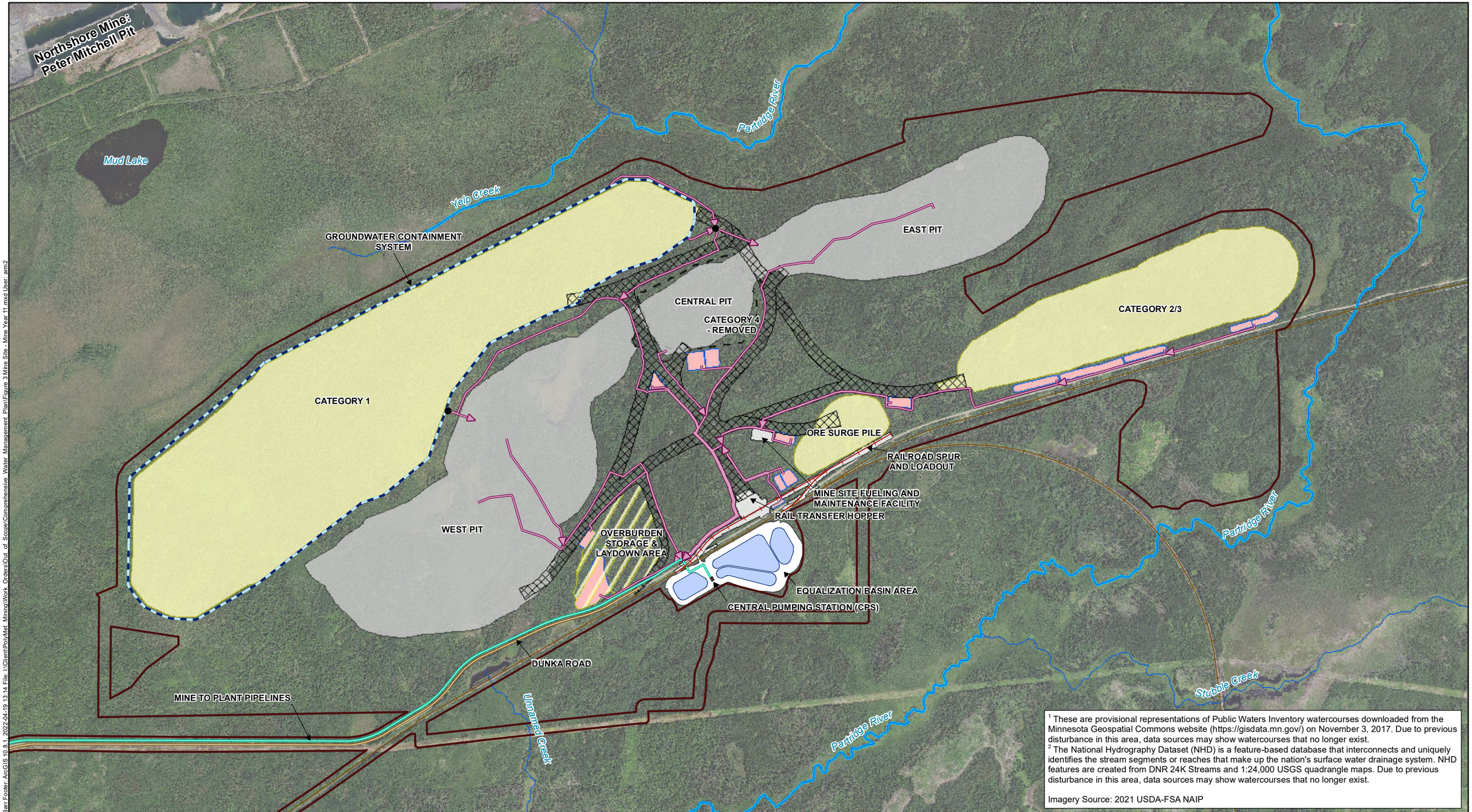
- Watershed Divide
- National Hydrography Dataset (NHD) Rivers & Streams[1]

0 1,000 2,000

Feet

PLANT SITE DETAIL
NorthMet Project
Poly Met Mining, Inc.

Figure 2
Comprehensive Water and Wetland Monitoring Plan



[1] These are provisional representations of Public Waters Inventory watercourses downloaded from the Minnesota Geospatial Commons website (https://gisdata.mn.gov/) on November 3, 2017. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.
[2] The National Hydrography Dataset (NHD) is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

- Mining Area
- Mine Year 11 Footprints
- Mine Pit
- Active Stockpile
- Storage & Laydown Area
- Removed Stockpile
- Haul Roads
- Dunka Road
- Proposed Railroad Track
- Existing Private Railroad
- Groundwater Containment System Sump
- Groundwater Containment System
- Mine to Plant Pipelines
- Mine Water Pipes
- Mine Water Ponds and Sumps
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

0 1,500 3,000
Feet

MINE SITE - MINE YEAR 11
NorthMet Project
Poly Met Mining, Inc.

Figure 3
Comprehensive Water and Wetland Monitoring Plan

Barr Foster ArcGIS 10.8.1, 2022-04-19 13:14 File: I:\Client\PolyMet Mining\Work Orders\Out of Scope\Comprehensive Water Management Plan\Figure 3 Mine Site - Mine Year 11.mxd User: amn2

City of Babbitt

Northshore Mine

Bear Creek

Embarrass River

Unnamed Mud Lake Creek

Trimble Creek

Heikkilla Creek

Unnamed Creek

Ridge Creek

Spring Mine Creek

Yelp Creek

MINE SITE

TAILINGS BASIN

Stubble Creek

TRANSPORTATION AND UTILITY CORRIDOR

RAILROAD CONNECTION TRACK

Embarrass River Watershed

Partridge River Watershed

Sabin Lake

Second Creek

Stephens Creek

Longnose Creek

Wetlegs Creek

Wynne Lake

Unnamed Creek

Wyman Creek

Partridge River

Embarrass Lake

[1] These are provisional representations of PWI watercourses found on the current paper regulatory maps. Due to previous disturbance, data sources may show watercourses that no longer exist.
[2] The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance, data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

- Surface Water Monitoring Locations - Stream
- Surface Water Monitoring Locations - Colby Lake, Whitewater Reservoir
- Surface Discharge Monitoring Locations
- USGS Stations
- Waste Station Monitoring Locations
- Monitoring Well
- Rotasonic Borings - 2011/2012
- Sorption Sampling Location - 2009
- Bedrock Groundwater Elevation Measurement - 2006
- Phase I - Bedrock Aquifer Testing Location - 2005
- Phase II - Pumping Test Wells - 2005/2006
- Phase II - Observation Wells - 2005/2006
- Wetland Hydrology Monitoring Locations
- Sampling Locations - Aquatic Biota and Fish
- Sampling Locations - Mussels
- Watershed Divide
- Mine Pit Footprints
- Stockpile Footprints
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

0 0.75 1.5
Miles

ENVIRONMENTAL REVIEW
WATER MONITORING LOCATIONS
NorthMet Project
Poly Met Mining, Inc.

Figure 4
Comprehensive Water and Wetland Monitoring Plan

PM-20
PM-12.2
PM-12
PM-12.1
PM-19
MLC-2
PM-12.3
TC-1a
MLC-1
04017000
TC-1
MLC-3
PM-12.4
MLC-3A
PM-11
SD001
SD005
SD002
PM-10
SD033
PM-13
PM-9/UC-1
SD004
PLANT SITE
MINE SITE
SD006
WS009
PM-8
WS012
Hay Lake
WS013
WS011
PM-23
Sabin Lake
PM-21
PM-24
Wynne Lake
PM-22
EL-1
EL-2
Embarrass Lake
Colby Lake
Whitewater Reservoir
04018000
Northshore's Peter Mitchell Open Pit Taconite Mine

[1] These are provisional representations of PWI watercourses found on the current paper regulatory maps. Due to previous disturbance, data sources may show watercourses that no longer exist.
[2] The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance, data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

- Surface Water Monitoring Locations
- Surface Discharge Monitoring Locations
- Waste Station Monitoring Locations
- Mining Area
- Embarrass River Subwatersheds
- Embarrass River Watershed
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

N

0 1.25 2.5 5
Miles

ENVIRONMENTAL REVIEW
EMBARRASS RIVER WATERSHED
SURFACE WATER, SURFACE DISCHARGE & WASTE STATION MONITORING LOCATIONS
NorthMet Project
Poly Met Mining, Inc.

Figure 5
Comprehensive Water and Wetland Monitoring Plan

Pike River
Embarrass River
Embarrass River
04017000
Northshore Mine Site
PM-1/SW001
PM-2/SW002
Yelp Creek
SW001b
One Hundred Mile Swamp
PM-3/SW003
Stubble Creek
WP-1
PM-6
SD026
PM-7
PM-6b
LN-2
WL-1
LN-1
PM-16/SW004
SW004c
SW004a
Mesabi Nugget
PM-5
PM-17
Stephens Creek
Second Creek
Second Creek Watershed
Wyman Creek Watershed
Longnose Creek
Wetlegs Creek
Upper Partridge Watershed
South Branch Partridge River
04015455
SW004b
PM-18
Wyman Creek
Colby-Whitewater Watershed
LCy-2
LCy-1
04015475
SW006
First Creek
04015500
04016000
LWr-1
HOYT LAKES
Partridge River
PM-4/SW005
Cranberry Creek
Colvin Creek
Lower Partridge Watershed
LWr-2
Saint Louis River
04016500

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[2] The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance, data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

- Surface Water Monitoring Locations - Colby Lake, Whitewater Reservoir
- Surface Water Monitoring Locations - Stream
- Surface Discharge Monitoring Locations
- USGS Stations
- Mining Area
- Partridge River Subwatersheds
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

