



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, ST. PAUL DISTRICT
180 FIFTH STREET EAST, SUITE 700
ST. PAUL, MN 55101-1678

RECORD OF DECISION

ACTION ID: 1999-05528

APPLICANT: PolyMet Mining Inc.

PROJECT NAME: NorthMet

1.0 INTRODUCTION AND DECISION SUMMARY

In accordance with 40 CFR § 1505.2, this document constitutes the Record of Decision (ROD) of the Department of the Army, St. Paul District Corps of Engineers (Corps) for the NorthMet Mine Project (Project) proposed by PolyMet Mining, Inc. (PolyMet, Applicant or Permittee). This document is prepared in accordance with the Council on Environmental Quality's (CEQ) regulations implementing the National Environmental Policy Act (NEPA) (40 CFR Parts 1500-1508), the Clean Water Act (CWA) Section 404(b)(1) Guidelines (40 CFR Part 230), and the Public Interest Review (33 CFR 320.4) under the authority delegated to the District Engineer by 33 CFR 325.8 and pursuant to Section 404 of the CWA.

This ROD describes the Corps' decision to authorize discharges of dredged and fill material into waters of the United States (WOTUS) in association with the Project as detailed in the December 2015 Final Environmental Impact Statement (FEIS) with incorporation of changes to the Project proposed by the Applicant in 2017. The authorization is subject to special conditions and the specified mitigation described in this ROD. As further described in Section 7 and 8 of this document, the Corps has determined that additional changes to the Project proposed by the Applicant after FEIS publication are not substantial and did not constitute significant new circumstances or information related to environmental concerns (40 CFR 1502.9(c)(1)). For these reasons, a Supplemental Environmental Impact Statement (SEIS) to address these revisions was not warranted.

The findings in the FEIS are based on an open, collaborative and robust process among the Corps, the United States Forest Service (Forest Service), the Minnesota Department of Natural Resources (MDNR), and other cooperating entities including federally recognized Tribes and the participating public. The FEIS and information provided by the Applicant after FEIS publication provide a sufficiently detailed analysis of the environmental impacts of the Project and a reasonable range of alternatives, including the No Action Alternative, to inform the federal review and authorization for this Project.

The FEIS for the NorthMet mining project is available at:
<https://www.dnr.state.mn.us/input/environmentalreview/applicant/feis-toc.html>

2.0 BACKGROUND

The Applicant submitted a permit application to the Corps on July 16, 2004, requesting authorization to discharge dredged and fill material into WOTUS under Section 404 of the CWA in association with the development of a copper-nickel-platinum group element (PGE) mine and associated facilities in St. Louis County, Minnesota. The Applicant submitted additional information subsequent to the Corps receipt of the application. The Corps determined the application complete in April 2005. An initial public notice (PN) was issued on May 10, 2005, describing the project and soliciting comments during a 30 day comment period. The Applicant also submitted applications to state agencies including the MDNR and Minnesota Pollution Control Agency (MPCA) for authorizations under Minnesota regulatory authorities.

The Applicant controls the mineral rights to the NorthMet ore body within the Mine Site boundaries but initially owned only a small portion of the surface rights at the Mine Site (FEIS figure 3.2-1). The majority of the surface rights were owned by the United States and initially within the Superior National Forest. The Applicant and the Forest Service began exploring the feasibility of a land exchange to consolidate surface and mineral rights and remove all national forest lands from the proposed project site.

Due to the context and intensity of the proposed impacts to WOTUS, the Corps determined an EIS would be prepared under NEPA. The MDNR also determined a state EIS was required under the Minnesota Environmental Policy Act (MEPA). In May 2005, the Corps and MDNR entered into a Memorandum of Understanding (MOU) with the Applicant for preparation of a joint state-federal EIS. The Forest Service was included as a cooperating agency. On July 1, 2005, a Notice of Intent (NOI) to prepare an EIS was published in the Federal Register (FR Volume 70, No. 126, page 38122). Details on public involvement in the NEPA process are provided in Section 7.0 of this document.

3.0 AUTHORITIES

The Applicant proposes to discharge fill material into WOTUS, including wetlands, which requires authorization from the Corps. This permit action is being undertaken through authority delegated to the District Engineer by 33 CFR 325.8, pursuant to Section 404 of the CWA (33 USC 1344).

Pursuant to CEQ regulations for implementing NEPA (40 CFR Parts 1500-1508), the Corps has responsibility as a co-lead federal agency for the EIS. The Corps has reviewed and evaluated the information in the FEIS, including all supplemental data subsequently provided, in accordance with 40 CFR 1506.3 and 40 CFR Part 230, and has found them to be sufficient and accurate assessments, and therefore appropriate for the purposes of the public interest review and alternatives analysis required by 33 CFR 320.4 and 40 CFR 230.10.

As discussed in NEPA regulations at 40 CFR 1506.2, where state laws or local ordinances have EIS requirements in addition to but not in conflict with those in NEPA, federal

agencies may cooperate with state agencies in fulfilling these requirements as well as those of federal laws so that one document will comply with all applicable laws. The Corps, in coordination with the co-lead agencies, prepared an EIS that includes an adequate level of detail and a reasonable range of alternatives sufficient to inform decisions by all agencies with review or authorization decision authorities.

The scope of the NEPA/MEPA analysis was crafted to provide information and disclose potential impacts in support of both state and federal regulatory authorities. State permitting requirements included a permit to mine, a water appropriation permit, a dam safety permit, a permit for work in public waters, a wetland replacement plan, a section 401 Water Quality Certification, National Pollutant Discharge Elimination System and State Disposal System (NPDES/SDS) Permits, and an air emissions permit, among others. While MDNR was the lead state agency for development of the EIS, all state agencies with jurisdiction by law or special expertise were directly involved in the development of the EIS. Federal, state, and local permitting authorities are listed on pages 1-17 and 1-18 in Table 1.4-1 of the FEIS.

4.0 PROPOSED PROJECT

4.1 EXISTING SITE CONDITIONS AND APPLICABLE PROJECT HISTORY

Reference: FEIS Section 4.2

The Project site is located on the eastern flank of the Mesabi Iron Range near the town of Hoyt Lakes in St. Louis County, Minnesota. It is about 50 miles southeast of Voyageurs National Park and 20 miles south of the Boundary Waters Canoe Area Wilderness (BWCAW). The Mesabi Iron Range region has been mined for iron ore and lower-grade iron ore called taconite for over 100 years. The Project includes three major components: a Mine Site, a Transportation and Utility Corridor, and a Plant Site (Figure 1, Appendix A¹).

The 3,016 acre Mine Site contains approximately 1311.1² acres of wetlands, the majority of which are characterized as high quality. Vegetation communities present in the Project area include forests composed of aspen, paper birch, jack pine, balsam fir, white spruce, red pine, and white pine in the uplands. Wetland communities include conifer bogs, shrub swamps, cedar swamps, shallow marsh, sedge wet meadow, open bog, and hardwood swamp. There is no known existing contamination by hazardous materials at the Mine Site.

While some exploration drill sites and soil borings have occurred, the Mine Site is relatively undisturbed and was within the Superior National Forest and managed by that Forest Plan prior to the PolyMet-Forest Service land exchange. The Forest Service

¹ Referenced figures appended to this ROD are located in Appendix A.

² The wetland acreages provided in this document have been updated since the FEIS. See Section 4.3 of this document for more information.

conveyed land within the Mine Site to the Applicant (as displayed in FEIS Figure 3.2-1) in exchange for land of equal value, which has become a part of the Superior National Forest.³

The former LTV Steel Mining Company (LTVSMC) processing plant and existing tailings basin is located about 8 miles from the Mine Site. This component of the project is referred to as the Plant Site throughout this document. The Plant Site is approximately 4,515 acres, most of which is a brownfield area characterized by existing facilities and infrastructure. The existing tailings basin, which is unlined and was constructed beginning in the 1950s, has been inactive since 2001 and currently releases seepage with elevated concentrations of sulfate, total dissolved solids (TDS), and hardness, among other constituents. Reclamation activities at the tailings basin consistent with a MDNR-approved Closure Plan are currently being managed by Cliffs Erie. The tailings basin consists of three cells. Cell 2W is 1,450 acres with an average fill height of 200 feet, and is closed and re-vegetated. Cell 1E is 980 acres and Cell 2E is 620 acres, both with an average fill height of 60 feet. A total of 257.53 acres of wetland are located on-site and are characterized primarily as low quality.

The transportation and utility corridor connects the Mine Site and Plant Site and contains about 120.1 acres of land. This corridor contains a privately owned road (Dunka Road) and a privately owned railroad. The railroad is in operating condition but has not been extensively used since operations at LTVSMC ceased in 2001. The railroad work area contains 0.44 acre of high quality wetland. The Dunka Road corridor includes 6.76 acres of high quality wetlands.

WOTUS that would be impacted at the Mine Site and transportation and utility corridor are located within the Upper Partridge River watershed. WOTUS that would be impacted at the Plant Site are located in the Embarrass River watershed. Both of these rivers drain to the St. Louis River.

The Mine Site, Transportation and Utility Corridor, and Plant Site, are within the territory ceded in the 1854 Treaty between the United States federal government and the Chippewa of Lake Superior. The signatory tribes to the 1854 Treaty exercise hunting, fishing, and gathering rights on public lands within this territory and on private lands with the permission of the land owner.

More details about existing conditions at the site including existing land use and wetlands are found in Sections 4.2.1, 4.2.2 and 4.2.3 of the FEIS and in Section 10 of this ROD.

³ In January 2017, the USFS finalized its decision to exchange land with PolyMet. Under this decision 6,650 acres (GLO) of federal land were conveyed to PolyMet, uniting surface and mineral rights within the mine site. The United States acquired 6,690 acres (GLO) of non-federal lands. These lands will be managed as part of the Superior National Forest and surface resources may be managed for multiple resource values.

4.2 PROJECT DESCRIPTION

Overview: The Applicant proposes the development of a copper-nickel-PGE mine on the lands described above. The Project includes three major components: a Mine Site, a Transportation and Utility Corridor, and a Plant Site (Figure 1, Appendix A). The project summarized in this section reflects the proposed Project and its impacts on WOTUS as described in the FEIS (Sections 3.1.1 and 3.2). Note that Section 4.3 of this document addresses the most current Project description, including post-FEIS modifications that resulted in changes to WOTUS in association with proposed changes to the tailings basin buttress and co-location of the Waste Water Treatment Facility (WWTF) with the Waste Water Treatment Plant (WWTP) at the Plant Site in lieu of two separate facilities at the mine and plant sites.

Construction activities associated with the Project would occur over 18 months and include land clearing, building renovation and construction, stockpile construction and utility upgrades. Operations would occur for approximately 20 years and would include ore mining and processing, continued construction and progressive reclamation. During the life of the mine an estimated 225 million tons of ore and 308 million tons of waste rock would be mined from the site, with an annual average of 32,000 standard tons per day.

Progressive reclamation at the Mine Site would include backfilling the combined central-East Pit once their ore is exhausted, likely around year 11 of mining. After year 11 (that is, at the completion of mining at the East Pit), the waste rock in the temporary stockpiles would be moved into the East Pit. Waste rock generated from ongoing mining in the West Pit and Central Pit after year 11 would be directly disposed of in the East Pit. The Central Pit would be mined between years 11-16 and would ultimately combine with the East Pit. Some Category 1 waste rock would continue to be placed on the Category 1 Stockpile until year 13. At the end of mining, all temporary Category 2/3 and Category 4 Stockpiles would have been removed, and the combined East-Central Pit would be mostly backfilled with this waste rock. Infrastructure (pipes, pumps, liners, etc.) associated with the temporary Category 2/3 Stockpile and Category 4 Stockpile and the Ore Surge Pile would be removed and the footprint of each area would be reclaimed to wetlands where practical (this is not considered compensatory mitigation to offset unavoidable impacts to WOTUS because of the temporal delay between impacts and reclamation and because of uncertainty regarding likelihood of success). While being backfilled with waste rock, the pits would be flooded with water to minimize the amount of pit wall and backfilled waste rock exposed to the atmosphere, thus limiting the oxidation of the sulfide minerals and reducing the amount of metals leaching into the pit water. The water quality objective of closure would be to provide mechanical or non-mechanical treatment for as long as necessary to meet regulatory standards at applicable groundwater and surface water compliance points.

Overall, the Project as described in the FEIS would result in the loss of 933.10 acres of wetlands.⁴ Direct wetland impacts associated with separate components of the Project follow: 757.4 acres at the Mine Site, 141.56 acres at the Plant Site and 7.2 acres at the Utility and Transportation Corridor. Indirect wetland impacts associated with fragmentation total 26.46 acres at the Mine Site and 0.47 acre at the Plant Site.

Proposed Mine Site Facilities: Mining activities would occur within about 1,725 acres of the site and would include overburden removal, open pit mining, drilling and blasting, excavation and haulage, ore storage and loading for transport to the process plant, waste rock stockpiling, and Mine Site water management. Three mine pits would be developed and primary project components would include: haul roads, a temporary ore storage pile, a rail-loading facility, water containment and management systems, one permanent and two temporary waste rock stockpiles and an overburden stockpile. Overburden would be separated based on its acid producing potential and hauled to the appropriate construction or disposal areas (reference FEIS pages 5-120 and 5-121). Waste rock would be sorted into four categories based on acid producing potential to contaminate water—Category 1 waste rock would have the lowest potential and Category 4 waste rock would have the highest potential. Ore would be hauled to a rail-loading facility for transport to the Plant Site.

Water would be managed on-site in accordance with the MDNR Permit to Mine and Water Appropriations permits and MPCA NPDES/SDS permit. These plans include water management system designs, operating and maintenance plans, water quality monitoring plans, reporting requirements, and adaptive management. Water management at the site would include stockpile liners, the stockpile cover, groundwater containment system, pit dewatering, and stormwater settling ponds, dikes and ditches.

As described in the FEIS, but later modified as described in Section 4.3 of this ROD, a WWTF would be constructed to collect and treat all contact water from the mine pits, waste rock stockpiles, ore surge pile and haul roads. For the first approximately 10 years, all treated effluent would be pumped to the flotation tailings basin pond at the Plant Site for reuse in the beneficiation process, eliminating the need to discharge process water to surface waters during operations. Starting in Year 11, some effluent from the facility would be sent to the East Pit to augment flooding as the pit is backfilled and the remainder would go to the flotation tailings basin.

Non-contact stormwater would be routed through sedimentation ponds prior to discharge via overland flow to wetlands adjacent to the Partridge River and Unnamed Creek, a tributary to the Partridge River (Figure 2, Appendix A). A system of dikes and ditches constructed at the Mine Site perimeter would minimize the amount of surface water flowing onto the site and into the mine pits, manage the amount of water that comes into contact with mining features, and control non-contact stormwater flowing off the site. The NPDES/SDS permit would include a Stormwater Pollution Prevention Plan that would

⁴ The Corps determined certain wetlands located on the west side of the Plant Site and in the area proposed to be impacted by construction of the hydrometallurgical residue facility are excluded from the permitting requirements of Section 404 of the CWA because they are part of a waste treatment system designed to meet the requirements of the CWA. These wetlands are identified as 'exempt' in FEIS figures.

identify and describe Best Management Practices for the Mine Site to minimize the discharge of potential pollutants in stormwater runoff.

About 757.4 acres of wetlands would be lost as a direct result of the discharge of dredged or fill material at the Mine Site in association with the construction of mine pits, waste rock stockpiles, overburden storage, ore surge pile, haul roads and stormwater and mine water management systems (Figure 3, Appendix A). Section 10 of this ROD addresses the sources and characterization of fill material that would be discharged into waters. Another 26.46 acres of wetlands would be indirectly lost due to fragmentation and resulting loss of hydrology. Direct and fragmentation wetland impacts are shown on Figure 3. A total of 522.65 acres of wetlands within the Mine Site would not be directly impacted and would be monitored for indirect effects.

Indirect effects caused by the discharge of dredged and fill material into wetlands, including changes to wetland hydrology, are difficult to model and accurately predict because of the complex mixes of bedrock, surficial deposits, and wetland soils at the Mine Site.⁵ A range of potential indirect impacts were identified in the FEIS (Section 5.2.3.2.2 and Figures 5.2.3-6 and 5.2.3-11) using the Analog Method⁶ developed by the co-lead agencies and is further discussed throughout this evaluation. It is important to note that the indirect effects analyses performed for the EIS were not performed to characterize impacts but were done to inform where monitoring should take place for those areas that were identified as having a potential for indirect wetland effects (FEIS page 5-259). This information informed where groundwater wells would be installed in order to facilitate monitoring. Monitoring results would provide data to assess whether wetlands have been indirectly impacted by the project and decisions would be made by the Corps and other agencies regarding appropriate actions, which could include additional monitoring, adaptive management or compensatory mitigation.

By year 11 all proposed wetland impacts associated with Mine Site infrastructure construction, including roads and ground water, mine water, and storm water management systems would be complete (Figure 2, Appendix A). Mining would occur over 20 years, with reclamation occurring concurrently to include backfilling the combined east and central pits with waste rock from temporary stockpiles as reserves are exhausted beginning in year 11 and eventually flooding the west pit and filling it with the most reactive rock.

Proposed Plant Site Facilities: The Plant Site would contain facilities to process the ore that is shipped by rail from the mine. Copper and nickel concentrate and base/precious metal precipitates would be produced and non-ore minerals, or tailings, would be collected as waste. Existing infrastructure at the Plant Site that would be refurbished and used includes beneficiation plant facilities, roads, railroads, maintenance facilities (shops), electrical transmission lines, sanitary and potable water treatment facilities,

⁵ Barr Memorandum Titled, *Modeling Indirect Wetland Impacts and Contaminant Transport*, dated March 2017

⁶ ERM and MDNR (Environmental Resources Management and Minnesota Department of Natural Resources). 2011. Analogue Information Relating to Mine Pit Cone of Depression Impacts on the Surficial Aquifer. J.L. Adams (ERM) and M. Liljegren (MDNR). May 23, 2011.

crusher buildings, and a concentrator building. New construction would include the Hydrometallurgical Plant, oxygen plant, flotation buildings, pipelines, concentrate dewatering, storage and load out buildings, tailings basin buttresses, the tailings basin perimeter capture system, and the hydrometallurgical storage facility.

As described in the FEIS (Figure 3.2-23) but later modified as described in Section 4.3 of this ROD, a WWTP would be constructed to treat any water collected by the tailings basin seepage capture system that cannot be reused as process water. Water captured from the Hydrometallurgical Residue Facility would also be treated by the WWTP. The WWTF would be constructed to ensure effluent meets the sulfate standard for waters used for the production of wild rice (10 milligrams per liter (mg/l)). Water would be treated to meet appropriate discharge limits and discharged to Second Creek, Unnamed Creek, Mud Lake Creek, and Trimble Creek. This discharge would provide flow to the surrounding wetlands and streams that would be reduced when seepage from the tailings basin is captured. Treated water that is discharged would be monitored as long as required in accordance with permits until if, and when, non-mechanical treatment is proven effective for meeting water quality requirements. The water quality objective of closure is to provide mechanical or non-mechanical treatment for as long as necessary to meet regulatory standards at applicable groundwater and surface water compliance points.

The tailings basin is to be comprised of three related components (Figure 4, Appendix A): the tailings disposal area, the tailings basin groundwater seepage containment system, and the tailings basin buttresses and associated infrastructure (i.e. emergency spillway). Cells 1E and 2E of the existing LTVSMC Tailings Basin would be used as the base for tailings disposal from the Project. Additional perimeter dams would be constructed with a cement deep soil mixing (CDSM) zone for stability. Tailings would be deposited on top of Cells 2E and 1E to a final height of 200 feet. A groundwater seepage containment system would be constructed around the base of the tailings basin to capture seepage and would pump the seepage to either the Tailings Basin pond for re-use, or to the WWTP for treatment prior to discharge as described beginning on page 5-185 of the FEIS. A diagram of this system is depicted in Figure 5, Appendix A.

Wetlands would be lost as a result of the discharge of dredged or fill material in association with construction of tailings basin infrastructure including 76.34 acres of wetlands associated with the groundwater seepage collection system and 62.78 acres of wetlands associated with the rock buttresses for stability along the north and east sides of Cell 2E and a drainage swale and overflow channel located northeast of Cell 2E (Figure 6, Appendix A). Fill material would be discharged into 0.62 acres of wetland in association with the new Hydrometallurgical Residue Facility located on the south-west edge of the Tailings Basin where the LTVSMC Emergency Basin is currently located (Figure 7, Appendix A). A total of 4.68 acres of wetlands would be lost in association with the discharge of tailings. A total of 0.11 acre of wetlands would be impacted by the discharge of fill material in association with pipeline construction. About 113.18 acres of wetlands at the Plant Site would not be directly impacted and would be monitored for indirect effects.

Proposed Transportation and Utility Corridor: The transportation and utility corridor connects the Mine Site and Plant Site. To accommodate access between the mine and plant site, about 8 miles of Dunka Road would be widened and upgraded, the railway would be refurbished and a new rail spur and rail connection track would be constructed. Utilities would be installed along Dunka Road to include a new 13.8 kV transmission line to connect the Mine Site to a Minnesota Power electrical substation and a pipeline system to transport water between the mine site and the plant site. Road culverts would also be extended (Figures 8, 9 and 10, Appendix A).

Discharges associated with this work along Dunka Road would result in direct impacts to about 6.76 acres of WOTUS, including wetlands. The construction of the rail spur to provide a rail connection between the Plant Site and the Mine Site utilizing the existing Erie Company Railroad would impact 0.44 acre of wetlands as shown in Figures 8 and 10.

Wetland Mitigation: As described in Section 5.2.3 of the FEIS but later modified as described in Section 4.3 of this ROD, the Applicant proposed permittee-responsible wetland restoration at three locations after exploring a variety of options for compensatory wetland mitigation. The Zim Site is located in the same major watershed as the Project while the Atkin and Hinkley sites are located in a different watershed. The Aitkin mitigation site, located north of Aitkin, Minnesota, included 808.3 acres of wetland restoration and 83.2 acres of upland buffer; the Hinckley Site, located south west of Hinckley, Minnesota, included 286.2 acres of wetland restoration and 91.2 acres of upland buffer; the Zim Site located in the same watershed as the Project included 508.2 acres of wetland restoration and preservation and 22.7 acres of upland buffer.

4.3 REVISED PROJECT DESCRIPTION

On September 28, 2017, Applicant revised their Section 404 permit application to include co-location of the Mine Site WWTF with the Plant Site WWTP. This proposal reduced wetland impacts by 7.9 acres. The revised application also proposed elimination of tailings basin CDSM and incorporated re-enforced buttresses to address tailings basin safety. This revision would increase wetland impacts by 2.97 acres. The Corps has fully considered the environmental effects of these changes as further described in Sections 7 and 8 of this document. As described in those sections, these revisions resulted in minor adverse or beneficial impacts on resources of concern, and therefore the Corps did not solicit public comment on these revisions.

The FEIS describes the use of CDSM to help stabilize tailings within the tailings basin. In response to comments received regarding tailings basin dam safety, MDNR contracted Emmons & Olivier Resources, Inc. (EOR) to assemble a team of experts and evaluate the tailings basin dam design. As part of the evaluation, EOR offered comments that the design and construction of the CDSM alternative is complicated, must be carefully monitored and must be constructed fully prior to placing the basin into service.⁷ The

⁷ EOR Memo-PolyMet Dam Safety Permit Application Review, dated May 15, 2017

Applicant proposed to eliminate CDSM and proposed a revised alternative that is simpler and can be constructed over an extended time period. In this revised alternative, the mass of the tailings basin buttresses would increase and the slope of the Cell 2E North tailings basin dam would be flattened. This alternative would be easier to inspect during construction, increasing assurance that design criteria are met. In comparison to the CDSM alternative in the FEIS, this alternative uses 2.17 million cubic yards more material, increases the buttress height by 30 to 35 feet and flattens the slopes from 3:1 to 3.5:1 to achieve desired slope safety factors. Under this revised alternative the footprint would extend about 107 feet north of the previous design and would increase wetland impacts at the Plant Site by about 2.97 acres.

The proposal described in the FEIS included WWTFs at both the Plant and Mine site. After release of the FEIS, the Applicant proposed co-locating the Mine Site WWTF with the Plant Site WWTP. The waste water treatment system (WWTS) building would be approximately 33% larger than the former WWTP (81,000 square feet instead of 61,000 square feet), and it would contain all the treatment processes formerly housed in the two separate buildings. The quantity, quality and location of treated water discharge to the environment would be unchanged from what was evaluated in the FEIS and NPDES/SDS permit application, Water Appropriation permit application, and the Permit to Mine application. To transport mine water to the Plant Site for treatment, a single water pipeline would be replaced by a three pipeline system in the transportation and utility corridor. These changes will not increase the proposed corridor width or the wetland impacts along this corridor. These pipelines would have flow meters at both ends of each pipe for leak detection. With the elimination of the WWTF at the Mine Site, the equalization basins would be relocated to the south of Dunka Road, avoiding 7.9 acres of wetland impact. No other changes to wetland impacts would occur in association with this modification. The new site configuration is shown in Figure 11 and the utility corridor is shown in Figures 8 and 9. Figure 2 shows the original location of the equalization ponds.

On September 28, 2017, the Applicant revised their Section 404 permit application to include these proposed changes. With an additional 2.97 acres of impact at the Plant Site for buttress modification and a decrease of 7.9 acres of wetland impact at the Mine Site, the modifications proposed would result in a net reduction of 4.93 acres of wetlands overall in association with the Project. These changes would have impacts on resources of concern, including wetlands, air quality and water quality, which were not discussed in the FEIS. The Applicant provided information on effects of these changes on resources including wetlands, air quality and water quality.⁸ The Corps has evaluated this information and included consideration for these effects in the determination of the environmentally preferred and least environmentally damaging practicable alternative (LEDPA) as described in Section 8 of this document.

Final proposed impacts to WOTUS that are evaluated throughout this ROD include a total of 928.17 acres of wetlands. Of this total, 901.24 acres of wetland would be directly impacted by the discharge of dredged and fill material and lost as a result of the Project.

⁸ Barr Memo NorthMet Project Cell 2E North Dam Buttress Mods, dated December 30, 2016; Barr Memo, Proposed Waste Water Treatment System (WWTS) Relocations (Version 3), dated April 11, 2017

A total of 26.93 acres of wetland would be indirectly impacted and lost as a result of fragmentation.

During the evaluation process for this Project, the Lake Superior Wetland Mitigation Bank was approved by the Corps to sell wetland credits to offset authorized losses of waters. This bank is located in the same major watershed as the Project (see Figure 12, Attachment 1) and is characterized primarily by bog wetland systems, which are the predominant type of wetland to be impacted by the Project. The Applicant modified their mitigation proposal, proposing to purchase credits at this bank instead of implementing the permittee responsible mitigation described above. Section 11 of this document provides details on compensatory mitigation.

5.0 SCOPE OF ANALYSIS

5.1 SCOPE OF ANALYSIS FOR NEPA

The Corps' federal involvement for a project that proposes activities regulated under one or more of the Corps regulatory authorities is normally limited to a DA permit decision where regulated activities are either authorized, authorized with conditions or denied. However, the Corps is required to determine the scope of analysis for a NEPA document to address the impacts of both the specific activity over which the Corps has jurisdiction, and those portions of an entire project over which the Corps has sufficient control and responsibility to warrant federal review.

