December 2022 version

Environmental Assessment Worksheet

This most recent Environmental Assessment Worksheet (EAW) form and guidance documents are available at the Environmental Quality Board's website at**:** https://www.eqb.state.mn.us**/** The EAW form provides information about a project that may have the potential for significant environmental effects. Guidance documents provide additional detail and links to resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item or can beaddressed collectively under EAW Item 21.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. **Project title: Mile Post 7 West Ridge Railroad Relocation, Dam Extensions, and Stream Mitigation Project**

2. **Proposer: Northshore Mining Company**

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4. **Reason for EAW Preparation:** (check one)

Required:
☐ EIS Scoping
X Mandatory EAW

Discretionary:
☐ Citizen petition
☐ RGU discretion
☐ Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s): MR 4410.4300, subp. 26.

Subpart 26, Stream Diversion: For a diversion, realignment, or channelization of any designated trout stream, or affecting greater than 500 feet of natural watercourse with a total drainage area of ten or more square miles unless exempted by part 4410.4600, subpart 14, Item E, or 17, the DNR or the local government unit is the Responsible Governmental Unit (RGU).

5. **Project Location:**

- County: Lake County
- City/Township: Beaver Bay
- PLS Location (¼, ¼, Section, Township, Range): See Table 1

- Watershed (81 major watershed scale): Lake Superior
- GPS Coordinates: See Table 1
- Tax Parcel Number: See Table 1

Table 1 summarizes the Public Land Survey (PLS) location, coordinates, and Tax Parcel Numbers for the project components.

Table 1 Summary of Project Location

Project Component	PLS Location	GPS Coordinates (Latitude, Longitude)	Tax Parcel Number
Dam 1 Extension	Sections 29, 30, 31, 32, T56N-R8W	47.300428/-91.387988	26-5608-29010, 26-5608-30010, 26-5608-31010, 26-5608-32010
Railroad Embankment/Dam 2 Extension	Section 6, T55N-R8W Sections 20, 21, 29, 30, 31, T56N-R8W	47.311302/-91.375415	26-5608-27010, 26-5608-30010, 26-5608-31010, 26-5608-21910, 26-5608-09250, 26-5608-20910,
Clay Borrow Pit	Section 9, T 55N- R8W	47.266429/-91.364379	26-5508-09490, 26-5508-09550, 26-5508-09370, 26-5508-09520, 26-5608-09250, 26-5508-09430
East Branch Beaver River	Section 27, T56N-R8W	47.312942/-91.327898	26-5608-27070, 26-5608-22610, 26-5608-27010
East Branch Beaver River – Tributary Ditch	Section 22, T56N-R8W	47.315193/-91.343805	26-5608-21910, 26-5608-22610, 26-5608-27070, 26-5608-28010
East Branch Beaver River - Berm	Section 21, T56N-R8W	47.318724/-91.352076	26-5608-21910
White Rock Creek	Section 36, T56N-R8W	47.289188/-91.282200	22-7470-10030, 22-7470-10020, 22-7470-10010, 22-7401-31680, 22-7401-31490, 22-7401-31685, 22-7401-31500, 22-7403-36585, 22-7403-36580, 22-7403-36910, 22-7401-31610, 22-7403-36583, 22-7401-31550, 22-7401-31672, 22-7401-31670, 22-7401-31860
Big 39 Creek	Section 31, T56N-R8W Section 30, T56N-R8W	47.299624/-91.406627	26-5608-30010, 26-5608-31010

Project Component	PLS Location	GPS Coordinates (Latitude, Longitude)	Tax Parcel Number
Little 39 Creek	Section 30, T56N-R8W	47.306666/-91.396986	26-5608-30010

At a minimum attach each of the following to the EAW:

- County map showing the general location of the project (See Figure 1)
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopyacceptable) (See Figure 2); and
- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan (See Appendices A-F).
- List of data sources, models, and other resources (from the Item-by-Item Guidance: *Climate Adaptation and Resilience* or other) used for information about current Minnesota climate trends and how climate change is anticipated to affect the general location of the project duringthe life of the project (as detailed below in EAW Item 7, Climate Adaptation and Resilience).

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6. Project Description:

a. Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50 words).

Northshore Mining Company proposes to relocate the West Ridge Railroad, extend Dams 1 and 2, construct a Dam 1 rail switchback, and develop a clay borrow site at the Mile Post 7 tailings basin. The project also includes approximately 20,665 linear feet of stream mitigation across six sites. Tailings placement would continue to the final permitted dam elevation of 1,315 feet above mean sea level.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will

cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities

Summary. Northshore Mining Company (Northshore or Proposer), which is an iron ore facility owned by Cleveland Cliffs, proposes to make modifications to the Mile Post 7 Tailings Basin (Mile Post 7 Tailings Basin or Tailings Basin) to allow the Tailings Basin to be used to its maximum capacity as permitted by the 1977 Master Permit.[1] In order to use the remaining portions of the Tailings Basin, the West Ridge Railroad line and corridor would be relocated approximately 4000 feet to the northwest of the existing rail line traversing the Tailings Basin, while Dam 1 and Dam 2 would be extended at their western ends respectively. These features, together with construction of a Dam 1 rail switchback, and the excavation of clay from various borrow pits for dam construction, would cover approximately 339.1 acres. Because the entirety of the permitted Tailings Basin would result in fill of remnant portions of Big Thirtynine Creek and Little Thirtynine Creek, located within the Tailings Basin, the project also includes approximately 20,665 linear feet (LF) of stream mitigation. This set of activities collectively constitute "the Project."

The Project can be divided into two basic components. For this EAW, the **Tailings Basin Features** are proposed changes and/or additions to the infrastructure at the existing Tailings Basin; these are: the Dam 1 and Dam 2 extensions; the relocation of the West Ridge Railroad, including a new rail switchback; and the excavation of a new clay borrow site. The **Stream Mitigation Sites** are collectively the other set of actual projects involving stream mitigation proposed at five sites in the general vicinity of Mile Post 7, along with a sixth project proposed within Silver Bay, Minnesota.

Tailings Basin Features – Proposed Activities

Dam 1 and Dam 2 Extensions. Northshore proposes to extend the western ends of Dam 1 and Dam 2 to allow continued placement of tailings in the Tailings Basin over the remaining permitted life of the Peter Mitchell Mine; see Figure 1 and Appendix A,1. No changes to the Dam 5 design are proposed.

Dam 1 Extension. Dam 1 is currently 10,000 feet long and would be extended approximately 6,600 feet, which would cover approximately 64.8 acres. The Dam 1 extension would provide for isolation of the Tailings Basin and ponded water from the existing ash landfill. The height of Dam 1 extension at the connection with the existing dam would be approximately 70 feet, which is also the maximum height of the dam along the proposed extension. Appendix A.1 provides three transects with cross-sections across the proposed Dam 1 extension. The dam heights at the three extended Dam 1 transects from Appendix A.1 would respectively be: Transect No. 1 = 30 feet; Transect No. 3 = 60 feet; and Transect No. 4 = 30 feet.

Dam 2 Extension. Dam 2 is currently 6,000 feet long and would be extended approximately an additional 2,350 feet. The total acreage of the Dam 2 extension and relocated West Ridge Railroad

[1]The Tailings Basin was permitted by the DNR and Minnesota Pollution Control Agency (MPCA) in 1977 through the Master Permit after extensive environmental review and litigation. The 1977 Master Permit provided that the Tailings Basin, at the end of its life, would store 733,000,000 long tons of fine and coarse tailings, with the dams constructed to an ultimate crest elevation of 1,315 feet (above) mean sea level. *See J3-1977 Master Permit at 14 and 12*.

would cover approximately 157.6 acres.[2] The height of the Dam 2 extension at the connection with the existing dam would be approximately 70 feet, which is also the maximum height of the dam along the proposed extension. Appendix A.1 provides one transect with a cross-section across the proposed Dam 2 extension. The Dam 2 height at Appendix A.1, Transect No. 2, would be approximately 20 feet.

The Project would not change the ultimate crest elevation of the total dams, as both dams would be constructed to their currently permitted maximum crest elevation of 1,315 feet above mean sea level (amsl), nor would it change the permitted capacity of the Tailings Basin.