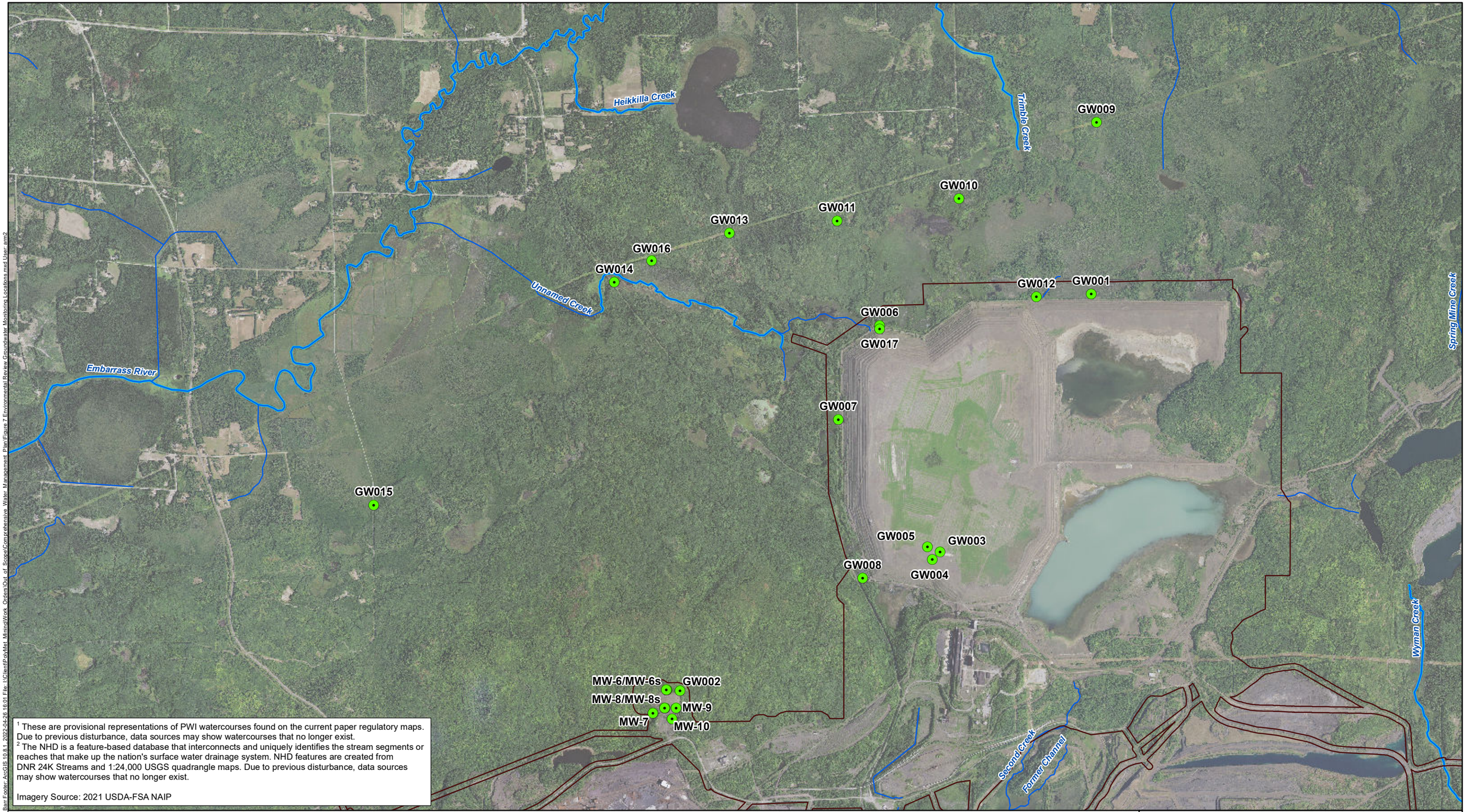
N

0 0.75 1.5 3
Miles

ENVIRONMENTAL REVIEW
PARTRIDGE RIVER WATERSHED
SURFACE WATER AND SURFACE DISCHARGE MONITORING LOCATIONS
NorthMet Project
Poly Met Mining, Inc.

Figure 6
Comprehensive Water and Wetland Monitoring Plan

Barr Foster ArcGIS 10.8.1, 2022-04-20 10:34 File: I:\Client\PolyMet_Mining\Work_Orders\Out_of_Scope\Comprehensive_Water_Management_Plan\Figure 6 Environmental Review Partridge River Watershed and Surface Water Monitoring Locations.mxd User: amr2



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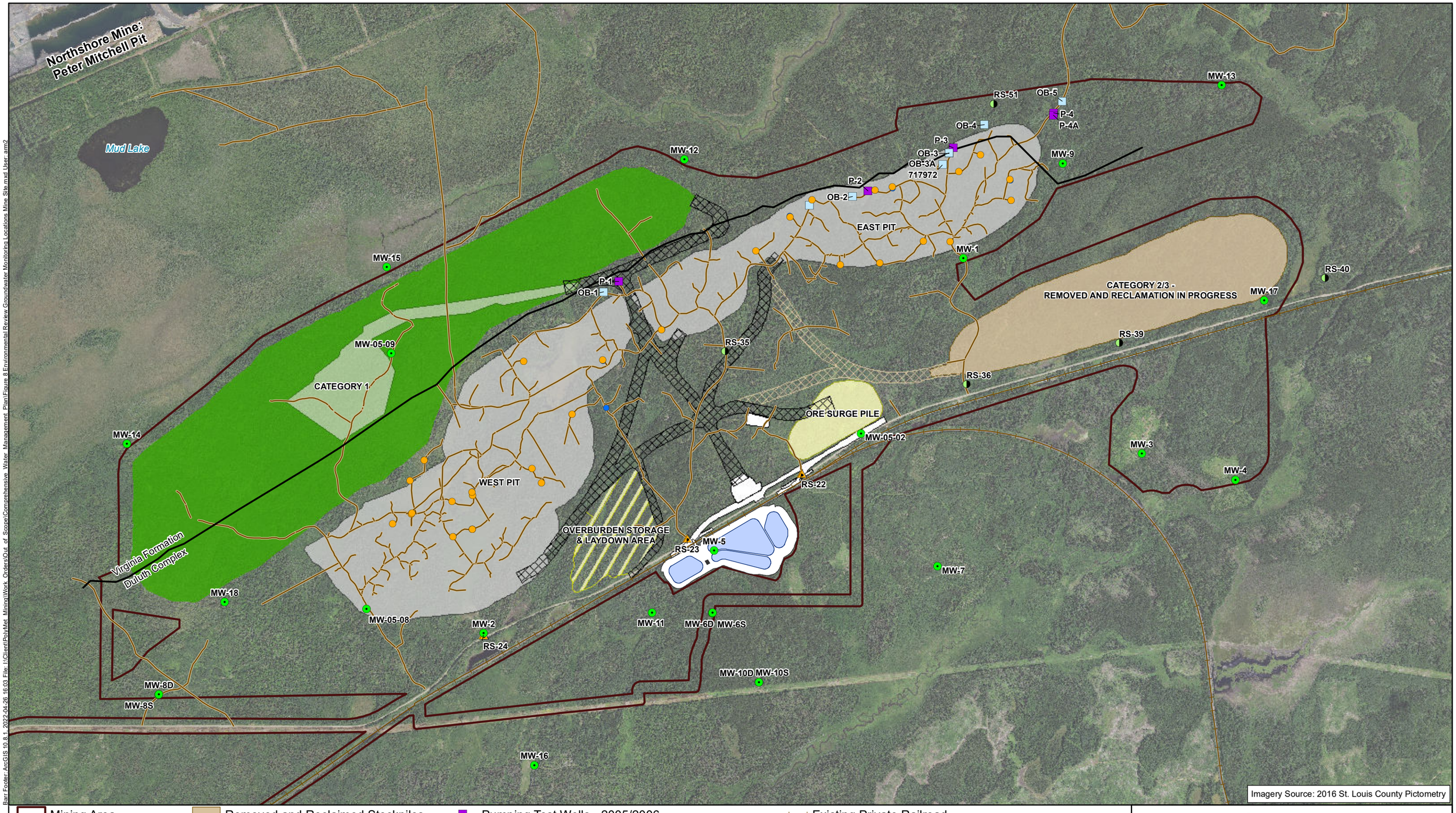
Imagery Source: 2021 USDA-FSA NAIP

- Groundwater Wells
- Mining Area
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

0 1,500 3,000 6,000
Feet

ENVIRONMENTAL REVIEW
GROUNDWATER MONITORING LOCATIONS
PLANT SITE
NorthMet Project
Poly Met Mining, Inc.

Figure 7
Comprehensive Water and Wetland Monitoring Plan



Barr Foster-ArcGIS 10.8.1, 2022-04-26 16:03 File: I:\Client\PolyMet_Mining\Work Orders\Out of Scope\Comprehensive Water Management Plan\Figure 8 Environmental Review Groundwater Monitoring Locations Mine Site.mxd User: arm2

- Mining Area
- Mine Year 20 Footprints
- Mine Pits
- Open Stockpile
- Covered Stockpile
- Active Stockpile
- Storage & Laydown Area
- Removed and Reclaimed Stockpiles
- Haul Roads
- Reclaimed Haul Roads

Phase I
- Bedrock Aquifer Testing Location - 2005

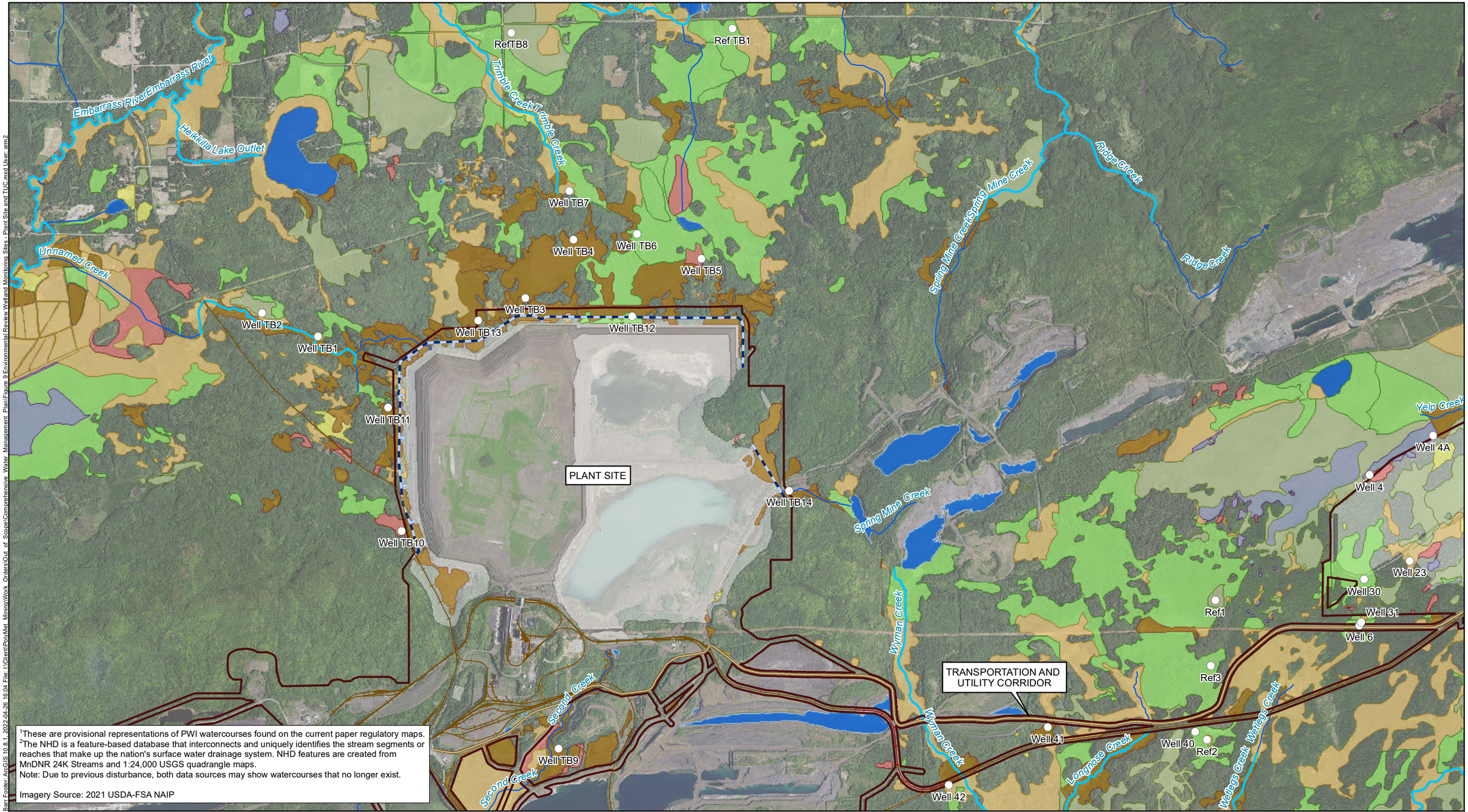
Phase II
- Observation Wells - 2005/2006
- Pumping Test Wells - 2005/2006
- 2011/2012 Rotasonic Borings
- Sorption Sampling Location - 2009
- Bedrock Groundwater Elevation Measurement - 2006
- Monitoring Well
- Unit Boundaries
- Existing Trails and Roads
- Existing Private Railroad

N

0 750 1,500
Feet

ENVIRONMENTAL REVIEW
GROUNDWATER MONITORING LOCATIONS
MINE SITE
NorthMet Project
Poly Met Mining, Inc.