The determination of the scope of analysis for the Corps federal action is guided by the Corps NEPA implementing regulations at 33 CFR 325, Appendix B. The scope of analysis includes WOTUS where regulated activities are proposed, as well as uplands where there is sufficient federal control and responsibility to warrant federal review. When determining whether there is sufficient control and responsibility to include portions of the Project beyond the regulated activities, factors from Appendix B may be considered. In this case, due to the configuration of WOTUS on the Project site, including the scattered locations throughout the Project area, and the substantial amount of wetlands to be impacted by regulated activities, the work to be completed in uplands would essentially be a product of the Corps permit. This extends federal control and responsibility into uplands. The Forest Service's action associated with the land exchange also increases the cumulative federal control and responsibility at the Project. For these reasons, the NEPA scope is the entire Project Area. Throughout the NEPA process, the federal agencies evaluated the direct, indirect and cumulative effects of the activities within this scope of analysis.

5.2 SCOPE OF ANALYSIS FOR ENDANGERED SPECIES ACT OF 1973 (ESA)

Section 7 of the ESA requires all federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service when any action undertaken, funded, or permitted through the agency may affect an ESA-listed species or critical habitat. The scope for ESA is the Action Area, which means all areas to be affected

directly or indirectly by the federal action, and not merely the area that falls directly under the Corps' regulatory jurisdiction.

The Action Area was determined to include the Project Area as well as a 6 mile buffer. This action area was determined based on the extent to which the Project would cause indirect effects on species from Project-related noise and vibrations (see FEIS pp. 4-293 to 4-302 and 5-526 to 5-555 for a detailed description and maps of estimated ranges of noise and vibrations).

The FEIS for the proposed Project provides information on the impacts of the Project on federally listed species. The Corps and Forest Service each consulted with USFWS on the agencies' separate proposed actions. The Biological Assessment was prepared jointly by the Corps and the Forest Service. The USFWS's responding Biological Opinion was issued on February 5, 2016.

5.3 SCOPE OF ANALYSIS FOR SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT:

Permit Area: When considering the effect of a federal undertaking on historic properties during permit application evaluation, the Regulatory Program uses the term permit area to determine to what extent the area outside the regulated activity would be directly affected by the authorization. Corps regulations also require consideration for impacts to known sites that would be indirectly affected by activities in the permit area. The indirect effects boundary aligns with the area of potential effects (APE), which is described in the Advisory Council on Historic Preservation's (ACHP) regulations at 36 CFR 800.16(d).

The definition of permit area is found at 33 CFR 325 Appendix C (1) (g) (1). "The term 'permit area' as used in this appendix means those areas comprising the waters of the United States that will be directly affected by the proposed work or structures and uplands directly affected as a result of authorizing the work or structures."

For an activity outside the WOTUS to be included in the permit area, the activity in that area must satisfy three tests found at 33 CFR 325, Appendix C (1)(g)(1) (i) – (iii). The Corps determined that the permit area for the Project included all waters to be impacted by the discharge of dredged or fill material and uplands within the Project including the entire Mine Site, Plant Site and Transportation and Utility Corridor. Application of the three tests are as follows:

1. *"Such activity would not occur but for the authorization of the work or structures within the waters of the United States"*

The Project involves mining a specific ore body located beneath the Mine Site area and could not be moved to another location. The project alternatives considered various configurations of the mine pit, stockpiles, waste rock piles, and ancillary areas, including backfilling the west pit with waste rock as well as alternatives to include underground mining. Throughout the review of the Project, impacts to WOTUS were minimized to the

maximum extent practicable as described in Section 9; however, the final configuration that allows maximum resource extraction and is practicable would result in considerable impacts to WOTUS across the Project site. Therefore the Corps determined that but for the authorized work within WOTUS, development of the Mine Site would not occur.

While an alternate tailings disposal area may have been possible, such alternatives were not practicable and rehabilitation of the LTVSMC tailings basin in itself requires extensive work in WOTUS. The improvements to Dunka Road, installation of utilities along that road corridor, improvement of rail connections in the rail corridor connecting the Mine Site to the plant site, and the refurbishment of facilities at the plant site would not occur but for the development of the Mine Site and reuse of the tailings basin. In addition, all of the new components at the Plant Site including the new hydrometallurgical facility involve work in WOTUS, with the exception of work proposed on some of the existing facilities at the plant site.

2. *“Such activity must be integrally related to the work or structures to be authorized within waters of the United States. Or, conversely, the work or structures to be authorized must be essential to the completeness of the overall project or program”*

The work in WOTUS at the Mine Site and at the tailings basin is essential to the completeness of the overall project. The work to be authorized at the Mine Site and the tailings basin is extensive and necessary to develop the Mine Site and rehabilitate the tailings basin. There would be no Project without development of the Mine Site.

A mining operation is an integral system requiring all of the system components to function. Therefore activities, or work, in upland areas to be completed for the Project such as work in connection with reuse of the plant site, improvements to Dunka Road, improvements to the plant track and railroad connecting Mine Site to the plant site, as well as the installation of utilities between the Plant Site and Mine Site are integrally related to the authorized work in WOTUS.

3. *“Such activity must be directly associated (first order impact) with the work or structures to be authorized”*

All of the activities, or system components referenced above are directly associated with the authorized work in WOTUS at the Mine Site and the tailings basin. Construction of the various components of the mining system is being undertaken solely as a result of Mine Site development and rehabilitation of the tailings basin. Many of these system components also involve work in WOTUS, just to a lesser extent.

Area of Potential Effects (APE): In order to ensure consideration for indirect effects on historic properties, the APE was defined. As described at 36 CFR 800.16 (d), the “Area of potential effects means the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.” The APE is influenced by the scale and nature of an undertaking and may vary for different kinds of effects caused by the undertaking. The “undertaking”

herein is “the work, structure or discharge that requires a Department of the Army permit pursuant to the Corps regulations at 33 CFR 320-334” (33 CFR 325, Appendix C (1)(f)).

The APE was defined and re-defined throughout the evaluation process in response to tribal concerns. The evolution of the APE boundary is described in detail in Section 10.7 of this document. APE boundaries were identified to delineate the geographic boundaries where sites of importance to the bands may be impacted by effects from the project on air quality, fugitive dust, surficial groundwater quality and groundwater drawdown. These boundaries are presented in Figures 4.2.9-3 through 4.2.9-6 in the FEIS. The potential for visual effects are shown on Figure 4.2.9-7. A composite APE is depicted in FEIS Figure 4.2.9-1.

6.0 PURPOSE AND NEED

6.1 APPLICANT’S STATED NEED AND PURPOSE: The need for the Project is driven by domestic and global demand for copper, nickel and PGE products. Demand continues to rise for these metals due to the expansion of the green economy and rising demand from developing countries. There is also a local need for jobs and economic development in the Project area. The Applicant’s stated purpose of the Project is to exercise its mineral lease to continuously mine, via open pit methods, the known ore deposits (NorthMet Deposit) containing copper, nickel, cobalt, and PGEs to produce base and precious metal precipitates and flotation concentrates. The Applicant would accomplish mining through uninterrupted utilization of the former LTVSMC processing plant.

6.2 CORPS’ DETERMINATION OF BASIC PROJECT PURPOSE: The basic project purpose is to mine and process polymetallic ore. The activity does not require access or proximity to or siting within a special aquatic site to fulfill its basic purpose. Therefore, the activity is not water dependent. Consistent with the 404(b)(1) Guidelines at 40 CFR 230.10(a)(3), if the proposed activity is not water dependent, the availability of practicable alternatives not involving special aquatic sites needs to be evaluated because such alternatives are presumed to be available and presumed to be less damaging unless clearly demonstrated otherwise. Consideration for and selection of the LEDPA is addressed in Section 8 of this document.

6.3 CORPS’ DETERMINATION OF OVERALL PROJECT PURPOSE: The overall project purpose is to produce base and precious metals precipitates and flotation concentrates from ore mined at the NorthMet deposit by uninterrupted operation of the former LTVSMC processing plant.

Note: A fundamental requirement of the Corps evaluation is to ensure that a project purpose is defined narrowly enough to take into consideration the applicant’s stated need and purpose, but not so narrowly as to eliminate consideration of alternatives that may be less damaging while also meeting the project purpose. The project purpose that was decided upon appears rather narrow, as it focuses on the NorthMet deposit and use of the existing processing plant. It is important to note as explained in the Final Scoping Decision Document that the mineralization of the NorthMet deposit dictates the location

of the Mine Site, and therefore alternative sites for the mine would not meet the Project's Purpose and Need and were eliminated from further consideration. Further, an alternative Plant Site was also eliminated from further consideration because there are no other existing brownfield facilities within reasonable proximity of the Mine Site and the re-use of an existing facility would have fewer environmental effects than greenfield sites. Therefore, even though the project purpose that was carried forward may seem to be narrow thereby restricting consideration of reasonable alternatives, in the context of this Project and its setting, alternative mine and plant sites are not reasonable and do not require in-depth analysis.

7.0 PUBLIC INVOLVEMENT

Chapter 2 of the FEIS describes the public involvement process for the EIS, including the EIS scoping, interagency coordination, public meetings and the comment periods on the Draft EIS (DEIS) and Supplemental Draft EIS (SDEIS). The comments and responses received on the DEIS and SDEIS are provided in Appendix A of the FEIS. That appendix also includes a summary of the process used by the co-lead agencies to organize, analyze, and respond to comments on the DEIS and SDEIS; comment themes developed for the 2009 DEIS comments; and an explanation of the relationship between DEIS comment themes and the SDEIS comment themes and responses. The entire FEIS document is available to the public on the MDNR's webpage.

7.1 SCOPING

The Corps issued a PN for scoping on June 10, 2005, and held a public scoping meeting on June 29, 2005, at Hoyt Lakes, Minnesota. The Corps and MDNR jointly prepared a final scoping decision document and distributed this document to parties on the EIS mailing list and other parties on October 25, 2005.

7.2 DEIS COMMENTS AND RESPONSES

Following scoping, the co-lead agencies began to develop a DEIS. During DEIS development, the Bois Forte Band of Chippewa and the Fond du Lac Band of Lake Superior Chippewa requested cooperating agency status. The MOU originally executed by the Corps, the MDNR, the Forest Service and Applicant was revised on May 19, 2008 to include the Bands. Grand Portage Band of Lake Superior Chippewa later also requested cooperating agency status and while the MOU was not revised, they participated as a cooperating agency with verbal approval from the co-lead agencies. The tribes serving as cooperating agencies are collectively referred to within this document as "the Bands."

In November 2009, a DEIS was issued by the co-lead agencies. A Notice of Availability (NOA) was published in the Federal Register on November 6, 2009 (FR Vol. 74, No. 214, page 57466). A PN for the DEIS was issued by the Corps on November 6, 2009, announcing a 90 day public review period to end on February 3, 2010. Public meetings were held on December 9 and 10, 2009, in Aurora and Blaine, Minnesota. About 3,800

e-mails, written and typed letters, postcards, and instances of public testimony (henceforth referred to as submissions) were received. The Environmental Protection Agency (EPA) reviewed the DEIS pursuant to its authority under NEPA CEQ regulations and Section 309 of the Clean Air Act, and assigned a rating of EU-3 (Environmentally Unsatisfactory-Inadequate Information).

The co-lead agencies received approximately 3,800 DEIS submissions from a variety of sources, including government agencies (federal, state, and local), tribal entities, local businesses, non-government organizations (NGOs), private individuals, and Applicant. These submissions generated approximately 5,900 distinct substantive comments because many submissions included more than one distinct substantive comment. A *substantive comment* is defined as an individual statement, question, or concern within a submission that substantively addresses the proposed project and that contains more than just a statement of approval or disapproval of the project. Key issue areas included cultural resources, air quality, wetlands, geotechnical stability, socioeconomics, endangered species, and water resources. Given the large number of submissions and individual comments received on the DEIS and SDEIS, the co-lead agencies determined that it was necessary to group similar comments into themes and respond to those themes instead of responding to each comment individually. These comments and responses are provided in Appendix A to the FEIS.

7.3 SDEIS AND SECTION 404 COMMENTS AND RESPONSES

In mid-2010 the Corps, MDNR, and the Forest Service agreed to prepare a SDEIS that would include the proposed PolyMet-Forest Service land exchange proposal as a connected action. The Forest Service agreed to participate as a co-lead agency on the EIS at that time. The EPA became a cooperating agency to participate in resolving concerns they submitted on the DEIS. On October 13, 2010, an NOI to prepare a SDEIS was published in the Federal Register (FR Vol. 75, No. 197, page 62756).

Due to changes in agency roles and participants, the lead agencies terminated the 2008 MOU in June 2011, and replaced it with the following documents: (1) an MOU signed by the Forest Service, the Corps, and MDNR as co-lead agencies, and Applicant as the Applicant; (2) an MOU between the co-lead agencies and the EPA, designating the EPA as a cooperating agency; and (3) letters to the Fond du Lac, Grand Portage, and Bois Forte Bands inviting each Band to continue as cooperating agencies in the preparation of the EIS. The Bands agreed to continue participation as cooperating agencies.

Between February 2010 and August 2013, the Applicant incorporated project modifications to address DEIS comments, and submitted them for lead and cooperating agency review and comment. The lead agencies evaluated changes to the proposed project, wetland impacts, and concerns raised in comments on the DEIS. These comments and the responses are provided in Appendix A to the FEIS. In response to concerns submitted from the public, other agencies and tribes, a revised alternative was developed by Applicant to address major environmental concerns and permitting barriers. On August 19, 2013, a revised permit application was submitted to the Corps

incorporating project modifications. This application superseded all previous application materials.

A SDEIS was issued by the co-lead agencies on December 13, 2013, and published in the Federal Register (FR Vol. 78, No. 240, Page 75919). The Corps issued a PN announcing a public review period for the SDEIS beginning on December 13, 2013, and ending on March 13, 2014. The Corps issued another PN on the same date soliciting comments on the revised permit application, also providing a 90 day comment period. Public meetings were held during January 2014, in Duluth, Aurora and Saint Paul, Minnesota. Several commenters had previously requested a public hearing pursuant to 33 CFR 327.4. In response to these requests, the Corps conducted a public hearing during the January 16, 2014, Duluth, Minnesota meeting.

In total, the co-lead agencies received 57,703 submissions during the public comment period. Commenters included federal, state, and local representatives; members of the public; federal, state, and local government agencies; tribal entities; non-governmental organizations; and other interested groups and stakeholders. Of the total submissions, 93 percent were duplicate form letters sponsored by outside entities (NGOs, unions, and other groups). A total of 43 distinct form letters were received from 14 outside entities, in addition to 6 form letters whose source could not be determined. Form letters were identified when two or more unrelated individuals submitted identical or substantively identical submissions, or when a submission was determined to consist entirely (or nearly so) of text provided by a website (such as a website maintained by an NGO) for the purpose of mass e-mailing.

The submissions, including both form letters and unique submissions, contained 16,469 unique, substantive comments. Comments were extracted from all submissions. Given the large number of submissions and individual comments received on the SDEIS, the co-lead agencies determined that it was necessary to group similar comments into themes and respond to those themes instead of responding to each comment individually. Key issue areas included cultural resources, air quality, wetlands, geotechnical stability, socioeconomics, endangered species, and water resources. These comments and responses are provided in Appendix A of the FEIS.

7.4 FEIS AND SECTION 404 PUBLIC NOTICE COMMENTS AND RESPONSES

A NOA for the FEIS was published in the Federal Register on November 13, 2015. On the same date, the Corps also issued a PN announcing the availability of FEIS and soliciting comments on a project revision described in the FEIS that would impact 1.37 acres of wetlands in association with construction of the tailings basin groundwater seepage containment system. The public comment period on the revised 404 action ended on December 21, 2015.

The co-lead agencies received 30,441 original submissions (non-duplicates) during the notice of availability of the FEIS from 24,969 different commenters comprised of federal, state, and local representatives; members of the public; tribal entities; non-governmental organizations; and other interested groups and stakeholders. Of these submissions, the vast majority were form letters and 793 were unique non-form letters ranging in length from one sentence to hundreds of pages with additional attachments. Comments received within the designated comment period were reviewed using the same procedures used on comments received on the DEIS and SDEIS. A total of 4,406 comments were identified.

Some commenters requested a public hearing to discuss the proposed project revisions. After considering the information provided, and in light of the minor nature of the proposed revisions, the Corps determined another public hearing would not be conducted because no new information would be received to inform the decision-making process.

Appendix B of this ROD summarizes the process used by the co-lead agencies to organize and consider the comments received on the FEIS as well responses to those comments.

7.5 COMMENTS RECEIVED AFTER DECEMBER 15, 2015

The public, federally-recognized Tribes, and non-governmental organizations have continued to provide comments on the Project. If comments raised themes that received responses in either Appendix A of the FEIS or attachment A of this ROD, those comments are not repeated here unless there is new information to consider. Issues raised following FEIS publication that had not been previously raised, or new questions or concerns about on-going issues are summarized below.

7.5.1 Commenters raised issues and concerns that a supplemental EIS needs to be prepared to consider information presented in a 2018 Canadian financial disclosure report (National Instrument 43-101F1 Technical Report). Comments indicate this information, which was prepared for PolyMet, calls into question the feasibility of the Project as presented in the FEIS and the company's ability to perform reclamation and closure. Comments state that the report constitutes a substantial change and describes significant new circumstances that result in unexamined environmental impacts from the Project and also state the report contains information that there is a feasible alternative for tailings disposal in an abandoned pit that must be analyzed. Comments further state that new information and environmental effects of the following must be examined: use of a modified buttress design in lieu of the proposed CDSM and liquefaction risk at the tailings basin; co-locating the Mine Site WWTF with the Plant Site WWTP; differences in water appropriation quantities between the FEIS and the draft permit application; and using a wetland bank in lieu of the proposed Hinkley, Aitkin and Zim restoration sites.

Response: Consistent with the requirements of NEPA, a supplemental EIS (SEIS) shall be prepared if there are substantial changes in the proposed action that are relevant to environmental concerns or if there are significant new circumstances or information

relevant to environmental concerns and bearing on the proposed action or its impacts (40 CFR 1502.9(c)(1)). Each of the concerns described above are summarized again below and a Corps response on whether that concern warrants preparation of a SEIS follows.

Comment: New information calls into question the feasibility of the Project as presented in the FEIS and the company's ability to perform reclamation and closure.

Response: The referenced technical report is required by Canada and prepared for potential investors and financial institutions as an indicator of a company's viability and potential performance. Corps regulations (33 CFR 230.4(q)) state in part that when private enterprise applies for a permit, it will generally be assumed that appropriate economic evaluations have been completed, the proposal is economically viable, and is needed in the market place.

This presumption does not eliminate the need to incorporate reasonable measures to minimize effects of unforeseen circumstances. The MDNR is requiring financial assurances to address reclamation and long term maintenance in the event Project viability is compromised. MDNR responded to this concern in a letter dated August 20, 2018, and determined there is no basis to conclude that the Project will be financially unable to cover the costs of reclamation and closure. In conclusion, this information does not constitute substantial changes in the proposed action that are relevant to environmental concerns nor does it present significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts, and therefore does not warrant an SEIS.

Comment: Information from the technical report constitutes a substantial change and describes significant new circumstances that result in unexamined environmental impacts from the Project.

Response: The referenced technical report provides information that the Applicant is considering potential expansion in the future and is therefore investigating the mineral resource and potential mining scenarios. As described in the report, the purpose of the additional investigations is to quantify potential viability of identified resources at higher throughputs that are not currently permitted for development. Development of those additional resources would require additional engineering, environmental review and permitting and would require changes in infrastructure that would require significant capital investment. The scenarios described in the report are preliminary in nature, economic viability of these additional resources has not been demonstrated to date and any expansion of the Project is speculative.

Because these preliminary scenarios are not sufficiently developed to be considered foreseeable future projects, it is not necessary or appropriate to include them in a cumulative effects assessment at this time. If at some point any of these scenarios become viable, they would be considered as appropriate in cumulative impact analyses or the subject of a permit evaluation should regulated activities in WOTUS be proposed. In conclusion, this information does not constitute substantial changes in the proposed

action that are relevant to environmental concerns nor does it present significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts, and therefore does not warrant an SEIS.

Comment: Based on the technical report, there is a feasible alternative for tailings disposal in an abandoned pit that must be analyzed in an SEIS.

Response: The technical report references tailings placement by gravity to two existing taconite pits near the Erie plant. The FEIS for the current Project considered and ruled out in-pit disposal as infeasible due to insufficient volume of the mine pits that would actually be available for tailings disposal. The practicability of using pits may be re-visited if a new project, project modifications, or expansions are proposed. In conclusion, this information does not constitute substantial changes in the proposed action that are relevant to environmental concerns nor does it present significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts, and therefore does not warrant an SEIS.

Comment: Use of a modified buttress design in lieu of the proposed CDSM at the tailings basin and safety concerns related to erosion liquefaction risk at the tailings basin and warrants an SEIS:

Response: The Applicant's revised buttress design is described in Section 4.3 of this document. With respect to safety concerns, MDNR has expertise and authority to evaluate the design of the dam and ensure the structure meets appropriate safety standards. The Applicant is required to comply with all applicable safety requirements associated with that agency's authority as further discussed in Section 10.20 of this document. In brief, as described in MDNR's letter dated August 20, 2018 to WaterLegacy, during its evaluation of the safety factor associated with the revised buttress alternative, the MDNR identified the factor of safety as 1.07, which is below the required 1.10 factor of safety. When MDNR notified the Applicant of this deficiency, the Applicant provided the results of more detailed modeling, which concluded that the revised alternative does meet the required 1.10 factor of safety design criteria.

The effects that construction of the modified buttress system would have on wetlands and other resources of concern including water quality and air quality are considered in Section 8 and subsequent sections of this document. As described further in Section 8, environmental impacts of the revised buttress alternative are substantially similar to those evaluated in the FEIS and it is unlikely that these additional impacts would result in changes to the environmental consequences disclosed in the FEIS. In conclusion, this information does not constitute substantial changes in the proposed action that are relevant to environmental concerns nor does it present significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts, and therefore does not warrant an SEIS.

Comment: Eliminating the WWTF would have impacts on water quality that require an SEIS to include, among others, consideration for the elimination of any mechanical water

quality treatment at the Mine Site, a marked increase in toxicity of material pipes from the Mine to the Plant Site and an increase in the risk of pipeline spills or leaks.

Response: The proposal to co-locate the WWTF with the WWTP at the Plant Site is a consolidation of two originally separate facilities into one WWTS. While structurally there would be a change in infrastructure at the Project, the WWTS is designed to provide the same treatment of water from both the Mine and Plant sites as described in the FEIS. Combining the facilities does not change the potential for significant adverse environmental impacts as described in FEIS. While the conveyance of untreated water from the Mine Site to the Plant Site via a pipeline system that runs along the Transportation and Utility corridor is a modification since the FEIS, the FEIS provided consideration for pipeline integrity and potential for spills and that analysis remains valid. Should any spill result in release of a hazardous substance under the Comprehensive Environmental Response, Compensation and Liability Act, the Applicant would be required to comply with notification requirements of federal law (40 CFR 355.60; 40 CFR Part 302) and the Emergency Notification Procedures in Minnesota.

As described further in Section 8, environmental impacts of the WWTS co-location are substantially similar to those evaluated in the FEIS and it is unlikely that these additional impacts would result in changes to the environmental consequences disclosed in the FEIS. In conclusion, this information does not constitute substantial changes in the proposed action that are relevant to environmental concerns nor does it present significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts, and therefore does not warrant an SEIS.

Comment: Volumes of water appropriated in draft permits greatly exceeded the FEIS estimated volumes, and increased volume of appropriations present the potential for significant environmental effects that have not been considered and warrant an SEIS.

Response: MDNR regulates water appropriations and is the permitting agency with authority on this issue. In a letter dated August 20, 2018, MDNR provided a detailed response to WaterLegacy on this issue. MDNR summarizes each of the points raised through comments on this issue and provides summaries of its agency's consideration and findings. In short, MDNR concludes that concerns were based on maximum potential volumes and clarifies that maximum volumes are typically episodic and vary over the entire life of the project. MDNR concludes that the FEIS evaluates the direct and indirect effects of appropriating volumes that are in line with appropriations that are likely to occur. Therefore, this information does not constitute substantial changes in the proposed action that are relevant to environmental concerns nor does it present significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts, and therefore does not warrant an SEIS.

Comment: The revised mitigation plan proposes the purchase of credits at the Lake Superior Wetland Bank instead of implementing the permittee responsible mitigation at the Hinckley, Aitkin and Zim mitigation sites as described in the FEIS. Comments state an SEIS is warranted to allow public review of whether the new wetland mitigation

proposal effectively remediates the adverse impacts to wetlands associated with the Project. Comments state the revised plan does not disclose whether proposed mitigation credit would be for wetland restoration or for “preservation” and not does reveal how proposed credits mitigate the loss of types and function of wetland impacted by the PolyMet project. Concern is expressed that the bank’s stage of development and whether credits would be approved prior to construction of the Polymet mine are not described.

Response: In general, consistent with the Corps Mitigation Rule (33 CFR Part 332), bank credits are almost always preferred over permittee responsible sites because in most cases bank credits are more likely to successfully offset the losses of waters at an impact site, bank credits are on the ground in advance of impacts that they offset and banks have a much lower risk of failure than permittee responsible mitigation.

As a matter of general background on the Lake Superior Bank, both restoration and preservation activities were approved as part of the plan for this bank. Credits purchased to offset debits at the Project site are not “restoration” or “preservation” credits, but rather the number of credits approved at the bank were based on the collective benefit that restoration and preservation activities provide to the watershed. This bank comprises over 20,000 acres in the St Louis River watershed and addressed watershed needs through the restoration and preservation activities.

Regarding the bank’s stage of development, sufficient credits had been released for the Applicant to purchase 1440 credits. These credits were not released until work on the ground had occurred. The released credits are in different stages of monitoring. Based on monitoring results, all credits are on a trajectory to success and no substantial performance issues have been identified.

As part of determining whether bank credits would adequately offset debits incurred at an impact site, consideration is given to whether the bank has the appropriate type and amount of credits. In the case of this Project, the predominant type of wetlands to be impacted are high quality bogs. Similarly, the predominant type of wetland credits at the Lake Superior Bank are bogs that are on a trajectory to being high quality. Therefore this bank does have the appropriate type of credits to offset the type of wetlands to be impacted at the Project site. In terms of the amount of credit needed to adequately offset impacts, this rationale is provided in Section 11. The Corps has determined the mitigation plan revisions do not constitute substantial changes in the proposed action that are relevant to environmental concerns nor does it present significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts, and therefore does not warrant an SEIS.

7.5.2 A detailed analysis was submitted to the Corps with information that the extent of wetlands at the Mine Site may include as much as 12 percent more wetland acreage than the acreage included in the FEIS.