Site preparation for dam construction would remove the surface vegetation, while excavation equipment would be used to remove underlying soils unsuitable for dam support, such as organic soils and/or soft/loose soils. Materials needed to extend Dam 1 and Dam 2 would be sourced from the Northshore property. Construction of the extensions for Dam 1 and Dam 2 proper would consist of plant aggregate placed over prepared foundation soils. Filter material, which is the sand fraction size of the plant aggregate, would be placed on the upstream slope between the tailings pond and coarse aggregate. Like historic activities, dam crests would be raised in increments in conjunction with raises for the main portions of the dams to match crest elevations. Dam extensions are anticipated to be constructed with typical mining construction equipment, such as haul trucks, bulldozers, and loaders.

Instrumentation, such as piezometers and inclinometers, would be installed at selected locations to monitor the integrity of the dam extensions for dam safety purposes. Dam stability would be assessed at each dam raise to meet the required minimum factors of safety. The Factors of Safety[3] assessed at the Mile Post 7 dam include various scenarios for Effective Stress Stability Analysis (ESSA) and Undrained Strength Stability Analysis (USSA); these scenarios include various iterations around block failure, fine tailings yield strength, and liquefied strength. The Department of Natural Resources (DNR) relies on the following values for minimum Factors of Safety: ESSA = 1.50; USSA = 1.30; and liquefied = 1.10. Tables 3, 4, and 5 of the 2019-2023 Five Year Operations Plan provide the Computed Factors of Safety for Various Scenarios for Dams 1, 2, and 5, respectively. The current Factors of Safety for the Mile Post 7 dams exceed the DNR minimum values. *See J19-2019-2023 5YOP at 19-26*. Furthermore, DNR's review of the most recent round of geotechnical evaluations of Dams 1 and 2 indicate that both dams are robust with Factors of Safety well above recommended levels.

Throughout construction, runoff water management and erosion prevention would follow the Tailings Basin Features construction stormwater pollution prevention plan (SWPPP). As part of the SWPPP, best management practices (BMP) measures such as silt fence, biorolls, and ditch checks would be implemented during construction. Construction would also be phased to meet SWPPP requirements. The proposed West Ridge Railroad relocation and switchback is subject to a separate, distinct SWPPP; the requirements for erosion and sedimentation control for Dams 1 and 2 extensions fall under Northshore's National Pollutant Discharge Elimination System (NPDES) Permit.

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[2]Because the eastern end of the proposed relocated West Ridge Railroad is contiguous to the proposed Dam 2 extension, reporting a combined acreage is warranted.

[3]Factor of Safety is a calculated measure of: 1) the actual load bearing capacity of a structure or component; or 2) the required margin of safety for structure or component according to code, law, or design requirements. Minimum Factor of Safety is the minimum required/acceptable ratio of strength to the applied load of a dam or other similar load-bearing structure. DNR has established minimum Factors of Safety for dams constructed and operated in Minnesota.

Once construction is complete, mulch and a native seed mix would be spread on dam extension slopes as final grades are reached. Stormwater runoff would be impounded between the Dam 1 extension and existing diversion dam. As the elevation of the tailings pond increases over time, it would transition to become a seepage collection pond. A pump station would be constructed to manage water in this pond in a similar timeframe as construction of the railroad grade. Other seepage management would consist of ditching along the toes of the dam extensions to route seepage to existing unlined seepage recovery ponds and pump stations. Culvert installation as needed would be an available water management measure. The dams would be subject to the site reclamation and closure requirements of Minn. R. Chapter 6130.

Dam 1 Rail Switchback. The Dam 1 rail switchback is the proposed railroad embankment that would be constructed along the southeastern side of the Dam 1 extension. Construction of this feature allows for the current rail corridor that traverses the Tailings Basin to be relocated to the edge of the basin allowing the entirety of the permitted capacity to be used. The rail switchback would be approximately 3,700 feet long and would cover 8.40 acres.

Relocation of the West Ridge Railroad. The existing West Ridge Railroad corridor would be relocated approximately 4,000 feet to the northwest at an elevation above the 1,315 feet amsl contour; see Figure 1 and Appendix A.2. The proposed new corridor would cover approximately 51.5 acres and be 21,950 feet long. Once relocated, tailings would eventually progress over the present rail corridor into the remaining permitted 650 acres of the Tailings Basin up to the 1,305 feet amsl contour. The majority of relocated railway embankment construction would occur separate from, as well as outside, the extended dam footprints. The exceptions would be: 1) where the new railway embankment would be constructed on a small section of the Dam 1 extension, and 2) that part of relocated railway abutting the entire length of the Dam 2 extension. The relocated railway would be inside the existing diversion ditches that were designed and constructed at the western limit of the Tailings Basin permit boundary. The relocated railway, as does the existing railway, would be used to supply plant aggregate and filter material as construction materials for ongoing development of the dams. The railroad has no structural function in entraining tailings; that is reserved for the dams and would not change under the proposed Project.

Site preparation for the railroad embankment footprint would be done using excavation equipment by removing vegetation and underlying soils unsuitable for embankment support, including organic soils and/or soft/loose soils. Ditches would be constructed along the railroad embankment and would direct water contacting plant aggregate to seepage recovery facilities. Water that does not contact plant aggregate would be routed offsite through culverts and ditches.

After construction is complete, topsoil or silty/clayey materials would be placed over slopes facing the exterior of the Tailings Basin and seeded with a native mix shortly following construction of the railroad embankment in compliance with the SWPPP and Minn. R. Chapter 6130. The exterior of the rail embankment would be designed with a specific, targeted slope and revegetation plan so that it would not have appreciable sheet flow. After the establishment of vegetation, no further amendments on the outside slopes would be required in the event of closure. During closure, the inside slopes would be subject to the same reclamation requirements for the dams.

Excavation of Clay Borrow Site. Clay material would be extracted for ongoing construction of Dam 5 and select portions of the Dam 1 extension. The material would be sourced from a clay borrow pit

developed on approximately 108.3 acres of company-owned property located south of the basin; see Figure 1 and Appendix A.1. Clay material would be excavated to a depth of five to ten feet below the soil surface. After the borrow has been removed, excavators and haul trucks would be used to respectively extract and transport clay material. Although no design changes are proposed to Dam 5, its ongoing construction consists of a clay core that requires a steady source of compatible clay materials for continued construction. Approximately 14.7 acres of the clay borrow site has already been excavated, but the need for a continuous source of suitable clay as a construction material would be necessary. In addition, approximately 17.3 acres of the clay borrow site is delineated as wetland and would not be disturbed. Once clay removal ceases, the area would be reclaimed at the depth of the extracted resource, where the ground surface would be seeded with a native mix and mulched in accordance with Minn. R. Chapter 6130.

Schedule. The schedule for the proposed railroad realignment would be timed to be complete once the tailings pond begins to encroach on the freeboard limits of the existing West Ridge Railroad corridor; this is expected to take several years. This means it is possible that both the existing and future railroad grades would operate simultaneously for a limited time. Initial construction would commence shortly after project approval, but the schedule is highly dependent on the annual pellet production because the construction materials, by design, are generated as a byproduct of the pellet making process. The Dams 1 and 2 extensions would be constructed over the course of an estimated 40 years, with a numeric term applied in the Permit to Mine to match the remaining estimated life of the Peter Mitchell mine.

Stream Mitigation Sites – Proposed Activities

Northshore is responsible for conducting six compensatory individual stream mitigation actions, including: the relocated/diversion channel of Little Thirtynine Creek; the relocated/diversion channel of Big Thirtynine Creek;[4] East Branch Beaver River; East Branch Beaver River Tributary Ditch; East Branch Beaver River Tributary Berm Stream; and White Rock Creek; see Figure 1 and Appendices B – F. The proposed activity at the Stream Mitigation Sites is summarized below:

East Branch Beaver River. The Project would restore approximately 3,001 LF of the East Branch Beaver River. The restoration design would address deficiencies noted in the existing conditions analysis by repositioning a set of perched culverts, make the floodplain accessible, move the channel away from eroding banks, add large woody debris, and improve bedform diversity.

East Branch Beaver River Tributary Ditch. The extension of Dam 2 would remove approximately 2 square miles of watershed from the East Branch Tributary restoration site. The site would however still retain stream function where the restoration is designed to complement the new, reduced

[4]According to the 1975 Draft EIS, approximately seven (7) miles of Big Thirtynine Creek, and 2.7 miles of Little Thirtynine Creek, existed within the boundary of the proposed tailings basin. *See J10.a-1975 Draft EIS at 231*. The construction of the tailings basin would, therefore, cut off the lower segments of Big Thirtynine Creek and Little Thirtynine Creek from the upper portions of the drainage basin. In accordance with the 1977 Master Permit Section VII.D, two diversion channels were constructed to physically divert waterflow from the two creeks around the Tailings Basin. This left remnants of the lower reaches of Big Thirtynine Creek and Little Thirtynine Creek within the permitted portions of the Tailings Basin. Because Big Thirtynine Creek and Little Thirtynine Creek were designated trout streams at the time of the diversions, the trout stream designation was removed from the remnant reaches the creeks within the Tailings Basin and subsequently applied to the new reaches created from the diversion channels. *See J7-2022 DNR Record of Decision at 47*.

watershed area by providing new calculated lift. The design would restore approximately 4,433 LF of the East Branch Beaver River Tributary Ditch by creating floodplain inside the ditched channel, adding bedform diversity, and adding large wood debris.