Figure 8
Comprehensive Water and Wetland Monitoring Plan



[1]These are provisional representations of PWI watercourses found on the current paper regulatory maps.
[2]The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from MnDNR 24K Streams and 1:24,000 USGS quadrangle maps.
Note: Due to previous disturbance, both data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

- Wetland Monitoring Locations
- Dunka Road
- Existing Private Railroad
- Proposed Railroad Track
- FTB Containment System
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]
- Mining Area
- Areas Disturbed by Proposed Project Features

Eggers & Reed Wetland Types

- Shrub Swamps (Alder thickets & Shrub-carrs)
- Coniferous bog
- Coniferous swamp
- Deep marsh; Shallow marsh
- Hardwood swamp
- Open water (Shallow, open water & lakes)
- Open bog
- Sedge meadow; Wet meadow

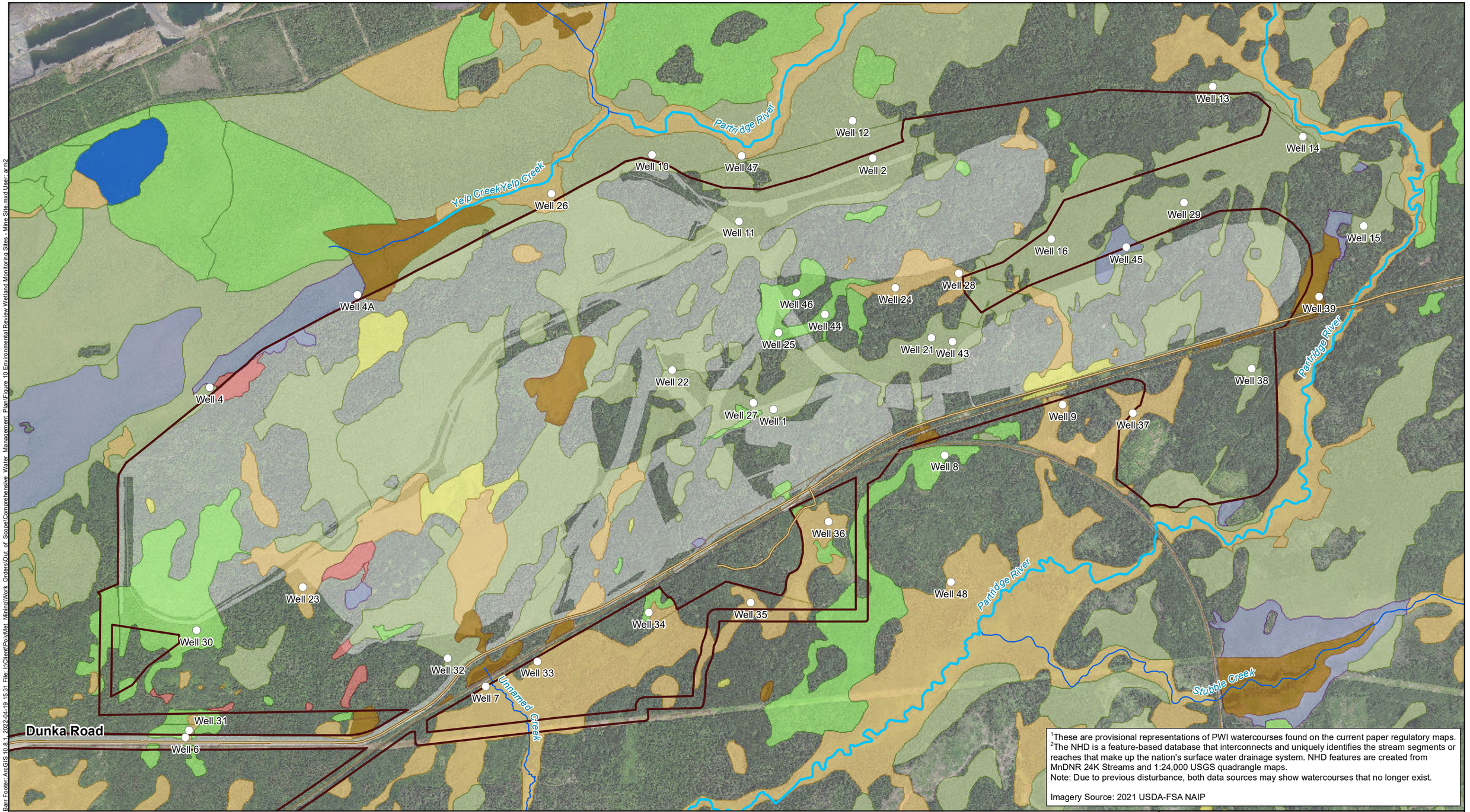
N

0 1,750 3,500 7,000

Feet

ENVIRONMENTAL REVIEW WETLAND MONITORING LOCATIONS - PLANT SITE AND TRANSPORTATION AND UTILITY CORRIDOR
NorthMet Project
Poly Met Mining, Inc.

Figure 9
Comprehensive Water and Wetland Monitoring Plan



[1]These are provisional representations of PWI watercourses found on the current paper regulatory maps.
[2]The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from MnDNR 24K Streams and 1:24,000 USGS quadrangle maps.
Note: Due to previous disturbance, both data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

- Wetland Monitoring Locations
- Dunka Road
- Railroads
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]
- Mining Area
- Areas Disturbed by Proposed Project Features

Eggers & Reed Wetland Types

- Shrub Swamps (Alder thickets & Shrub-carrs)
- Coniferous bog
- Coniferous swamp
- Deep marsh; Shallow marsh
- Hardwood swamp
- Open water (Shallow, open water & lakes)
- Open bog
- Sedge meadow; Wet meadow

0 750 1,500 3,000
Feet

ENVIRONMENTAL REVIEW
WETLAND MONITORING LOCATIONS - MINE SITE
NorthMet Project
Poly Met Mining, Inc.

Figure 10
Comprehensive Water and Wetland Monitoring Plan

09LS098
PM-20
10EM045
Embarrass River
PM-12.1
09LS100
09LS101
M-3
PM-19
M-4
Trimble Creek
Unnamed (Mud Lake) Creek
Ridge Creek
Heikkilla Creek
Northshore Mine
Unnamed Creek
PM-11
B-5
B-7
97LS005
Spring Mine Creek
PR-West
PR-East
Yelp Creek
M-1
B-2
TAILINGS BASIN
MINE SITE
Stubble Creek
TRANSPORTATION AND UTILITY CORRIDOR
M-2
B-3
SD026
RAILROAD CONNECTION TRACK
Sabin Lake
Second Creek
Tongoose Creek
Wetlegs Creek
Stephens Creek
Wynne Lake
B-1
South Branch Partridge River
Wyman Creek
Partridge River
81LS008
USFS_PR
USFS_CCr
Unnamed Creek
Embarrass Lake
First Creek
Colby Lake
09LS105
HOYT LAKES
Cranberry Creek
Colvin Creek
Whitewater Reservoir
Saint Louis River
Bear Pass River

[1] These are provisional representations of PWI watercourses found on the current paper regulatory maps. Due to previous disturbance, data sources may show watercourses that no longer exist.
[2] The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance, data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

- Sampling Locations - Aquatic Biota and Fish
- Sampling Locations - Mussels

Sampling Reaches
- Reach 1
- Reach 2
- Reach 3
- Reach 4

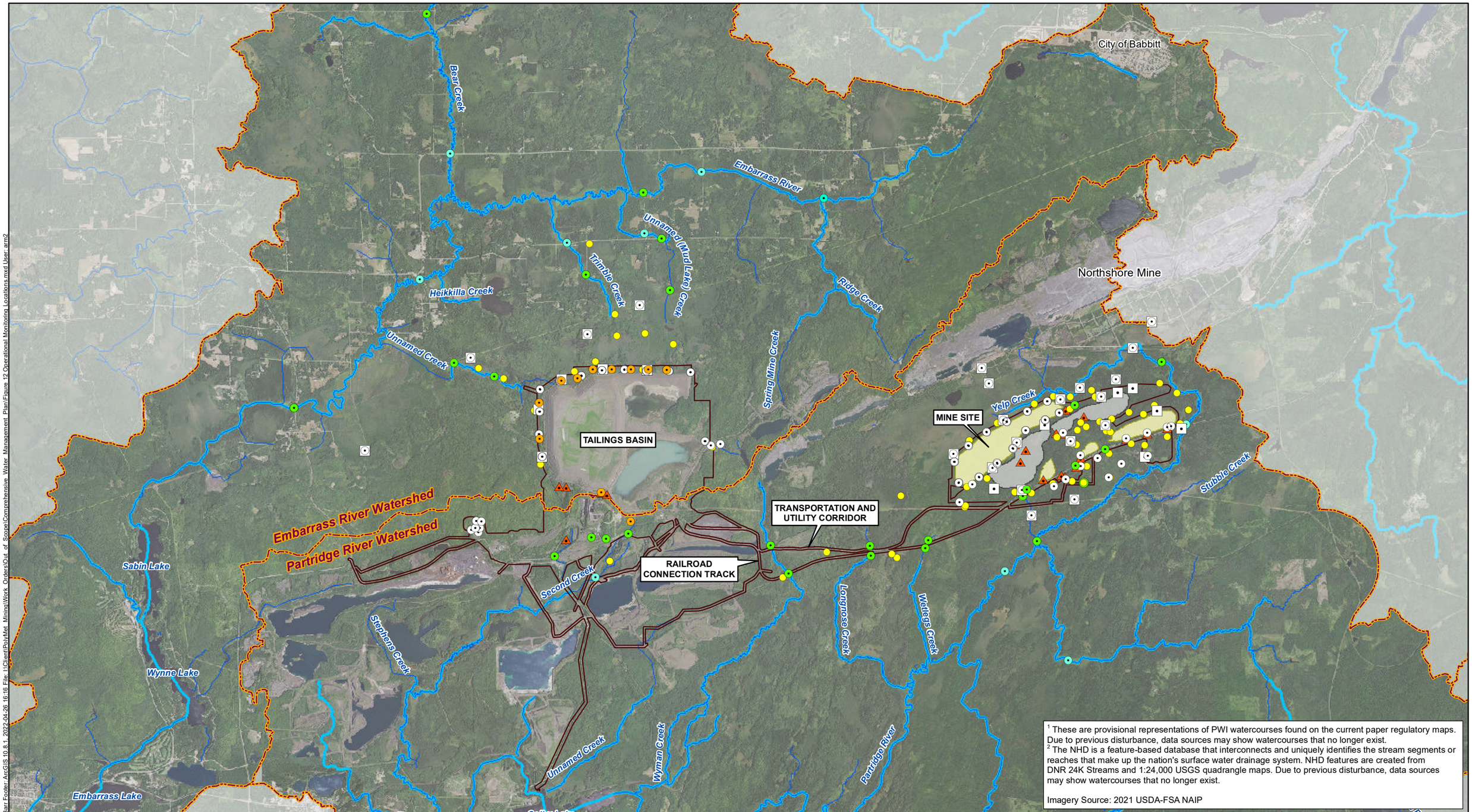
- Mining Area
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

N

0 0.75 1.5 3
Miles

ENVIRONMENTAL REVIEW
AQUATIC BIOTA, FISH AND MUSSEL SAMPLE SITE LOCATIONS
NorthMet Project
Poly Met Mining, Inc.