Response: The Corps evaluated this information, analyzed areas of concern using off-site procedures for mapping wetlands, and conducted field verifications in September

2017 and June 2018. This review resulted in a net increase in 16.48 acres of wetlands at the site (39.62 acres of previously identified upland were wetland, and 23.14 acres of previously identified wetland were upland). Total wetland acreage at the Mine Site increased from 1,297.8 to 1,311.1 acres. Based on the location of the changes and the proposed work at the site, the revised wetland boundaries resulted in a decrease in direct wetland impacts of 2.05 acres, to 749.5 acres. The Applicant's consultant provided information in response to the Corps evaluation including revised figures and tables that accurately represent the extent of wetlands at the Mine Site (Appendix F).⁹

7.5.3 Photographs were provided and described as depicting pipes discharging into the Embarrass River from the old LTVSMC tailings basin.

Response: Extensive studies have been performed to identify potential sources of contamination from the LTVSMC plant site. Figure 4.2.2-11 of the FEIS shows all known NPDES discharges into the Partridge and Embarrass Rivers in the vicinity of the Project. All effluent generated by the Project's operations is subject to review and regulation under NPDES permitting.

7.5.4 A commenter expressed concern about the math and scientific concepts used in the risk analysis sections of the FEIS and requested a review for accuracy and correction of errors.

Response: State and Federal agencies with jurisdiction by law are responsible for risk analyses of impacts within their area of expertise and responsibility. For example, the Air Emissions Risk Assessment (AERA) was led by the MPCA, the agency with special expertise in this area. A third party contractor (Environmental Resource Management) was also hired and provided assistance when needed preparing the EIS. The Corps defers to the agencies with authority and expertise to evaluate impacts subject to their jurisdiction and did not conduct independent reviews of the methodologies employed to conduct risk analyses.

7.5.5 A commenter questioned the method used to evaluate indirect effects and provided details to support the position that MODFLOW should be used to evaluate these effects. The commenter also stated that the Corps recommendation on the amount of advanced mitigation for indirect wetland impacts caused by the groundwater cone of depression is unsupported.

Response: Rationale supporting the application of the *Adams/Liljegren* analog approach coupled with a monitoring plan for evaluating potential indirect wetland impacts was provided in the FEIS. The Corps reviewed additional information from the Applicant regarding the inapplicability of MODFLOW to evaluate indirect effects caused by the

⁹ Appendix A, Table 1 of a Barr Engineering Memo titled, *Supplemental Response to GLIFWC Memorandum and Summary of Field Visits*, dated August 1, 2018.

groundwater flow into the NorthMet mine pit.¹⁰ Based on the review of all available information, the Corps maintains the position that MODLFOW or other similar modeling tools would not provide meaningful data, and the analog approach on which the FEIS relied remains a reasonable method for locating ground water monitoring wells. Ultimately regardless of the method used to identify potential areas of impact, implementation of a monitoring plan will provide definitive information on the extent and nature of indirect wetland impacts.

With respect to concerns regarding the Corps determination of advance mitigation for indirect wetland impacts, it is important to clarify that while the Applicant has purchased 162 credits in advance of any indirect impacts in association tin the Project, the definitive amount of appropriate credits to offset any indirect impacts that may be encountered will be assessed at the time such impact occurs.

7.5.6 The Fond du Lac Band of Lake Superior Chippewa requested that EPA provide notice to it pursuant to Section 401(1)(2) of the CWA. The Band requested this notice so that it can comment, raise objections and/or urge additional measures necessary to ensure that PolyMet's Project will satisfy the Band's downstream water quality standard.

Response: Pursuant to Section 401(a)(2) of the CWA, if EPA determines that the proposed discharge may affect the quality of the waters of any state other than the state in which the discharge will originate, it will so notify such other state, the district engineer, and the applicant. No such notice or request for supplemental information was received from EPA.

7.6 COMMENTS OUTSIDE THE CORPS PURVIEW

Some concerns raised during the EIS process and after publication of the FEIS are outside of the Corps authority to control. The Corps has authority and responsibility to evaluate the direct, indirect and cumulative effects caused by the discharge of dredged and fill material into waters.¹¹ This authority and responsibility extends to effects that are physically caused by the regulated activity but not does extend to effects that are distant from or attenuated from the regulated activity, which, in the case of activities regulated only under Section 404 of the CWA, include operational aspects of a project. The following is a brief discussion of activities and effects that are not within the Corps control.

Effects from operation, including but not limited to ore spillage from rail cars traveling to the plant, vehicle collisions with wildlife, fugitive dust from operation of equipment, leaks or spills from transportation of hazardous materials, water withdrawals, effluent discharged to receiving waters, and potential groundwater flow to the north after mine

¹⁰ Barr Memorandum titled, *Response to Evaluation of the Impact of the Proposed NorthMet Mine on Local Wetlands* by Jonathan Price, PhD, July 2017, dated January 11, 2018.

¹¹ Direct effects are those that occur to waters at the time and place of the regulated activity in WOTUS, and include the loss of waters as a result of dredged and filling activities. Indirect effects are those that are caused by the regulated activity, and have a reasonably close causal connection to the regulated activity. Activities that would not occur but for the activities regulated by the Corps do not necessarily fall under the Corps control unless they are physically caused by the regulated activity.

closure when the mine pits are flooded are outside of the Corps regulatory authority. To the extent these operational effects are controlled by the appropriate state agencies, the Applicant must comply with all applicable laws and regulations related to operational activities. With respect to the design and construction of facilities, these aspects of the project are also not subject to the Corps regulatory authority and the Applicant must meet all applicable safety standards established by the state. While operational aspects and design/construction standards are not within the Corps control, they are discussed as appropriate in the context of the Corps evaluation of the Project on the public interest in Section 10 of this document.

8.0 ALTERNATIVES

8.1 OVERVIEW

Throughout the NEPA process, the Corps worked in coordination with the co-lead agencies, interested stakeholders and the Applicant to conduct a comprehensive process to identify and evaluate alternatives to the Project. As described in Section 3.2.3 of the FEIS, during the scoping process, alternatives were considered to include alternative sites (including brownfield and greenfield sites for tailings disposal), alternative technologies, modified design or layouts, modified scale or magnitude and alternatives incorporating mitigation measures. Alternatives were screened against criteria to include whether the alternatives would meet the project purpose and need, were technically and economically feasible, were available and whether they offered substantial environmental or socioeconomic benefits over other alternatives. Alternatives and mitigation measures were either incorporated into the Project or they were eliminated because they did not offer measurable environmental benefits over other alternatives (including the NorthMet Project Proposed Action), were not reasonable (were not economically or technically feasible) or would not meet the project purpose.

The Final Scoping Decision Document dated October 25, 2005, the DEIS at Sections 2.2 and 3.2; the SDEIS at Section 3.2 and Tables 3.2-2 through 3.2.4; and the FEIS at Sections 3.2.3, 3.2.3.4, and 3.2.3.6 all describe various alternatives and why these alternatives were eliminated. Further, several alternatives previously eliminated were reconsidered during preparation of the FEIS. Some of the re-considered alternatives included a Mine Site alternative, a tailings basin alternative, several wet and dry tailings basin cover alternatives, use of low sulfur waste rock as construction material, underground mining, disposal of waste rock and/or tailings in the west pit, alternative pit locations, alternative ore transport, alternative processing plant location, other hydrometallurgical technologies and several waste rock and tailings disposal alternatives (FEIS Section 3.2.3.4 and Table 3.2-17). Most of the re-considered alternatives remained eliminated for one or more reasons. Not all alternatives were eliminated though, and the revised preferred alternative was modified to incorporate improved waste rock and water management, including a more robust groundwater collection system at the tailings basin to better address water quality and quantity impacts. The Project was further refined through identification of improved mitigation measures such as the full bentonite amendment cover for the Tailings Basin. Also the alternative to use low sulfur waste rock

as construction material was partially incorporated into the Project, specifically that it may be used if approved by the MDNR in circumstances where contact water is controlled and treated.

After careful study of alternatives throughout the scoping, DEIS and SDEIS processes, two alternatives were carried forward for detailed consideration in the FEIS, including the preferred Project and the No Action. Because alternatives sites, alternative technologies, modified design or layouts, modified scale or magnitude and alternatives incorporating mitigation measures were considered throughout the process and the Project was modified to incorporate practicable measures with environmental benefit, consideration of only the preferred alternative and the no action alternative was appropriate at the FEIS stage. Following the FEIS, a revised version of the Project was submitted by the Applicant to the agencies for review and became the Applicant's preferred Project.

8.2 NO ACTION ALTERNATIVE

The No Action Alternative would result from the Corps not issuing a DA permit for the discharges of dredged and fill material into WOTUS. The Mine Site would be returned to pre-exploration conditions under the requirements of exploration approvals to reclaim surface disturbance associated with exploratory and development drilling activities. No further upgrades or new segments would be constructed along the existing power transmission line, railroad, or Dunka Road, which would continue to be used by their private owners. At the brownfield Plant Site, Cliffs Erie would continue to complete closure and reclamation activities as specified under state permits and plans and the Cliffs Erie Consent Decree. This would include completing activities for the localized affected areas under the Minnesota Voluntary Investigation and Cleanup (VIC) Program, removal of the former Plant Site building, and construction of engineering controls to address seepage at the Tailings Basin embankment. This alternative does not meet the project purpose and need and is therefore not practicable.

8.3 NORTHMET PROJECT PROPOSED ACTION FEIS ALTERNATIVE

This alternative was described in Section 4.2 of this document. With respect to the construction of the tailings basin, this alternative included a CDSM zone in the Cell 2E North Dam. As described in Section 7 of this document, the use of CDSM was more carefully evaluated after publication of the FEIS because of its complexity and because of concerns with safety. EOR reported that to their knowledge, CDSM technology has not been used in a tailings basin, construction would have to be carefully monitored in the subsurface to make sure pillars are constructed as designed, and additional monitoring would be required during construction and during operations and closure to assess the effectiveness of the CDSM. The review concluded that this alternative meets the required safety standards, that use of CDSM would be a new application and that effective implementation of the design criteria is critical to ensure that use of CDSM would meet the safety criteria. While challenging to implement, CDSM was not eliminated as impracticable and therefore the alternative would meet the overall project purpose and is practicable.

8.4 REVISED PROJECT

The Applicant proposed two modifications after publication of the FEIS. Each of these are stand-alone modifications, in that one does not depend on the other. While the Applicant has identified both revisions as part of their revised alternative, they are addressed as separate alternatives for the purposes of informing our determination of the environmentally preferred and least environmentally damaging alternative. In other words, one, both or neither may represent the LEDPA.

8.4.1 Revised Project - Modified Tailings Buttress – As described in Section 4.3 of this document, the part of this proposal that varies from the FEIS Project is specific to construction of the tailing basin buttresses at the Cell 2E North Dam. This alternative is simpler than the CDSM alternative described in the FEIS and can be constructed over an extended time period. The mass of the tailings basin buttresses would increase and the slope of the Cell 2E North tailings basin dam would be flattened. This alternative uses about 2.17 million cubic yards more material than the CDSM alternative, increases the buttress height by 30 to 35 feet and flattens the slopes from 3:1 to 3.5:1 to achieve desired slope safety factors. The revised footprint would extend about 107 feet north of the previous design and would increase by 16.07 acres. The slope stability factor of safety for the modified plan was above the minimum required and the applicant coordinated with MDNR's third party geotechnical consultants who reviewed the modified plan. This change increases wetland impacts at the Plant Site by about 2.97 acres. This alternative meets the project purpose and need and is practicable.

8.4.2 Revised Project – Co-location of the WWTF at the Plant Site - As described in Section 4.3, the part of this alternative that varies from the FEIS Project is specific to co-location of the Mine Site WWTF with the Plant Site WWTP, for one waste water treatment system (WWTS). The WWTS building would be approximately 33% larger than the former WWTP (81,000 square feet instead of 61,000 square feet), and it would contain all the treatment processes formerly housed in the two separate buildings. To transport mine water to the Plant Site for treatment, a single water pipeline would be replaced by a three pipeline system in the transportation and utility corridor. These changes will not increase the proposed corridor width or the wetland impacts along this corridor. These pipelines would have flow meters at both ends of each pipe for leak detection. The quantity, quality, and location of discharge to the environment would be unchanged from what was evaluated in the FEIS and NPDES/SDS permit application, Water Appropriation permit application, and the Permit to Mine application. With the elimination of the WWTF at the Mine Site, the equalization basins would be relocated to the south of Dunka Road, avoiding 7.9 acres of wetland impact (See Figures 2 and 3). No other changes to wetland impacts would occur in association with this modification. This alternative meets the project purpose and need and is practicable.

8.4.3 Revised Project – Co-location of the WWTF at the Plant Site and Modified Tailings Buttress – This alternative combines both of the revisions described above and is the Applicant's current preferred alternative.

8.5 SUMMARY OF PRACTICABLE ALTERNATIVES

Of the five alternatives described above, only the no action is not practicable. The FEIS alternative, and the alternatives revised after the FEIS will be assessed to make a determination of which alternative is environmentally preferable and the LEDPA.

8.6 CORPS DETERMINATION OF THE ENVIRONMENTALLY PREFERABLE AND LEAST ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATIVE

For purposes of NEPA, the ROD must identify the environmentally preferable alternative. For purposes of the 404(b)(1) Guidelines, the LEDPA must be identified. The LEDPA is usually the alternative with the least aquatic resource impact, but could be an alternative with more aquatic resource impact if the alternative with less aquatic impact has other more damaging environmental consequences.

It is important to note that avoidance and minimization measures were incorporated into the Project throughout the EIS process. From initial scoping to FEIS, direct wetland impacts at the Mine Site were minimized by about 499 acres (from an estimated impact of 1,257 acres to 758 acres). This demonstrates that other more damaging practicable alternatives were considered and eliminated during the EIS process. With respect to impacts at the Plant Site, impacts increased from about 24 acres of wetland impact to about 141 acres of wetland impact. The alternative described in the DEIS included construction of vertical wells along the tailings basin Cells 2E and 2W northern embankment benches. These extraction wells would capture and pump the collected tailings basin seepage to a sump and collected water could then be recycled (DEIS Section 3.2.3). However this alternative would not effectively address on-going tailings basin seepage and associated water quality issues so the DEIS recommended further studies on several measures to address these issues. The alternative in the FEIS expanded the tailings basin perimeter capture system to the base of the new buttresses as well as the base of the existing cell 2W as shown in Figures 5 and 6. This alternative increases the footprint of the system and increased wetland impacts. This alternative was considered environmentally preferable to previous alternatives with less wetland impact because it would result in more effective treatment of seepage thereby having a positive impact on water quality.

In order to inform a decision on the LEDPA and consistent with the requirements of NEPA, environmental impacts including effects to WOTUS of the two revised alternatives are compared below to the FEIS alternative.

The applicant's revised preferred alternative for the tailings basin buttress construction would increase total wetland impacts for the buttress by 2.97 acres from that described in the FEIS. This additional wetland acreage and the wetlands proposed to be impacted in the FEIS are previously disturbed low quality wetlands located at the toe of the tailings basin.

The additional 2.97 acres of impacted wetlands in the revised preferred alternative are substantially similar to those evaluated in the FEIS and it is unlikely that these additional impacts would result in changes to the environmental consequences disclosed in the FEIS. With respect to resources of concern that were evaluated in the FEIS, the Corps evaluated the revision to assess any difference in impacts to air and water quality impacts. Air impacts associated with both the CDSM alternative and the revised buttress alternative were modeled and it was determined that fugitive dust and emissions from construction equipment tailpipes during construction of the modified alternative would not be more than those modeled in previous evaluations. During initial modeling for water quality, an alternative similar to the revised preferred alternative was modeled before the CDSM alternative was proposed. This resulted in the entry of 3.4 million cubic yards of material associated with buttress design instead of the 1.06 million cubic yards that was later proposed in association with the CDSM alternative. The revised buttress design now calls for 3.23 million cubic yards of material. Because mass of the proposed modified buttress design is within the mass of buttress in the GoldSim model, the revised buttress alternative would not affect analysis of water quality or the characterization of impacts conducted to support the FEIS. No other resources of concern evaluated throughout the FEIS would be impacted differently by the revised alternative than the FEIS alternative.

The revised buttress alternative is preferred by the Applicant for several reasons including its simpler design and construction flexibility that allows for phased construction over time. Simpler design lends to an alternative that would be less likely to encounter construction errors that could compromise safety. Therefore even though both the CDSM and revised alternative have sufficient safety ratings when modeled, there is less risk that construction of the revised buttress alternative would lead to safety concerns. While this alternative would result in the loss of almost three additional wetland acres, those wetlands are low quality. Compensatory mitigation has been proposed to offset the impacts that would occur in association with the revised alternative, as described in Section 11. There are no other measurable adverse environmental effects associated with the revised alternative and therefore both the FEIS and revised alternative have substantially similar impacts. Because the Applicant's revised preferred alternative and the alternative presented in the FEIS have essentially equal environmental consequences, and because the Applicant's revised alternative has logistical and technical benefits, the Applicant's preferred alternative may be selected to move forward in the evaluation. The Corps has determined it is appropriate to consider the revised buttress design as the LEDPA for this portion of the project.

Co-location of the WWTS: As described above, co-location of the WWTS at the Plant Site will result in 7.9 acres less wetland impact at the Mine Site. The quantity, quality, and location of discharge to the environment would be unchanged from what was evaluated in the FEIS and NPDES/SDS permit application, Water Appropriation permit application, and the Permit to Mine application. This alternative would incorporate operating efficiencies that would reduce impact on the environment. These efficiencies include among others: WWTP concentrate would not need to be shipped via trains between the two treatment buildings, reducing the total railcar usage and associated emissions and safety concerns for the Project, and eliminating the need for a rail spur at

the Mine Site; chemicals used in the precipitation process would not need to be trucked or hauled by rail to the Mine Site; and the hauling distance of solids generated from the chemical precipitation process to the hydrometallurgical residue facility (HRF), once operational, would be significantly reduced, because the chemical precipitation process would be located at the Plant Site instead of the Mine Site. The incorporation of project changes that result in a reduction in wetland impacts is consistent with the requirements of the 404(b)(1) guidelines to ensure all practicable means are incorporated into the project to avoid and minimize impacts to waters. Therefore this alternative, with less impacts to waters and less overall impacts to the environment, represents the LEDPA with respect to the Project's WWTS.

In conclusion, the Applicant's revised preferred alternative incorporating both the revised buttness proposal and the co-located WWTS is the LEDPA for purposes of the 404(b)(1) Guidelines and the environmentally preferred alternative for purposes of NEPA. This is not a determination of compliance with the 404(b)(1) Guidelines, which is addressed in Section 10, but rather a determination that there are no other less damaging practicable alternatives. The remainder of this ROD documents whether this alternative is compliant with the 404(b)(1) Guidelines, whether it is or is not contrary to the public interest and whether it is in compliance with all other applicable laws, regulations and policy.

9.0 EVALUATION OF THE DISCHARGE OF DREDGED AND FILL MATERIAL IN ACCORDANCE WITH THE SECTION 404(B)(1) GUIDELINES

9.1 FINDING OF PRACTICABLE ALTERNATIVES AND LEAST ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATIVE (40 CFR 230.10(a))

This project would discharge into special aquatic sites and is not water dependent. Therefore upland alternatives are presumed to be available until demonstrated otherwise. Based on the information described above in Section 8.0, many alternatives to the preferred proposal were identified and evaluated, and there are no practicable alternatives to the proposed project that would achieve the project purpose and not impact special aquatic sites. It has further been determined that there are no practicable alternatives to the proposed discharge that would be less environmentally damaging. The proposed discharge in this evaluation is the least environmentally damaging practicable alternative. This alternative meets the overall project purpose, and is practicable in consideration of costs, logistics, and existing technology.

9.2 CANDIDATE DISPOSAL SITE (40 CFR 230.11(f))

The "disposal site" is the water(s) where a discharge is proposed. Depth of water, current velocity, direction and variability at the disposal site are considered.

At the Mine Site, approximately 749.5 acres of wetlands would be directly impacted by the discharge of dredged or fill material. Wetlands directly impacted by type include coniferous bog (66.20 percent), shrub swamp (13.30 percent), coniferous swamp (9.40 percent), sedge/wet meadow (5.10 percent), shallow marshes (3.12 percent), hardwood swamp (1.78 percent) open bog (1.00 percent) and deep marshes (less than 1 percent). These waters drain to the tributaries of the Partridge River.

At the plant site, about 144.53 acres of wetlands would be directly impacted by the discharge of dredged or fill material including deep marsh (53%), shallow marsh (32%), coniferous swamp (8%), shrub swamp (6%), and fresh/wet meadow (1%). Waters to be impacted are in the headwaters of sub-watersheds to the Embarrass River. Surface and groundwater flows from the discharge areas are to the north and northwest toward the Embarrass River.

At the Transportation and Utility Corridor, approximately 7.2 acres of wetlands would be directly impacted by the discharge of fill material. These impacts include shrub swamp (57%), coniferous swamp (22%), bog (12%), shallow marsh (8%), and deep marsh (1%). Surface and groundwater flows are to the Partridge River south of the proposed work.

The direct wetland impacts within the entire Project area would occur in the following wetland types: coniferous bog (56 percent), shrub swamp (12 percent), coniferous swamp (9 percent), shallow marsh (8 percent), deep marsh (8 percent), sedge/wet meadow (4 percent), hardwood swamp (1 percent), and open bog (1 percent). With the exception of deep marshes, under normal conditions high water elevations in these wetlands typically range from soil saturation at or near the surface to a few inches of inundation, and these wetlands often contain no standing water during dry portions of the year. Because the site is dominated by densely vegetated wetlands, water movement through these wetland complexes is slow.

9.3 POTENTIAL IMPACTS ON THE PHYSICAL AND CHEMICAL CHARACTERISTICS OF THE NON-LIVING ENVIRONMENT (40 CFR Part 230):

Sections 5.2 and 5.3 of the FEIS provide information on the Project's potential impacts on substrate, suspended particulates/turbidity, water, current patterns and water circulation and normal water fluctuations.

Substrate: The proposed discharge would adversely impact the physical substrate of 928.17 acres of wetlands through excavation and filling activities. Dredged or fill material would be discharged into wetlands that would then be removed and replaced by mine pits or excavated and replaced with fill material discharged to construct overburden and waste rock storage facilities, roads, storm water and mine water management systems, tailings basin buttresses, the tailings basin groundwater seepage capture system, and utility corridors. The discharges would remove or permanently affect the texture and elevations of the substrate in these waters.

Suspended Particulates/Turbidity: The direct discharge of dredged or fill material into wetlands would generate turbidity and suspended particulates that could be conveyed via overland flow to downstream wetlands and tributaries of the Partridge or Embarrass Rivers.

Minewater, stormwater and groundwater management systems would reduce or contain turbidity and particulates from being transported to the Partridge River and nearby wetlands during construction and operation at the Mine Site. Stormwater and groundwater management systems including dikes, ditches and settling ponds would be installed throughout the Mine Site including along the north side of the Category 1 stockpile and the east pit (Figures 2 and 11). These systems would minimize the amount of surface

water flowing onto the site, minimize the amount of surface runoff flowing into the mine pits, manage the amount of process water collected, and control stormwater flowing off the site. These water management features would expand as the project progresses (FEIS Figures 3.2-6 through 3.2-8).

All non-contact stormwater runoff from undisturbed and reclaimed vegetated areas within the Mine Site would be collected and routed to the Partridge River via existing drainage patterns to the extent possible. Routing stormwater off site using existing drainage patterns would mitigate the loss of contributing watershed areas. Stormwater quality is not expected to differ significantly from existing conditions because it would not contact reactive rock, but there would be the potential for increased suspended solids. Sedimentation ponds at outlet locations would manage suspended solids prior to discharge to surface waterbodies. This approach would minimize changes to the hydrologic regime while minimizing the presence of suspended particulates, turbidity, and associated contaminants.

At the plant site, groundwater and stormwater would be directed to the perimeter capture system (Figures 4 and 5) and would reduce suspended particulates entering tributaries of the Embarrass River. The Applicant would implement standard erosion control measures consistent with the state requirements for a Storm Water Pollution Protection Plan.

Water: The discharge of dredged or fill material can change the chemistry of the receiving water at a disposal site through the introduction of chemical constituents in suspended or dissolved form. The Project has the potential to indirectly affect groundwater and surface water quality in both the Partridge River and Embarrass River watersheds. The ore and waste rock that would be generated would contain various amounts of sulfide minerals, which when exposed to oxygen and water have the potential to release soluble metals and sulfate and produce acid mine drainage. The NorthMet waste rock is predicted to average 0.15 percent sulfide S.

FEIS Section 3.2.2.1.7 describes how material obtained on-site would be separated into categories that have been determined to be suitable and unsuitable for use as fill material. The Rock Overburden and Management Plan¹² provides additional detail regarding the categorization and management of waste rock and overburden. Impacts to water quality would be minimized through identification of material that would not generate acid or leach metals into the waters. Details on characterization of the fill material are provided in Section 9.7 of this document.

Water quality could be indirectly impacted by sulfides and metal leachates when oxidized rock is exposed to water. A total of 27 analytes were selected to be directly modeled because concentrations of those analytes could be altered by the Project. The list of analytes was developed with consideration for host rock mineralogy and the results of geochemistry analyses and includes: alkalinity, antimony, iron, calcium, arsenic, lead, chloride, barium, manganese, fluoride, beryllium, nickel, sulfate, boron, selenium,

¹² NorthMet Project Rock and Overburden Management Plan, Version 10, dtd December 2017 (FEIS Reference PolyMet 2015h)

magnesium, cadmium, silver, potassium, chromium III, thallium, sodium, cobalt, vanadium, aluminum, copper and zinc. As described in FEIS Section 5.2.2.1, GoldSim was used to independently model these chemical parameters and provided values to further calculate two more chemical parameters, TDS and hardness. GoldSim uses probabilistic (Monte Carlo) simulations that take into account the uncertainty of the model inputs and generated outputs taking the form of cumulative probability distributions.

The Co-lead Agencies selected the 90th percentile probability (P90) as their evaluation threshold in determining whether the model results meet established evaluation criteria (i.e., there is at least a 90 percent probability that a constituent would not exceed the water quality evaluation criteria) when the waterbody does not currently exceed the evaluation criteria. The FEIS assesses whether the Project discharges would cause or add to an exceedance. The 29 water quality parameters were screened against evaluation criteria to determine which ones require further analysis. Through initial and secondary screening evaluations in the Partridge River Watershed, Colby Lake, and the Embarrass River Watershed, only aluminum in the Embarrass River required further assessment to determine its potential Project-related impacts. With the proposed engineering controls, the water quality model predicts that the Project would not cause any significant water quality impacts because: 1) exceedances of the P90 threshold did not occur, 2) the Project concentrations were no higher than concentrations predicted for the Continuation of Existing Conditions scenario, 3) the frequency or magnitude of exceedances for Project conditions was within an acceptable range, or 4) the effects were not attributable to the Project discharges.

The Co-lead Agencies prompted the Applicant to substantially modify the Project between the DEIS and SDEIS. Additional modifications were made between the SDEIS and this FEIS to further protect water resources. The proposed engineering controls would provide a higher degree of reliability and flexibility to ensure that the evaluation criteria would continue to be met in the future, when nearly all contact/process water at the Project area would be treated at the WWTS before being released to the environment.