East Branch Beaver River Tributary Berm. The goal of the mitigation would be to remove the berm that is no longer necessary based on the current Tailings Basin design, which would reconnect the watershed flow through the downstream channel. Berm removal and resulting mitigation of the watershed drainage area would complete this mitigation. No other stream mitigation methods would be used downstream of the berm. The berm removal would restore 1,520 LF of the channel and 0.24 square miles of the watershed area, the latter which represents restoration of the full watershed area. The return of flow changes the hydrology parameters in the Minnesota SQT tool by increasing bankfull flow calculations.

White Rock Creek. The design would restore approximately 3,967 LF of White Rock Creek by creating a floodplain within the confines of the narrowed valley, improving bedform diversity, and adding large woody debris. A riparian planting plan would also improve the vegetative community.

Little Thirtynine Creek. The design would restore approximately 5,700 LF for Little Thirtynine Creek by adding a bankfull bench, adding large wood debris, and increasing bedform diversity through the addition of riffles and pools where appropriate.

Big Thirtynine Creek. The design would restore approximately 1,700 LF of Big Thirtynine Creek by creating an accessible floodplain (bankfull bench), adding large woody debris, adding sinuosity or meander, and maximizing the bedform diversity parameter through the addition of riffles and pools.

These actions were required by the US Army Corps of Engineers (USACE) to provide compensatory stream mitigation for the loss of function of remnant Big Thirtynine and Little Thirtynine Creeks due to the proposed construction of the Dams 1 and 2 extensions and relocated railway. The East Branch Beaver River, Big and Little Thirtynine Creeks, and East Branch Tributary projects are located on Northshore property whereas White Rock Creek flows through the City of Silver Bay. The goal of the mitigation is to provide functional uplift to the channels that would result in mitigation credit by stabilizing stream channels, restoring floodplain connectivity, and improving aquatic habitat.

The general goals and objectives to be met for each of the Stream Mitigation Sites include:

- Establish natural stream processes within the watershed.
- Establish an appropriate pattern and profile for the valley and channel type.
- Establish appropriate channel dimensions for channel type.
- Establish a floodplain appropriate for the valley and channel type.
- Improve aquatic and floodplain habitat for the area.
- Meet all the objectives to provide the maximum uplift as determined by the Minnesota

Stream Quantification Tool (SQT).[5]

Improved stream function would be provided by increasing functional feet of each streams' reach, thereby providing functional lift on the channel reaches by creating bedform diversity and access to the floodplain. The design would generally follow the existing streams' alignment, and gravel riffles would provide habitat, roughness, and grade control. Toe wood structures and log J-hooks would replicate natural stream banks, protect the outer meander bends, and create woody habitat. In the higher gradient channels, the designs include step pool features along with floodplains appropriate to its stream type.

Construction would typically include use of an excavator and other associated heavy equipment to construct the new channel. An excavator with a hydraulic thumb would be used to install the in-stream structures including toe-wood, boulders, logs, and rocks. To facilitate construction, the streams would be temporarily diverted or pumped around active construction areas using an engineer-approved stream diversion plan. Temporary access trails have been designed to be located along existing roads and disturbed areas where possible. After construction is complete, the temporary access trails would be reclaimed and revegetated. Any stockpiles would have erosion and perimeter control and other BMPs would be implemented to prevent sediment from entering streams during construction.

The existing channel vegetation would be temporarily removed. The existing alder would be excavated and used as transplants in critical areas. Native seeds, trees, and shrubs would be planted along the stream banks and within the adjacent riparian corridor. Further back from the channel, a straw-type erosion control blanket would be used to hold the soils until the vegetation is established.

Silt fences, seeding and mulching, erosion control blankets, and other appropriate erosion control measures would be incorporated into the construction phase of the project. Other measures would include working during low flow periods and limiting the amount of disturbed area and soils exposed at any one time. Low-flow conditions are defined as July 1 – March 31 for White Rock Creek, and July 1 – September 14 for the other five projects. Disturbed sites would have the soil prepared for reseeding, would be reseeded with appropriate native vegetation, and would be mulched to encourage rapid revegetation. The riparian areas would be planted with native vegetation, with sites stabilized with erosion control blankets to allow vegetation to become established. Plantings would consist of native forbs and grass seed, shrubs, and trees.

Schedule. The Stream Mitigation Sites would be completed two individual projects at a time, under a three-phase schedule, with construction occurring in 2023, 2025, and 2027 respectively. The first projects to be constructed are the Big Thirtynine Creek and Little Thirtynine Creek proposals; these would require one field season to complete. The sequencing and batching of the remaining four individual projects has yet to be determined, but current authorizations require two stream projects to be done every two years. The remaining projects too would require one field season to complete.

c. Project magnitude:

[5]The objectives include improvements in the hydrology, hydraulics, and geomorphology categories of the Minnesota SQT. A third-party consultant would complete the Minnesota SQT data entry and calculations before and after restoration work.

Table 2 provides a breakout of the total project acreage for the Tailings Basin Features and Stream Mitigation Sites respectively. Table 3 provides information regarding the project magnitude.

Table 2 Project Acreage and Linear Feet

Project Feature	Total Project Acreage	Project Length (LF)[1]	Functional SQT Length (ft)[2]
Dam 1 Extension	64.8	~6,600	N/A
Dam 1 Rail Switchback	8.4	~3,700	N/A
Railroad Embankment/Dam 2 Extension	157.6	~21,950	N/A
South Borrow Pit	108.3	N/A	N/A
East Branch Beaver River	N/A	3,001	316
East Branch Beaver River Tributary	N/A	4,433	1,250
East Branch Beaver River Tributary Berm	N/A	1,520	304
White Rock Creek	N/A	3,967	988
Little 39 Creek	N/A	5,672	1,171
Big 39 Creek	N/A	2,072	511
Total	339.1	20,665[1]	4,540

Notes:

[1]Stream mitigation length may vary. The original stream mitigation plan was based on 30% design. Minnesota SQT lengths were based on true ground measurement before and after construction (i.e., the stream gets longer in most cases after construction) and EAW "construction footprint" would differ from both because it does not factor in stream sinuosity.

[2]The functional debit and the functional lift are 668.2 feet apart, with the deficit on the functional lift. The functional lift directly satisfies 87% of the functional debits considering only the functional lift within the project reaches. The scope of the restoration activities and the lift provided downstream of stream mitigation project component provide adequate mitigation for the 668.2 foot-deficit.

Table 3 Project Magnitude

Project Feature	Acres
Total project acreage (Tailings Basin Features)	339.1
Total project length (Stream Mitigation Sites)	20,665 linear feet
Number and type of residential units	0
Residential building area (in square feet)	0
Commercial building area (in square feet)	0

Project Feature	Acres
Industrial building area (in square feet)	0
Institutional building area (in square feet)	0
Other uses – specify (in square feet)	0
Structure height(s)	N/A

d. Explain the project purpose; if the project will be carried out by a governmental unit, explain theneed for the project and identify its beneficiaries.

The purpose of the Tailings Basin Features is to support the use of the entirety of the Tailings Basin already permitted in 1977 over the remaining operating life of the Peter Mitchell Mine, which is estimated to be approximately 40 years.

The purpose of the Stream Mitigation Sites is to provide mitigation required by the USACE and MPCA for the impacts to the remnants of Big Thirtynine Creek and Little Thirtynine Creek, whose upper watersheds were diverted in the late 1970s (as part of the originally permitted Tailings Basin construction), with the remnants planned to be covered with tailings over the present and future operating life of the Tailings Basin. All six proposed individual stream actions would meet the functional uplift required by the Minnesota SQT to in turn meet the requirements of the stream debits as calculated by the Minnesota SQT. The designs provide the maximum uplift through the creation of a meandered channel appropriate for its channel type, with addition of riffles and pools, and both riparian and aquatic habitat.

e. Are future stages of this development including development on any other property planned orlikely to happen? ☐ Yes **X** No
If yes, briefly describe future stages, relationship to present project, timeline and plans forenvironmental review.

f. Is this project a subsequent stage of an earlier project? **X** Yes ☐ No
If yes, briefly describe the past development, timeline and any past environmental review.