Figure 11
Comprehensive Water and Wetland Monitoring Plan



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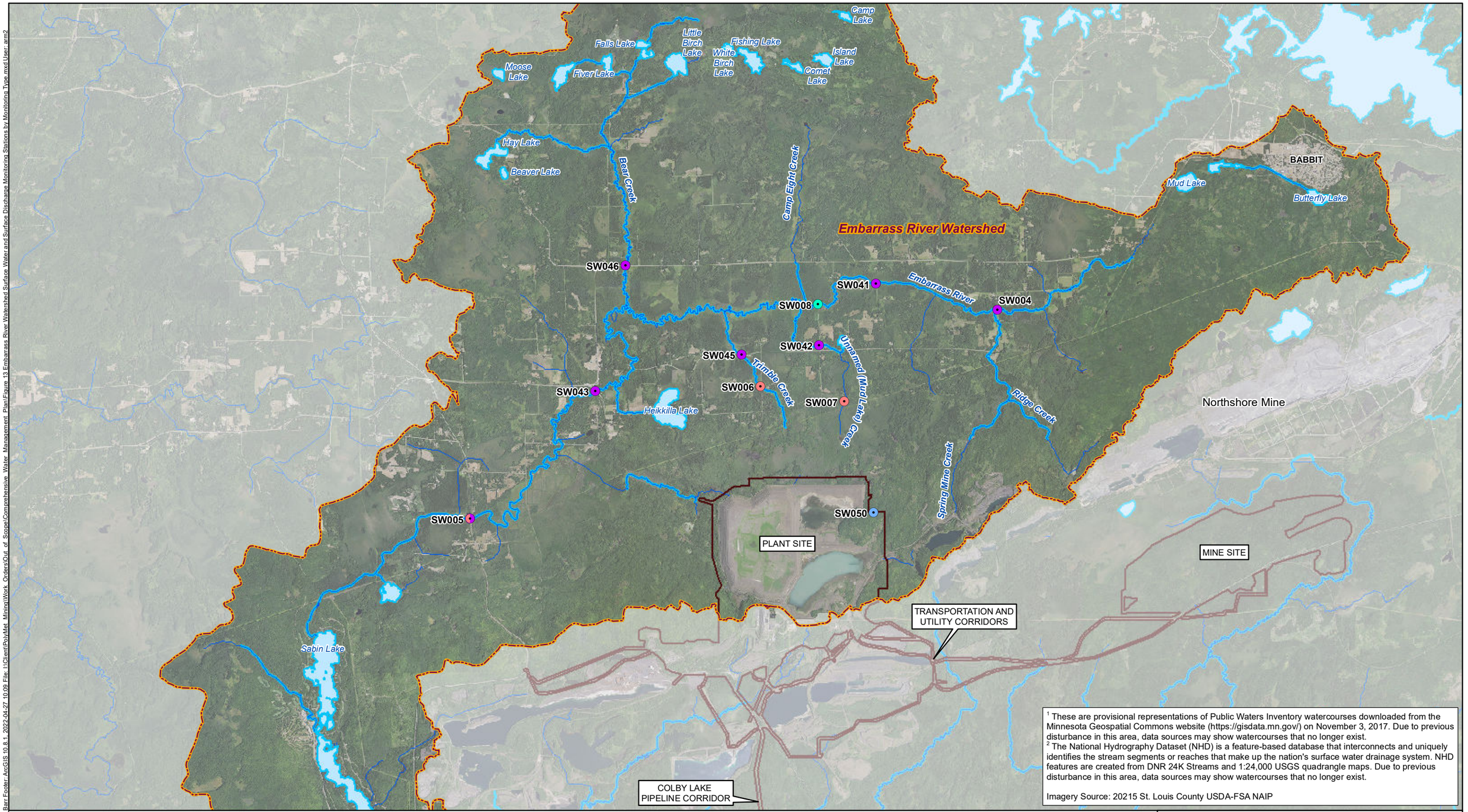
Imagery Source: 2021 USDA-FSA NAIP

- Stream Water Quality
- Streamflow
- Treated Water Discharge
- Surficial Groundwater Well
- Bedrock Groundwater Well
- Wetland Monitoring Wells
- Industrial Water Collection
- Watershed Divide
- Mine Pit Footprints
- Stockpile Footprints
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

0 0.75 1.5 3
Miles

OPERATIONAL MONITORING LOCATIONS
NorthMet Project
Poly Met Mining, Inc.

Figure 12
Comprehensive Water and Wetland Monitoring Plan



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Imagery Source: 20215 St. Louis County USDA-FSA NAIP

- Mining Area
- Proposed Surface Water Monitoring Stations
  - Background
  - Monitor Only
  - Augmentation Flow
  - Stream Flow
  - Monitor Only/Stream Flow
- Watershed Boundary
- Public Waters Inventory (PWI) Basins
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

SW402 Monitoring Station ID

0 0.75 1.5 3
Miles

EMBARRASS RIVER WATERSHED SURFACE WATER AND SURFACE DISCHARGE MONITORING STATIONS BY MONITORING TYPE
NorthMet Project
Poly Met Mining, Inc.

Figure 13
Comprehensive Water and Wetland Monitoring Plan

Barr Foster; ArcGIS 10.8.1; 2022-04-27 10:09; File: I:\Client\PolyMet_Mining\Work_Orders\Out_of_Scope\Comprehensive_Water_Management_Plan\Figure_14 Partridge River Watershed Surface Water and Surface Discharge Monitoring Stations by Monitoring Type.mxd User: arm2

Iron Lake
Northshore Mine
SW402
SW430
Mud Lake
Yelp Creek
H03155002
PLANT SITE
MINE SITE
SD401
SW414
SW415
SW433
Stubble Creek
TRANSPORTATION AND UTILITY CORRIDORS
SD011
SW410
SW411
SW412
SW413
SW044
SW431
Longnose Creek
Wetlegs Creek
South Branch Partridge River
SW432
Second Creek
COLBY LAKE PIPELINE CORRIDOR
Partridge River Watershed
Wyman Creek
Partridge River
Unnamed Creek
SW047
AURORA
First Creek
Colby Lake
Big Lake
HOYT LAKES
Cranberry Creek
Colvin Creek
Cranberry Lake
Whitewater Reservoir
Saint Louis River

[1] These are provisional representations of Public Waters Inventory watercourses downloaded from the Minnesota Geospatial Commons website (https://gisdata.mn.gov/) on November 3, 2017. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.
[2] The National Hydrography Dataset (NHD) is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

Mining Area
Surface Water Monitoring Stations
- Background
- Monitor Only
- Streamflow
- Background/Streamflow
- Surface Water Discharge/Augmentation Flow

Watershed Boundary
Public Waters Inventory Basins
Public Waters Inventory (PWI) Watercourses[1]
National Hydrography Dataset (NHD) Rivers & Streams[2]

SW402 Monitoring Station ID

N

0 0.75 1.5 3
Miles

PARTRIDGE RIVER WATERSHED SURFACE WATER AND SURFACE DISCHARGE MONITORING STATIONS BY MONITORING TYPE
NorthMet Project
Poly Met Mining, Inc.

Figure 14
Comprehensive Water and Wetland Monitoring Plan

Barr Foster ArcGIS 10.8.1, 2022-04-27 10:09 File: I:\Client\PolyMet_Mining\Work_Orders\Out_of_Scope\Comprehensive_Water_Management_Plan\Figure_15_Embarrass_River_Watershed_Surface_Discharge_Monitoring_Stations.mxd User: amn2

Camp Lake
Little Birch Lake
Falls Lake
Fishing Lake
White Birch Lake
Island Lake
Comet Lake
Moose Lake
Fiver Lake
Hay Lake
Beaver Lake
Bear Creek
Camp Eight Creek
Embarrass River Watershed
BABBIT
Mud Lake
Butterfly Lake
Embarrass River
Trimble Creek
Unnamed (Mud Lake) Creek
Ridge Creek
Heikkilla Lake
Spring Mine Creek
Northshore Mine
SD006 SD007 SD008 SD009
SD005
SD010
SD004
SD002
SD001
SD004
SD005
SD003
SD002
PLANT SITE
MINE SITE
SD006
SD001
TRANSPORTATION AND UTILITY CORRIDORS
Sabin Lake
COLBY LAKE PIPELINE CORRIDOR

[1] These are provisional representations of Public Waters Inventory watercourses downloaded from the Minnesota Geospatial Commons website (https://gisdata.mn.gov/) on November 3, 2017. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.
[2] The National Hydrography Dataset (NHD) is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.

Imagery Source: 20215 St. Louis County USDA-FSA NAIP

- Mining Area
- Surface Water Discharge
- Surface Water Discharge/Augmentation Flow
- Surface Water Discharge - Legacy NPDES
- **SW402** Monitoring Station ID
- Watershed Boundary
- Public Waters Inventory (PWI) Basins
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[4]

N

0 0.75 1.5 3
Miles

EMBARRASS RIVER WATERSHED SURFACE DISCHARGE MONITORING STATIONS
NorthMet Project
Poly Met Mining, Inc.