Water management features at the Mine Site would be designed to control water potentially affected by sulfides and metal leachates from oxidized rock exposed through mining.¹³ Waste rock would be sorted into four categories based on its potential to contaminate water—Category 1 waste rock would have a low potential and Category 4 waste rock would have a high potential. Fixed engineering controls have been designed and would be constructed based on the potential reactivity of materials. Water control systems would be constructed to capture water that has contacted surfaces disturbed by mining operations, as well as water collected on stockpile liners (i.e., contact or process water). Nearly all contact/process water at the Project area would be captured and treated by the WWTS at the Plant Site before being released into the environment.

¹³ PolyMet, *NorthMet Project Water Management Plan – Mine*, Version 7. December 2017 (PolyMet 2017). The Water Management Plan – Mine describes process water management systems, key water quality outcomes, operational water management plans, monitoring and reporting requirements and adaptive management action plans.

Water management features at the Plant Site would be designed and constructed to control water potentially affected by sulfides and metal leachates from tailings and hydrometallurgical residue.¹⁴ A containment system would encompass the tailings basin to capture groundwater and surface seepage from the facility. Many of the engineering controls proposed by the Applicant at the Plant Site are related to managing seepage from the combined existing LTVSMC tailings and the future NorthMet tailings. The presence of chemical constituents in suspended or dissolved form would be addressed at the WWTS. A leachate collection system would be constructed under the Hydrometallurgical Residue Facility.

Overall, impacts to water quality and chemistry are not expected to exceed regulatory limits. Discharges at the Plant Site from the WWTS would be subject to the MPCA NPDES permit that was issued on December 20, 2018. This permit contains Operating Limits for sulfate and copper in the permit that are enforceable. Given the treatment technology required by the permit, compliance with the Operating Limits will ensure the discharge does not exceed water quality standards for other parameters. MPCA added a prohibition against discharges from the treatment facility that violate water quality standards. *Current patterns and water circulation and normal water fluctuations* – The discharge of dredged and fill material would cause indirect effects to include the alteration of surface and ground water levels both within and outside the Project area. Potential indirect effects of the Project could include wetland fragmentation; changes in wetland hydrology resulting from changes in watershed area; changes in wetland hydrology due to groundwater drawdown resulting from open pit mine dewatering (Cone of Depression); changes in wetland hydrology from groundwater drawdown resulting from operation of the Plant Site, including groundwater seepage containment; and changes in stream flow rates near the Mine Site and Plant Site. (FEIS page 5-257). During the FEIS, it was determined the effects analysis would not be used to definitively characterize impacts but rather to inform where monitoring should take place for those areas that were identified as having a potential for indirect wetland effects (FEIS page 5-259).

Wetland Fragmentation: The evaluation¹⁵ to determine if a wetlands would remain viable included the following criteria: size of remaining wetland, wetland type, source of hydrology, direction of flow in the area, location in the current watershed, location in the future watershed, and connectivity to other wetlands. All wetland fragments of less than 0.5 acre in size were determined to be too small to retain their functions and were considered as indirectly impacted. Minerotrophic bogs and small non-bog wetlands depend on their watershed size to maintain and were further evaluated to determine their hydrologic sustainability (Ombrotrophic bogs greater than 0.50 acre were not identified as indirectly impacted because their sole source of hydrology is precipitation.) Based on the location of predicted wetland fragments on the Mine Site, their locations within the

¹⁴ PolyMet, NorthMet *Project Water Management Plan – Plant*, Version 7. December 2017 (PolyMet 2017). The Water Management Plan – Plant describes process water management systems at the plant site including the WWTS and stormwater management infrastructure, key water quality outcomes, operational water management plans, monitoring and reporting requirements, adaptive management action plans, Tailings Basin containment system design and surface seepage management system design, and Plant Site reclamation plans.

¹⁵ PolyMet. 2015b. *NorthMet Project Wetland Data Package, Version 11*. April 8, 2015.; PolyMet. 2015j. *NorthMet Project Water Modeling Data Package, Volume 2 – Plant Site, Version 11*. March 13, 2015.

sub-watersheds in relation to direct impacts within that same sub-watershed and the direction of flow were noted. A wetland is more likely to retain its function if the fragment that remains is located in the upper portion of its sub-watershed than in the lower portion. For each minerotrophic bog and non-bog wetland in the analysis, GIS was used to determine the acreage of its watershed area

Construction of the Mine Site features (e.g., open pits, stockpiles, haul roads, etc.) would result in 26.93 acres of wetland fragments (FEIS Figure 5.2.3-1, Figure 3). Wetlands were determined to be fragmented and their associated remaining acreage included as a potential indirect wetland effect if they were small remnants of a directly impacted wetland located between Mine Site features (e.g., in the area between the Category 1 Stockpile and the West Pit or along Dunka Road or the Railroad Connection Corridor) and their functions were lost. The majority of the wetland fragments in the Mine Site would consist of coniferous bog (79 percent), alder thickets (14 percent), coniferous swamp (7 percent), and sedge/wet meadow (less than 1 percent). In addition, a 0.01 acre alder thicket would become fragmented just outside of the Transportation and Utility Corridor near Dunka Road. Impacts at the Plant Site would result in fragmentation of 0.5 acre of wetlands.

Changes in wetland hydrology resulting from changes in watershed area changes in the size of the contributing watershed area: Eleven wetlands totaling 35 acres would have the potential to experience an increase in yield per wetland acre of greater than 20 percent and nine wetlands totaling 15 acres would likely experience a decrease in yield per wetland acre in excess of 20 percent (see Figure 5.2.3-4). Ombrotrophic bogs were not included in the total wetland acreage because their hydrology is solely supported by precipitation and not dependent on watershed size. Wetland types include alder thickets (52 percent), coniferous swamp (34 percent), minerotrophic coniferous bog (8 percent), shallow marsh (6 percent), and sedge/wet meadow (less than 1 percent) (PolyMet 2015b).

Potential Indirect Wetland Effects Resulting from Changes in Hydrology Due to Drawdown at the Mine Site - Indirect effects caused by the discharge of dredged and fill material into wetlands are difficult to model and accurately predict because of the complex mixes of bedrock topography, surficial deposits and wetland soils at the Mine Site.¹⁶ As wetland soils including peat and other overburden is removed and the mine pit is developed, a local groundwater cone of depression may impact nearby wetland hydrology. As discussed in an ERM/MDNR memorandum¹⁷, the Co-lead Agencies determined site conditions at the Mine Site preclude the use of computer modeling to predict the groundwater cone of depression and identify specific resultant wetland impacts around the mine pit. Unconsolidated surficial deposits observed at the Mine Site are relatively heterogeneous and range from very dense clay to well-sorted sand. The hydraulic conductivity of these surficial deposits ranges from 0.012 to 31 feet per day, and bedrock outcrops are present across the area which may hydraulically separate or isolate different areas of the surficial deposits. Based on observations at other Mine Sites

¹⁶ Barr Memorandum Titled, *Modeling Indirect Wetland Impacts and Contaminant Transport*, dated March 2017

¹⁷ ERM and MDNR (Environmental Resources Management and Minnesota Department of Natural Resources). 2011. *Analogue Information Relating to Mine Pit Cone of Depression Impacts on the Surficial Aquifer*. J.L. Adams (ERM) and M. Liljegren (MDNR). May 23, 2011

located on the Minnesota Iron Range, the lead agencies developed the analog approach described in the referenced ERM/MDNR memo, in which the degree of effect was correlated to the distance from the open mine pit. Analog data were used instead of a model such as MODFLOW.¹⁸ While the heterogeneous nature of surficial deposits and undulating topography of bed rock makes precise predictions of impacts to a specific wetland and the extent of the cone of groundwater depression problematic, impacts would generally be expected to be greatest close to the mine pits with impacts reducing as a function of distance from the mine pits.

A range of potential indirect impacts has been estimated in the FEIS (Section 5.2.3.2.2 and Figures 5.2.3-6 and 5.2.3-11) using the Analog Method developed by the Co-lead Agencies. Wetlands were identified within four analog impact zones (Figure 12). :

- 0-1,000 ft from the pits: significant surficial groundwater drawdown in this zone is most likely to occur. Impacts are most likely to be measurable, but there may also be areas of perched surficial water table that will be unaffected by pit dewatering.
- >1,000-2,000 ft: surficial groundwater drawdown may occur but will likely be much less than within the 1000 ft zone and may not be discernable from natural variation.
- >2,000-3,500 ft: surficial groundwater drawdown is unlikely, except under unique hydrogeologic conditions, e.g., where elongated bedrock valleys of coarse glacial material are severed by the pit. Impacts may not be discernable from natural variation.
- >3,500-10,000 ft: impacts unlikely.

The indirect effects analyses performed for the FEIS were not performed to characterize impacts but were done to inform where monitoring should take place for those areas that were identified as having a potential for indirect wetland effects (FEIS Page 5-259). The FEIS used two approaches. The first was the “within analog zones” approach, which focuses on impacts as a function of distance from the mine pit. The second was the “crossing analog zones” approach, which focuses on impacts based on connectivity across zones. Figures 13 and 14 of Appendix A display the results of these approaches. The within analog zones approach predicts no impacts beyond 3,500 feet from the mine pit. While areas between 3,500 and 10,000 feet are not expected to be impacted based on the analog approach, they will be monitored and if impacts are found, adaptive management or compensatory mitigation would be required as appropriate.

Because there is considerable uncertainty regarding the extent of indirect effects that may occur due to groundwater drawdown, indirect effects cannot be definitively determined in advance of direct impacts. Therefore the Corps developed a protocol for utilizing well data to determine indirect impacts to wetlands due to groundwater drawdown. The agencies directed the Applicant to develop a plan to monitor for indirect wetlands impacts

¹⁸ MODFLOW could not practicably be used to estimate potential indirect wetland effects of pit dewatering on wetlands due to complex mixes of bedrock, surficial deposits, and wetland soils at the Mine Site; therefore, MODFLOW could not be used to accurately assess the potential effect of pit dewatering on wetlands (PolyMet 2015b).

that would incorporate the Corps' protocol for utilizing well data to establish baseline conditions before construction and to determine variations from baseline conditions post construction. Compliance with this plan ¹⁹ is a special condition of the permit for this Project as described in Section 12.

Changes in wetland hydrology from groundwater drawdown resulting from operation of the Plant Site, including groundwater seepage containment - The Tailings Basin containment system, located along the northern and western sides, and portions of the eastern side of the Tailings Basin, is modeled to collect at least 90 percent of the Tailings Basin groundwater seepage and 100 percent of the surface water seepage. The uncaptured groundwater seepage would travel within the northern, northwestern, and western groundwater flowpaths (see FEIS Section 5.2.2). The Tailings Basin containment system located along a portion of the eastern side of the Tailings Basin would collect 100 percent of groundwater and surface water seepage

Flow augmentation has been designed such that the existing flows within the tributaries at the Plant Site are maintained within plus or minus 20 percent, which is within the range of annual variability in precipitation as well as streamflow, within the Embarrass River Watershed. Therefore, changes to downstream hydrology, including adjacent wetlands, would be expected to be within the range of that typically observed due to natural variability (PolyMet 2015b).

Despite the use of augmentation to mitigate effects, the response of complex natural systems to human disturbances could only be estimated. Therefore, monitoring of wetland hydrology and vegetation communities would be the most appropriate way to document the extent and magnitude of wetland responses to the Project.

Changes in stream flow rates - The XP-SWMM model was used to model surface water impacts. Modeling results for the Partridge River are described starting on FEIS page 5-135. The proposed Project would reduce annual daily mean flow in the Partridge River, with a maximum reduction of 5% in year 11 predicted at SW-004a (FEIS Table 5.2.2-25). This would fall into the range of annual natural variability in terms of precipitation (FEIS Section 5.2.2.3). These reduced flows are not anticipated to result in any measurable effect on available aquatic habitat in any streams in the Project area, as long as seasonal flow variation is also maintained. The Applicant would collect non-contact stormwater runoff from undisturbed and reclaimed vegetated areas within the Mine Site and route it to the Partridge River via existing drainage patterns to the extent possible (FEIS page 5-143).

At the Plant Site, the seepage containment system that would be built around the Tailings Basin would substantially reduce the current amount of seepage leaving the flotation tailings basin, consequently reducing the stream flow in four tributaries around the tailings

¹⁹ Barr Engineering Memorandum titled, *Monitoring Plan for Potential Indirect Wetland Impacts*, dtd March 2019 which includes as Attachment A the Corps' Memo Titled, *Interpreting Monitoring Well Data for Determining Potential Indirect Hydrological Impacts to Wetlands*, dated May 2, 2018

basin, including Unnamed Creek, Second Creek, Trimble Creek and Mud Lake Creek. All of the surface flow that currently upwells near the west, northwest, and north toes of the Tailings Basin would be captured and treated by the WWTS and then effluent would be discharged to the tributaries to prevent significant hydrologic effects due to reduction in flow. To the west, the discharge(s) would be directed to a location near the existing surface discharge SD-006 (FEIS Figure 5.2.3-21). To the northwest and north, the effluent would be discharged at multiple locations along the downstream side of the Tailings Basin containment system to add flow to the adjacent wetlands (PolyMet 2015b). Flow to Mud Lake Creek would be augmented entirely with offsite runoff diverted toward Mud Lake Creek by a drainage swale constructed northeast of Cell 2E. Augmentation would not be necessary at the eastern segment of the Tailings Basin containment system as this area is currently flowing into the Tailings Basin; therefore, the collection of seepage would not have a hydrologic effect to the watershed. Augmentation would restore flow to \pm 20 percent of existing or uncaptured flows to maintain existing hydrology, geomorphology, aquatic communities, connectivity, water quality, and biology (FEIS page 5-102).

During closure and long-term maintenance, the WWTP would continue to treat water collected by the tailings basin containment systems, and flow augmentation would continue²⁰ (PolyMet 2015a). Tailings seepage bypassing the containment system (approximately 20 gpm) would continue to enter the northern, northwestern, and western surficial flow paths and migrate slowly toward the Embarrass River (FEIS page 5-109).

The Project is not expected to have any measurable effects on surface water hydrology of the tributary streams impacted along the Transportation and Utility Corridor. Existing culvert configurations would be maintained to the extent practicable, and current patterns and water circulation should be unaffected outside the footprint of the direct wetland impact. Flow data collection and monitoring of the Partridge River tributary streams would be conducted and provided to the permitting agencies (FEIS page 5-140).

9.4 POTENTIAL IMPACTS ON THE BIOLOGICAL CHARACTERISTICS OF THE AQUATIC ECOSYSTEM (40 CFR 230.30-230.32)

Consistent with this subpart, impacts on biological characteristics of the ecosystem including threatened and endangered species, fish and other aquatic organisms and other wildlife were considered.

Threatened and Endangered Species: As described in Section 5.2.6 of the FEIS, there are no federal or state-listed threatened or endangered fish or macroinvertebrate species known to occur in the Project area.

Three federally listed species, Canada lynx, gray wolf, and the northern long-eared bat, are expected to be affected by the Project. The Project area is within the critical habitat for the Canada lynx and the gray wolf. The primary effects to lynx and to wolf would be from loss and fragmentation of habitat, to habitat connectivity, and from fatalities associated with vehicle and rail traffic within the Project area. The primary effect to

²⁰ PolyMet. 2015a. *NorthMet Project Description Version 9*. February 19, 2015. (PolyMet 2015a).

northern long-eared bat would be loss of habitat. The Project is not expected to affect bat hibernacula, as none have been observed in the Project area. The Project would affect about 0.03% of lynx critical habitat in Minnesota, including Primary Constituent Elements (PCEs) of lynx critical habitat. Less than 0.03% of wolf critical habitat, including PCEs for wolf, would be directly affected by mining. Of the 1,719 acres that would be directly affected by mining, about 397 acres (23%) would be reclaimed to habitats that could be used by lynx and wolf about 10 or more years after reclamation. It is unlikely that habitat loss and fragmentation resulting from the Project would represent a significant impact to lynx and wolf habitat from a regional perspective. In a Biological Assessment dated April 2015, the Corps and Forest Service initiated consultation with the USFWS. The BA concluded the Project is likely to adversely affect the Canada lynx, gray wolf, and the northern long-eared bat. It was also concluded that the Project is likely to adversely affect Canada lynx and gray wolf critical habitat.

As part of the consultation, the Applicant provided information that it would carry out conservation measures, which are outlined in the Biological Opinion. The USFWS considered that these measures would be implemented when assessing impacts to species and critical habitat. Measures include: 1) reclamation of about 397 acres of wetland and upland habitat at the Mine Site as mandated by MDNR and planting approximately 200 additional acres with trees to expedite forest regeneration of lynx, wolf, and NLEB habitat; 2) maintenance of vegetated buffers including the existing vegetative buffer around most of the Project area perimeter, which would reduce light and noise effects on lynx, northern long-eared bat and wolf; 3) limiting public access to the Project area; 4) minimizing road construction and reclaiming unused roads; 5) educating employees and the public about reporting of sightings and taking appropriate actions to reduce impacts to wildlife, including practicing safe driving habits; 6) support to the Forest Service to conduct lynx monitoring to provide further understanding of their movements and use of the area; and 7) preservation and protection of suitable habitat for the bat including clearing trees outside of the summer maternity roosting season, from June 1 through July 31, to the extent practicable. If trees need to be cleared during the pup season, the Applicant would contact USFWS in advance and would not remove any known occupied maternal roost trees or other trees within 150 feet of a known occupied roost tree during the pup season.

On February 5, 2016, the USFWS, issued a Biological Opinion (BO) for the Project. The USFWS concluded that the action, as proposed, is not likely to jeopardize the continued existence of Canada lynx, gray wolf, or northern long-eared bat and it is not likely to adversely modify critical habitat for lynx or wolf. The USFWS issued an incidental take statement with terms and conditions to which the Applicant must comply in order to receive the statement's protective coverage (pages 63-66 of the Biological Opinion). This would include not conducting activities that would disturb or disrupt hibernating bats or their habitat surrounding hibernacula and not removing trees within 0.25 miles of any known NLEB hibernacula. The Applicant would need to follow reporting requirements that address vehicle collisions with lynx or wolf as well as sick, injured, and/or dead bats sightings, with annual reports submitted to the USFWS.

The Corps has reviewed the two terms and conditions that are part of the incidental take statement. The first relates to the protection of hibernacula for the northern long-eared bat should any be found on-site. This habitat could be encountered while the Applicant is conducting activities that are authorized by the Corps. Therefore, the Corps should enforce this condition and will include this condition in the Corps permit. The other term and condition relates to the operation of vehicles and reporting of wildlife collisions. These activities and effects are not physically caused by the Corps regulated activities and cannot be reasonably enforced by the Corps. Therefore, this term and condition will not be added to the Corps permit.

Fish and other aquatic organisms: Section 5.2.6 of the FEIS describes the potential effects of the Project on fish and aquatic macroinvertebrate communities. These potential effects include changes in physical habitat (including flow), riparian and aquatic connectivity, and water quality. There are four special status aquatic species including Quebec emerald dragonfly, ebony boghaunter, creek heelsplitter mussel, and northern brook lamprey that have not been found in the Project area, but suitable habitat is likely to occur and the species could be present. Habitat for several freshwater mussel species likely exists in the vicinity of the Project area; however, only two species of mussels (the giant floater and fat mucket) were observed in two years of baseline freshwater mussel surveys, neither of which are species of special concern. Effects on fish spawning in tributary streams would be reduced by maintenance of seasonal, bankfull flows over the life of the Project including flow augmentation to tributaries of the Embarrass River.

Other Wildlife: The discharge of dredged or fill material can result in the loss or change of breeding and nesting areas, escape cover, travel corridors, and preferred food sources of resident and transient wildlife species associated with the aquatic ecosystem. The FEIS discusses the effects of the project on wildlife species starting on page 5-434. Page 5-439 of the FEIS describes the environmental consequences of the Project to state listed species. Starting on page 5-442, the FEIS describes the environmental consequences of the Project to other species and habitat.

The Forest Service prepared a Biological Evaluation to document sensitive species populations and habitat use on or near the federal and non-federal lands, and to document potential direct, indirect, and cumulative impacts to these species from the Project (Appendix D to the FEIS).

Sensitive species, and other wildlife species, including those considered culturally significant to the Bands, may be affected by human activity, noise and vibration, rail and vehicle traffic, and decrease of habitat. The Project would likely affect moose individuals in the vicinity through habitat loss and fragmentation; however, population level effects are not expected to be detectable.

9.5 POTENTIAL IMPACTS ON SPECIAL AQUATIC SITES (40 CFR Section 230 Subpart E).

Sanctuaries and Refuges: Sanctuaries and refuges are designated under state and federal laws to be managed principally for the preservation and use of wildlife and fish. There are no sanctuaries or refuges in the Project area. While the Project resulted in the exchange of lands previously within Superior National Forest, national forests allow timbering, cattle grazing and mining and recreation with and without vehicles. Considerations for the BWCAW and Voyageurs National Park areas are addressed in Section 10 of this document.

Wetlands: Discharges would have minor long-term regional effects at the Partridge and Embarrass watershed level. Direct wetland impacts within the Partridge River watershed constitute about 2.4% of the wetlands within that watershed. Direct wetland impacts within the Embarrass River watershed constitute about 0.44% of the wetlands within that watershed. The 901.24 acres of direct wetland loss constitutes 1.4% of the combined Embarrass/Partridge Watershed wetlands. (FEIS Table 6.2.3-3)

There are an estimated 31,318 acres of wetlands in the Partridge River watershed. There are about 233.26 acres of wetlands between 0 and 1,000 feet from the mine pit and 310.88 acres of wetlands between 1,000 and 2,000 from the mine pit. A loss of 233 acres of wetlands would constitute 0.74% of the Partridge River watershed wetlands. The loss of all wetlands within 2,000 feet of the mine pits would constitute a 1.7% loss of wetlands within the Partridge River watershed.

While the direct loss of 901.24 acres of wetlands is more than minimal when viewed locally (within 2 miles of the project site), it is not a significant loss when viewed at the Partridge and Embarrass Watershed levels. The direct wetland impacts constitute a small percentage of the wetlands within the Partridge and Embarrass watersheds. Based on the analog method the potential indirect wetland impacts caused by the cone of depression around the Mine Site would likely be less than 1.7%. As with the direct wetland impacts, the impacts at the watershed level are not significant. Additional description of the Project's impacts are provided in Section 10.6.

Mudflats, vegetated shallows, coral reefs and riffle-pool complexes: The project area is not characterized by these special aquatic sites.

9.6 POTENTIAL EFFECTS ON HUMAN USE CHARACTERISTICS (40 CFR Section 230, Subpart F)

Municipal and Private Water Supplies - There are 37 known domestic wells between the tailings basin and the Embarrass River, with the closest being approximately 1.1 miles from the toe of Cell 2E. The location and characteristics of the wells are presented in FEIS Figure 4.2.2-18 and Table 4.2.2-26. Although some of the residential wells are drilled into bedrock, the well completion records indicate that these wells were not constructed to separate the bedrock groundwater from the surficial aquifer.

The GoldSim models predict that water quality evaluation criteria would be met at the NorthMet property boundary and natural groundwater transport processes lead to a

reduction in chemical concentrations. Accordingly, it is highly unlikely that water wells (all located downgradient of the property boundary) would be impacted.

Drinking water standards apply at the project area boundaries and at Colby Lake. Groundwater and surface water flow models predict that, at these locations, the proposed Project would have a minimal effect on the evaluation criteria used to assess drinking water standards.

Recreational and Commercial Fisheries: While there are no fisheries within or in close proximity to the Project area, the Project has the potential to impact flows to the Partridge and Embarrass Rivers. These rivers drain to the St. Louis River and then to Lake Superior. As described above, at the Plant Site, reductions in flow to tributaries of the Embarrass River will be offset through the release of WWTS effluent and through the construction of a drainage swale and cutoff wall to reroute flow towards Mud Lake Creek. This augmentation would maintain tributary flows within 20% of existing conditions. At the Mine Site, flow to the Partridge River could be reduced by 2.7 percent. On an annual average basis, inflow to Colby Lake would be reduced about 1.7 percent during operations (in mine year 11) and have virtually no change during closure (see FEIS Table 5.2.2-26 for SW-006). These impacts are expected to result in no impact or unappreciable impacts on aquatic resources including downstream fisheries.

Many of the lakes and rivers in the Project area are classified as impaired waters by the MPCA because of elevated mercury in fish. There are several factors that cause elevated mercury in fish, including the increased availability of methylmercury. The production of methylmercury is dependent on sulfate concentrations and environmental conditions required for sulfate-reducing bacteria to live (e.g., sufficient organic carbon and lack of oxygen). Because the project is located within the Lake Superior Basin, it is subject to the Great Lakes Initiative mercury water quality standard of 1.3 ng/L. The NorthMet ore and waste rock contain trace amounts of mercury. Mass balance modeling and analog data from other natural lakes and mine pit lakes in northeastern Minnesota suggest that the mercury concentration in the West Pit Lake would stabilize at approximately 0.9 ng/L. Mercury loadings in the Partridge River are expected to decrease. There would also be mercury in the tailings, although about 92 percent of the mercury in the ore is predicted to remain in the ore concentrate and the mercury concentration in seepage from the Tailings Basin is expected to be less than the standard. The WWTS would be designed and operated to meet water quality based effluent limits that are protective of the 1.3 ng/L mercury standard. Overall, the Project is predicted to increase mercury loadings in the Embarrass River. The net effect of these changes would be an overall reduction in mercury loadings to the downstream St. Louis River upstream of the Fond du Lac Reservation boundary. The Project is not expected to add to any potential exceedance of the Fond du Lac mercury water quality standard of 0.77 ng/L within the Reservation. The Applicant would be required by its permits to monitor the Project's effects on surface water and groundwater hydrology and water quality in order to refine modeling to help predict future conditions. In the event that the monitoring coupled with modeling identifies the potential for any water quality exceedances, the Applicant has proposed an Adaptive Water Management Plan (AWMP) that identifies additional mitigation measures that could be taken, if necessary, to protect water quality (FEIS Section 5.2.2.3.5).

Water-related recreation – Water related recreation does not occur in or in close proximity to the project area.

Aesthetics – The Project is located in an area that has a long mining history. The proposed Project is not inconsistent with current nearby uses, as abandoned and active open pits, stockpiles and tailings basins are numerous on the Mesabi Iron Range. The Plant Site including tailings basin and the transportation corridor are being rehabilitated. The Mine Site is in close proximity and just south of the North Shore Mine located within the City of Babbitt Mineral Mining District.

At the Mine Site, maximum stockpile elevation would be between 180 and 240 feet above ground surface. Just north of the Mine Site is the Giants Range, which would block views of the mine, stockpiles and safety lights from the north and west including the BWCAW. Use of safety lights may contribute to a localized “glow” effect. Light sources would be similar to those used at other mine sites and would be mostly directed downward, helping to mitigate effects. Following completion of mining, reclamation would include removal of all building and facilities at the Mine Site and revegetation of disturbed areas. The Category 1 stockpile would remain noticeable above the treeline, especially in winter. Other similar stockpiles are in the region and over time take on the appearance of a vegetated hill.

The tailings basin is visible to rural residences on County Road 358, located about a mile north of the Plant site. The elevations in Cells 1E and 2E would be raised to the elevation in Cell 2W. The silhouette of the basin would be expanded on the southern horizon but this would be consistent with the character of the existing tailings basin.