Past Development, Any Past Environmental Review, and Timelines

DNR has compiled substantial information beyond this EAW regarding past development, any past environmental review, and timelines and permitting for development to date at Mile Post 7, which also includes information on the status of present operations at the facility. *See Appendix J, List of Supplemental Information Known to RGU*, for supplemental documentation cited in the discussion below and for other select EAW Items.

Summary. The proposed Project includes stream mitigation actions and site modifications to allow Northshore to use the entirety of the Mile Post 7 Tailings Basin as permitted in 1977. Original construction of the Mile Post 7 Tailings Basin arose out of a court order directing then Reserve Mining to cease tailings disposal in Lake Superior after being granted a reasonable time to find an on-land disposal facility for tailings associated with processing ore from the Peter Mitchell Mine. *See J25-*

Reserve Mining Co. v EPA.[6] The ultimate site selected and permitted as the on-land disposal facility for tailings associated with processing ore at Silver Bay from the Peter Mitchell Mine was the Mile Post 7 Tailings Basin. This site was selected, and permits were issued, for the Mile Post 7 Tailings Basin only after completion of environmental review of the entire footprint of the Mile Post 7 Tailings Basin as well as of other alternative sites, extensive public input, and extensive litigation culminating in an order from the Minnesota Supreme Court directing the state to issue the permits necessary to construct and operate the Mile Post 7 Tailings Basin in 1977. *See J26-Reserve Mining Co. v Herbst at 845-846*.[7] Subsequently the DNR and the Minnesota Pollution Control Agency (MPCA) issued Reserve Mining a permit to operate the Mile Post 7 Tailings Basin in August 1977. *See J3-1977 Master Permit*.

Below is a brief chronology of the important milestones detailing the Mile Post 7 Tailings Basin Site's history and associated references:

1956 Reserve Mining Company began full operations at its Silver Bay taconite processing plant. Tailings from the Silver Bay plant were dumped into Lake Superior. *See J10.a-1975 Draft EIS at 5.*

June 1973 In June 1973, the US Environmental Protection Agency (USEPA) released documentation of the discovery of asbestiform fibers in City of Duluth's drinking water. Reserve Mining Company's discharge to Lake Superior was thought to be the source of the asbestiform fibers in Duluth, Minnesota's, drinking water. *Id. at 7*.

April 1974 Minnesota Federal District Court finds Reserve Mining Company's discharge of tailings into Lake Superior was a violation of the Federal Water Pollution Control Act, enjoins the further disposal of tailings into Lake Superior, and orders Reserve Mining Company to locate an on-land disposal facility for its tailings. *See J31-United States v. Reserve Mining Co*. *1974.*[8 & 9]

November 1974 Reserve Mining Company submits permit applications to the DNR and MPCA to build an on-land tailings basin at Mile Post 7. *See J10.a-1975 Draft EIS at 7*.

May 1975 Minnesota Environmental Quality Council designated DNR and MPCA as joint responsible agencies for preparation of an Environmental Impact Statement for Reserve Mining Company's Mile Post 7 plan. *Id.*

October 1975 DNR and MPCA issued the Draft Environmental Impact Statement for Reserve Mining Company's Proposed On Land Tailings Disposal Plan (*1975 Draft EIS)*.[10] *See J10-1975 Draft EIS in total*.

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[6]*See J25-Reserve Mining Co. v. Environmental Protection Agency et. al.,* 514 F.2d 492 (8th Cir. 1975) in Appendix J.
[7]*See J26-Reserve Mining Co. v. Herbst et.al,* 256 N.W. 2d 808, 845-46 (Minn. 1977) in Appendix J.
[8]*See United States v. Reserve Mining Co.,* 380 F. Supp. 11 (D. Minn. 1974) *aff'rmd and modified by Reserve Mining Co. v. EPA,* 514 F.2d 492 (8th Cir. 1975), both cases in Appendix J.
[9]Reserve Mining's disposal practices prior to the establishment of the Mile Post 7 Basin was the subject of extensive federal and state litigation. A documentation of the history of this litigation can be found in the 1975 Draft Environmental Impact Statement.
[10]All citations to the 1975 Draft EIS apply to the Draft Environmental Statement for Reserve Mining Company's Proposed On Land Tailings Disposal Plan (October 1975).

June 2, 1976 DNR deems Final Environmental Impact Statement (1975-76 Final EIS) for "Reserve Mining Company's Proposed On Land Tailings Disposal Plan" to be complete. *See J9.a-1975-76 Final EIS at PDF 355*. The FEIS assumed that the Tailings Basin would have a 40-year life, equivalent to the time needed to complete mining at the Peter Mitchell Mine. *Id. at PDF 363.*

May 1977 US Army Corps of Engineers releases Final Environmental Impact Statement for Power Plant Discharge Structure, Delta Stabilization Dike, and On-Land Taconite Tailings Disposal for Reserve Mining Company. *See J29-1977 USACE Final EIS*.

August 1977 DNR issues a Master Permit to Reserve Mining Company for the Mile Post 7 On Land Tailings Disposal Plan at Silver Bay, Minnesota. *See J3-1977 Master Permit.*

April 1978 MPCA issues its permits for construction and operation of a disposal system (i.e., Mile Post 7). *See J13-1984 NPDES Permit MN0055301 at PDF 15*.

February 1981 Reserve Mining Company submits an Application for a Permit to Mine (1981 Permit to Mine Application) to DNR upon passage of the Mineland Reclamation Act. *See J23-1981 Permit to Mine Application*.

May 1984 MPCA issues NPDES Permit MN0055301 to allow a discharge from Mile Post 7. *See J13-1984 NPDES Permit MN0055301*.

March 1985 DNR issues a Permit to Mine (1985 Permit to Mine) to Reserve Mining Company Peter Mitchell Mine and Stockpiles, Reserve Railroad, E.W. Davis Works, and Milepost 7 Tailings Basin Site pursuant to the state Mineland Reclamation Act. *See J5-1985 Permit to Mine*.

August 1986 Reserve Mining Company files for bankruptcy under Chapter 11. *See J17-1995-1998 Five Year Operations Plan (5YOP) at 2*.

August 1989 Reserve Mining interests in Mile Post 7 and the Peter Mitchell Mine are transferred to Cyprus Mineral Company. Mile Post 7 NPDES Permits, the 1977 Master Permit, and the 1985 Permit to Mine transferred to Cyprus Mineral Company and Cyprus Northshore Mining. *See J27-1989 Stipulation Agreement.*

September 1994 Cleveland Cliffs purchases Cyprus Mineral Company including Northshore Mining and Cyprus Northshore Mining is renamed Northshore Mining. *See J17-1995-1998 5YOP at 2*.

January 1995 MPCA issues Air Emission Permit No. 07500003 as a Total Facility Operating Permit. *See J11-MPCA Air Permit 07500003-101 at 2*.

August 1995 1977 Master Permit renewed. *See J4-1995 Master Permit Renewal*.

September 1996 MPCA combines three water quality NPDES/SDS Permits for the Mile Post 7 Tailings Basin into a single NPDES/SDS Permit No. MN0055301. *See J15-Furnace 5 Reactivation Record of Decision at 3*.

March 2005 DNR's assignment of the 1985 and 1989 Permit to Mine to Cleveland Cliffs and Northshore Mining Company completed. *See J6-2005 Permit to Mine Assignment, et. al.*

In addition to the state and federal EISs and other documents cited above, other information has been compiled as detailed in the following documents:

- "Cleveland-Cliffs, Inc. and Northshore Mining Company Mile Post 7 Tailings Basin Progression and Clay Borrow Site Environmental Review Need Determination," with references, figures, and attachments, dated June 28, 2021 (2021 DNR ERND). *See J2-2021 DNR ERND*.

- "Record of Decision on the Need for an Environmental Assessment Worksheet for the Mile Post 7 Tailings Basin Progression, Lake County, Minnesota," with citations of material evidence, proposer information, and additional information known to DNR, dated February 4, 2022 (J7-2022 DNR Record of Decision). *See J7-2022 DNR Record of Decision*.

Any references from these respective decision documents not cited in this EAW can be made available upon request.