Figure 15
Comprehensive Water and Wetland Monitoring Plan

Unnamed Creek
Spring Mine Creek
WS007
WS006
WS008
WS003
WS002
WS014
WS011
WS001
DRAINAGE SWALE
PLANT SITE
Embarrass River Watershed
WS013
WS009
Partridge River Watershed
WS051
WS010
WS016
WS005
WS004
WS012
WS072
WS073
WS074
WS015
LINED PRETREATMENT BASIN
WWTS
WS061
WS062
WS063
WS031
WS081
WS082
WS083
WS084
WS085
WS086
WS087
WS089
MINE TO PLANT PIPELINES
SOUTH SEEPAGE MANAGEMENT SYSTEM
SEWAGE TREATMENT STABILIZATION PONDS
Colby Lake Pumphouse Inset
SW047
PUMPHOUSE
Colby Lake

[1] These are provisional representations of Public Waters Inventory watercourses downloaded from the Minnesota Geospatial Commons website (https://gisdata.mn.gov/) on November 3, 2017. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.
[2] The National Hydrography Dataset (NHD) is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

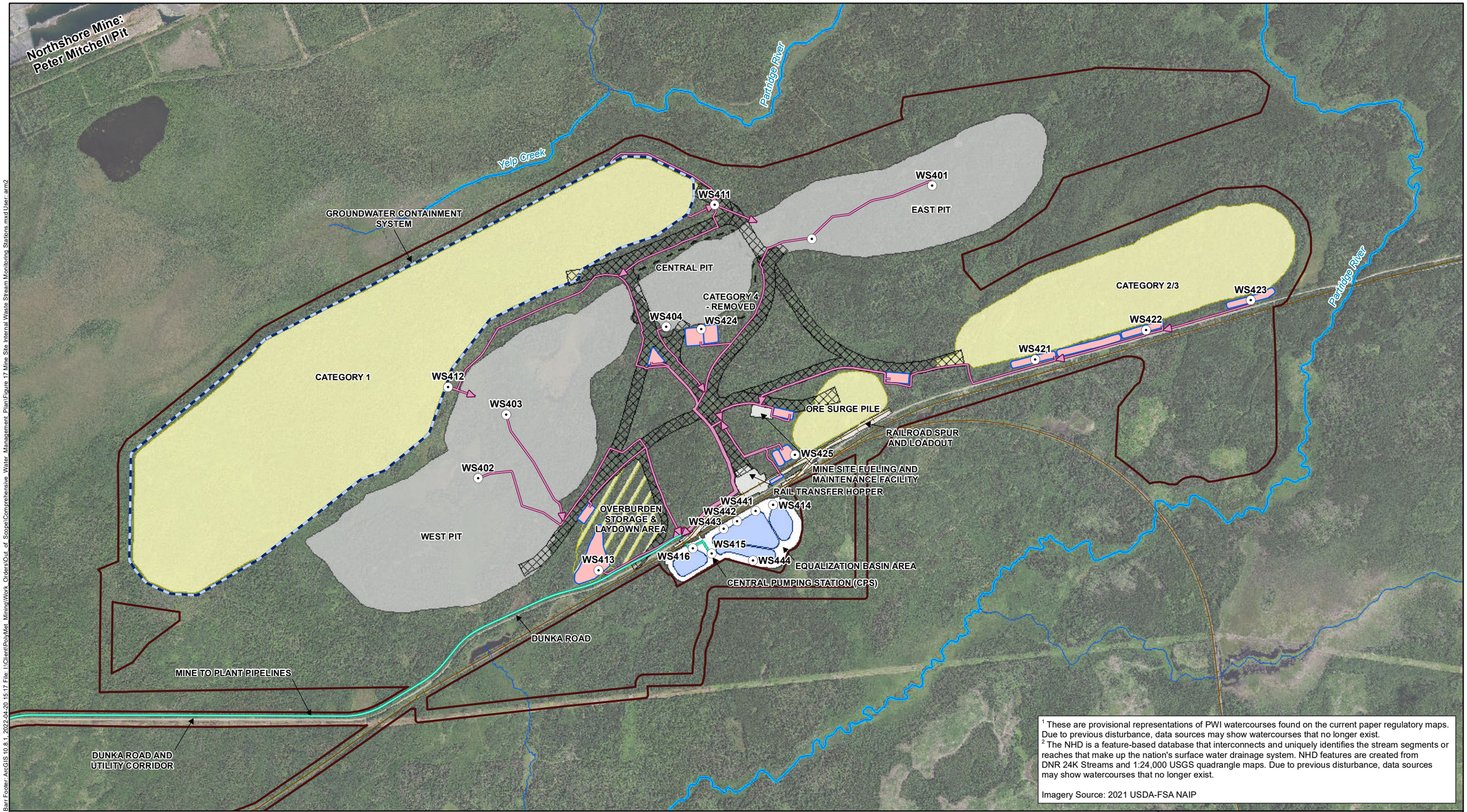
- NPDES/SDS Only, Internal Waste Stream Monitor Only
- NPDES/SDS Only, Internal Performance Monitoring
- Water Appropriation Only, Appropriation Source Monitoring
- Water Appropriation Only, Seepage Flow Monitoring
- Water Appropriation Only, Internal Flow Monitoring
- NPDES/SDS Monitor Only and Water Appropriation Source
- NPDES/SDS Monitor Only and Water Appropriation Seepage Flow
- NPDES/SDS Monitor Only and Water Appropriation Internal Flow
- Legacy NPDES only, Internal Waste Stream Monitor Only
- Existing Waste Stream Station
- Mining Area
- Dunka Road
- Existing Railroad
- Proposed Railroad
- Colby Lake Pipeline
- Mine to Plant Pipelines
- FTB Seepage Containment System
- FTB Water Return Pipe
- FTB Tailings Discharge Pipe
- Tailings Basin Seepage Collection Pipe
- Plant Reservoir Overflow
- Treated Water Pipe
- Treated Mine Water Ppe
- Watershed Divide
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

0 1,000 Feet

PLANT SITE INTERNAL WASTE STREAM MONITORING STATIONS
NorthMet Project
Poly Met Mining, Inc.

Figure 16
Comprehensive Water and Wetland Monitoring Plan

Barr Foster ArcGIS 10.8.1 2022-04-27 10:13 File: I:\Client\PolyMet Mining\Work Orders\Out of Scope\Comprehensive Water Management Plan\Figure 16 Plant Site Internal Waste Stream Monitoring Stations mxd User: emn2



[1] These are provisional representations of PWI watercourses found on the current paper regulatory maps. Due to previous disturbance, data sources may show watercourses that no longer exist.
[2] The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance, data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

Proposed Internal Waste Stream Monitoring Stations
- Internal Waste Stream Monitor Only
- WS401 Proposed NPDES/SDS Monitoring Station ID

Mining Area
Mine Year 11 Footprints
- Mine Pit
- Active Stockpile
- Storage & Laydown Area
- Removed Stockpile

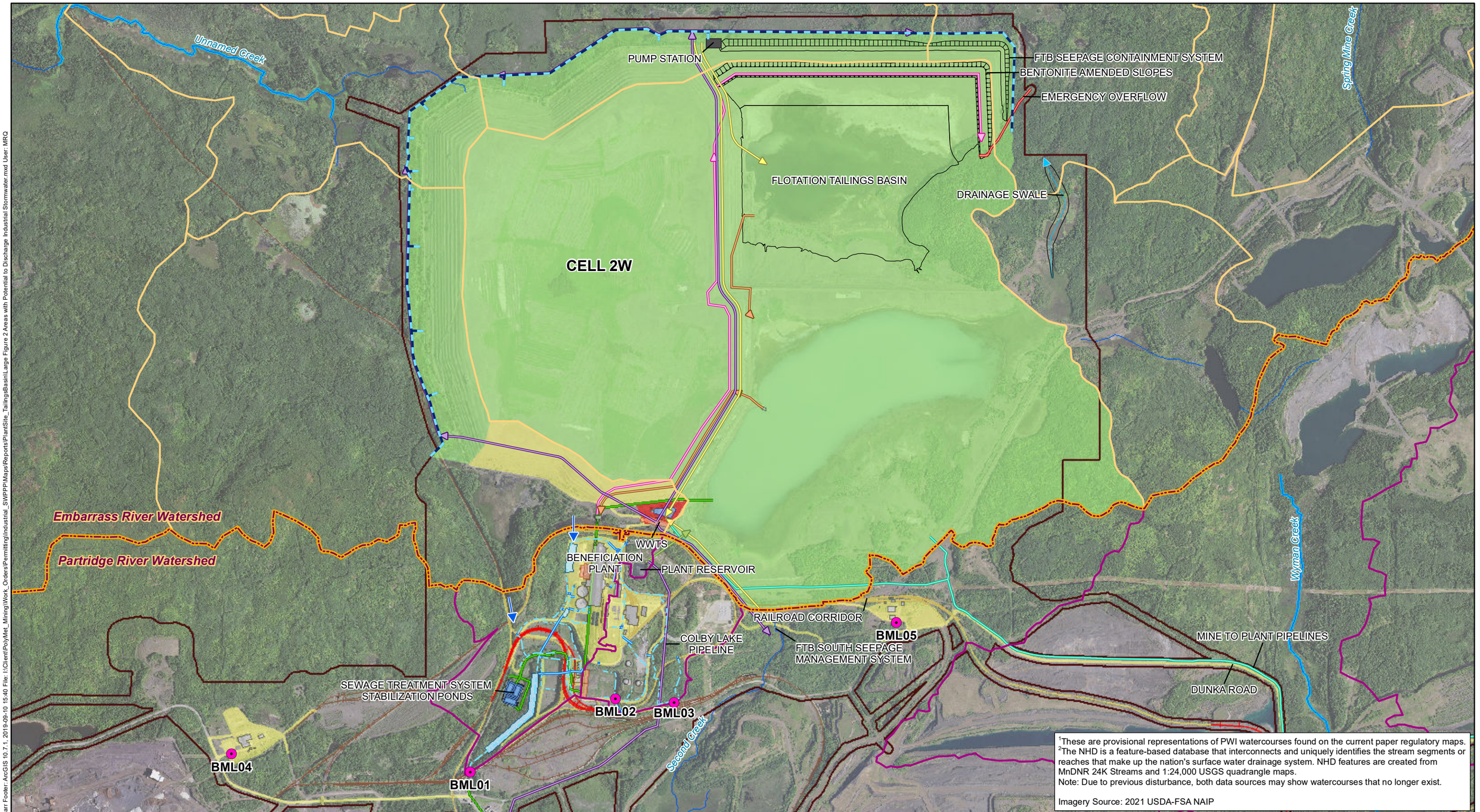
- Haul Roads
- Railroad
- Groundwater Containment System
- Mine to Plant Pipelines
- Mine Water Pipes
- Mine Water Ponds and Sumps

- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

0 750 1,500 3,000
Feet

MINE SITE INTERNAL WASTE STREAM MONITORING STATIONS
NorthMet Project
Poly Met Mining, Inc.