Parks, national and historical monuments, national seashores, wilderness areas, research sites and similar preserves – There are no parks, national and historical monuments, national seashores, wilderness areas or research sites in the Project area. Considerations for the BWCAW, Voyageurs National Park, Isle Royale National Park, and Rainbow Lakes Wilderness Class I areas are addressed in Section 10 of this document.

9.7 CONTAMINANT DETERMINATIONS

The following evaluation was conducted to assess the biological availability of possible contaminants in the dredged or fill material.

Physical Characteristics - Material to be discharged into WOTUS at the Project site is proposed to include overburden (from the site), Duluth complex mine waste rock (from the site), and Biwabik Iron Formation (BIF) bedrock (from areas within proximity to the site). Some existing tailings at the Plant Site may also be used. The characterization, management, testing and use of material is described in FEIS Section 3.2.2.1.7 starting on page 3-44. The Rock Overburden and Management Plan²¹ provides additional detail

²¹ NorthMet Project Rock and Overburden Management Plan, Version 10, dtd December 2017 (FEIS Reference PolyMet 2015h)

categorizing and managing waste rock and overburden. In addition, tailings from the Project would be discharged into about 4.68 acres of wetlands at the Plant Site.

The Project would use mine waste rock and overburden for fill material. Overburden includes soil, glacial deposits and other mineral deposits overlying bedrock. Natural deposits of minerals may be present in overburden. Section 5.2.2.2.3 of the FEIS describes the geochemistry of the NorthMet Deposit waste rock and the factors affecting contaminant release and transport from the various contaminant sources at the Mine Site. The mechanism most responsible for the release of solutes from waste rock is oxidation of sulfide minerals, primarily pyrrhotite ($Fe_{1-x}S$) in NorthMet Deposit rock. The sulfide-oxidation reaction produces sulfuric acid, and releases soluble metals (e.g., cobalt, copper, iron, and nickel) that were bound in sulfide minerals. Secondary effects include leaching of some metals (primarily nickel and chromium) from silicate minerals, particularly where acidic pore waters increase silicate solubility. Mine-related blasting and excavation dramatically increases the surface area and porosity of the rock, which allows rapid introduction of atmospheric oxygen and flushing of solutes by water. The information in this section is based on a Barr Engineering memo titled, *NorthMet Project Waste Characterization Data Package*, Version 12, Issue Date: February 13, 2015

Overburden present at the Mine Site consists of three categories based on reactivity: unsaturated overburden, saturated overburden, and peat. Each type of overburden would be managed according to its potential to be reactive (i.e., acid-producing through oxidization of iron sulfides contained therein).

- Unsaturated overburden is material that has been above the natural water table and exposed to air long enough for chemical reactions to have taken place. Unsaturated overburden would be used for on-site construction purposes and discharged into WOTUS. Unsaturated overburden that exceeds immediate construction and reclamation needs would be stored in unlined overburden stockpiles at the Overburden Storage and Laydown Area.
- Saturated overburden is material that has remained below the water table, has not likely been exposed to air and has the potential to be reactive (i.e., acid-producing through oxidization of iron sulfides contained therein if exposed to air). The use of saturated overburden for fill material discharged into WOTUS would be limited to applications where it would remain in a reduced state or water that comes into contact with this fill material and collected and treated in the WWTS or collected and used as process water. For example, saturated overburden obtained on site would be used only for bedding material under stockpile liners and stockpile foundation.
- Peat is composed of partly decomposed plant matter. Excavated peat would be reused for various reclamation activities or stockpiled in the overburden storage and laydown area until it could be reused for off-site wetland restoration activities, stockpile reclamation covers, and other on-site reclamation. Peat (organic soils)

that exceeds immediate construction and reclamation needs would be stored in unlined overburden stockpiles at the Overburden Storage and Laydown Area.

Waste rock has been characterized in four categories based on sulfide content and acid producing potential. Category 1 waste rock²² has the lowest sulfur content at 0.12% or less. It would have a low potential to generate acid, but may leach heavy metals. The Applicant proposes to use a subset of the Category 1 waste rock with a maximum average sulfur concentration of 0.05% for general construction material, including material to be discharged into WOTUS. Based on long-term kinetic testing, bulk chemical composition, and water quality evidence from analog sites, water contacting this subset of Category 1 waste rock is expected to remain neutral in pH (as is the case for all Category 1 waste rock), and also contain sufficiently low dissolved metals as to meet stormwater benchmarks for the Project (FEIS page 5-55 through 5-56), as listed in Minnesota's NPDES/SDS Industrial Stormwater General Permit.

Biwabik Iron Formation (BIF) rock obtained off-site may also be used for construction in early phases of the project most notably before Duluth Complex waste rock is available. Procedures have been developed for identifying Biwabik Iron Formation Rock with properties similar to the Duluth Complex waste rock proposed for a source of fill²³. Criteria and procedures developed by the Applicant are designed to select BIF construction rock that is not potentially acid generating and will result in contact water that meets stormwater benchmarks for the Project, as listed in Minnesota's NPDES/SDS Industrial Stormwater General Permit.

Approximately 4.68 acres of low quality wetlands at the Plant Site would be impacted by the discharge of tailings, which have the potential to introduce contaminants including metals. The groundwater seepage containment system has been designed to collect groundwater that may be impacted by tailings disposal. Water would be treated consistent with the requirements of the NPDES permit prior to discharge from the site.

Additional modeling, sampling or analyses may be necessary to identify waste rock, Biwabik rock and LTVSMC tailings that would be appropriate for discharge into WOTUS. The permit will be conditioned to require that no discharge of fill material occurs in WOTUS until sufficient information is received, evaluated and approved by the Corps.

9.8 ACTIONS TO MINIMIZE ADVERSE EFFECTS (40 CFR 230.70-230.77)

The Applicant has identified numerous measures to minimize adverse impacts. These measures are outlined in Sections 5.2.2.3.5 of the FEIS, in the DA permit application and in the NorthMet Project Water Management Plan – Mine Version 7 dated December 2017 and NorthMet Project Water Management – Plant Version 7 dated December 2017. Minimization measures described below are the key measures that are incorporated into

²² Duluth Complex bedrock removed to access metals is referred to as waste rock.

²³ FEIS Reference PolyMet 2015h, NorthMet Project Rock and Overburden Management Plan, Version 7 dated January 1, 2015. The current version is Version 10 dated, December 2017

Factual Determinations and Technical Evaluation Factors of the Corps' analysis on which the finding of no significant degradation is based.

Actions concerning the location of the discharge: The Project includes the following avoidance and minimization actions related to the location of the discharge:

- The plans for mining activity progression, waste rock management and storage locations were reconfigured to avoid and minimize wetland impacts. By reducing the footprint of the mine pits and reducing, consolidating, eliminating and relocating waste rock piles to areas of future disturbance (i.e. the Category 4 stockpile would be sited at the future location of the central pit) direct impacts at the Mine Site have been minimized from 1,257 acres initially proposed to 758 acres in the FEIS. See Figure 15 of Appendix A.
- Wetland impacts would be minimized by placing newly removed waste rock directly into the East Pit and Central Pit after year 11, thereby reducing the need for additional surface stockpile areas that would otherwise affect wetlands.
- Waste rock and other material stored in the Category 2/3, and 4 stockpiles would be backfilled into the west and central pits starting in milestone year 11 to reduce the need for surface storage of waste rock and resulting land disturbance.
- The open pit mine has been engineered to optimize recovery of the ore reserve and minimize the amount of overburden and waste rock removed so as to minimize associated land disturbance for storage of these materials.
- The Applicant proposes to combine the saturated overburden and temporary stockpiles, and leave only unsaturated overburden and peat in the Overburden Storage and Laydown Area. By doing so, the footprint of these stockpiles would be reduced, resulting in fewer direct wetland impacts.
- A post-FEIS modification proposed co-locating the Mine Site WWTF with the Plant Site WWTP, further reducing wetland impacts by 7.9 acres. Direct impacts at the Mine Site would total 749.5 acres, approximately a 507 acre reduction over the initial wetland impact estimate at scoping.
- Haul road construction would include placement of large rocks as a foundation to allow shallow subsurface groundwater flow paths in wetlands to be maintained within the active areas of the Mine Site between the pits and stockpiles.
- Where practicable, items of infrastructure (roads, utility lines, water management pipes, and ditches) have been co-located to minimize wetland impacts.
- Roads have been located on uplands or disturbed areas where practicable and the number and locations of selected routes avoids and minimizes wetland impacts to the extent practicable.
- Wetland impacts associated with minewater, groundwater and stormwater management systems have been minimized to the extent practicable by co-locating dikes, ditches and pipes with haul roads, and siting them in disturbed areas, and siting features on small wetland remnants (i.e. between Category 1

stockpile and the west pit, or between the Category 2/3 stockpile and the railroad tracks) as shown in Figures 3 and 11 of Appendix A.

- The required addition of pipelines between the Mine Site and the plant site WWTS facilities would be located in the utility corridor and would not result in additional wetland impacts.

Actions concerning the material to be discharged - The Project includes the following avoidance and minimization actions related to the material to be discharged:

- Biwabik waste rock that is non-acid generating would be obtained off site and discharged into WOTUS in association with construction activities until waste rock and overburden is generated on-site. Waste rock and overburden has been characterized for the potential to be acid generating and metal leaching. Duluth complex Category 1 waste rock with a sulfur content of less than 0.05% sulfur and unsaturated overburden would not generate acid or leach metals and would be used for construction material discharged into WOTUS. Use of this material from the site minimizes the amount of fill needed from material sites.
- Saturated overburden obtained at the Mine Site has the potential to be acid generating. It would be used in limited applications where water coming in contact with it would be collected and treated at the WWTS or used as process water; or in applications where it would remain in a reduced (vs. oxidized) state.
- LTVSMC tailings and commercial fill that would be discharged into WOTUS would be used only after testing confirms it is suitable fill material.

Actions controlling the material after discharge - The Project includes the following avoidance and minimization actions related to the material after discharge:

- The design of the tailings basin impoundment dam complies with industry standards for stability and safety.
- Minewater, groundwater, and stormwater management systems and the seepage collection system would be constructed around all Mine Site stockpiles and facilities to minimize runoff and erosion.
- Facility slopes would be designed to minimize erosion to the extent practicable.
- Concurrent reclamation would occur during mine operations where possible in areas no longer required for active mining.
- Best management practices (BMPs) would be used to minimize erosion and sedimentation to wetlands and WOTUS for all Project components from construction through closure. BMPs are actions that relate to the method of dispersion and control the material after discharge. Mine water would be managed in accordance with the MPCA NPDES/SDS permit, which would include a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP would identify and describe BMPs for the Mine Site to minimize the discharge of potential pollutants in non-contact stormwater runoff.
- Disturbed areas would be stabilized and seeded as soon as possible as necessary to reduce sediment runoff.

- At closure, the Applicant would remove all unnecessary infrastructure and facilities, then reclaim disturbed lands. Reclamation objectives would include rapidly establishing a self-sustaining plant community, controlling dust, controlling soil erosion, providing wildlife habitat, and minimizing the need for maintenance. The Category 1 stockpile and tailings basin would be capped and the mine pits would be flooded. Post-closure activities would include monitoring and maintenance of reclamation and operation of mechanical or non-mechanical water-treatment infrastructure until facility features were deemed environmentally acceptable in a self-sustaining and stable condition (FEIS Sections 3.2.2.1.10, 3.2.2.3.12, and 3.2.2.4).
- Financial assurance would be established and approved by the State of Minnesota prior to construction and operations to cover the costs of mitigation, reclamation and closure.
- Post-closure sediment controls would include site grading and capping of erodible material, revegetation, and re-routing of surface runoff to re-establish natural conditions.

Actions related to technology (40 CFR 230.74) - The Project would include fixed engineering controls, adaptive engineering controls and contingency measures that would avoid and minimize impacts to aquatic resources. These are discussed in detail in Section 5.2.2.3.5 of the FEIS.

- Fixed engineering controls would include, among others, perimeter and pit rim ditches, sedimentation basins and lined process ponds to separate and control stormwater and process waters; geomembrane liners, underdrain systems, sumps, and overflow ponds for temporary storage of Category 2/3 Category 4 and Ore Surge Pile rock; treated Water Pipeline and Central Pumping Station to allow the re-use of water at the processing plant and zero liquid discharge during operations at the Mine Site; collection and control of NorthMet tailings and re-use of process water at the tailings basin; measures during reclamation and operations to reduce both water and oxygen intrusion into the tailings; Tailings Basin containment system to collect surface and groundwater seepage on the western, northwestern northern, eastern and southern sides of the Tailings Basin and pump it back to the Tailings Basin pond or to the WWTS; and Tailings Basin tributary augmentation system to maintain flows within ± 20 percent of existing flows using WWTS effluent
- The Applicant would be required by its state permits to monitor water quality and quantity to refine modeling and to predict future conditions for consideration in permit renewals. In the event that monitoring, coupled with modeling, identifies the potential for water quality exceedances, the Applicant has proposed adaptive engineering controls and contingency mitigation that could be implemented to prevent exceedances of water quality standards.
- Adaptive engineering controls are included as part of the permit to mine financial assurance package.

- Contingency mitigation measures are technically feasible options that could be undertaken should engineering controls (fixed or adaptive) be unable to ensure compliance with applicable water quality standards. Contingency measures would be employed as appropriate and approved by the MPCA and MDNR to address situations such as, but not limited to, a pattern of overflows of the process water sumps or ponds; compliance issues of groundwater down gradient of lined infrastructure; water quality in the west pit not as expected; groundwater inflows greater than expected at the east or west pit; or northward flow of pit water.

Actions affecting plant and animal populations (40 CFR 230.75) - The Project would include the following actions to reduce impacts on plant and animal population:

- The Applicant would develop a wildlife avoidance and human encounter/interaction plan to minimize the risk of adverse wildlife interactions with workers.
- Surface water and groundwater quality sampling will regularly be conducted.
- Groundwater elevations will be regularly be sampled and recorded.
- Pursuant to the Reclamation and Closure Plan, disturbed areas will be reclaimed to a stable condition that would support wildlife habitat.
- Reclamation objectives would include rapidly establishing a self-sustaining plant community, controlling air emissions, controlling soil erosion, providing wildlife habitat, and minimizing the need for maintenance.
- Seed mixes and methodologies would be designed to minimize the introduction of invasive species. FEIS Table 5.2.4-2 describes the target plant communities for stockpile areas, mine pits, roads, parking areas and buildings.
- The Tailings Basin would be incrementally reclaimed by a qualified professional pursuant to *Minnesota Rules*, part 6132.2700.
- About 397 acres (or about 23% of lands impacted by mining) would be reclaimed to habitats that could be used by wildlife including the lynx and wolf about 10 or more years after reclamation.
- Maintenance of vegetated buffers including the existing vegetative buffer around most of the Project area perimeter, which would reduce light and noise effects on wildlife including the lynx, northern long-eared bat and wolf

9.9 FACTUAL DETERMINATIONS (40 CFR 230.11)

The determinations of potential short or long-term effects of proposed discharges of dredged or fill material on the physical, chemical and biological components of the aquatic environment are discussed below. Determinations are based on the information above, including actions to minimize and consideration for contaminants. These “factual determinations” are used to evaluate compliance with Restrictions on Discharges – see Section 9.10 below.

PHYSICAL SUBSTRATE DETERMINATION: Based on consideration of the information above in Section 9.3 of this document, incorporation of actions to minimize effects and

the applicant's compliance with special conditions in Section 12 of this document, the Project would have a minor long-term effect on physical substrate.

WATER CIRCULATION, FLUCTUATION and SALINITY DETERMINATIONS: Water circulation within the project site would be impacted due to ground disturbance, however flow and circulation would not be appreciably impacted outside the project site. Based on consideration of the information above in Section 9.3 of this document, monitoring would be required to assess indirect hydrologic impacts on surface and groundwater circulation and fluctuations that may occur as a result of the Project. If it is determined that monitored wetlands are indirectly impacted by the Project, additional monitoring, adaptive management or compensatory mitigation would be required. Appropriate monitoring and follow up actions would ensure the Project does not have more than minor long term effects. Based on consideration of the information above, incorporation of actions to minimize effects and the applicant's compliance with special conditions in Section 12 of this document, the Project would have no appreciable effects or minor impacts on water fluctuations.

SUSPENDED PARTICULATE/TURBIDITY DETERMINATIONS: Based on consideration of the information above in Section 9.3 of this document, incorporation of the actions to minimize effects and the Applicant's compliance with special conditions in Section 12 of this document, and the Applicant's compliance with the NPDES/SDS permit, the Project would have minor short term effects on suspended particulates and turbidity.

CONTAMINANT DETERMINATIONS: Based on consideration of the information in Section 9.7 of this document, the majority of the fill material proposed to be discharged would not introduce, relocate, or increase contaminants. Approximately 4.68 acres of low quality wetlands would be impacted by the discharge of tailings, which have the potential to introduce contaminants including metals. Based on the applicant's incorporation of actions to minimize effects, its compliance with the 401 and 402 CWA permits and its compliance with the special conditions in Section 12 of this document, contaminants would not have more than a minor adverse impact.

AQUATIC ECOSYSTEM AND ORGANISM DETERMINATIONS: Based on consideration of the information above in Section 9.4 of this document, the Applicant's incorporation of actions to minimize effects and the Applicant's compliance with special conditions in Section 12 of this document, the Project would have minor long term effects on the aquatic ecosystem and organisms.

PROPOSED DISPOSAL SITE DETERMINATION: The Project does not involve open water disposal of material and therefore no effects to the mixing zone would occur.

DETERMINATION OF CUMULATIVE EFFECTS ON THE AQUATIC ECOSYSTEM: In Sections 6.2.2 and 6.2.3, the FEIS considered cumulative effects on water resources and wetland within the Partridge River and Embarrass River Watersheds. In addition to the contributing past, present and reasonably foreseeable actions that were considered in these two watersheds in the FEIS at Section 6.2.2.2, an additional project has since been

identified as reasonably foreseeable.²⁴ However, a DA permit application has not been received and foreseeable impacts are unknown at this time. Therefore, no updates to the cumulative effects assessment are warranted.

The Project in combination with present and reasonably foreseeable future projects would likely result in the following cumulative wetlands effects in the Partridge River: Approximately 30,276 acres of wetlands are projected to be present in the 101,812-acre watershed in the foreseeable future. The change in wetlands, as a proportion of all wetlands within the study area, would be a 10 percent reduction from pre-settlement conditions and a 3 percent reduction compared to existing conditions (PolyMet 2015b). In the Embarrass River watershed, approximately 33,947 acres of wetlands are projected to be present in the 116,797-acre watershed in the foreseeable future. The Project, in combination with present and reasonably foreseeable future projects, would likely result in a 2 percent reduction from pre-settlement conditions and a 1 percent reduction compared to existing conditions (PolyMet 2015b).

The FEIS discusses cumulative effects on the hydrology and water quality within the Partridge River and Embarrass River watersheds. As concluded in the Water Resources section of the FEIS, the Project, which includes augmentation to Embarrass River tributaries, is predicted to only result in minor changes to hydrology within the Partridge River and Embarrass River. Although not expected to result in any direct exceedances of water quality evaluation criteria, the Project, in combination with other reasonably foreseeable actions, would increase metal and other solute loadings to the Partridge River and Embarrass River, and further downstream in the St. Louis River. These loadings would, however, be diluted as the solutes are transported downstream (i.e., average annual flow in the St. Louis River at the confluence with the Embarrass River is approximately four times more than in the Partridge and Embarrass Rivers alone).

Sulfate and mercury loadings, two key constituents of concern, are predicted to decrease overall as a result of the Project. Although sulfate loadings are predicted to increase slightly in the Partridge River Watershed (less than 1 percent) as a result of the Project, this is offset by a large decrease in the Embarrass River Watershed (greater than 40 percent at PM-13), resulting in a significant net decrease in overall sulfate loadings to the St. Louis River as a result of the Project. Similarly, mercury loadings are predicted to increase slightly in the Embarrass River Watershed (0.1 percent) as a result of the Project, but this is offset by a larger decrease (1 percent) in the Partridge River Watershed, resulting in a net decrease in overall mercury loadings to the St. Louis River as a result of the proposed Project. Therefore, the Project is not considered to have the potential for cumulative negative effects on hydrology and water quality in the St. Louis River.

DETERMINATION OF SECONDARY EFFECTS ON THE AQUATIC ECOSYSTEM: As described above in Section 9.3 of this document, monitoring would be required to assess indirect hydrologic impacts on surface and groundwater fluctuations that may occur as a result of the Project. If it is determined that monitored wetlands are indirectly impacted

²⁴ The Corps has received a delineation of waters for the Central Reserve Site located between the East Reserve and Laurentian Deposits.

by the Project, additional monitoring, adaptive management or compensatory mitigation would be required. Appropriate monitoring and follow up actions would ensure the Project does not have more than minor long term effects. Based on consideration of the information above, incorporation of actions to minimize effects and the applicant's compliance with special conditions in Section 12 of this document, monitoring would ensure that indirect effects are properly assessed and compensation will be provided as appropriate to offset any losses.

9.10 DETERMINATION OF COMPLIANCE WITH THE SECTION 404(B)(1) GUIDELINES (40 CFR 230.10(a-d) and 40 CFR 230.12)

This determination of compliance is based on the conclusions of factual determinations and technical evaluation factors of this analysis and takes into account the detailed analysis of impacts on specific physical, chemical, biological and human characteristics of the aquatic ecosystem conducted as part of the FEIS and the additional information provided after FEIS publication regarding effects associated with project revisions. Additionally, Subpart H of the 404(B)(1) Guidelines (see Section 9.8 above) summarizes key measures that relate to the discharge of fill material into WOTUS to minimize adverse effects.

Based on consideration of the above, it has been determined that the Proposed discharge of dredged or fill material would not:

(1) Violate any applicable State water quality standard. The State water quality agency, MPCA, issued their conditioned 401 Water Quality Certification for the discharge of fill material into waters in association with the Applicant's proposed Project as modified and described in Section 4.3.

(2) Cause or contribute to violations of any applicable water quality standards and would not violate any toxic effluent standards under section 307 of the CWA.

(3) Jeopardize the continued existence of any species listed as endangered or threatened species under the Endangered Species Act of 1973 (ESA) or their critical habitat. The Project has been coordinated with the USFWS through formal consultation resulting in a determination of "likely to adversely affect" for all listed species and critical habitat in the Project Area. The USFWS's responsive Biological Opinion concluded the project is not likely to jeopardize listed species or modify critical habitat provided all terms and conditions of the incidental take statement are implemented.

(4) Violate any requirement imposed by the Department of Commerce to protect marine sanctuaries under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972. This is not applicable as there are no marine sanctuaries in the Project area.

Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of WOTUS. [40 CFR 230.10(c)]

Findings of significant degradation related to the proposed discharge shall be based upon appropriate factual determinations, evaluations, and tests are required by the 404(B)(1)

Guidelines under subparts B and C, after consideration of subparts C through F. The discharge shall not be permitted if it:

(1) Causes significant adverse effects through pollutants on human health or welfare, municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites. These factors for the proposed Project have been thoroughly evaluated above.

(2) Causes significant adverse effects through pollutants on life stages of aquatic life and other wildlife dependent on aquatic ecosystems. These factors for the proposed Project have been thoroughly evaluated above.

(3) Causes significant adverse effects through pollutants on aquatic ecosystem diversity, productivity, and stability to the loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy. These factors for the proposed Project have been thoroughly evaluated.

(4) Causes significant adverse effects through pollutants on recreational, aesthetic, and economic values. These factors for the proposed Project have been thoroughly evaluated above.

No significant adverse effects from pollutants would occur on the resources described in (1)-(4) above provided the Applicant complies with all approved permits including general and special terms and conditions of those permits. The Project is compliant with the Section 404(b)(1) Guidelines.

10.0 PUBLIC INTEREST REVIEW

The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest.

10.1 EVALUATION OF GENERAL CRITERIA

The Corps has determined, after evaluation of the following general criteria (i – iii below) and the factors listed below, that the proposed Project will not be contrary to the public interest, as long as all measures identified in Section 11 of this ROD, including permit special conditions, are implemented.

- i. The relative extent of the public and private need for the proposed work:

The Applicant's stated need for the proposed Project is to meet demand for copper, nickel, cobalt, and platinum group elements. This need is driven by domestic and global demand for these products. Demand continues to rise for these metals due to the expansion of the green economy and rising demand from developing countries like India, China, and Brazil. Based on the closure of LTVSMC and other job losses in northeastern Minnesota, there is also a need for jobs and economic development in the area.

- ii. The practicability of using reasonable alternative locations and/or methods to accomplish the objective of the proposed structure or work:

Overall, the Corps finds that practicable alternatives that do not impact WOTUS and/or special aquatic sites do not exist as a result of geographical and technological constraints

of Project siting. An analysis of practicable alternatives and the Corps' LEDPA determination is presented in Section 8 of this document.

iii. The extent and permanence of the beneficial and/or detrimental effects that the proposed structures or work may have on the public and private uses which the area is suited:

The FEIS provides information on the extent and permanence of the beneficial and detrimental effects that the proposed work may have on the public and private uses to which the area is suited.

As described in Section 4.2.1 of the FEIS, the Mine Site is primarily characterized by undeveloped uplands and high quality wetlands. It is suited for hunting, fishing and gathering and other traditional uses by the Bands under the 1854 Treaty, a diverse array of land and resource management uses under the Forest Plan including commercial goods such as timber, scenic uses, developed recreational opportunities and habitat for fish and wildlife. However it is bound by private land and permission for access has generally not been provided. The land is also suited for the exploration, development and production of mineral resources where activities are consistent with sound environmental management and lies within the Mineral Mining zoning districts of the cities of Babbitt and Hoyt Lakes and an industrial use district of St Louis County. The Project would have beneficial effects on use of the land as a Mine Site for a period of about 20 years. The Project would generally have negative impacts on traditional uses by the Bands, scenic uses, recreational opportunities, habitat for fish and wildlife and wetlands that provide watershed functions. These impacts range in intensity and are described in detail in the FEIS and summarized in this ROD. Many impacts will be minimized through measures to be implemented by the Permittee, through compliance with required state and federal regulations, and by specific permit conditions imposed by the respective permits.

The Transportation and Utility Corridor is suited to link the Plant Site and Mine Site, and includes Dunka Road, and a railroad connection. The corridor passes through private, state, and Superior National Forest lands, some of which were previously mined. The private lands are within the City of Babbitt Mineral Mining zoning district and the City of Hoyt Lakes Mineral Mining district. Dunka Road is a private road, with segments owned and leased by Cliffs Erie, the Applicant, and Minnesota Power and it is used for forest maintenance in the area of the Mine Site. Dunka Road also provides access to an existing electrical transmission line that runs parallel to and south of the road. The railroad is privately owned and in operating condition, but has not been extensively used since operations at LTVSMC ceased in 2001. Generally because the Project will use an existing transportation corridor as a connection between the plant and Mine Site, it will have beneficial impacts on uses for which this area is suited.