The following paragraphs describing the Mile Post 7 Tailings Basin rely on these documents and other information known to DNR. Past development included the construction and/or operation of: the Mile Post 7 Tailings Basin; two stream diversions with associated berms (necessitated by the construction of the original Tailings Basin dams); the West Ridge Railroad; a wastewater treatment plant; and an ash disposal landfill.

Mile Post 7 Tailings Basin

Past Development. The Mile Post 7 Tailings Basin was designed and constructed to accept tailings, or silica waste solids, from ore mined from the Peter Mitchell Pit and processed in Silver Bay, Minnesota. The design capacity or volume of the Tailings Basin was based on the estimated remaining ore and rate of mining anticipated in the Peter Mitchell Mine. When processed, taconite ore originating from the Peter Mitchell Mine (at Babbitt, Minnesota) produces both coarse and fine tailings that are disposed at Mile Post 7 Tailings Basin. The coarse tailings fraction is shipped by rail to the Tailings Basin for use in the historic and ongoing construction of Dams 1, 2, and 5 and the West Ridge Railroad. Fine tailings are pumped up from Silver Bay and spigotted into the Tailings Basin. The proposed Project is necessary to allow use of the Tailings Basin at its total designed capacity. This entails continued delivery of: (1) coarse tailings for construction of Dams 1, 2, and 5; (2) coarse tailings to construct the dam extensions and relocated materials supply railroad; and (3) fine tailings deposited within the basin itself, all of which would occur over the remaining operating life of the Peter Mitchell Mine.

As designed, tailings deposited at the Mile Post 7 Tailings Basin are physically contained by a combination of site topography and three existing dams designated as Dams 1, 2, and 5; see Figure 1. Tailings dams are compacted fill embankments continuously constructed (raised and expanded) over the life of a tailings basin, typically beginning with construction of a starter dam that is subsequently raised in individual lifts over time. The current elevations of Dams 1, 2, and 5 are 1,242 feet amsl, 1,244 feet amsl, and 1,255 feet amsl respectively. The maximum permitted elevation for all three dams is 1,315 feet amsl. The highest permitted elevation of the tailings deposition area or pond is

1,305 feet amsl. The difference between dam height and tailings elevation is designed to provide ten feet of freeboard[11] from the tailings pond/surface to the top of the dams.

Past development at the Tailings Basin proper also includes a seepage collection system (i.e., catchment areas) at the toe of the dams to capture seepage through the dams. The captured seepage is pumped and thus recycled back into the tailings pond to minimize release to the environment. MPCA's permits require continuous monitoring of both surface and groundwater losses from the seepage collection system.

As for the development parameters for the Mile Post 7 Tailings Basin proper, the following text provides additional details on the: final dam and tailings elevations; volume of tailings deposition; and area of tailings deposition.

Final Dam and Tailings Elevations. The history of the maximum permitted elevation for the dams and tailings is summarized as follows:

- The final dam height evaluated in the 1975 Draft EIS was 1,280 feet amsl. This was conceptually depicted in 1975 Draft EIS Figure 3, Proposed Mile Post 7 Disposal Area. *See 1975 Draft EIS at 21*.

- The final dam heights in the 1975-76 Final EIS were adjusted upward by approximately 30 feet, meaning the final dam height by the end of environmental review was ~1,310 feet amsl. *See J9.a-1975-76 Final EIS at PDF 364*, (summarizing the modifications made in the dam height during the administrative hearing proceedings and reflected in the 1975-76 Final EIS).

- The final dam height identified at Section 1.050 of the 1977 USACE Final EIS was 1,315 feet amsl, which was selected to "to provide sufficient storage capacity for 40 years of operations." *See J29-1977 USACE Final EIS at 12*.

- The 1977 Master Permit set the final height of the "Tailings Containment Dams," and specified "Dams 1 and 2-3…will be constructed to ultimate crest elevation 1,315 mean sea level, over a period of years, according to a predetermined construction schedule." *See J3-1977 Master Permit, Section V, at 12.* Similarly, Dams 4, 5, and 6 were proposed to be constructed to ultimate crest elevation 1,315 mean sea level. *Id.* This has not changed in subsequent permitting nor is it proposed to be changed under the current action.

- The 1985 Permit to Mine approved the tailings basin with "an average level of ultimate tailing pond area will be about elevation 1,305 while the dam crests will be elevation 1,315." *See J23-1981 Permit to Mine Application at 48*. This has not changed in subsequent permitting nor is it proposed to be changed under the current action.

No change in permitted final dam elevations, which is 1,315 feet amsl, is required to achieve the proposed Project's objectives.

Volume of Tailings Deposition. The history of the anticipated volume of tailings to be placed at Mile

[11]Freeboard is the vertical distance from the tailings pond surface to the lowest elevation at which water would flow over the dam at a section not designed to be overflowed.

Post 7 is summarized as follows:

- The 1975 Draft EIS assumed 20,417,000 long tons of fine tailings would be pumped annually into the Mile Post 7 tailings basin over the 40-year operational life of the Mile Post 7 tailings basin. This amounts to a total deposition of 816,680,000 long tons of fine tailings over the life of the tailings storage facility.

- Although not directly comparable to the 1975-76 Final EIS estimate, the 1977 Master Permit provided the tailings basin would eventually store 733,000,000 long tons of "fine and coarse tailings."

See J2-2021 DNR ERND at 14.

The Proposer reports that actual tailings production has not met the original projections of ~20 million long tons per year over the estimated 40-year life of the Peter Mitchell Mine. The tailings production rate from 1985 to 2005 ranged from ~4.0-5.3 million long tons per year, resulting in the deposition of an estimated 88,736,000 long tons of fine tailings within the Mile Post 7 Tailings Basin. Much of this deviation from the original estimate of 20,417,000 long tons per year can be attributed to the vagrancies of the steel market over time, including four years of no tailings production while Reserve Mining was in bankruptcy. Since 2005 to the present, fine tailings production has ranged from ~5.5-7.9 million long tons per year, resulting in the placement of an additional ~102,383,000 long tons of fine tailings within the tailings basin. In aggregate, the Proposer estimates that the total volume of tailings deposited at the Mile Post 7 Tailings Basin between 1985 and 2019 is 191,118,000 long tons. *Id. at 14-15*.

The Proposer used Lidar-based modeling and tailings disposal data to calculate the remaining volume in the Tailings Basin from a baseline date of May 2019; this assumed dam construction to the permitted final dam height of 1,315 feet amsl. Based on this analysis, the remaining volume in the Tailings Basin is estimated to be 561,905,000 long tons of tailings. When the volume of existing tailings (119,118,000 long tons) is added to the remaining capacity (561,905,000 long tons), the total volume of tails in the Mile Post 7 Tailings Basin is projected to be 753,023,000 long tons of tailings. *Id. at 15*. The Proposer's updated Lidar-based estimate is comparable to the volume of tailings estimated in the 1977 Master Permit.

No change in the permitted volume of tailings storage is required to achieve the proposed Project's objectives.

Area of Tailings Deposition. The history of the anticipated area of tailing deposition at Mile Post 7 is summarized as follows:

- The total proposed Tailings Basin area evaluated in the 1975 Draft EIS was 7.6 square miles for both fine and coarse tailings. Because of the relationship between the final dam height and the area to be covered by fine tailings, the estimated area to be covered by fine tailings in the 1975 Draft EIS was 4.6 square miles, or ~2,950 acres. Thus, the balance of 3.0 square miles was to be used as a coarse tailings storage and disposal area. *See J2-2021 DNR ERND at 16*.

- Although the reason was not specified, the total area assigned to the Tailings Basin in the

1975-76 Final EIS was adjusted downward to approximately 6 square miles, or 3,850 acres, from the 7.6 square miles assessed in the 1975 Draft EIS. *See J9.a-1975-76 Final EIS at PDF 364*. In addition, the 1975-76 Final EIS did not break out the area assigned for fine tailings disposal, which meant the maximum elevation of tailings deposition of 1,305 feet amsl did not change thus leaving ~2,950 acres allocated for disposal of fine tailings.

- The changes made in the 1975-76 Final EIS were incorporated into the 1977 Master Permit. The Tailings Basin permitted in the 1977 Master Permit would encompass "approximately six square miles," or ~3,850 acres total. *See J3-1977 Master Permit at 2*. Because there was no change in the final dam heights from the 1975-76 Final EIS, this equated to ~2,950 acres allocated for actual disposal of fine tailings under the 1977 Master Permit. There were no modifications to the Tailings Basin acreage made under the 1985 Permit to Mine. *See J23-1981 Permit to Mine Application at 48*. In short, the acreage for disposal of fine tailings in the Tailings Basin has remained constant since the 1975-76 Final EIS.