Figure 17
Comprehensive Water and Wetland Monitoring Plan



[1]These are provisional representations of PWI watercourses found on the current paper regulatory maps.
[2]The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from MnDNR 24K Streams and 1:24,000 USGS quadrangle maps.
Note: Due to previous disturbance, both data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

- Areas with Potential to Discharge Industrial Stormwater (New Additions for NorthMet Project)
- Areas with Potential to Discharge Industrial Stormwater (pre-NorthMet Project)
- Areas with No Potential to Discharge Industrial Stormwater
- Mining Area
- Existing Buildings
- Proposed Buildings
- FTB Water Return Pipe
- FTB Tailings Discharge Pipe
- Tailings Basin Seepage Water Pipe
- Treated Water Pipe
- Plant Reservoir Overflow
- Benchmark Stormwater Monitoring Station
- Proposed Outflows
- Stormwater Ditch
- Stormwater Culvert
- Sewer Pipe (Final pipe alignment TBD)
- Watershed Divide
- Embarrass River Subwatersheds
- Partridge River Subwatersheds
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

N

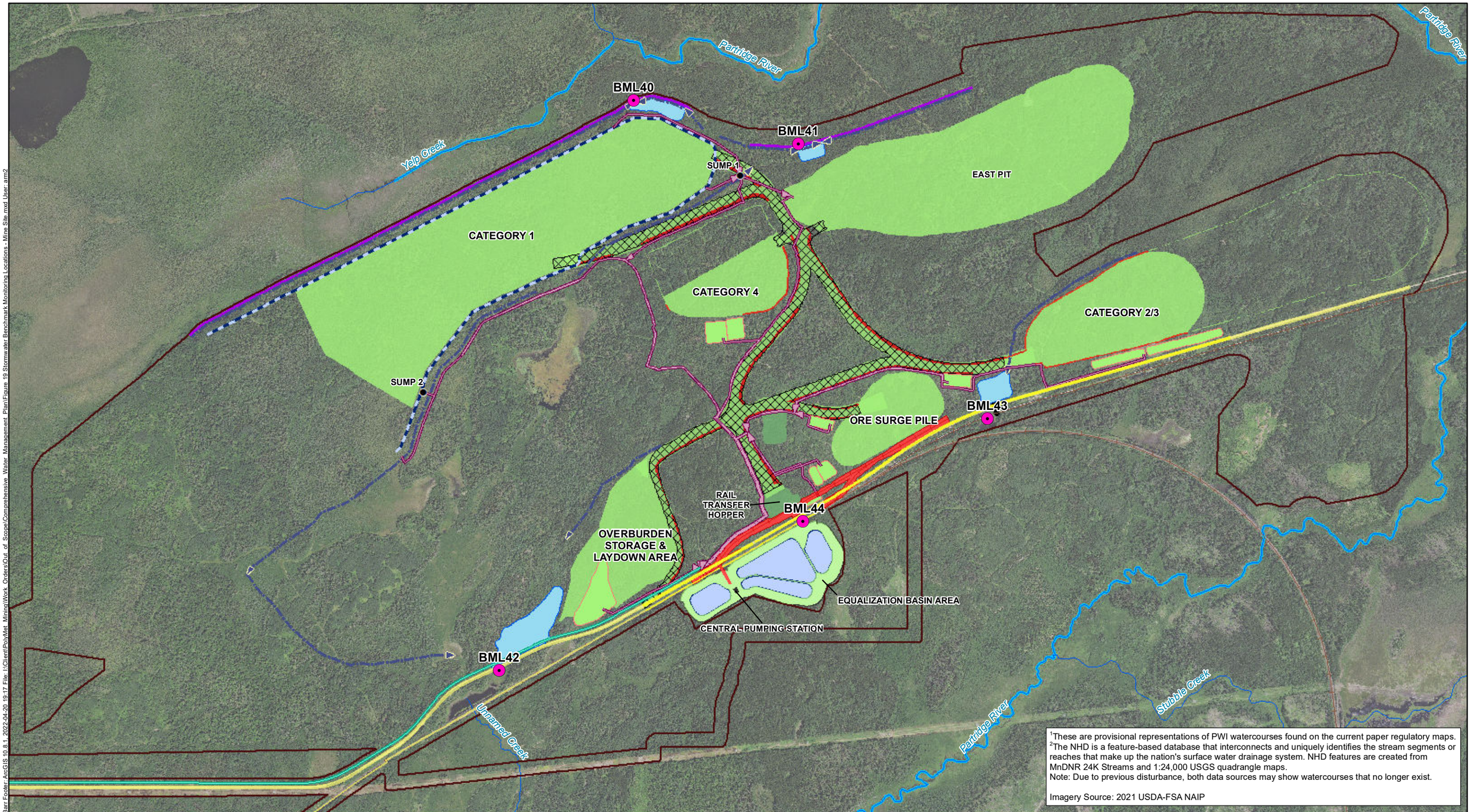
0 1,000 2,000

Feet

STORMWATER BENCHMARK MONITORING LOCATIONS
PLANT SITE
NorthMet Project
Poly Met Mining, Inc.

Figure 18
Comprehensive Water and Wetland Monitoring Plan

Barr Footer: ArcGIS 10.7.1, 2019-09-10 15:40 File: I:\Client\PolyMet_Mining\Work_Orders\Permitting\Industrial_SWPPP\Maps\Reports\PlantSite_TailingsBasin\Large Figure 2 Areas with Potential to Discharge Industrial Stormwater.mxd User: MRQ



[1]These are provisional representations of PWI watercourses found on the current paper regulatory maps.
[2]The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from MnDNR 24K Streams and 1:24,000 USGS quadrangle maps.
Note: Due to previous disturbance, both data sources may show watercourses that no longer exist.

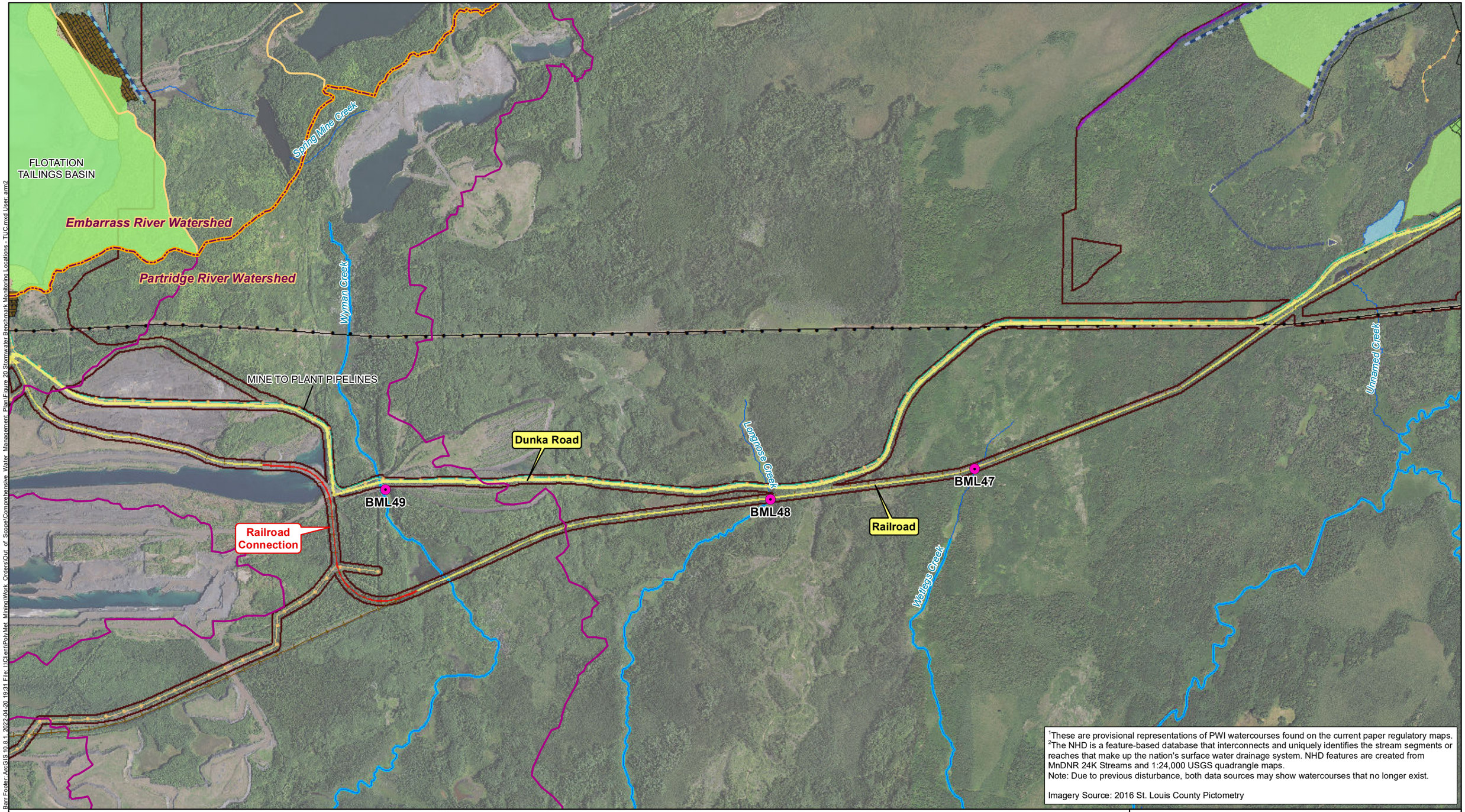
Imagery Source: 2021 USDA-FSA NAIP

- Areas with Potential to Discharge Industrial Stormwater (New Additions for NorthMet Project)
- Areas with Potential to Discharge Industrial Stormwater (pre-NorthMet Project)
- Areas with No Potential to Discharge Industrial Stormwater
- Mining Area
- Dunka Road
- Railroad
- Benchmark Stormwater Monitoring Station
- Perimeter Dike
- Stormwater Ditches
- Stormwater Culverts
- Stormwater Ponds
- Groundwater Containment System
- Mine to Plant Pipelines
- Mine Water Pipes
- Mine Water Ponds and Sumps
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

0 625 1,250 2,500
Feet

STORMWATER BENCHMARK MONITORING LOCATIONS- MINE SITE
NorthMet Project
Poly Met Mining, Inc.

Figure 19
Comprehensive Water and Wetland Monitoring Plan



STORMWATER BENCHMARK MONITORING LOCATIONS- TRANSPORTATION AND UTILITY CORRIDORS
NorthMet Project
Poly Met Mining, Inc.

Figure 20
Comprehensive Water and Wetland Monitoring Plan

Heikkilla Lake
Unnamed (Mud Lake) Creek
Embarrass River
Unnamed Creek
GW109
GW009
GW110
GW010
PZ010
GW116
GW016
POLYMET OWNED BRIDGE
GW118[3]
GW213
GW212
GW211
GW215
GW214
GW001
GW217
GW216
GW117[3]
GW219
GW218
GW220
GW221
GW209
GW119[3]
GW210
GW006
GW208
GW207
GW206
GW120[3]
GW205
GW204
GW007
GW203
GW202
GW201
GW200
GW115
GW015
CELL 2W
PLANT SITE
FLOTATION TAILINGS BASIN
(FTB) CELL 1E/2E
DRAINAGE SWALE
GW222
GW223
GW236
GW237
GW005
GW003
GW004
GW496
GW008
HYDROMETALLURGICAL
RESIDUE FACILITY
WWTS
PROCESS PLANT AREA
MW6
MW-6s
GW002
MW-8
MW-8s
MW-9
MW-7
MW-10
TRANSPORTATION AND
UTILITY CORRIDORS
Second Creek
Wyman Creek

[1] These are provisional representations of Public Waters Inventory watercourses downloaded from the Minnesota Geospatial Commons website (https://gisdata.mn.gov/) on November 3, 2017. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.
[2] The National Hydrography Dataset (NHD) is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.
[3] These wells will be sited in the field based on depth to bedrock obtained during future geotechnical investigation or construction of the containment system.