The Plant Site is suited to private industrial use and currently is characterized predominantly by existing facilities and infrastructure of the former LTVSMC processing plant and Tailings Basin including extensive mechanical facilities, rail lines, mine workings and tailings storage. The majority of the Plant Site is located within the incorporated limits of the City of Hoyt Lakes and in the City's Mineral Mining district. The northern section of the Tailings Basin is in St. Louis County and is zoned for industrial use. The Applicant

became responsible for 29 of the identified Areas of Concern (AOCs) (see legacy contamination discussion in Section 4.2.1.4.2 of the FEIS). Of these, six have already been closed or have received a No Further Action letter from the MPCA (see Table 4.2.1-2 of the FEIS). Additional investigation would be required to determine whether the remaining AOCs require further action. The existing LTVSMC Tailings Basin is not lined and currently releases seepage with elevated concentrations of sulfate, TDS, and hardness, among other constituents. Many of the engineering controls proposed by the Applicant at the Plant Site are related to managing seepage from the combined existing LTVSMC tailings and the future NorthMet tailings. Because the land is characterized primarily by existing infrastructure that can be refurbished for continued industrial use and because the Project would address legacy water quality issues at the existing tailings basin, this Project will have a beneficial use on the use to which the land is suited. The Plant Site would be used to process ore and treat and dispose of tailings during the 20 year life of the mine.

After the end of mining, mechanical treatment would continue operating until monitoring and pilot-testing demonstrated that a transition could be made to non-mechanical treatment systems, which may consist of constructed wetlands, permeable reactive barriers, permeable sorptive barriers, and/or other technologies to be identified. Non-mechanical treatment systems will be designed and tested to treat water from the Category 1 Stockpile Groundwater Containment System, the West Pit Overflow, the HRF, and the FTB seepage capture systems.²⁵ Based on the results of field demonstrations, non-mechanical treatment systems would be implemented only when monitoring at mine facilities indicated that the water quality requirements could be met and flow rates are amenable to these measures.

The Project would impact 928.16 acres of wetlands directly or through fragmentation. Water and air quality, native habitat, endangered species, and natural resources of cultural importance to the Ojibwe Bands would also be impacted. The potential duration of these impacts range from the life of the Project to a permanent effect. The applicant's proposed avoidance, minimization and compensation measures as described in Sections 9, 10 and 11 of this document reduce the likelihood of long-term permanent adverse impacts. Effects of the Project on the public interest are discussed throughout this section. Note that cumulative effects on resources of concern are disclosed in more detail in Chapter 6 of the FEIS.

10.2 CONSERVATION (33 CFR 320.4(m) and 320.4(p))

Reference: FEIS Sections 5.2 and 5.3

The proposed action would impact land, water resources including wetlands, wildlife, cultural resources, aquatic species, vegetation, soils, air and minerals. The effects on these resources are discussed throughout this ROD. Based on site selection and project design, there has been consideration for conservation of natural resources, with the exception of the extracted metals to include copper, nickel and platinum group elements.

²⁵ PolyMet. 2015d. *NorthMet Project Adaptive Water Management Plan, Version 9*. April 30, 2015.

Conservation measures have been considered and incorporated into the Project to minimize impacts, including for example, use of an existing brownfield site that would be refurbished for waste treatment and disposal instead of impacting a greenfield site. Selection and use of this site avoids greenfield sites, conserves construction material, and further avoids placement of waste into other brownfield areas where known mineral resources are present thereby enabling future access to these resources. Reusing the existing LTVSMC Tailings Basin for tailings disposal offers environmental benefits including reduced wetland effects and addressing legacy water quality issues caused by seepage with elevated concentrations of sulfate, TDS, and hardness, and other constituents from the existing tailings basin. Many of the engineering controls proposed by the Applicant at the Plant Site are related to managing seepage from the combined existing LTVSMC tailings and the future NorthMet tailings.

Consideration has been provided for the avoidance of direct and indirect effects on as many wetlands in and around the project area as possible. A total of 635.83 acres of wetlands in the Project boundaries would be avoided. These wetlands as well as wetlands surrounding the Mine Site would be monitored for indirect effects. Compensatory mitigation in the form of wetland bank credits in the same watershed as the impact would be purchased to offset direct and indirect losses of wetlands associated with a discharge of dredged or fill material.

Many energy conservation measures would be incorporated into the Project, including electric drive mine haul trucks, gen-set locomotives, mill technology, and the use of waste heat from autoclaves for space heating. Water conservation would be incorporated as required in the Water Appropriation Permit issued by the MDNR.

The Corps has determined the Project would have minor adverse impacts on conservation.

10.3 ECONOMICS (33 CFR 320.4(q))

References: FEIS Sections 5.2.10 and 6.2.10

Corps regulations specify that when the applicant is a private enterprise, it is generally assumed that appropriate economic evaluations have been completed, and that the proposal is economically viable, and needed in the marketplace (33 CFR 320.4(q)). According to the Applicant, the Project would create up to 500 direct jobs during peak construction and 360 direct jobs during operations. These direct jobs would generate additional indirect and induced employment, estimated to result in 332 additional construction-phase jobs and 631 additional operations-phase jobs that may be temporary, part-time, full-time, long-term, or short-term jobs. While some workers may relocate from outside the region for temporary employment, the majority of Project-related jobs are expected to be filled by those currently residing in the region. Federal, state, and local taxes would total an estimated \$80 million annually. During operations, there would be approximately \$231 million per year in direct value added through wages and rents and \$332 million per year in direct output related to the value of the extracted minerals. As

with employment, these direct economic contributions would create indirect and induced contributions, estimated at \$99 million in value added and \$182 million in output.

The economic effects of construction and operation of the Project would be largely positive. The construction and operation of the Project would provide new jobs, substantial new earnings, and substantial direct and indirect contributions to public finances. Potential negative socioeconomic effects of the Project include increased demand for housing and increased demand for public services and facilities. The influx of direct, indirect, and induced employees could cause a minor increase in housing demand and prices. When considering cumulative effects in the portion of the Mesabi Iron Range within St. Louis, Lake, and Cook counties (FEIS Figure 6.2.10-1), increases in population and housing demand are not likely to strain overall service capacity in the region due to existing capacity, but could create localized pressures on housing markets or public service agencies. These effects are expected to be minor.

The Corps has determined that the Project is generally expected to have a beneficial effect on the local and regional economies.

10.4 AESTHETICS (33 CFR 320.4(a))

References: FEIS Sections 5.2.11 and 6.2.11

The proposed Project is located in an area that has a long mining history and is not inconsistent with current nearby uses, as abandoned and active open pits, stockpiles and tailings basins are numerous on the Mesabi Iron Range. The Plant Site including tailings basin and the transportation corridor are being rehabilitated. The Mine Site is in close proximity and just south of the North Shore Mine located within the City of Babbitt Mineral Mining District. When considering cumulative impacts in the Mesabi Iron Range within St. Louis County, six other mines totaling approximately 2,650 acres are largely existing, expanded or reconfigured mines and located on private land (FEIS Section 6.2.11).

At the Project's proposed Mine Site, maximum stockpile elevation would be between 180 and 240 feet above ground surface. Just north of the Mine Site is the Giants Range, which would block views of the mine, stockpiles and safety lights from the north and west including the BWCAW. Use of safety lights may contribute to a localized "glow" effect. Light sources would be similar to those used at other mine sites and would be mostly directed downward, helping to mitigate effects. Following completion of mining, reclamation would include removal of all building and facilities at the Mine Site and revegetation of disturbed areas. The Category 1 stockpile would remain noticeable above the treeline, especially in winter. Other similar stockpiles are in the region and over time take on the appearance of a vegetated hill.

The tailings basin is visible to rural residences on County Road 358, located about a mile north of the Plant site. The elevations in Cells 1E and 2E would be raised to the elevation in Cell 2W. The silhouette of the basin would be expanded on the southern horizon but this would be consistent with the character of the existing tailings basin.

Visual impact of the Project on historic properties is addressed in Section 10.7 of this document.

The Corps has determined the Project would have negligible to minor impacts on aesthetics.

10.5 GENERAL ENVIRONMENTAL CONCERNS (33 CFR 320.4(a))

Reference: FEIS Sections 5.2.7, 5.2.8 and 5.2.13

General environmental concerns that were identified in the FEIS as matters of general environmental concern, and which are not included in the standard public interest topics include noise and vibration, air quality and greenhouse gas emissions including contribution to climate change and hazardous materials.

The Project would cause a long-term increase in the levels and duration of noise above ambient levels throughout the construction, operation, and reclamation period in an approximate half-mile radius of the Mine Site (approximately 11,456 acres affected) and Plant Site (approximately 568 acres affected). Noises were judged by the extent to which a Project would exceed noise regulations and the estimated degree of disturbance to people who live in or use an area. The total noise associated with the Project when mining, hauling and ore crushing operations are occurring concurrently was calculated along with baseline noises. In all cases when the Project is in operation, it would comply with the applicable day time and nighttime standard. The residences closest to the mine are at a distance where blasting and other Project-related noise would not be heard. It was determined that sound from the Mine Site and Plant Site would not be audible at the BWCAW. Tribal members who may have a cultural and spiritual connection to archeological sites in the Superior National Forest, in areas immediately near the mine, may occasionally experience noise and/or vibration associated with the Project.

There are no other past, present, or reasonably foreseeable actions within the half-mile radius of the Mine Site and Plant Site that would interact in such a way as to have a cumulative effect on nearby residences/dwelling places, recreational sites or cultural sites (FEIS Section 6.2.8). The environmental concerns of this Project on noise are negligible to minor and would not be contrary to the public interest. Note that effects of noise on wildlife are addressed in the public interest review factor for fish and wildlife.

With respect to air quality, as described in Section 5.2.7 of the FEIS, the Project has been designed so that it is considered a synthetic minor source for air permitting purposes. However, the evaluation of the Project in the FEIS treated it as a major source due to its sensitive nature. Compliance with state and federal ambient air quality standards and growth increments, designed to protect human health and the environment, were evaluated using generally accepted state and federal threshold criteria. Local and regional effects, up to 300-km from the project facilities, were evaluated to incorporate sensitive, pristine area resources such as BWCAW and Voyageurs National Park. Control technologies similar to federal Best Available Control Technologies (termed BACT-like)

were evaluated and applied to the project equipment in order to minimize the potential for air emissions. In particular, BACT-like controls were incorporated to reduce mercury emissions to levels that would not impede current State of Minnesota mercury emissions reduction goals. Based on the FEIS evaluation, the Project has been shown to not cause or contribute to significant air quality effects. Cumulative effects on air quality are disclosed in Section 6.2.7 of the FEIS.

Climate Change. The proposed activities within the Corps federal control and responsibility likely will result in a negligible release of greenhouse gases into the atmosphere when compared to global greenhouse gas emissions. Greenhouse gas emissions have been shown to contribute to climate change. Aquatic resources can be sources and/or sinks of greenhouse gases. For instance, some aquatic resources sequester carbon dioxide whereas others release methane; therefore, authorized impacts to aquatic resources can result in either an increase or decrease in atmospheric greenhouse gas. These impacts are considered de minimis and are negated through compensatory mitigation. Greenhouse gas emissions associated with the Corps federal action may also occur from the combustion of fossil fuels associated with the operation of construction equipment, increases in traffic, etc. The Corps has no authority to regulate emissions that result from the combustion of fossil fuels. These are subject to federal regulations under the Clean Air Act and/or the Corporate Average Fuel Economy (CAFE) Program. Greenhouse gas emissions from the Corps action have been weighed against national goals of energy independence, national security, and economic development and determined not contrary to the public interest.

As described in FEIS Section 5.2.7.1.3 page 5-481, the greenhouse gas emissions expected from the Project are 0.12 percent of the statewide emissions for Minnesota, 0.003 percent of the United States emissions, and 0.00038 percent of the annual global emission estimations. Combining the direct and indirect emissions from the Project (697,342 mtpy CO₂e), the total represents 0.44 percent, 0.01 percent, and 0.0014 percent of the annual statewide, U.S., and global emissions, respectively (PolyMet 2015e). It is possible that, due to global demand for copper, nickel, and precious metals, some of these emissions would occur regardless of the development of the Project.

With respect to hazardous materials, accidental release of these materials during transportation, storage, handling, and/or use at the Project and could impact air, water, soil and ecological resources. Materials defined as hazardous are a routine part of mining and ore processing. Their handling, storage, and disposal are regulated by a number of state and federal laws. Adherence to these would limit the potential for off-site effects on only the transport of large quantities of hazardous. Transport routes have been defined that limit the potential for effects on population centers and sensitive resources. Given overall Project design and operational commitments, there would be no significant adverse effects from the proposed use or generation of hazardous wastes by the Project. In summary, the Corps has determined noise, greenhouse gas emissions and hazardous materials associated with the Project would have negligible to minor impacts on general environmental concerns.

10.6 WETLANDS (33 CFR 320.4(b))

Reference: FEIS Sections 5.2.3 and 6.2.3

As described in earlier sections of this document, about 901.23 acres of wetlands would be lost as a result of the discharge of dredged or fill material in association with the Project. An additional 26.93 acres would be fragmented by the proposed Project. About 775.96 acres of these would be at the Mine Site, 144.53 acres at the plant site, and about 7.64 acres for the utility and transportation corridor and rail spur connecting the plant and Mine Sites. Approximately 757.14 acres of these direct wetland impacts are located in the Partridge River Watershed, constituting about 2.4% of the wetlands within this watershed. Approximately 144.53 acres of the direct wetland impacts are located in the Embarrass River Watershed, constituting about 0.44% of the wetlands within that watershed. The 901.23 acres of direct wetland loss constitutes 1.4% of the combined Embarrass/Partridge Watershed wetlands. (FEIS Table 6.2.3-3) The impacted wetlands are located high in subwatersheds of the Partridge and Embarrass River watersheds. Their main functions in this setting include providing habitat, water storage and slow release of rainwater to downstream areas.

To offset unavoidable losses of wetlands associated with the proposal, the Applicant purchased mitigation credits from the Lake Superior Wetland Mitigation Bank located in the St. Louis River Watershed. These bank credits provide stormwater storage as well as high quality habitat within the St. Louis watershed. Wetlands to be impacted by the Project are located in the Embarrass and Partridge Watersheds, which are sub-watersheds of the St. Louis River Watershed; therefore impacts and compensation are located in the same major watershed. The primary wetland type to be impacted and the primary wetland type at the Lake Superior Bank is coniferous bog communities; therefore compensation is in-kind. More information on the amount of compensatory mitigation and other details are provided in Section 11 of this document.

The direct wetland impacts constitute a small percentage of the wetlands within the Partridge and Embarrass watersheds. While the direct loss of 901.23 acres of wetlands is locally important and more than minimal, at the Partridge and Embarrass Watershed level the impacts are negligible with the appropriate mitigation. The mitigation measures proposed by the Applicant will ensure that there is no net wetland loss within the major watershed.

As described in Section 9, there is considerable uncertainty regarding the extent of indirect effects that may occur due to groundwater drawdown at the site. Because indirect effects cannot be determined in advance of impacts, the Applicant will monitor areas around the Project to assess the extent of changes to hydrology and vegetation that can be attributed to the project. If indirect impacts are found, adaptive management and/or compensatory mitigation would be required to offset these impacts. Additional information on compensation to offset any indirect impacts is provided in Section 11 of this document.

Based on avoidance, minimization and compensation measures to offset impacts to wetland in association with the Project, impacts to wetlands would be minor.

10.7 HISTORIC PROPERTIES (33 CFR 320.4(e))

Reference: Sections 4.2.9 and 5.2.3 in the FEIS.

The Project is considered an undertaking as defined in 36 CFR Part 800, the regulation implementing Section 106 of the National Historic Preservation Act (NHPA). The intent of Section 106 is for federal agencies to take into account the effects of a proposed undertaking on historic properties and to consult with the Advisory Council on Historic Preservation (ACHP), State Historic Preservation Offices (SHPOs), federally recognized tribes, other federal agencies with concurrent undertakings in connection with the project, local governments, and any other parties with a demonstrated interest in the proposed undertaking and its potential effects on historic properties.

The federal Co-Leads agencies consulted with the Fond du Lac Band of Lake Superior Chippewa, the Grand Portage Band of Lake Superior Chippewa and the Bois Forte Band (Consulting Bands) and Minnesota SHPO on determinations of National Register of Historic Places (NRHP) eligibility of identified cultural resources in the APE, on effects of the Project on historic properties, and on resolution of adverse effects as required under 36 CFR Part 800.

The APE was defined and re-defined throughout the evaluation process in response to tribal concerns. From about 2007 through 2009, the APE was defined as the Mine Site, the plant site, and the Dunka Road/utility corridor. In 2009, in response to tribal concerns about effects of the Project on ground water and water quality, and subsequent effects to historic properties of traditional religious and cultural significance to the Consulting Bands, the APE was expanded. This expanded APE covered a large area encompassing portions of the Embarrass River, Partridge River, and Dunka River watersheds adjacent to and downstream from the Project as well as the downstream portion of the St. Louis River to Lake Superior.

Following the expansion of the APE, a memorandum was drafted providing a plan for the identification of historic properties significant to the Consulting Bands. However, the expanded APE posed many problems to a reasonable approach to the identification of historic properties and the modeling of various potential effects for the project was not yet complete. As the analysis of project impacts was nearing completion in 2013 through 2015, prior to the release of the FEIS in November of 2015, the revised APEs were coordinated with the Minnesota SHPO and the Consulting Bands. The area of direct effect for the APE did not change much from the surveys conducted from 2007 to 2009 (see Figure 4.2.9-2 in the FEIS). Indirect effects to air quality, fugitive dust, surficial groundwater quality, groundwater drawdown are presented in figures 4.2.9-3 through 4.2.9-6 in the FEIS. The potential for visual effects are shown on Figure 4.2.9-3. At the request of the SHPO a composite APE was mapped as shown on Figure 4.2.9-1.

Note that because groundwater effects could not be predicted with certainty during modeling, monitoring wells will be located in wetlands at strategic locations, the majority of which are located within 2,000 feet from the mine pits²⁶. The Corps will use data collected from these wells to determine the need for additional wells. FEIS Figure 5.2.3-7 and 5.2.3-11 display the connectivity of the Mine Site wetlands within 10,000 feet of the Mine Site. This connectivity will help inform the location of additional wells. The APE for groundwater drawdown aligned with the analog zones mapped to a distance of 3,500 linear feet from the mining operations, which includes the zones where indirect effects were modeled to have a low, moderate or high likelihood of impact (see FEIS Figure 5.2.3-11). Areas between 3,500 and 10,000 feet are not expected to be impacted indirectly by groundwater drawdown but they will be monitored as described in the monitoring plan.

Identification of historic properties was completed within the composite APE. Through consultation it was determined that the Spring Mine Lake Sugarbush; the Partridge River Section of the Mesabe Widjiu; the Partridge River Segment of the Beaver Bay to Lake Vermillion Trail; and the Erie Mining Company Mining Landscape Historic District (comprised of the Erie Mining Company Railroad; Erie Mining Company Plant Site, Erie Mining Company Taconite Harbor Facility, the Community of Hoyt Lakes; and DM&IR Segment) are eligible for inclusion in the NRHP and therefore considered historic properties under Section 106. All other cultural resources identified as part of the NorthMet Project Proposed Action, as described in FEIS Section 4.2.9.2.4, were determined to be not eligible for inclusion in the NRHP, and therefore did not receive further consideration under Section 106 during review of the Project. The SHPO and the Bands concurred with these determinations.

The federal Co-lead Agencies, in consultation with the SHPO, Bands, and Applicant have assessed the effects of the Project on the Spring Mine Lake Sugarbush; the Partridge River Section of the Mesabe Widjiu; the Partridge River Segment of the Beaver Bay to Lake Vermillion Trail; and the Erie Mining Company Mining Landscape Historic District and have determined that those historic properties would be adversely affected. The ACHP was notified of these adverse effect and chose to participate in the resolution of adverse effect. Those adverse effects have been taken into account and resolved through mitigation measures stipulated in a memorandum of agreement (MOA), which has been executed by the Forest Service, Corps, the SHPO, the ACHP, and Applicant. The MOA is attached to the ROD as Appendix D. Any permit issued would include a special condition that requires compliance with the stipulated terms and conditions of the MOA. A summary of the deliverables for which the Applicant is responsible in association with each property follows. (Note that for most deliverables, the Applicant will submit products to the federal Co-lead Agencies, who are responsible for coordinating as described in the MOA with the SHPO and Consulting Bands. Work has been on-going in association with some stipulations.)

- Erie Mining Company Mining Landscape Historic District: Phase II Intensive Level Survey and Report for Historic Properties within APE, Historic Property

²⁶ Barr Memo titled, *Monitoring Plan for Potential Indirect Wetland Impacts*

Documentation Plan, Phase I Reconnaissance Survey of the Historic District outside of the APE;

- Spring Mine Lake Sugarbush: Phase II Intensive Level Survey and Historic Property Inventory Form, Protection Measures to prevent removal of cultural materials from the Spring Mine Sugarbush site; Band Member access prior to implementation of the Permit to Mine, Sugar Maple Management Plan to conserve the sugar bush stands; and National Register of Historic Places Nomination
- Beaver Bay to Lake Vermillion Trail: Partridge Ridge Segment: Phase III Recordation Survey and completion of Historic Property Inventory Form and development of historic context for Beaver Bay to Lake Vermillion Trail;
- Mesabe Widjiu: Partridge River Segment: Mesabe Widjiu site visit (within 6 months of the Section 404 permit issuance and prior to commencement of mining operations); and Historic Property Management Plan.

With consideration for steps take to resolve adverse effects to historic properties, the Corps has determined the Project would have minor adverse effects on historic properties.

10.8 CULTURAL VALUES (33 CFR 320.4(e))

Reference: FEIS Sections 4.2.9.3, 5.2.2, 5.2.4 and 5.2.9.2.2

The Project area falls within the territory ceded as part of the 1854 Treaty between the U.S. government and the Chippewa of Lake Superior. The Chippewa of Lake Superior who reside in the 1854 Ceded Territory are the Fond du Lac, Grand Portage, and Bois Forte Bands. The rights to hunt and fish (gather or take) subsistence resources within the 1854 Ceded Territory were retained by the Bands on a usufruct basis. The Project would have effects on 1854 Treaty resources because the Project area is characterized by areas and species that are traditionally or culturally important to the Bands.

Natural resources and the lands on which they are gathered are important to the Bands for a number of reasons, including cultural, spiritual, and/or historical meanings. The Project would result in direct and indirect environmental effects due to ground-disturbing activities. The Corps and the Forest Service consulted with the Bands to understand how the proposed federal actions may impinge on or abrogate treaty rights. There is little specific information concerning the use of natural resources by the Bands in the Project area, other than the Spring Mine Lake Sugarbush, which is being considered under Section 106 of the NHPA. Lack of information likely reflects limited present day or recent past subsistence gathering in the Project area due to general inaccessibility because the Project area is surrounded by private land and cannot be easily accessed due to private roads.

A good faith effort was made on the part of the Co-lead Agencies to identify use areas in or adjacent to the Project area. Band members' use of the Project area is not well-defined, and did not emerge through interviews. The agencies learned little specific information concerning recent-historic subsistence use and no information regarding

contemporary subsistence activity at the Mine Site, Transportation and Utility Corridor, or Plant Site. Without private landowner permission, there is minimal opportunity for the Bands to exercise usufructuary rights (hunting, fishing, and gathering) on this property.

Construction and operation of the Project is not likely to significantly reduce overall availability of 1854 Treaty resources that are typically part of subsistence activities in the 1854 Ceded Territory. Some individuals and localized populations may be affected, but overall species populations are expected to remain available. The sulfate released from the NorthMet waste rock and tailings is especially important because there are waters supporting the production of wild rice downstream from both the Mine Site and Tailings Basin. Research indicates that elevated sulfate concentrations can affect the growth and viability of wild rice. The MPCA has established a 10 mg/L sulfate water quality standard for waterbodies designated as waters used for production of wild rice. Effluent from the WWTS would be discharged at a water quality based effluent limit concentration that protects the sulfate standard for waters used for production of wild rice (10 mg/L).

The Corps has determined the Project would have minor adverse impacts on cultural resources.

10.9 SCENIC/RECREATIONAL VALUES (33 CFR 320.4(e))

Reference: FEIS Sections 5.2.11 and 5.2.12

The majority of the Mine Site was within a portion of the Superior National Forest prior to the Forest Service-PolyMet land exchange. As discussed in the Forest Service ROD, titled *NorthMet Land Exchange*, the land exchange resolved a conflict between surface (non-mineral) property interests of the Forest Service and PolyMet's proposal to access privately owned subsurface minerals. This exchange united PolyMet's surface and mineral rights at the Mine Site and the Federal government received land of equal value that will be managed as part of the Superior National Forest.

The Mine Site is surrounded by private land that lacks public roads or trails and was therefore not publicly accessible by land. The portions of the Project to include the Transportation and Utility Corridor and Plant Site are privately owned lands and are not open to the public for recreation and generally do not offer recreational opportunities. While mine facilities such as mine pits and stockpiles would be set back from most publicly accessible land, including portions of the Superior National Forest, the Project would likely make recreational activities in the immediate vicinity of to the project less enjoyable and therefore less likely. Operational noise, ground vibration, and airblast overpressure could exceed the most stringent category of state noise standards at a distance of up to 0.9 mile from the Mine Site during the day and 2.3 miles at night. Because the area to be affected by noise from the Project comprises approximately 0.2 percent of the more than 3 million acres of the Superior National Forest, effects from noise on recreational values are expected to be minor.

Air emissions, water discharges and noise could potentially cause wildlife to avoid areas in closest proximity to the Project, leading to reduced hunting opportunities in these areas. Wildlife is expected to remain in surrounding areas of the Superior National Forest; and overall opportunities for hunting and wildlife viewing on public lands in the region are not expected to change substantially.

The BWCAW and Voyageurs National Park are about 19 miles from the Project area. An analysis of potential air quality effects demonstrated that there are no expected effects on visibility in these areas when compared to pristine conditions. The Project is not expected to impact recreational patterns and facilities in the Arrowhead region as a whole.

The Skibo Vista Overlook on the Superior National Forest Scenic Byway is approximately 12 miles south-southwest of the Mine Site. A portion of stockpiles at the mine site and a portion of the Plant Site would be visible above the treeline from this scenic overlook (see photo simulation in FEIS Figures 5.2.11-1 and 5.2.11-2). Views of Project activities from other locations would be limited by topography and distance.

The Corps has determined effects of the proposal on recreational and scenic values are negligible to minor.

10.11 FISH AND WILDLIFE

Reference: FEIS Section 5.2

Impacts to aquatic species including fish and aquatic macroinvertebrates are described in Chapter 5.2.6 of the FEIS. There are no federal or state-listed threatened or endangered fish or macroinvertebrate species known to occur in the Project area. There are four special status aquatic species including the Quebec emerald dragonfly, ebony boghaunter, creek heelsplitter mussel, and northern brook lamprey that could be present in the Project area. While they have not been identified in the Project area, suitable habitat is likely to occur and the species could be present. Habitat for several freshwater mussel species likely exists in the vicinity of the Project area; however, only two species of mussels (the giant floater and fat mucket) were observed in two years of baseline freshwater mussel surveys, neither of which are species of special concern.

The Partridge River and Embarrass River watersheds are located within the Project area and would be affected by the Project. Impacts from the Project on fish and macroinvertebrates would include loss of habitat, specifically reduction in flow, and water quality. Vegetative cover is not expected to be impacted as Project activities would not occur within the riparian buffer of any streams.