The Proposer has used Lidar-based imagery to provide an updated estimate of the total acreage available in the basin up to the 1,305 feet amsl permitted elevation for actual tailings disposal, which allows for a ten-foot freeboard from the final dam height of 1,315 feet amsl. That calculation indicates the Tailings Basin at capacity will cover ~2,800 acres, which is slightly less than the estimates from the 1975-76 Final EIS and 1977 Master Permit. *See J2-2021 DNR ERND at 15-16*. Based on this Lidar data, tailings at the Mile Post 7 Tailings Basin currently cover ~2,150 acres of the 2,800 acres evaluated in the 1975-76 Final EIS, which was subsequently permitted in both the 1977 Master Permit and 1985 Permit to Mine.

The proposed Project, if implemented, would allow Northshore to use the remaining 650 acres of the Tailings Basin already permitted for placement of fine tailings. At that point, the Mile Post 7 Tailings Basin would reach 2,800 acres out of its original 2,950 acres of permitted capacity. Approximately 550 acres of surface within the basin under the proposed Project, lying between the 1,305 feet amsl contour and the base of the relocated West Ridge Railroad, would not be covered by tailings. There is no plan to deposit tailings on this remaining 550 acres above the 1,305 feet amsl contour but inside the interior base of the West Ridge Railroad. All the Mile Post 7 Tailings Basin would undergo reclamation and closure as required under the most recent provisions of both the 1977 Master Permit and the 1985 Permit to Mine.

No change in the permitted area to receive tailings is required to achieve the proposed Project's objectives.

Past Environmental Review. The Mile Post 7 Tailings Basin was subject to both state and federal environmental review.

State Environmental Review. The Mile Post 7 Tailings Basin was subject to state environmental review. The "Reserve Mining Company's Proposed On Land Tailings Disposal Plan" EIS was conducted over 1975 and 1976. A Draft EIS was released in October 1975.[12] The Final EIS issued in June 1976 consists of the Draft EIS and the Finding, Conclusions and Recommendations, Index to Transcripts, and Listing of Exhibits from the administrative proceedings. *See J9.a-1975-76 Final EIS in total*.

[12]All citations to the 1975 Draft EIS apply to the "Draft Environmental Statement for Reserve Mining Company's Proposed On Land Tailings Disposal Plan" (October 1975).

Federal Environmental Review. National Environmental Policy Act (NEPA) environmental review requirements were fulfilled when on May 17, 1977, when the USACE issued a federal EIS for the proposed "Power Plant Discharge Structure, Delta Stabilization Dike, and On-Land Taconite Tailings Disposal" project at Mile Post 7. Like the state's 1975-76 Final EIS, the federal final environmental impact statement considered the environmental impacts associated "with authorization of Federal permits" for the Mile Post 7 Tailings Basin. Of note the 1977 USACE Final EIS stated, "it is presently anticipated that a final decision with respect to these and other matters pertaining to the applicant's permit request will not be made until resolution of the current State of Minnesota/Reserve Mining impasse." *See J29-1977 USACE Final EIS at i*.

Timeline Post-State EIS. Upon completion of the 1975-76 Final EIS, the MPCA and DNR undertook consideration of Reserve Mining's permit applications previously submitted in November 1974. After reviewing the 1975-76 Final EIS and the information submitted by Reserve Mining, the DNR and MPCA denied Reserve Mining's request for permits for constructing and operating a tailings basin at Mile Post 7 on July 1, 1976. Upon review of the extensive administrative record including the 1975 Draft EIS and Transcript of the Administrative Hearing (i.e., 1975-76 Final EIS), the Hearing Officer's Order at the completion of said hearing and extensive briefing, the Minnesota Supreme Court on May 27, 1977, ordered the DNR and MPCA to issue Reserve Mining the permits necessary to construct and operate the Mile Post 7 Tailings Basin. *See J2-6Reserve Mining Co. v. Herbst 1977.*

Subsequently after the Minnesota Supreme Court's decision in August 1977, DNR and MPCA jointly-issued a Master Permit to Reserve Mining to operate a tailings disposal facility at Mile Post 7. By its terms, the permit was to be updated every five years. This update was accomplished through Mile Post 7 Operations Plans (5-Year Operations Plans). *See J3-1977 Master Permit at 4*. As the name implies, the 5-Year Operations Plans were to be submitted every five years for review and approval by DNR and MPCA over the anticipated 40-year life of the Mile Post 7 Tailings Basin. *Id.* The 2019-2023 Five Year Operations Plan is currently in effect. *See J19-2019-2023 5YOP*. Because the laws governing dam safety were not in place until 1979, the 1977 Master Permit also regulates dam safety at Mile Post 7.[13]

With the passage of the Mineland Reclamation Act rules for ferrous mining in 1981, Reserve Mining applied for a Permit to Mine to DNR in February 1981. *See J23-1981 Permit to Mine Application*. In March 1985, DNR issued a Permit to Mine to Reserve Mining for all its Northshore operations, including the Mile Post 7 Tailings Basin, Peter Mitchell Mine, and the taconite ore processing facilities at Silver Bay.[14] The Permit to Mine is reviewed annually. The permit assumed an operating life of the mine at the Peter Mitchell Pit to be at least 35 years as it was believed that within 35 to 40 years all

[13]Tailings dams in Minnesota are subject to DNR's Dam Safety Program pursuant to Minn. Stat. § 103G.501 through 103G.561. Also see Minn. R. 6115.0300 through 6115.0520. Because the laws governing dam safety were not in place until 1979, the Master Permit regulates dam safety at Mile Post 7. Because the dams at Mile Post 7 are Class 1 dams, they are monitored daily by the basin engineer and other employees working on the dam. The Factors of Safety consistently assessed at the Mile Post 7 dams include various scenarios for Effective Stress Stability Analysis (ESSA) and Undrained Strength Stability Analysis (USSA); these scenarios include various iterations around block failure, fine tailings yield strength, and liquefied strength. DNR accepts the following values for minimum Factors of Safety: ESSA = 1.50; USSA = 1.30; and liquefied = 1.10. The current Factors of Safety for the Mile Post 7 dams exceed the DNR minimum values. *See J19-2019-2023 5YOP at 19-26*.

[14]Reserve Mining declared bankruptcy 1986. All original permits have been transferred to Cleveland Cliffs and its subsidiary Northshore Mining Company.

available ore in the Peter Mitchell Mine would have been mined. Thus, the lifespan of the Mile Post 7 Tailings Basin coincides with the remaining mine life of the Peter Mitchell Mine. *See J5-1985 Permit to Mine at 1*.

Summary. Under the proposed Project, there is no: 1) change in the maximum permitted elevation of the dams and tailings; 2) expansion of the final tailings storage volume;[15] or 3) change in the final permitted area of tailings deposition, from the Tailings Basin concept that was studied in the 1975-76 Final EIS and subsequently permitted in 1977 and 1985. Therefore, the continued placement of tails within the permitted footprint and storage capacity of the Mile Post 7 Tailings Basin was not considered or evaluated as part of the proposed Project.

Diversions of Big Thirtynine Creek and Little Thirtynine Creek

Past Development. Tailings basin development included two constructed stream diversions involving both Big Thirtynine Creek and Little Thirtynine Creek. The purpose of the diversions was to route water around the interior areas of the future tailings basin. New channels (Diversion Channels) were constructed to direct water from the upper watersheds of Big and Little Thirtynine Creeks to the west into the Beaver River. These Diversion Channels today are effectively ditches carrying water from the upper watersheds of both creeks. A series of berms was also constructed to meet this water management objective. The result was to effectively isolate the lower reaches of both creeks from their upper watershed, which was estimated to be 7.0 miles of Big Thirtynine Creek and 2.7 miles for Little Thirtynine Creek. *See J10.a-1975 Draft EIS at 230.* The construction substantially reduced contributing flows from those of natural, historic levels within the stream remnants of both creeks (remaining within the currently unused portions of the Tailings Basin).

Prior to construction of the Mile Post 7 Tailings Basin, the stream reaches below the diversions and berms were designated trout streams. *See J10.a-1975 Draft EIS at 141*. After the diversions, both historic stream channels were removed from the list of designated trout streams and the new Diversion Channels were in turn designated as a trout stream. Thus, the remnants of both of Little Thirtynine and Big Thirtynine Creeks located below the diversion are no longer designated trout streams and have not been designated trout streams for many years.