Imagery Source: 2021 USDA-FSA NAIP

Mining Area

Proposed Surficial Aquifer Monitoring Stations
- Background Well
- Compliance Well
- Indicator Well
- Performance Well
- Performance Piezometer
- Water Appropriation Only

Proposed Bedrock Monitoring Stations
- Background
- Monitor Only
- Performance

GW002 Monitoring Station ID

- FTB Seepage Containment System
- Existing Beneficiation Plant Building
- Existing Other Plant Building
- Proposed Beneficiation Plant Building
- Proposed Hydrometallurgical Plant Building

- Public Waters Inventory Basins
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

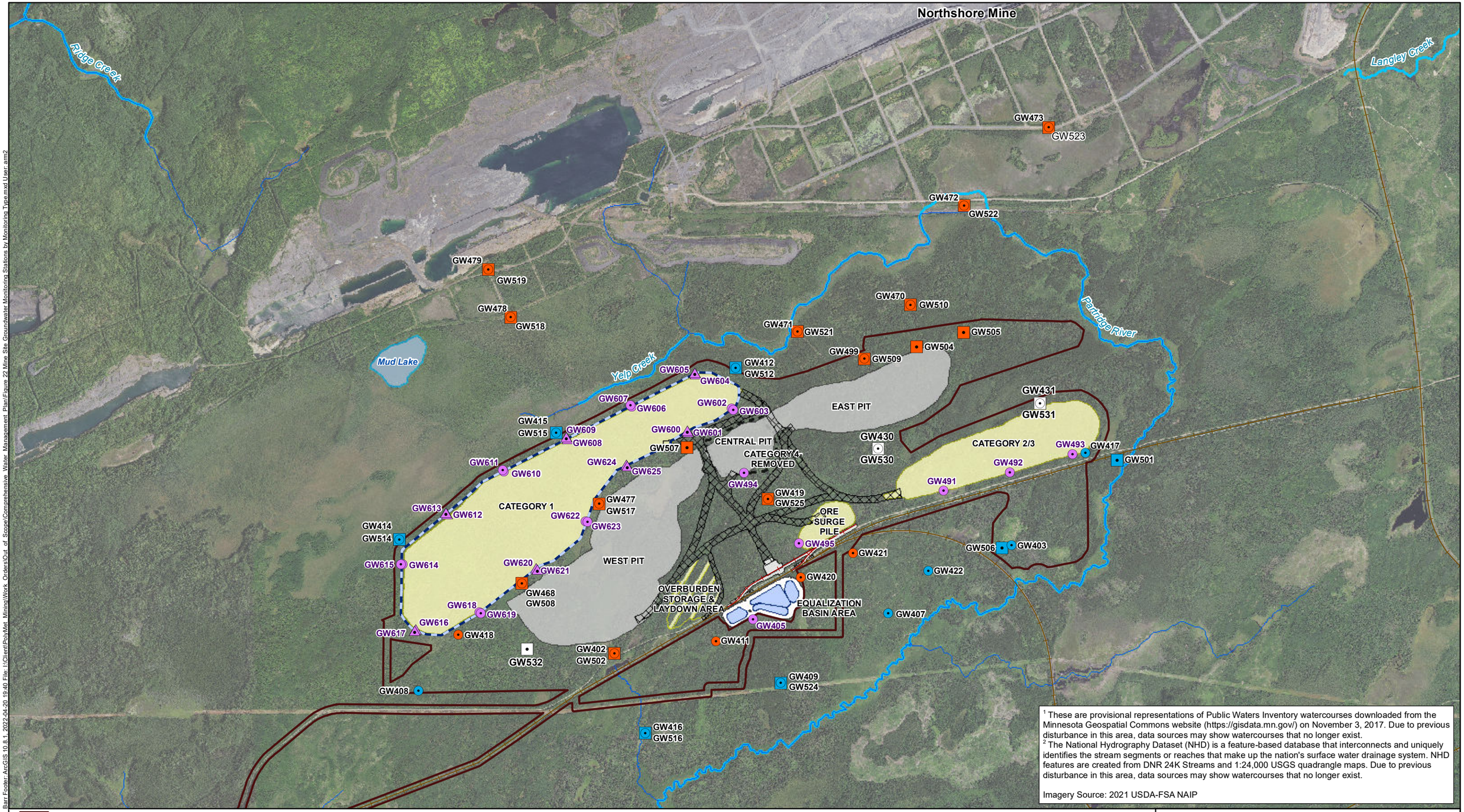
N

0 1,250 2,500 5,000
Feet

PLANT SITE GROUNDWATER MONITORING STATIONS BY MONITORING TYPE
NorthMet Project
Poly Met Mining, Inc.

Figure 21
Comprehensive Water and Wetland Monitoring Plan

Barr Footer: ArcGIS 10.8.1, 2022-04-20 19:38 File: I:\Client\PolyMet_Mining\Work_Orders\Out_of_Scope\Comprehensive_Water_Management_Plan\Figure 21 Plant Site Groundwater Monitoring Stations by Monitoring Type.mxd User: arm2



[1] These are provisional representations of Public Waters Inventory watercourses downloaded from the Minnesota Geospatial Commons website (https://gisdata.mn.gov/) on November 3, 2017. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.
[2] The National Hydrography Dataset (NHD) is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance in this area, data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

Mining Area

Proposed Surficial Aquifer Monitoring Stations
- Water Appropriation Only
- Compliance Well
- Indicator Well
- Performance Well
- Performance Piezometer

Proposed Bedrock Monitoring Stations
- Compliance
- Indicator
- Water Appropriation Only

GW405 Monitoring Station ID

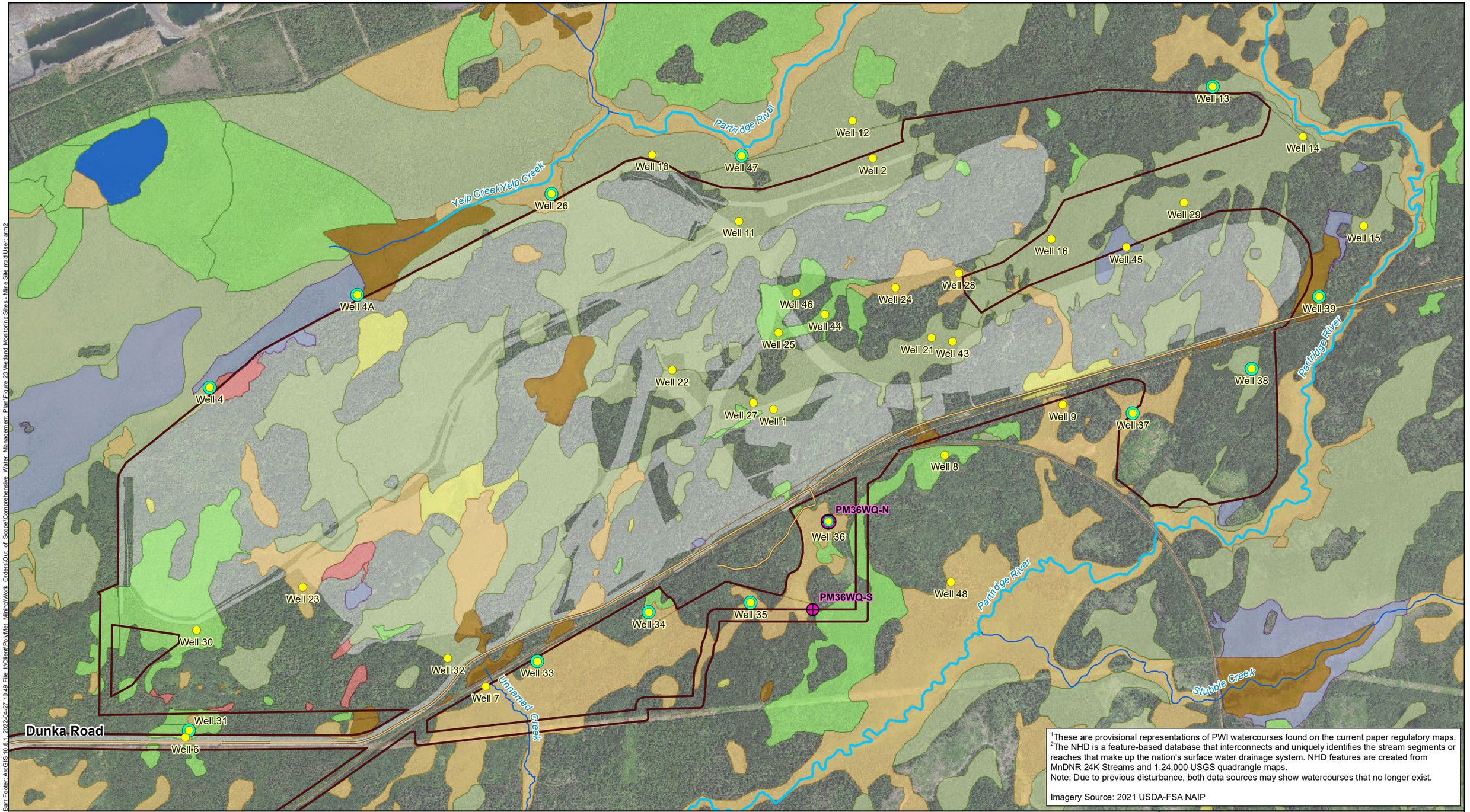
Mine Layout - Year 11
- Mine Pit
- Active Stockpile
- Storage & Laydown Area
- Removed Stockpile
- Haul Roads
- Groundwater Containment System

- Dunka Road
- Existing Railroad
- Proposed Railroad
- Public Waters Inventory Basins
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

0 1,250 2,500
Feet

MINE SITE GROUNDWATER MONITORING STATIONS BY MONITORING TYPE
NorthMet Project
Poly Met Mining, Inc.