As described in Section 9 of this document, the Project would impact water quality. Class 2B surface water chronic standards reflect “the highest water concentration of a toxicant or effluent to which aquatic life, humans, or wildlife can be exposed indefinitely without causing chronic toxicity” (*Minnesota Rules*, part 7050.0218, subpart 3, item Q). Water quality modeling results indicated the Project would meet all Class 2B water quality

standards with the possible exception of aluminum in Embarrass River tributaries that extend from the Tailings Basin. For aluminum, ambient water quality, at times, already exceeds the Class 2B standard in both the Partridge River and Embarrass River. Modeling results show that there would not be a measurable increase in aluminum concentrations in the Partridge River as a result of the Project (FEIS Section 5.2.2.3.2). In the Embarrass River, an increase in aluminum concentration would not be the result of aluminum loadings from the Project, but rather the result of mass loading from surface runoff and the loading from other minor sources (FEIS Section 5.2.2.3.3). Although all other solutes are predicted to meet evaluation criteria or not cause or add to exceedances of evaluation criteria, the aggregate of these solutes, primarily metals, has the potential to affect aquatic biota.

As a result of the Tailings Basin groundwater containment system, flows would be reduced to tributaries of the Embarrass River that extend from the Tailings Basin. These impacts would be minimized with the use of flow augmentation, which would maintain flows to within $\pm 20\%$ of existing flows. Flow augmentation would occur throughout Project operations, reclamation, and long term closure, and monitoring would be required in order to ensure that the flow quantity would be within the natural variability of the streams. This maintenance of the hydrologic regime of receiving streams will ensure impacts to aquatic species are minimized. A special condition requiring flow monitoring and maintenance of flows within $\pm 20\%$ of existing flows would maintain the natural variability of the streams and ensure impacts to aquatic species are minimized.

In the Partridge River, flows would be reduced by a maximum of 4 percent. As described in Section 5.2.6.2.1 of the FEIS, a review of case studies²⁷ found that recommendations for flow protection are quite consistent, typically resulting in a range of allowable cumulative depletion of 6 percent to 20 percent of normal to low flows, but with occasional allowance for greater depletion in seasons or flow levels during which aquatic species are thought to be less sensitive. This review supports the conclusion that flow reductions in the Partridge River Watershed due to the Project are anticipated to be generally within the natural ecological condition and less likely to have significant impacts to ecosystem function and aquatic species.

Water quality and quantity monitoring and modeling would be required to continue in order to assess the current environment and predict future conditions. The Applicant would implement adaptive engineering controls and contingency mitigation in the case that water quality standards are exceeded. Adaptive engineering controls could include design modification, flow alteration, or other practices deemed necessary. Contingency mitigation would need to be approved by the MPCA and MDNR as needed.

Impacts to wildlife are described in Section 5.2.5 of the FEIS. Three federally listed species, Canada lynx, gray wolf, and the northern long-eared bat, are expected to be affected by the Project. As described in Section 9.4 of this document, the co-lead federal agencies determined that the Project would be likely to adversely affect Canada lynx,

²⁷ Richter, B.D., M.M. Davis, C. Apse, and C. Konrad. 2011. *Short Communication: A Presumptive Standard for Environmental Flow Protection*. River Research and Applications (2011). Wiley Online Library.

gray wolf, and northern long-eared bat, and likely to adversely affect critical habitat for the Canada lynx and gray wolf. The Corps and Forest Service jointly prepared a Biological Assessment (Appendix D to the FEIS), and USFWS responded with a Biological Opinion (Appendix C of this ROD). After reviewing the current status of Canada lynx, gray wolf, and northern long-eared bat, the environmental baseline for the action area, the effects of the proposed Project including mine and land exchange parcels, and the cumulative effects, it is the USFWS's opinion that the action as proposed, and in compliance with the requirements and recommendations of the Biological Opinion, is not likely to jeopardize the continued existence of Canada lynx, gray wolf, or northern long-eared bat. It is also not likely to adversely modify critical habitat for lynx or wolf. FEIS Section 5.2.5.2.1, the biological assessment, and the Biological Opinion provide a discussion of the effects on these federally listed species.

The FEIS provided information on eight state-listed and special concern species that may be impacted by the Project. These include the eastern heather vole, moose, little brown bat, eastern pipistrelle, northern goshawk, boreal owl, wood turtle, and yellow rail. It is expected that the Laurentian tiger beetle, taiga alpine butterfly, Freija's grizzled skipper butterfly, Nabokov's blue butterfly, and Quebec emerald dragonfly would not be affected. The FEIS also discussed 95 Species of Greatest Conservation Need (SGCN), 18 Regional Forester Sensitive Species (RFSS), and other wildlife species, including those considered tribally or culturally significant. While no species are expected to be impacted at a population level effects are expected to occur as a result of human activity, noise and vibration, rail and vehicle traffic, and decrease of habitat associated with the Project.

Human activity would displace many mobile individuals. While similar habitat is available in surrounding areas and could absorb displaced wildlife, displaced individuals could increase the competition for resources in their new habitat. Less mobile species would be expected to have higher mortality rates due to their reduced capacity to adapt to losses in habitat. In regards to species that use or depend on riverine systems, the Partridge and Embarrass Rivers are proposed to be maintained within natural variability limits, and therefore effects to wildlife that use or are dependent on these systems would be limited.

Effects from noise on wildlife are largely unknown as described in the Corps and the Forest Service's Biological Assessment. Sensitivity thresholds to noise are generally lower for animals than humans and effects from noises such as blasting would likely cause animals to startle and would interrupt forage or nesting activities. Bird communications could change as a result of noise and this could result in decreased reproduction and anomalies in learned vocalizations.

Wildlife mortality generally increases with increasing traffic volumes and vehicle speed. Highly mobile species and habitat generalists (species that utilize a wide variety of habitats) are known to have higher road mortalities. Traffic effects from collisions with wildlife depend upon factors such as traffic volume, traffic speed, and the species involved. The potential for road effects increases if the roads are bordered by high-quality habitat or are crossed by wildlife travel corridors. The high density of affected wetlands at the Mine Site bordering the haul roads may result in a relatively high amphibian and reptile

mortality. Shrubs and trees near roadsides can increase road crossings by deer and birds. The barrier effect of roads is greater for small mammals, amphibians, and reptiles than for birds and large mammals. Species that utilize the small preserved forest island remnants between haul roads at the Mine Site would be most affected.

Four key habitat types have been identified at the Project and would be impacted: (1) 1,909 acres of mature upland/wetland forest, (2) 1,242 acres of open ground/bare soil including areas disturbed by past mining activities, (3) 296 acres of brush/grassland/early successional forest, and (4) 582 acres of aquatic environments including open water and wetlands. The Project's impacts to ground/bare ground habitat should result in little effect on wildlife but impacts to all other habitats have the potential to impact species, including species of greatest conservation need. Several conservation measures described above and incorporated into the Project to minimize and reduce potential impacts to the Canada lynx, gray wolf and the northern long-eared bat would also help to reduce effects on other wildlife species. Also the Applicant proposes to provide wetland mitigation by purchasing credits from the Lake Superior Mitigation Bank. This bank is located in the same major watershed as the proposed Project and would likely provide habitat favorable to wildlife including the gray wolf and Canada lynx.

Based on the above discussion and the content of the FEIS including consideration for impacts and minimization and mitigation strategies, the Project would have minor adverse effects on fish and wildlife.

10.12 FLOOD HAZARDS

Reference: FEIS Section 4.3.3

The proposed Project is not located within a Federal Emergency Management Agency (FEMA) mapped 100 year flood plain. As shown in FEIS Figure 4.3.3-2, the 500-year floodplain encroaches on a portion of the Mine Site. The landscape north of the East Pit includes low wetland areas adjacent to the Partridge River. A berm would be constructed between the river and the parallel northern rim of the East Pit in this low area to prevent flow entering the East Pit during high water events. The proposed mining activity associated with the Project would be managed by the MDNR Permit to Mine to manage the flood damage potential for upstream and downstream property owners.

The Project would have little if any impacts on flooding hazards.

10.13 FLOODPLAIN VALUES (33 CFR 320.4(I))

Streams in the vicinity of the Project have well-developed floodplains. At the mine site stormwater would be directed off-site via historic flow paths. At the tailings basin, treated water would supplement stream flow as necessary to maintain flow. Based on modeling, stream flows would remain within +/- 20 percent of historic rates. Maintenance of hydrologic input will ensure that streams remain connected to their floodplains.

The project would have negligible impacts on floodplain values.

10.14 LAND USE (33 CFR 320.4(a)(1))

Reference: FEIS Sections 4.2.1 and 5.2.1

The Project area lies within the Mineral Mining Zoning Districts of the Cities of Babbitt and Hoyt Lakes and an industrial use district of St. Louis County. Both the county and municipal zoning districts surrounding the Plant Site are designated for industrial or mining use. Privately owned parcels adjacent to the Mine Site fall under the same or similar zoning and land use designations; therefore, the Project would not have the potential to conflict with surrounding land uses. Components of the proposed Project would need to comply with local zoning ordinances and comprehensive land use plans. The Project would decrease the amount of land available for public access and use, and would decrease portions of the 1854 Ceded Territory available for use by the Bands. Given the historic use of the federal lands within the Mine Site for mineral exploration and ongoing restrictions on public access, the Project would result in little or no change in actual public use of these lands.

The effects of this proposal on land use are negligible.

10.15 NAVIGATION (33 CFR 320.4(o))

There are no Section 10 waters or traditionally navigable waters within the Project site.

10.16 SHORELINE EROSION AND ACCRETION (33 CFR 302.4(a))

Tributaries that receive drainage from the Project area are characterized by well-developed floodplains and bank vegetation. As described above, the Project would have negligible or minor changes on the flow and dynamics of streams outside the Project area. The Project is not expected to have appreciable impacts on bank erosion or sediment and would have negligible impact on shoreline erosion and accretion.

10.17 WATER SUPPLY AND CONSERVATION (33 CFR 320.4(m))

Reference: FEIS Sections 4.2.2 and 5.2.2

Consistent with Corps policy at 33 CFR 320.4(m), water conservation requires the efficient use of water resources in all actions which involve the significant use of water or that significantly affect the availability of water for alternative uses including opportunities to reduce demand and improve efficiency in order to minimize new supply requirements. As described in the FEIS, the Project has been designed to collect, treat and reuse water to the maximum extent practicable. The primary source of process water at the Plant Site would be the Tailings Basin ponds, which would contain return water from the beneficiation plant, treated water from the WWTS, and water collected from the Tailings

Basin containment system. Direct precipitation and stormwater runoff from the process areas at the Plant Site would also be directed to the Tailings Basin pond.

To address water supplementation needs, the Project proposes to withdraw water from Colby Lake, which is approximately six mile south of the Plant Site. Colby Lake is currently used as a potable water source for the City of Hoyt Lakes and as a cooling water source for Minnesota Power's Laskin Energy Center natural gas power plant. The MDNR is the agency with permitting authority over water appropriations and a permit is needed to appropriate or use waters of the state for any use that exceeds 10,000 gallons in any one day or 1,000,000 gallons in a year except for domestic use serving less than 25 persons. The MDNR Water Appropriation Permit 2017-0260 was issued on November 1, 2018. The Applicant's compliance with this permit should ensure the efficient use of water resources and ensure the availability of water for alternative uses. The Permittee may transfer water from Colby Lake into Whitewater Reservoir, except that no such transfer is permitted when the water elevation in Colby Lake is below 1439 ft msl or the water elevation in Whitewater Reservoir is above 1442 ft msl. If the water elevation of Colby Lake is below 1439 ft msl, the Permittee may only pump water from Colby Lake if water is being transferred at an equal or higher rate from Whitewater Reservoir to Colby Lake. The Permittee may transfer water from Whitewater Reservoir to Colby Lake when the water elevation of Whitewater Reservoir exceeds 1410 ft msl. Impacts from the Project are expected to be within the range of variability historically experienced during the former LTVSMC mining operations.

The Project accounts for each part of the water budget and collects any contact water, treats it and releases it to tributaries with the goal to keep the stream flows within 20% of the existing rates. Should monitoring indicate that the plan is not sufficiently augmenting any flows lost due to changes to the drainage area, reduction of baseflow or removal of water from lakes and reservoirs, a number of contingency mitigation options are presented in the FEIS. These mitigation options include adding additional capacity to ponds or sumps to prevent overflow; the addition of a grout curtain of control flow of water in, and later out of, the pits; and the expansion of the tailings basin seepage containment system to ensure the capture of all water.

There are 38 known residential wells between the Tailings Basin and the Embarrass River with the closest located approximately 1 mile from the toe of Cell 2E. Fifteen residential wells near the Tailings Basin were sampled. The MPCA conducted a review of the residential well and monitoring well results (which, in part, included the consideration of chemical tracers).²⁸ This review concluded that it was not clear whether elevated metal concentrations in some of the residential wells were caused by the Tailings Basin or reflect natural or localized background concentrations. However, the results for residential wells are similar to the results for natural background wells. That similarity suggests that the residential wells may not be impacted by the existing Tailings Basin.

²⁸ Barr 2009d. Technical Memorandum: Results of Residential Well Sampling North of LTVSMC Tailings Basin. January 27, 2009.

The Applicant plans to consistently monitor groundwater levels (approximately 3 times per year), process water streams (generally continuous monitoring), surface water streams (generally monthly monitoring), and pond levels (generally daily monitoring). Monitoring will also be used to identify any hydrologically significant faults in the bedrock during the mining phase. This robust monitoring program is designed to provide additional data for updating models and predicting unexpected environmental impacts in time to mitigate them.

The Corps has determined that the Project would have minor impacts on water supplies.

10.18 WATER QUALITY (33 CFR 320.4(d))

References: FEIS Section 5.2.2

The overall Project includes all activities in uplands, mining and processing of ore over a 20 year period, restoration and project closure procedures, and mechanical or non-mechanical treatment for as long as necessary to protect regulatory standards at applicable groundwater and surface water compliance points. These activities have the potential to affect water quality in both the Partridge River and Embarrass River watersheds, both tributaries to the St. Louis River and within the Lake Superior Basin.

This Project would represent the first copper-nickel-PGE mine in Minnesota, with the ore and waste rock containing various amounts of sulfide minerals. Sulfide minerals, when exposed to oxygen and water, have the potential to release soluble metals and sulfate and produce acid mine drainage. The sulfide sulfur (S) concentrations of the NorthMet waste rock would be relatively low compared to many other mines with sulfide-bearing rock around the world. The NorthMet waste rock is predicted to average 0.15 percent sulfide S, while concentrations in other mines with sulfide-bearing rock can be as high as 40 percent.

With respect to the discharge of dredged and fill material into WOTUS, the identification of clean fill and measures to minimize effects from activities regulated by the Corps are described throughout Section 9 of this document. These measures would ensure that discharges of dredged and fill material do not adversely impact water quality. On December 20, 2018, the MPCA issued a Section 401 Water Quality Certification for the discharge of dredged and fill material into waters.

Overall, impacts to water quality and chemistry are not expected to exceed regulatory limits. Discharges at the Plant Site from the WWTS would be subject to the MPCA NPDES permit that was issued on December 20, 2018. The MPCA NPDES permit contains Operating Limits for sulfate and copper in the permit that are enforceable. Given the treatment technology required by the permit, compliance with the Operating Limits will ensure the discharge does not exceed water quality standards for other parameters. MPCA added a prohibition against discharges from the treatment facility that violate water quality standards.

Concern has been expressed about the potential for contaminated groundwater flow to the north towards the BWCAW after mine closure when the mine pits are flooded. While not expected to occur based on MODFLOW modeling conducted during the EIS, the possibility of northward flow from the Mine Site cannot be ruled out. Such effects, which would not be physically caused by the Corps regulated activities, but rather by flooding of mine pits, are not subject to the Corps regulatory authority. Contingency mitigation that may be required by the MDNR to prevent northward flow are described in FEIS Sections 5.2.2.3.5.

Based on the above discussion and the content of the FEIS, the probability of significant water quality impacts due to the Project is acceptably low. The Project would likely not exceed water quality standards as required in the NPDES permit and would likely adhere to the Section 401 Water Quality Certification and the Corps Section 404 permit. Under the NPDES permit, water treatment would continue indefinitely, and any changes from a mechanical to a non-mechanical treatment system would only occur after it can be proven such a treatment would meet water quality criteria. MDNR and MPCA permits require a robust monitoring program, model refinement, and adaptive management plans to ensure water quality standards would be met under all future conditions.

The Corps has determined that the proposed Project would have minor adverse effects on water quality.

10.19 ENERGY NEEDS (33 CFR 320.4(n))

Reference: FEIS Section 5.2.7.4

Corps regulations specify that energy conservation and development are major national objectives. While the Project would not be directly involved in energy development, many of the metals that would be produced are components in energy conservation and development related projects such as wind, gas and power plant turbines, hybrid cars, batteries and fuel cells.

Several sources of energy would be consumed during the development, operation and closure of the NorthMet mine including electricity, petroleum, and natural gas. As described in the FEIS, aspects of the project were planned or modified to improve energy conservation and production efficiency to reduce greenhouse gas (GHG) emissions. A summary of these measures follows.

The Applicant would use a hydrometallurgical process, which uses about 50 percent less energy than the alternative pyrometallurgical process. However, while energy use is reduced by one-half, GHG emissions do not decline per unit of production from what would be expected from a pyrometallurgical process, principally because of the large load of non-energy process emissions associated with hydro processing.

As a part of the initial ore extraction process, primary production excavators and two of the three blast-hole drills would be electric rather than diesel powered. The ore hauling process would include new gen-set locomotives that are more efficient and use less fuel

than conventional locomotives (FEIS, page 5-512). In order to improve the grinding process, the ore grinding circuit was modified to include a semi-autonomous grinding (SAG) mill which is more efficient and would use less energy than the originally proposed rod and ball mill circuit (FEIS Appendix A, page 454).

The Applicant also plans to use premium efficiency motors in selected locations rather than standard motors. Motor efficiencies typically vary between 85 and 96 percent, depending upon the size and load of the motor. Gravity transport of process slurries will also be used where possible, instead of pumps. Some of the metals will be extracted using a hydrometallurgical process which is expected to reduce the energy demand by 50 percent over comparable pyrometallurgical processes (FEIS, page 5-511).

In addition to these controls, the Project would also use high efficiency particulate air (HEPA) filters following the fabric filters on selected units to allow vented exhaust air to be re-routed back into the building. Venting exhaust air back into a building will reduce the heating fuel demand and offset the cost and energy usage associated with re-routing air to maintain indoor air quality (FEIS, page 5-518). The Applicant plans to configure the processing plant such that the overall power factor for the facility is as close to one (energy input to energy output) as practical, which will help minimize electricity use (FEIS, page 5-511). Future energy reductions may be possible if feasibility studies show that transitioning from a mechanical water treatment system to a non-mechanical water treatment system will allow water resource objectives to be met (FEIS, page 5-244).

The Project would incorporate energy conserving efficiencies by updating existing infrastructure and utilizing currently available energy efficient equipment and processes where possible.

10.20 SAFETY OF IMPOUNDMENT STRUCTURES (33 CFR 320.4(k))

MDNR reviews dam/buttness design through their Dam Safety Permit and Permit to Mine review. While the Corps regulatory program does not regulate the construction or operations of dams or dam safety, any Corps permit issued would regulate discharges into WOTUS associated with tailings basin buttness construction.

The revised buttness design that was proposed after the FEIS and its impacts on environmental resources is described above in Sections 4.3 and 8.6. The buttnesses have been designed or reviewed by qualified staff at Minnesota DNR and licensed professional engineers at Barr Engineering, EOR, and an expert review team assembled by EOR. A dam permit was issued by MDNR for the final design on November 1, 2018.

Consistent with Corps regulations at 33 CFR 320.4(k), the Applicant has demonstrated that the structures comply with established state dam safety criteria, have been designed by qualified persons and the design has been independently reviewed. Safety concerns with regard to buttness design have been adequately addressed and the impoundment structure would not impair safety.

10.21 FOOD SUPPLY

Reference: FEIS Sections 5.2.9.2.2 and 5.2.7.2.5

Subsistence fishing and consumption is a common activity for Bands in the 1854 Ceded Territory. Members of the Grand Portage and Fond du Lac Bands are known to consume substantially more fish than the assumed statewide average. As described in Section 5.2.9.2.2 of the FEIS, bioaccumulation of mercury in fish could affect Band members' willingness to rely on subsistence fishing as a contribution to household economies, as well as affect continuation of traditional fishing practices, but there is no evidence that this availability would significantly affect subsistence use given the lack of information showing recent or historic fishing activity in the Project area. The Air Emissions Risk Analysis (AERA) assessed health effects for recreational and tribal fishermen and their families consuming fish that could potentially contain elevated bioaccumulated levels of methylmercury. A potential small change in fish mercury concentration was estimated based on modeled emissions and deposition. The potential change in methylmercury concentration was not statistically measureable given variability in background concentrations and current laboratory analytical methods (Barr 2013j). Therefore, there is no expected change in fish mercury concentrations, and no subsequent change in human health risks related to fish consumption (see FEIS Section 5.2.7.2.5).

10.22 MINERAL NEEDS

Reference: FEIS Section 3.2

The mine would produce economically and strategically important non-ferrous metals including copper, nickel, cobalt, and platinum group metals including platinum, palladium, gold and silver. These metals are needed for a wide variety of industrial purposes.

The Applicant has taken into consideration the location of the known metallic mineral deposits at the Mine Site within the extent of the NorthMet ore body and has developed engineering controls to ensure that mining activities and the management of project features at the Mine Site, the tailings basins, and the transportation and utility corridor comply with state and federal regulations. The Applicant has also taken into consideration the location of known mineral reserves, designing project features at locations that would not preclude future exploitation of these resources.

The Corps has determined the Project would have not have adverse impacts on mineral needs.

10.23 CONSIDERATION OF PROPERTY OWNERSHIP

Authorization of work in WOTUS under a Corps permit does not convey a property right, nor authorize any injury to property or invasion or infringement of other rights. The applicant's signature on an application is an affirmation that the Applicant possesses or will possess the requisite property interest to undertake the activity proposed in the

application. A Forest Service-PolyMet land exchange has been completed as described in Section 4.1 of this document. All lands within the Project area are now privately owned.

The project is located within the territory ceded by the Chippewa of Lake Superior to the U.S. Government in the 1854 Treaty. All of the impacted lands are within this ceded territory. The rights to hunt and fish (gather or take) subsistence resources within the 1854 Ceded Territory were retained by the Bands on a usufruct basis. These rights are exercised on public lands within this ceded territory, and on private lands with the permission of the land owner. As described in Section 10.1(iii) of this document, even before the land exchange when the majority of the Mine Site was within the Superior National Forest, the Project area is bound by private roads and access to the site has been generally restricted. The Project would result in little or no change in access for the public and Band members. The land that was transferred by the Applicant to the Superior National Forest is expected to be open to the public and Band members.

Several aspects of the Project have the potential to impact adjacent or nearby property ownership as described throughout this public interest evaluation. The Project would be consistent with local zoning and land use plans, and would be similar in nature to other activities in the region. As described throughout this section, the Applicant has incorporated measures into the Project to reduce effects on resources of concern including wetlands, water quantity and water quality, air quality, fish and wildlife resources, historic properties and cultural resources. The Project's compliance with all state and federal permits would ensure that there is no appreciable impacts on adjacent properties.

The Corps has determined the Project would have negligible impacts on property ownership.

10.24 NEEDS AND WELFARE OF THE PEOPLE

The metallic minerals mined at the Project site would be processed and sold for use in a variety of industries that would meet specific public needs, such as transportation, manufacturing, communication, electrical generation and transmission, and healthcare. The activities associated with the Project are compatible with the existing land uses and would take advantage of the existing LTVSMC Plant Site and transportation corridor. Engineering controls would ensure that environmental standards are met during mining operations and in mine closure.

The Project has been modified to incorporate all practicable measures to minimize impacts to important resources of concern including air, water, fish and wildlife, historic properties and cultural resources. Based on the applicant's compliance with all state and federal authorizations, including compliance with all general and special permit conditions, the Corps has determined the Project would not be contrary to the public interest.

11.0 MITIGATION (33 CFR 320.4(r), 33 CFR Part 332, 40 CFR 230.70-77, 40 CFR 1508.20 and 40 CFR 1502.14)

Avoidance and minimization measures to reduce impacts to WOTUS are described throughout this document including Sections 8, 9 and 10. Avoidance and minimization measures are addressed in the DEIS at Section 3.2.3.2 and Table 3.2-2, in the FEIS at Section 3.2.3 and Table 3.2-16, and in response to comments received on the SDEIS and FEIS. It has been determined that all practicable avoidance and minimization measures have been incorporated into the Project.

To offset unavoidable impacts to wetlands associated with the Project, including 901.23 acres of direct impacts and wetland loss and 27 acres of indirect fragmented wetland loss, the Applicant purchased 1278.36 mitigation credits from the Lake Superior Wetland Mitigation Bank located in the St. Louis River Watershed. Wetlands to be impacted by the Project are located in the Embarrass and Partridge Watersheds, which are sub-watersheds of the St. Louis River Watershed; therefore impacts and compensation are located in the same major watershed. These bank credits provide stormwater storage and high quality habitat within the St. Louis watershed. Credits are characterized primarily by bog wetlands that are of the same type proposed to be impacted.

Consistent with district policy, the base compensation ratio in this part of the state where more than 80 percent of the pre-European settlement wetlands remaining is typically 1.5:1, with a minimum compensation ratio of 1:1. Incentives for in-kind, in-place and in-advance mitigation can reduce these ratios to 1:1. In this case, the Corps has determined base compensation ratios would be higher to offset high quality and difficult to replace bogs and forested wetlands. The following base ratios have been established for high quality and forested or bog wetlands: non-forested, non-bog high quality wetlands would be offset at a base ratio of 1.75:1; low or medium quality bogs and forested wetlands would be offset at a base ratio of 1.75:1 and high quality bogs and forested wetlands would be offset at a base ratio of 2:1.

The purchase of credits at a bank characterized predominantly by high quality bog in the same major watershed as the impacts would be considered in kind, in advance and in place compensation. Therefore district policy provides for the application of incentives that reduce the base ratio by 0.5. Non-forested, non-bog high quality wetlands as well as low or medium quality bogs and forested wetlands would be offset at a ratio of 1.25:1 and high quality bogs and forested wetlands would be offset at a ratio of 1.5:1.

The Applicant has purchased 1,278.36 credits to offset unavoidable loss of wetland associated with this Project. Appendix G provides information on the type and quality of wetlands to be impacted, total credits required for compensation at the base ratios described above and total credits after applying incentives. The purchase of credits from the Lake Superior Wetland Bank will be more effective in replacing lost functions than the mitigation originally proposed. It is the Corps conclusion that purchase of credits from the Lake Superior Wetland Bank will adequately replace lost functions at the impact site.

To provide upfront compensation for wetlands that are likely to be lost as a result of indirect effects from groundwater drawdown at the Mine Site, the Applicant purchased 162 credits at the Lake Superior Wetland Mitigation Bank. If monitoring required to assess extent of indirect effects concludes that wetlands are lost as a result of the Project, these credits would be applied to debits incurred. If debits at the impact site exceed 162 credits, additional compensation will be required. The applicant has also purchased options for an additional 529 credits that may be used to offset indirect impacts that are determined after construction of the Project begins and during monitoring.