Regarding the proposed Project, the Stream Mitigation Sites are designed to mitigate the impacts of filling these remaining creek remnants as a result by construction of the newly proposed infrastructure (dam extensions and rail line relocation), and the loss of functions and values of the remnant portions of Big and Little Thirtynine Creeks within the Tailings Basin. The proposed mitigation includes work in the two Diversion Channels, whose purpose is to create more natural stream functions and values and thus better match the respective trout stream designations.

Past Environmental Review. The diversions of both Big Thirtynine Creek and Little Thirtynine Creek were assessed in the state and federal EISs.

The state's 1975 Draft EIS documents that approximately 7 miles of Big Thirtynine Creek, and 2.7 miles

[15]The term "expansion" is defined by rule as "an extension of the capability of a facility to produce or operate beyond its existing capacity." Minn. R. 4410.0200, subp. 28. The term "extension" is defined in Merriam Webster as "an enlargement in scope of operation," and the Oxford English Dictionary defines the term extension as "a part that is added to something to enlarge or prolong it, a continuation."

of Little Thirtynine Creek, lay within the boundary of the proposed Mile Post 7 Tailings Basin. According to the 1975 Draft EIS, the "[T]ailings [B]asin [would] occupy 7.6 square miles and eliminate approximately 9.7 miles of streams," which would result in reduced capacity of the drainage basin to carry waters downstream thus reducing downstream flows. These changes in flow regimes caused by the diversions in the Creeks would result in varying reductions in river miles and an associated loss of fishing habitat. *See J10.a-1975 Draft EIS at 231*.

The 1975 Draft EIS also found that Diversion Channels 1 and 2, if implemented, would divert 22.6 square miles of the 31.3 square miles of stream flow in the Big and Little Thirtynine Creeks watershed, which is a sub-watershed of the Beaver River watershed. It was estimated that 23 cubic feet of water per second would be diverted or lost from the watershed. *Id. at 46*. The diversions would also eliminate one waterfall. *Id. at 220*.

Sections 4.053 through 4.063 of the 1977 USACE Final EIS considered how construction and operation of the Mile Post 7 Tailings Basin would impact aquatic habitats within the Beaver River Watershed. *See J29-1977 USACE Final EIS at 61-62*. Although not as detailed as the state 1975-76 Final EIS, the documented anticipated impacts to water resources were consistent across both the state and federal EISs, especially in terms of the changes to Big and Little Thirtynine Creeks resulting from construction of Diversion Channels 1 and 2.

Timeline. The 1977 Master Permit Section VII.D, "Diversion Dikes and Channels – Surface Water Diversions 1 and 2," authorized construction of Diversions 1 and 2. The purpose of these Diversions was to prevent surface runoff and flows from entering the Tailings Basin. Both Diversions were required to be designed to control the probable maximum precipitation event. Diversion Channel 1 would connect Little Thirtynine Creek with Big Thirtynine Creek. Diversion Channel 2 would connect Big Thirtynine Creek with the Beaver River. *See J3-1977 Master Permit at 18*.

Diversion Channels 1 and 2, and Diversion Dikes 1 and 2, were constructed in 1978. Diversion 1 was 6,400 feet long and Diversion 2 was 2,420 feet long. Both Diversions are routinely inspected and have been maintained since being constructed. Similarly, flows in the two reaches of Big Thirtynine Creek and Little Thirtynine Creeks south of the diversions have been restricted since the original construction of Diversions 1 and 2. This means all watershed-scale impacts resulting from constructing the Diversions, and subsequent impacts to the streams from reduced flows, have been in place since 1978.

West Ridge Railroad

Past Development. Coarse tailings required for dam construction have historically been delivered to the Mile Post 7 site, and across the Tailings Basin to the Dam sites, by means of a spur rail line emanating originally from Reserve Mining's existing mining railroad. Although no location for where the rail line would traverse the Tailings Basin was originally specified, it was generally understood this rail line would move over time to accommodate the changing construction areas for the dams and as the basin filled with tailings. The railroad grade itself is composed of coarse tailings (i.e., plant aggregate), which is material authorized to be placed within the basin. This railroad grade is not a dam and serves no structural function. To date the railway has operated in two locations. The second and current location of the rail line has been in place since 2005. The rail line will now shift a third and final time under the proposed Project. Both previous locations will eventually be overtopped by tailings as they occur below the final tailings elevation of 1,305 feet amsl.

Past Environmental Review. The need for a materials supply railroad, which eventually became known as the West Ridge Railroad, was assessed in both the state and federal EISs.

The 1975-76 Final EIS provided that the coarse tails required for dam construction would be delivered to the Mile Post 7 site by means of a spur rail line from Reserve Mining's existing mining railroad. This was shown in the 1975 Draft EIS in Figure 16, which is detailed in the J2-DNR 2021 ERND at Attachment 5 – Possible Railroad Spur. *See (complete) J2-DNR 2021 ERND at PDF 85*. Although no location was specified for this spur line in the 1975-76 Final EIS, an estimated 5.5 miles of new railroad construction was necessary to connect the existing Reserve Railroad line at Mile Post 6.5 to the future operations at Mile Post 7. It was generally understood this spur line would move over time to accommodate the changing construction areas for the dams and as the basin filled with tailings. Thus, the spur line is little more than a convenience for the transportation of building materials to the Tailings Basin dam sites as the basin was filled. *Id. at 24*.

Whereas the 1975 Draft EIS only referenced a general "possible railroad spur" off the existing Reserve Railroad to convey the dam construction materials across the Tailings Basin site, the 1977 USACE Final EIS addressed the future materials supply railroad in detail at Sections 1.056 to 1.060, and in "Exhibit 31 – Construction Railway General Alignment." Railroad components were expected to evolve over time and included the: spur railroad; initial railroad; intermediate railroad(s); and the ultimate railroad, where subsequent components were to be relocated upgradient along the western side of the Tailings Basin over time. *See J29-1977 USACE Final EIS at 13-14, A-36*. This rail line was, in fact, constructed at its original location, and was then relocated to its present alignment. Northshore now proposes to relocate the West Ridge Railroad under the proposed Project to its final alignment; this alignment is depicted as the "ultimate railroad" on Exhibit 31, Construction Railway General Arrangement, in the 1977 USACE Final EIS. *Id*. *at A-36.* The greater detail in the 1977 USACE Final EIS reinforces the understanding of this site feature at the time of the 1975-76 Final EIS, as well as the understanding that this rail line was intended to move over time.

Timeline. The 1977 Master Permit did not expressly identify the tailings storage facility as including a materials supply railroad; however, it did note there would be "eleven stream crossings by roads, railroads, and pipelines." *See J3-1977 Master Permit at 3*. Similarly, the 1981 Permit to Mine Application specifies the use of "the conveying and rail-haul system" as necessary to transport the dam construction materials. *See J23-1981 Permit to Mine Application at 44*. Once operational, the 1995-1998 Five Year Operations Plan identified the need to relocate the original West Ridge Railroad corridor upslope to the west once the tailings pond reached an elevation of 1,220 feet amsl. *See J17-1995-1998 5YOP at 7*. This happened in 2005 when the West Ridge Railroad was moved approximately 1000-2000 feet west from its original alignment to its current location at an elevation of ~1,240 feet amsl. *See J18-2004-2008 5YOP at 15*. The relocation of the West Ridge Railroad in the proposed Project would require an amendment to the Permit to Mine and would be subject to the 2024-2028 Five Year Operations Plan.

Wastewater Treatment Plant

Past Development. A water treatment plant was added to the Mile Post 7 Tailings Basin facility in 1985. It was designed to remove excess water from the Tailings Basin, treat it, and discharge it into the Beaver River. It was located south of the east-end of Dam 1. In 2007, the water treatment facility was upgraded by adding additional treatment lines thereby increasing the facility's capacity. Since the

2007 upgrade, the normal treatment rate ranges from 2,500 to 3,500 gpm, but rates as high as 4,200 gpm have been recorded. These treatment flows have maintained basin water levels within acceptable engineering norms. *See J19-2019-2023 5YOP at 14.* The proposed Project does not substantially change the current facility water balance and thus does not affect operations or discharges from the wastewater treatment plant.

Past Environmental Review. The Water Treatment Plant has not undergone either state or federal Environmental Review. Reserve Mining sanctioned preparation of a Preliminary Engineering Report for Excess Water Discharge in March 1984. The report noted that because the mining, processing, and operating levels resulted in reduced production rates, water levels in the basin were rising faster than the dams could be constructed. This required discharge of some of the water. The Water Treatment Plant was constructed at the Tailings Basin so this water could be treated prior to discharge to the Beaver River. *See J24-1984 Water Discharge Study at 1-3*.