Figure 22
Comprehensive Water and Wetland Monitoring Plan



[1]These are provisional representations of PWI watercourses found on the current paper regulatory maps.
[2]The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from MnDNR 24K Streams and 1:24,000 USGS quadrangle maps.
Note: Due to previous disturbance, both data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

- Wetland Hydrology and Vegetation Monitoring Locations
- Wetland Water Quality Monitoring Locations
- Wetland of Interest Monitoring Locations
- Dunka Road
- Railroads
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]
- Mining Area
- Areas Disturbed by Proposed Project Features

Eggers & Reed Wetland Types

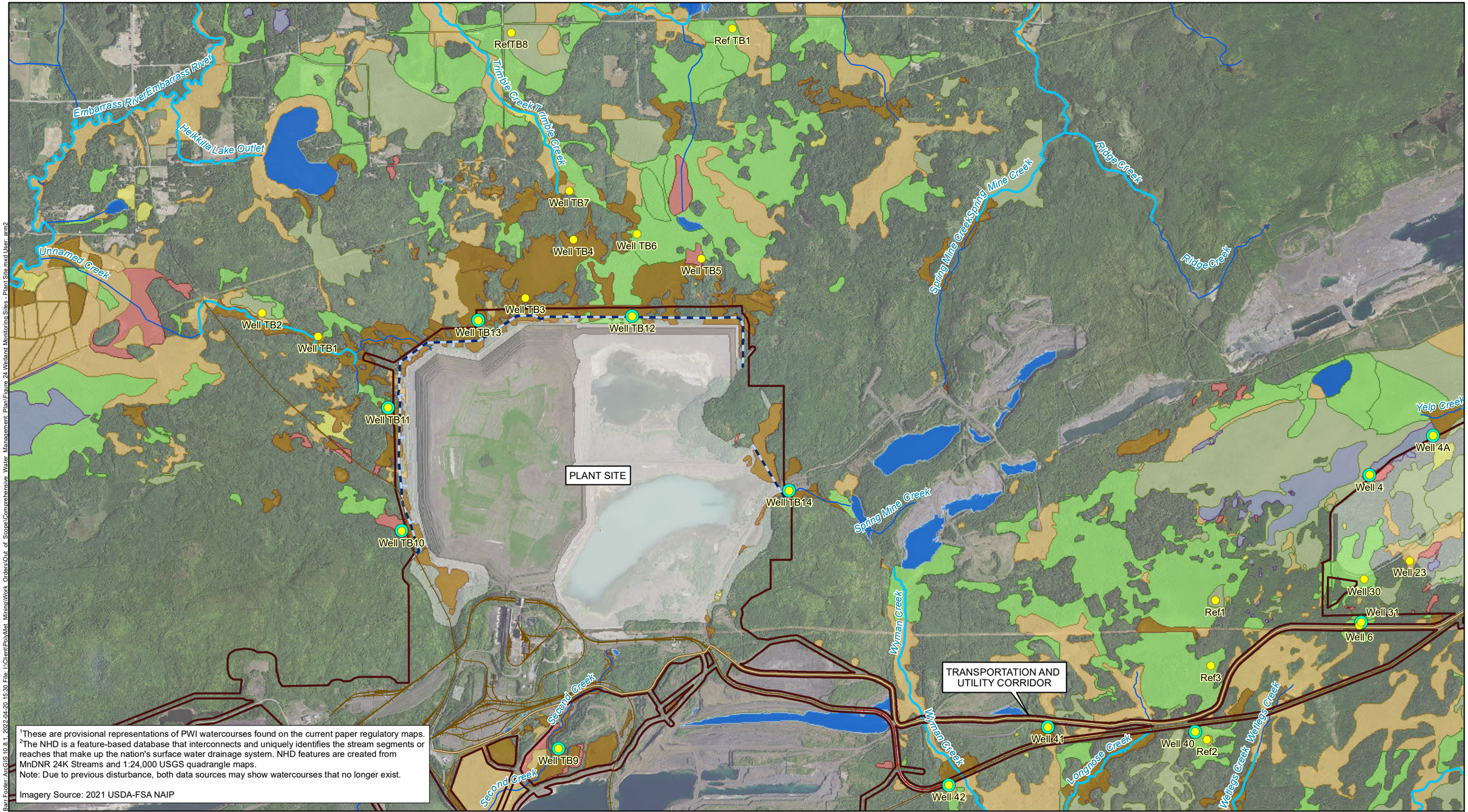
- Shrub Swamps (Alder thickets & Shrub-carrs)
- Coniferous bog
- Coniferous swamp
- Deep marsh; Shallow marsh
- Hardwood swamp
- Open water (Shallow, open water & lakes)
- Open bog
- Sedge meadow; Wet meadow

N

0 750 1,500 3,000
Feet

WETLAND MONITORING SITES - MINE SITE
NorthMet Project
Poly Met Mining, Inc.

Figure 23
Comprehensive Water and Wetland Monitoring Plan



[1]These are provisional representations of PWI watercourses found on the current paper regulatory maps.
[2]The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from MnDNR 24K Streams and 1:24,000 USGS quadrangle maps.
Note: Due to previous disturbance, both data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

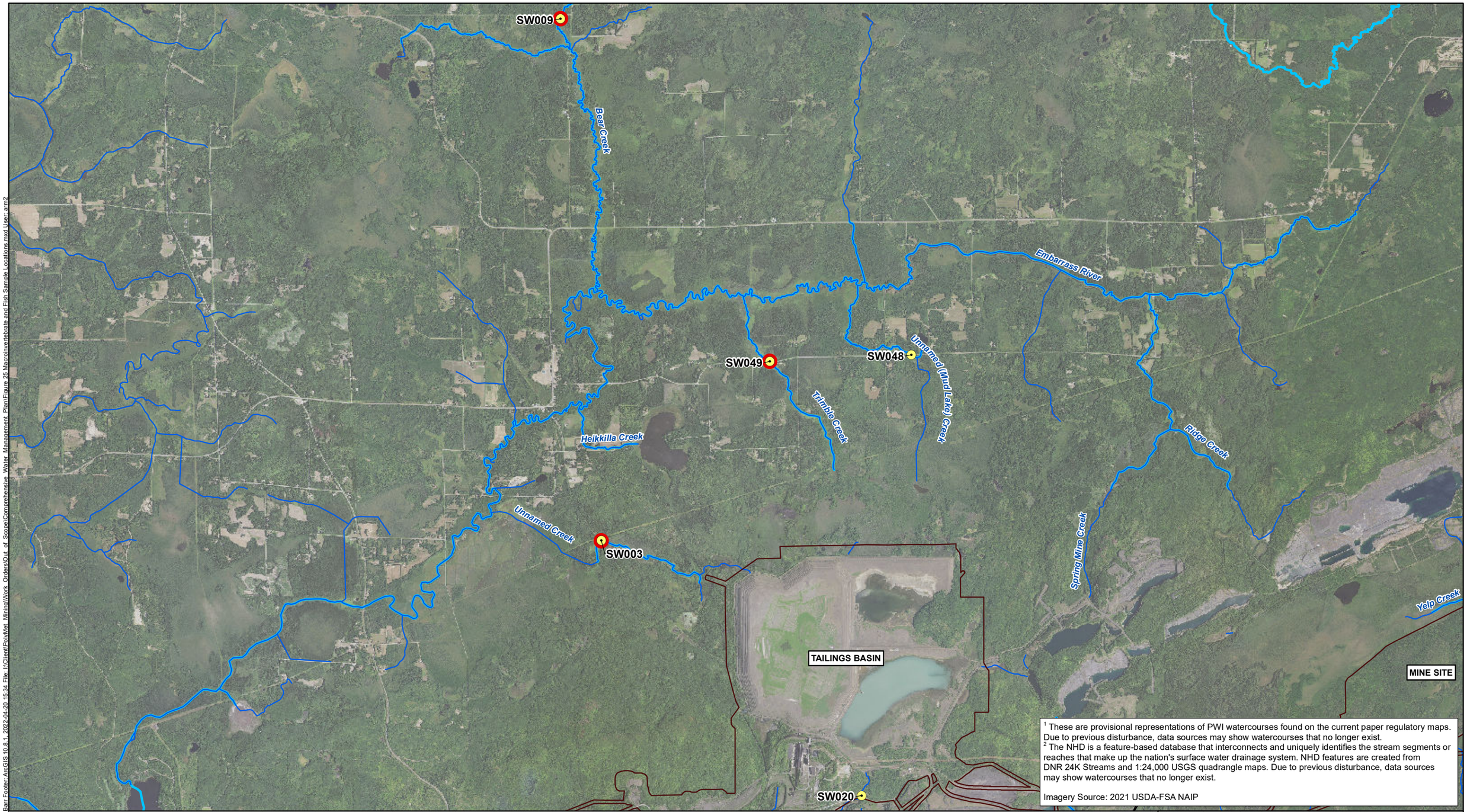
- Wetland Hydrology and Vegetation Monitoring Locations
- Wetland Water Quality Monitoring Locations
- Dunka Road
- Existing Private Railroad
- Proposed Railroad Track
- FTB Containment System
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]
- Mining Area
- Areas Disturbed by Proposed Project Features

Eggers & Reed Wetland Types
- Shrub Swamps (Alder thickets & Shrub-carrs)
- Coniferous bog
- Coniferous swamp
- Deep marsh; Shallow marsh
- Hardwood swamp
- Open water (Shallow, open water & lakes)
- Open bog
- Sedge meadow; Wet meadow

0 1,750 3,500
Feet

WETLAND MONITORING SITES - PLANT SITE AND TRANSPORTATION AND UTILITY CORRIDORS
NorthMet Project
Poly Met Mining, Inc.

Figure 24
Comprehensive Water and Wetland Monitoring Plan



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Imagery Source: 2021 USDA-FSA NAIP

- Sampling Location - Macroinvertebrate Monitoring
- Sampling Location - Fish Community Monitoring
- Mining Area
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

0 0.5 1 2
Miles

MACROINVERTEBRATE AND FISH SAMPLE SITE LOCATIONS
NorthMet Project
Poly Met Mining, Inc.

Figure 25
Comprehensive Water and Wetland Monitoring Plan

Barr Foster-ArcGIS 10.8.1, 2022-04-26 14:26 File: I:\Client\PolyMet Mining\Work Orders\Out of Scope\Comprehensive Water Management Plan\Figure 26 Permit-Required Mercury Monitoring Locations.mxd User: arm2

Embarrass River
Unnamed (Mud Lake) Creek
Trimble Creek
Heikkilla Creek
Unnamed Creek
Ridge Creek
Spring Mine Creek
Yelp Creek
Second Creek
Longnose Creek
Wetlegs Creek
Stephens Creek

SW008
SW006
SW007
SW003
SW005
SW020
SW402
SW410
SW411
SW412
SW413
SW414
SW415

Northshore Mine

TAILINGS BASIN
MINE SITE
TRANSPORTATION AND UTILITY CORRIDOR
RAILROAD CONNECTION TRACK

Well TB13
Well TB12
Well TB11
Well TB14
Well TB10
Well TB9
Well 13
Well 47
Well 26
Well 4A
Well 4
Well 39
Well 38
Well 37
Well 36
Well 35
Well 34
Well 33
Well 31
Well 41
Well 40
Well 42

SD002
SD001
SD001

WS001
WS411
WS401
WS423
WS422
WS404
WS424
WS412
WS403
WS421
WS402
WS425
WS414
WS416
WS415
WS413
WS013
WS005
WS004
WS015
WS002
WS003
WS072
WS073
WS074

BML47/SW407
BML48/SW408
BML49/SW409

Embarrass River Watershed
Partridge River Watershed

[1] These are provisional representations of PWI watercourses found on the current paper regulatory maps. Due to previous disturbance, data sources may show watercourses that no longer exist.
[2] The NHD is a feature-based database that interconnects and uniquely identifies the stream segments or reaches that make up the nation's surface water drainage system. NHD features are created from DNR 24K Streams and 1:24,000 USGS quadrangle maps. Due to previous disturbance, data sources may show watercourses that no longer exist.

Imagery Source: 2021 USDA-FSA NAIP

- Stream Water Quality
- Treated Water Discharge
- Wetland Monitoring Wells
- Industrial Water Collection
- Legacy NPDES, Internal Waste Stream and Surface Discharge
- Watershed Divide
- Mine Pit Footprints
- Stockpile Footprints
- Public Waters Inventory (PWI) Watercourses[1]
- National Hydrography Dataset (NHD) Rivers & Streams[2]

N

0 0.5 1 2
Miles

PERMIT-REQUIRED MERCURY MONITORING LOCATIONS
NorthMet Project
Poly Met Mining, Inc.

Figure 26
Comprehensive Water and Wetland Monitoring Plan