12.0 SPECIAL CONDITIONS

AUTHORIZED WORK

1. The Permittee understands and agrees that the DA permit has been issued based upon the Permittee's intended purpose to mine, via open pit methods, the known ore deposits containing copper, nickel, cobalt, and platinum group elements; and based upon information the Permittee supplied to the Corps. This information includes the DA permit application, all information and analyses submitted by the Permittee to the Corps after publication of the Final Environmental Impact Statement and relevant parts of documents to include the NorthMet Project Water Management Plan – Mine dated December 2017 and the NorthMet Project Water Management Plan – Plant dated December 2017. The Permittee recognizes its commitment to conduct work in waters of the United States as described in materials it submitted. Enclosure A to this permit includes drawings depicting authorized activities and Enclosure B provides details on wetlands authorized to be filled.
2. The Permittee shall require, as a material condition of its contracts and subcontracts, that all its contractors and their subcontractors at any tier comply with the permit. A copy of the permit shall be available at the construction site(s) at all times and the Permittee shall ensure that all contractors and subcontractors are provided a copy of the permit and are familiar with the activities that have been authorized and familiar with all parts of the Project area containing waters of the United States that shall be avoided. The Permittee shall be responsible for ensuring that its contractors and subcontractors at any tier comply with this permit.
3. When work authorized by this permit begins, the Permittee shall notify the St. Paul District Corps of Engineers in writing at the following address: 180 5th Street East Suite 700, St Paul, MN 55101
4. The Permittee shall provide a shapefile identifying the footprint of the Project area, the 901.24 acres of wetlands authorized to be filled, the 26.93 acres of wetlands indirectly impacted by fragmentation and the 635.83 acres of wetlands at the Mine and Plant Sites to be avoided. This shapefile shall be provided to the Corps no later than 30 days before the start of work.

RATIONALE: These special conditions are required to ensure the Permittee understands the Corps' permit decision was based on the information it supplied to the Corps to evaluate, and to ensure compliance with the permit and minimize impacts to adjacent wetlands and other waters as a result of the permitted activities.

AVOIDANCE AND MINIMIZATION

5. The Permittee shall clearly identify the permitted limits of disturbance at the Project site with highly visible markers so that boundaries are clearly visible to all equipment operators before any discharge into waters of the United States on-site. The Permittee shall properly maintain such identification until construction, operation and reclamation activities are complete and the soils have been stabilized. The Permittee is prohibited from conducting any unauthorized Corps-regulated activity outside of the permitted limits of disturbance (as described in the permit).

6. The Permittee shall not discharge any dredged or fill material, place or stockpile any overburden, waste rock, equipment or other materials, operate, park or store any construction equipment or vehicles (whether temporarily or permanently), or engage in other ground disturbing activities in waters of the United States that have not been affirmatively authorized under this permit for those activities to take place.

RATIONALE: These conditions are required to minimize impacts to adjacent wetlands and other waters as a result of the permitted activities.

FILL MATERIAL

7. The Permittee shall not discharge any dredged and fill material into waters of the United States until the portion of the Rock and Overburden Management Plan that addresses material to be discharged into waters of the United States is received and approved by the St. Paul District Corps of Engineers.

8. The Permittee shall not discharge any Biwabik formation (BIF) material into waters of the United States until such discharge is approved by the Corps. The Permittee shall prepare a BIF construction rock workplan including any modeling, sampling, and analyses necessary to demonstrate to the Corps that the material is suitable for discharge into waters of the United States.

9. The Permittee shall not discharge any LTVSMC tailings into waters of the United States until such discharge is approved by the Corps. The Permittee shall prepare an LTV tailings construction workplan including any modeling, sampling, and analyses necessary to demonstrate to the Corps that the material is suitable for discharge into waters of the United States.

10. The Permittee shall not discharge any waste rock into waters of the United States on-site unless the waste rock is Category 1 waste rock with a sulfur content of 0.05 % or less. This material shall not be discharged into waters of the United States until approved by the Corps. The Permittee shall prepare a workplan including any modeling, sampling, and analyses necessary to demonstrate to the Corps that the material is suitable for discharge into waters of the United States.

RATIONALE: These conditions are required to ensure these materials are appropriate for discharge into wetlands as a result of the permitted activities.

401 WATER QUALITY CERTIFICATION

11. All terms and conditions of the 401 Water Quality Certification issued by the Minnesota Pollution Control Agency are hereby incorporated as terms and conditions of this permit (Enclosure C).

RATIONALE: This condition is required to ensure the permitted activities in wetlands comply with Section 401 of the Clean Water Act.

ENDANGERED SPECIES ACT

12. The Permittee shall comply with the federal Endangered Species Act. The Permittee shall also comply with Term and Condition 1 of the Biological Opinion issued by the US Fish and Wildlife Service (USFWS) on February 5, 2016 (Enclosure D). Specifically, if any hibernacula for the northern long-eared bat (NLEB) are found in the Project area, the Permittee shall not conduct any activities that disturb or disrupt hibernating NLEB individuals when they are present and shall not physically alter the hibernaculum's entrance or environment when NLEB are not present. This includes not conducting any tree removal within 0.25 miles (0.4 km) of any known NLEB hibernacula. The Permittee shall immediately notify the Corps and the USFWS Office if it is unable to comply with this Term and Condition so that consultation may be initiated as appropriate before the work begins.

RATIONALE: This condition is required to ensure compliance with Section 7 of the Endangered Species Act.

NATIONAL HISTORIC PRESERVATION ACT (NHPA)

13. The Permittee shall comply with all stipulations and terms relevant to the Permittee's responsibilities under the NHPA listed in the December 15, 2016, Memorandum of Agreement between the United States Forest Service, the U.S. Army Corps of Engineers, the Advisory Council on Historic Preservation, PolyMet Mining, Inc., and the Minnesota Historic Preservation District regarding the NorthMet Mining Project (Enclosure E).

RATIONALE: This condition is required to ensure compliance with Section 106 of the National Historic Preservation Act.

MINIMIZING INDIRECT EFFECTS

14. Prior to the initiation of any work authorized by this permit, the Permittee shall install erosion control measures along the perimeter of all work areas to prevent the displacement of fill material outside the authorized work areas into WOTUS. Immediately after completion of the final grading of the land surface, all slopes, land surfaces, and filled areas shall be appropriately stabilized to prevent erosion. The erosion control measures shall remain in place and be maintained until all authorized work is completed and the work areas are stabilized.

15. The Permittee shall maintain stream flows within the Embarrass River at +/- 20% of historic average annual flow. Stream gage data collected shall be provided to the St. Paul District on an annual basis.

RATIONALE: These conditions are necessary to ensure indirect effects associated with regulated activities in wetlands are minimized.

MONITORING OF INDIRECT EFFECTS ON WETLANDS

General Data Collection and Reporting

16. Data for hydrology, vegetation, and wetland boundary monitoring shall be collected as described in the memorandum titled *Monitoring Plan for Potential Indirect Wetland Impacts* prepared by Barr Engineering Company dated March 2019 (Barr Memorandum).

17. Data shall be compiled into annual reports, with the first annual report submitted to the Corps by March 31, 2020. Each annual report shall include all required data and analyses related to monitoring of hydrology, vegetation and wetland boundaries based on the status of construction and operations of the Project. Details on when monitoring shall begin and when results shall be reported are addressed in Special Conditions 19 – 25.

18. All monitoring reports shall include methods used, results found, and evaluations performed to characterize indicators of potential adverse indirect wetland impact. When changes to hydrology, vegetation or wetland boundaries are documented as further described in conditions 21, 23 and 25, each monitoring report shall include recommendations for appropriate steps to respond to the documented change, to include additional monitoring, adaptive management and/or compensatory mitigation.

Reporting of hydrology data:

19. The Permittee shall compile wetland monitoring well data collected for hydrology monitoring into annual reports submitted to the St. Paul District by 31 March following the year of data collection. Data collected in 2019 shall be reported by March 31, 2020. Unless the 2017-2018 data is submitted before the 2020 report, that report shall also include 2017 and 2018 data.

20. The Permittee shall apply St. Paul District's memorandum titled, *Interpreting Monitoring Well Data for Determining Potential Indirect Hydrological Impacts to Wetlands* dated May 2018 to establish baseline hydrographs for all wells and to characterize hydrology indicators of potential adverse indirect wetland impact. The first report to be submitted in March of the year following the beginning of construction shall include the baseline hydrographs and minimum/maximum brackets for all wells. Baseline hydrographs shall be developed based on data collected up to the point that construction activities begin on-site.

21. The Permittee shall document all deviations from the established baseline when inundation and/or depth to the water table during the growing season does not remain within the minimum/maximum brackets documented by baseline monitoring well data when placed in context of hydrological conditions. Each annual report submitted after construction begins shall summarize all deviations from baseline monitoring well data meeting one or both of the following criteria: (1) frequency ≥ 2 growing seasons; or (2) duration ≥ 14 consecutive days.

Reporting of Vegetation Data:

22. The vegetation monitoring data shall be compiled into biennial reports submitted to the St. Paul District by 31 March following each two-year interval of vegetation monitoring. The first two year interval shall begin immediately following the initial approximate 18 month construction period.

23. For each individual vegetation monitoring location, PolyMet shall summarize any change in species richness that is 25% or greater; any change in living tree areal cover that is 25% or greater; any change in areal cover by living Sphagnum mosses (*Sphagnum* spp.) that is 25% or greater; any appearance of non-native and/or invasive species and their areal cover in a relevé where none were previously recorded; or a 25% or greater increase in non-native and/or invasive areal cover or number of species in relevés where non-native and/or invasive species were previously recorded (as baseline conditions); and a 25% or greater reduction of native hydrophytic species and/or their areal cover in the relevé; and a change in wetland type (Eggers and Reed 2015) and/or Native Plant Community Class (MDNR 2003). Information to explain the reason for such changes shall be included in the monitoring report.

Reporting of Wetland Boundaries

24. The wetland boundary data shall be compiled into reports at five-year intervals. The first five year interval shall begin immediately following the initial approximate 18 month construction period. The Permittee shall contact the St. Paul District if construction is expected to extend beyond 18 months and provide details on reason for and duration of the extended construction period. If initial construction is expected to extend for four or more months beyond the estimated 18 month period, the first five year interval shall begin as directed by the St. Paul District before the completion of initial construction.

25. Any loss of wetland area from the baseline wetland extent shall be described.

Assessment of Potential Indirect Wetland Impacts

26. Contents of each report shall be subject to review and approval by the Corps and the Permittee shall provide any corrections or additional information requested by the Corps within 30 days of the Corps' request.

27. If the St. Paul District makes a determination that wetlands have been adversely impacted, PolyMet shall provide a plan within 60 days for increasing monitoring, implementing adaptive management and/or providing compensatory mitigation for review and approval by the St. Paul District. Upon approval of the proposed plan, the Permittee shall implement the measures described within the approved plan within 60 days of notification of approval from the St. Paul District.

Duration

28. Monitoring well, vegetation and wetland boundary data shall be collected and reported as described above until the St. Paul District notifies PolyMet in writing that data collection may cease.

RATIONALE: Conditions 16-28 are required to ensure adequate monitoring and reporting of data and information to inform the Corps' determinations of indirect effects on wetlands associated with authorized activities.

ADDITIONAL MONITORING OF HYDROLOGY AT SPECIFIC LOCATIONS

29. The well data collected at five wells shall be provided quarterly to the St Paul District. Specifically data collected on wells 2, 12, and 16 shall be provided on a quarterly basis once overburden removal begins at the east pit. Further, data collected on wells 32 and 33 near the west pit outlet shall be provided on a quarterly basis once overburden removal begins at the west pit. This data shall be collected and reported consistent with the protocol established in Barr Memorandum.

RATIONALE: This condition is required to ensure adequate monitoring and reporting of data and information to inform the Corps' determinations of indirect effects on wetlands in areas of the Project site that may have a higher likelihood for indirect effects.

COMPENSATORY MITIGATION FOR AUTHORIZED IMPACTS

30. The Permittee shall provide 1278 mitigation credits from the Lake Superior Wetland Mitigation Bank to offset 901.23 acres of direct impacts and wetland loss and 27 acres of indirect fragmented wetland loss. The Permittee has demonstrated its purchase of these credits.

RATIONALE: This condition is required to ensure appropriate compensation to offset any indirect effects to wetlands caused by the permitted activities.

COMPENSATORY MITIGATION FOR INDIRECT EFFECTS

31. If compensatory mitigation to offset indirect effects is deemed necessary by the St Paul District, the Permittee shall be responsible for submitting a proposed compensation plan to offset the impacted wetlands. This plan shall be submitted to the Corps for review and approval within 60 days of notification that compensation is required. The compensation plan shall provide rationale for the location, type and amount of proposed

compensation and shall consider the type and quality of impacted resource, the amount of impacted resource, type of impact (full or partial loss of functions), duration of impacts (short or long term, permanent or temporary) and importance of the affected resource in the watershed. The Permittee may propose to use advance credits it has purchased from the Lake Superior Wetland Mitigation Bank for all or a portion of the compensation. If the Corps notifies the applicant that the proposed compensation is insufficient to offset documented impacts, the Permittee shall submit a supplemental compensatory mitigation plan to the St Paul District for review and approval within 60 days of such notification. Once the St. Paul District reviews and approves mitigation plan, the Permittee shall implement the approved plan within 60 days of notification of approval from the St. Paul District.

32. The Permittee shall retain the option to purchase up to 529 credits at the Lake Superior Wetland Bank. If not needed sooner to offset indirect impacts to wetlands documented in association with the Project, these options shall be retained by the Permittee until at least October 27, 2022.

33. If indirect effects are documented after option credits are no longer available or if indirect effects require more compensation than that available in the option credits, the Permittee shall be responsible for providing a compensatory mitigation plan proposing alternative compensation to the Corps for review and approval. Once the St. Paul District reviews and approves mitigation plan, the Permittee shall implement the approved plan within 60 days of notification of approval from the St. Paul District.

RATIONALE: These conditions are required to ensure appropriate compensation to offset any indirect effects to wetlands caused by the permitted activities.

ENVIRONMENTAL REVIEW MEETINGS (ERMs):

34. The Permittee shall be responsible for scheduling ERMs with the Corps to periodically review the environmental compliance of the Project with respect to the Section 404 permit. Meetings shall be scheduled to occur annually and not later than June 30th of each year. No later than thirty days prior to the scheduled date of the ERM, the Permittee shall provide a project status update to the Corps that contains the following information:

- a. A shapefile showing completed work at the Project;
- b. Status of the Project including details on discharges authorized by the permit as well as operations and reclamation;
- c. Status of the Permittee's compliance with special conditions of the section 404 permit;
- d. Status of activities completed under state permits and any modifications, approvals, non-compliance, or other agency actions associated with these permits and/or approvals since the previous ERM;
- e. A summary of water quality data required by and reported to MDNR and MPCA
- f. An assessment of the current environmental conditions at the site focusing on any new information not previously considered by the Corps and/or new inventories

and/or impact analyses conducted by other federal, state, or local regulatory agencies.

- g. A summary of monitoring of indirect effects as required in Special Conditions 16 – 28.
- h. A summary of compensatory mitigation credit options, if any, that remain available at the Lake Superior Bank to offset indirect effects associated with the Project;
- i. Information on compensatory mitigation options including additional bank credits, in-lieu fee programs, and/or permittee-responsible mitigation if advance credit options have been expended to offset indirect effect debits or are close to being expended.
- j. If all credit options have not been purchased by September 27, 2022, the Permittee shall notify the Corps of its plan to either allow the purchase agreement to expire without purchasing the option credits or propose to extend the term of the option by six or twelve months. The risk and likelihood of indirect effects shall be described in the Permittee's submittal and the Permittee shall retain the option credits for six or twelve months if directed by the Corps.

RATIONALE: This condition is required to compliance with the permit and minimize impacts to adjacent wetlands and other waters as a result of the permitted activities.

13.0 COMPLIANCE WITH ENVIRONMENTAL LAWS AND POLICIES

13.1 SECTION 401 OF THE CLEAN WATER ACT ((33 USC Section 1341) WATER QUALITY CERTIFICATION (33 CFR 320.4[d])

The Project is in compliance with Section 401 of the CWA. The Water Quality Certification was issued by the MPCA on December 20, 2018 with conditions and is included in Appendix E. Pursuant to 33 U.S.C. 1341(d). Compliance with the Section 401 WQC is a special condition of the DA permit as described in Section 12.

13.2 ENDANGERED SPECIES ACT OF 1973 (16 USC 1531)

The proposed Project is in compliance with Section 7 of the ESA. The consultation conducted for the Project and the Biological Opinion issued by the USFWS is described in Section 9.4. Compliance with term and condition 1 in the Biological Opinion is a special condition of the DA permit as described in Section 12.

13.3 SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT (NHPA) (16 USC 470 et seq.)

The proposed action is in compliance with Section 106 of the NHPA. The identification of historic properties, assessment of effects and resolution of adverse effects is described in Section 10.7 of this document. The federal Co-lead Agencies, in consultation with the SHPO, Bands, and the Applicant assessed effects of the Project on the Spring Mine Lake Sugarbush; the Partridge River Section of the Mesabe Widjiu; the Partridge River

Segment of the Beaver Bay to Lake Vermillion Trail; and the Erie Mining Company Mining Landscape Historic District and have determined that those historic properties would be adversely affected. The ACHP was notified of these adverse effects and chose to participate in the resolution of adverse effect. Those adverse effects have been taken into account and resolved through mitigation measures stipulated in a memorandum of agreement (MOA), which has been executed by the Forest Service, Corps, the SHPO, the ACHP, and PolyMet. The MOA is attached to the ROD as Appendix D. The permit issued for this Project would include a special condition that requires compliance with the stipulated terms and conditions of the MOA.

13.4 FISH AND WILDLIFE COORDINATION ACT (FWCA) (16 USC 661)

The proposed action is in compliance with the FWCA. Sections 5.2.5 and 5.2.6 of the FEIS identify the impacts of the proposed Project on fish and wildlife species. The Corps coordinated with the USFWS on the proposed action, including meetings to obtain input, and providing a copy of the SDEIS. During preparation of the SDEIS, the Corps requested that USFWS be a cooperating agency. The USFWS declined the invitation. USFWS did not provide comments on the SDEIS.

13.5 NATIONAL ENVIRONMENTAL POLICY ACT of 1969 (42 USC 4321 – 4347)

The proposed action is in compliance with NEPA. The FEIS was completed to evaluate a reasonable range of alternatives and the direct, indirect, and cumulative effects associated with a reasonable range of alternatives. The Corps followed the NEPA process identified in 40 CFR Part 1500 et seq., 33 CFR Part 230, and 33 CFR Part 325, Appendix B, including noticing and timeline requirements, to produce an EIS that discloses to the public the probable impacts of each alternative, taking into account mitigation. The FEIS is being utilized to make a permit decision on the proposed Project. Signature of this ROD by the authorizing official completes the Corps NEPA requirements and responsibilities.

13.6 SECTION 176(C) OF THE CLEAN AIR ACT (CAA) GENERAL CONFORMITY RULE REVIEW (42 USC 7401 – 7671 Section 176[c])

The proposed action has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. The Corps has determined that direct emissions from the proposed activities that require a DA permit will not exceed de minimis levels of a criteria pollutant or its precursors and are exempted by 40 CFR 93.153. For more discussion of the emissions from the proposed action, please reference FEIS Section 5.2.7.1.3. Any later indirect emissions are generally not within the Corps' continuing program responsibility and generally cannot be practicably controlled by the Corps. For these reasons, a conformity determination is not required for this action.

The MDNR has issued an air quality control permit for operation of the Mine Site. The Corps finds the issuance of this permit to be conclusive with respect to air quality issues. Completion of the process and analysis contained within this ROD and signature by the authorizing official completes the Corps' Clean Air Act requirements.

13.7 EXECUTIVE ORDER 13175: CONSULTATION WITH INDIAN TRIBES, ALASKA NATIVES AND NATIVE HAWAIIANS

Consistent with the Corps' Tribal Consultation Policy, government-to-government consultation is to be conducted when an action has the potential to significantly affect Indian lands, tribal rights, or tribal protected resources. Consultation under Section 106 of the NHPA was conducted with the Fond du Lac Band of Lake Superior Chippewa, the Bois Forte Band of Chippewa and the Grand Portage Band of Chippewa as described above in Section 10.7 to take into account the effects of the Project on 1854 Treaty resources.

As described in Section 10.8, the Project is located in the 1854 Ceded Territory where Ojibwe Bands have retained the right to hunt, fish, gather or take subsistence resources. The federal Co-lead Agencies consulted with the Bands in order to take their interests and concerns into consideration during development of the FEIS and throughout the decision making process. In a letter dated May 31, 2006, the Corps invited the seven (7) federally recognized Ojibwa tribes residing in Minnesota to consult on the Applicant's proposal. About a year later, in a letter dated August 13, 2007, the Corps invited fifteen Ojibwa tribes across Minnesota, Wisconsin and Michigan to more formally participate in the development of the EIS as cooperating agencies. The Bois Forte, Grand Portage and Fond du Lac Bands participated as cooperating agencies. Other Tribal entities participating in the EIS process include the 1854 Treaty Authority and GLIFWC.

From 2006 through late 2009, teleconferences were usually held twice a month among the Co-lead Agencies and the Bands to gather comments, or listen to concerns, resulting from their review of documents developed for the DEIS. As development of the DEIS proceeded, the Bands expressed concerns about the disposition of their comments and requested that tribal position statements be included in the DEIS. In October of 2009, as the DEIS was being prepared for public comment, Grand Portage and Fond du Lac invoked the dispute resolution under the MOU through letters sent to the St. Paul District Commander and the MDNR Commissioner.

The Co-leads Agencies developed, in consultation with the Bands, a Coordination – Communication Plan. Chapter 8 of the FEIS describes the Impact Assessment Planning workshops, the Tribal issue review meetings and the monthly cooperating agency meetings that took place to provide the Bands with opportunities to express their points of view on the potential effects of the Project on the environment, including points of disagreement with the Co-lead Agencies, prior to the release and review of the SDEIS.

To the extent possible, the Co-Leads Agencies worked to resolve the issues raised by the Bands. Ultimately, 18 issues remained unresolved and have been documented as Major Differences of Opinion (MDO). Three meetings, or workshops, were held by the Co-leads in July of 2013, to help ensure that the MDOs were fully understood and to reach consensus with the Bands on the language used to summarize the tribal position on each issue prior to publishing those tribal positions and Co-lead responses in the

December 2013 DEIS and November 2015 FEIS. Table 8-1 of the FEIS summarizes the MDOs including the 18 issue areas as identified in the SDEIS; the Tribal Position Summaries as identified in the SDEIS; the Tribal Cooperating Agency(ies) holding the MDO; the Co-lead Agencies' responses on the issues for the SDEIS and updated responses for the FEIS; and the location in the FEIS of reference material supporting the Co-lead Agencies' opinion on the issues.

13.8 EXECUTIVE ORDER 11988: FLOODPLAIN MANAGEMENT

The proposed Project has been evaluated consistent with the intent of EO 11988. The proposed Project is not located within a FEMA mapped 100 year floodplain. Our review did not identify any 100-year flood plains in the vicinity of the Project. As identified in Section 4.3.3 and Figure 4.3.3-2 of the FEIS, a segment of the Mine Site is within a 500-year floodplain.

13.9 EXECUTIVE ORDER 12898: ENVIRONMENTAL JUSTICE

Executive Order 12898 requires federal agencies identify and address "as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

The FEIS in Section 5.2.10.2.6 provides information on the degree to which construction, operation and reclamation of the Project could disproportionately affect minority and low-income populations. Residents of the study area were considered as well as Band members who use the study areas for subsistence regardless of where they live. In the study area, approximately 13.5 percent of the population is below the federal poverty level, compared to 10 percent for the state; Native Americans comprise 2.3 percent of the study area, compared to 1.1 percent of the state population; and children under 18 years of age comprise nearly 29 percent of the study area population, compared to 24 percent for the state.

Construction and operation could increase public service demands and demand for short-term housing. These impacts are expected to be minor and would not disproportionately affect Environmental Justice (EJ) populations.

Operations could affect individuals who consume fish harvested from nearby waterbodies. Subsistence fishing and consumption is a common activity for Bands in the 1854 Ceded Territory. Members of the Grand Portage and Fond du Lac Bands are known to consume substantially more fish than the assumed statewide average. Increased mercury concentrations, and potential increases in mercury bioaccumulation in fish tissue could therefore constitute an EJ impact for Band members and other subsistence consumers of fish. The Air Emissions Risk Analysis (AERA) assessed health effects for recreational and tribal fishermen and their families consuming fish that could potentially contain elevated bioaccumulated levels of methylmercury. A potential small change in fish mercury concentration was estimated based on modeled emissions and deposition. The potential change in methylmercury concentration was not statistically measureable

given variability in background concentrations and current laboratory analytical methods (Barr 2013j). Therefore, there is no expected change in fish mercury concentrations, and no subsequent change in human health risks related to fish consumption (see FEIS Section 5.2.7.2.5).

As described in Section 10.8, Band members' use of the Project area is not well-defined and did not emerge during interviews. Without private landowner permission, there is minimal opportunity for the Bands to exercise usufructuary rights (hunting, fishing, and gathering) on this property. Construction and operation of the Project is not likely to significantly reduce overall availability of 1854 Treaty resources that are typically part of subsistence activities in the 1854 Ceded Territory. Effects on 1854 Treaty resources are difficult to quantify when the effects are within environmental standards, yet above current baseline conditions. Some individuals and localized populations may be affected, but overall species populations are expected to remain available. Effects on the environment, including any from increased mercury, are expected to meet the standards and regulations set forth by the appropriate state or federal agency or program. These laws are intended to protect important natural and cultural resources and include, but are not limited to the ESA, CWA, and CAA.

In conclusion, the Project would not have a disproportionately high and adverse human health or environmental effect on minority populations and low-income populations. The proposed action is in compliance with Title VI of the Civil Rights Act and Executive Order 12898.

13.10 EXECUTIVE ORDER 13112, AS AMENDED BY EXECUTIVE ORDER 137511, INVASIVE SPECIES

The Applicant would temporarily vegetate and stabilize disturbed areas during operation to minimize opportunities for invasive species to be established. Areas would be permanently reclaimed during closure as discussed in Section 10.2 of this ROD. Seed mixes and methodologies used during reclamation would be designed to minimize the introduction of invasive species. Appropriate measures would be implemented to minimize the chances of invasive species being introduced during reclamation activities.

14.0 FINAL CORPS DECISION

I find that the issuance of the Corps permit, as described by regulations published in 33 CFR Parts 320 through 332, with the scope of work as described in this document, is based on a thorough analysis and evaluation of all issues set forth in this ROD. There are no less environmentally damaging, practicable alternatives available to PolyMet to construct the Project. The issuance of this permit is consistent with statutes, regulations, guidance, and policy and on balance, issuance of a Corps' permit to construct the NorthMet Mine Project is not contrary to the public interest. As explained above, all practicable means to avoid and/or minimize environmental harm from the selected, permitted alternative have been adopted and required by terms and conditions of this permit.

Approving Official:

Samuel L. Calkins
Colonel, Corps of Engineers
District Engineer

Date