Timeline. In 1985, MPCA issued permits to Reserve Mining for the construction of a water treatment facility and initiating a permitted water discharge. The MPCA issued three separate permits to Reserve Mining regulating water resources at Reserve Mining's Northshore facilities: one for the operation of the Mile Post 7 Tailings disposal system; a second to regulate the Mile Post 7 water treatment plant and discharge to the Beaver River; and a third to regulate the discharge of non-contact cooling water from the Silver Bay Power Plant to Lake Superior and the discharge of process wastewaters from the Silver Bay Plant to the Mile Post 7 Tailings basin. *See J15-Furnace 5 Reactivation Record of Decision – Permitting History at 3*. These permits were reissued and/or transferred to Cyprus Mineral Company and Cyprus Northshore Mining Company in August 1989, when that company acquired the assets of Reserved Mining. *Id*. The three permits were subsequently combined into a single MPCA NPDES/SDS Permit No. MN0055301, which was issued to Cyprus Mineral Company and Cyprus Northshore Mining Company in 1996. *Id*.

The permit was again reissued in 2005 to Northshore Mining Company, Silver Bay Power Company, and Cleveland-Cliffs Inc. as MPCA NPDES/SDS Permit MN0055301 (MPCA NPDES Permit). *See J14-2005 NPDES Permit MN0055301*. This permit continues to govern water quality at the Mile Post 7 site. This global permit regulates not only the water quality of the treatment plant effluent, but also the monitoring requirements for all other potential sources of impacts to surface water and groundwater resources at the Mile Post 7 Tailings Basin and the Silver Bay processing facility. *Id*. Operations of the wastewater treatment facility are also documented in the 2019-2023 Five Year Operations Plan (*at 14*).

Ash Disposal Facility

Past Development. *A* lined solid waste disposal facility for disposal of demolition debris and coal ash is located at the west corner of the Mile Post 7 site (Disposal Facility). *See J12-MPCA Solid Waste Permit SW-409 at 4*. Historically, Reserve Mining began disposing demolition debris from its Silver Bay and other facilities within unused portions of the Mile Post 7 Tailings Basin. The disposal site(s) were unlined but above the water level in the basin. Originally taking the form of three permit-by-rule (PBR) landfill sites, each disposal site was designed with a capacity of up to 15,000 cubic yards of demolition waste. This practice was discontinued circa 2000-2002. *Id*.

As designed the ash landfill is 30 acres with a total capacity of 566,000 cubic yards. The Disposal Facility was constructed in phases. Construction of Phases I, II, and III have been completed and filled

with waste. A portion of the Phase IV liner was constructed in 2008 (designated as Phase IVA) for the purposes of managing stormwater from Phases I-III. *Id.* The ash landfill is projected to continue to be used for the disposal of coal ash and other approved wastes up to its ultimate design capacity. The orientation of the Dam 1 extension and the West Ridge Railroad under the proposed Project are designed to avoid impacts to the ash disposal facility.

Past Environmental Review. The need for this disposal and eventual development of a landfill was neither anticipated nor analyzed in the 1975-76 Final EIS, nor in the 1977 USACE Final EIS. Neither mandatory nor discretionary Environmental Review has occurred for the facility.

Timeline. The MPCA issued to the Proposer its Solid Waste Permit SW-409 authorizing construction of the ash disposal facility in 2000. *Id*. This permit was reissued in 2004, 2010, and most recently on May 18, 2017. The ash landfill is currently permitted through 2027. The proposed Project is not anticipated to change any operations of the ash disposal facility.

7. Climate Adaptation and Resilience:

a. Describe the climate trends in the general location of the project (see guidance: *Climate Adaptation and Resilience*) and how climate change is anticipated to affect that location duringthe life of the project.

The DNR Minnesota Climate Trends tool provides a summary of historical climate data for various regions across Minnesota. The climate data that is presented in this tool was collected from nationally available sources, the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information, and the Parameter-elevation Regression on Independent Slopes Model (PRISM) Climate Group. Future projections are based on the data developed from the University of Minnesota and are summarized in two scenarios, which are the Representative Concentration Pathway (RCP) 4.5 and the RCP 8.5. "RCP" is a measure adopted by the Intergovernmental Panel on Climate Change (IPCC) to represent various greenhouse gas concentration pathways. The numbers (i.e., 4.5 and 8.5) represent the amount of net radiative forcing the earth receives in watts per meter squared where a higher RCP signifies a more intense greenhouse gas effect resulting in a higher level of warming. RCP 4.5 represents an intermediate scenario where emissions begin to decrease around 2040 and RCP 8.5 represents a scenario with no emissions reductions through 2100.

The climate models predict the average temperature for Lake Superior–South to increase by approximately 0 to 6 degrees Fahrenheit (°F) by the Mid-Century (2040 to 2059) compared to current (1980 to 1999) conditions under the RCP 4.5 scenario. For the Late-Century (2080 to 2099), air temperature is projected to increase by approximately 3 to 8°F under RCP 4.5 and approximately 7 to 14°F under the RCP 8.5 scenario. The models also predict future annual precipitation values for the region. The model mean shows that from the Present to Mid-Century under RCP 4.5 conditions, there may be a slight increase in average precipitation of 0.12 inches. For Late-Century, the model mean shows an increase of 0.33 inches (RCP 4.5) and 0.67 inches (RCP 8.5).

The EPA Climate Resilience Evaluation and Awareness Tool (CREAT) anticipate an increase in 100-year storm intensity of 10.7% in 2035 and 20.9% in 2060.[16] The EPA Streamflow Projections Map

[16]The EPA CREAT [tool] only provides predictions for the 100-year recurrence interval. While the CREAT does not estimate 500-year or greater events, it does provide climate change scenarios that present useful information for

anticipates an increase in streamflow by a ratio of 0.9 to 1.2 in 2071 to 2100 (RCP 8.5) compared to baseline historical flow (1976 to 2005).

b. For each Resource Category in the table below: Describe how the project's proposed activitiesand how the project's design will interact with those climate trends. Describe proposed adaptations to address the project effects identified. See Table 4.

higher intensity events, including higher than is being used currently for 100-year events. The tool also identifies adaptation options to increase resilience.

Table 4 Proposed Climate Adaptations

Resource Category	Climate Considerations (as identified above in 7a)	Project Information (what features of this resource category addresses vulnerabilities because of/due to climate and climate trend)	Adaptations (effect on that feature)
Project Design	More frequent and intense rain events and warmer temperatures	The Tailings Basin Features design includes shedding of precipitation exterior of the basin while accommodating precipitation interior to the basin. The Stream Mitigation Sites design would reconnect the floodplain, allowing flood flows to spill into the floodplain. Use of floodplain reduces velocities and attenuates peak flood flows.	Based on the design considerations, further adaptations are not necessary to address future climatic conditions because the design is based on the probable maximum precipitation event. Tailings Basin planning is updated every 5 years, at which time pond level and probable maximum precipitation event is re-evaluated. All precipitation that falls within the footprint of the basin is captured, regardless of precipitation intensity or frequency, forest cover, or wetlands, so the only climate trend consideration is total annual precipitation, for which the basin operation is adjusted every 5 years. The Stream Mitigation Sites would reduce shear stresses from flood flows. With more floodplain capacity, channel erosion would be reduced, and the channel would remain resilient to more frequent flood flows. BMPs, as outlined in the SWPPPs for the Stream Mitigation Sites (Appendix B through F) and the Tailings Basin Features Construction Stormwater SWPPP, would be followed during construction to minimize risks.

Resource Category	Climate Considerations (as identified above in 7a)	Project Information (what features of this resource category addresses vulnerabilities because of/due to climate and climate trend)	Adaptations (effect on that feature)
Land Use	More frequent and intense rain events. Increased temperatures.	The Tailings Basin Features would result in loss of wetlands and associated flood storage specific to the footprint only. The loss of wetland would be mitigated for by purchasing wetland bank credits according to the previously issued authorizations (Table 8). In addition, loss of forest cover could increase stormwater run-off and decrease carbon sequestration. The Stream Mitigation Sites would not change land use or increase the amount of impervious surface, and the riparian area would be vegetated with trees and native vegetation. The trees that are planted would off-set a portion of the loss of carbon sequestration from the Tailings Basin Features.	Based on the design considerations, further adaptations are not necessary to address future climatic conditions because the design is based on the probable maximum precipitation event. For the Stream Mitigation Sites, access to floodplain increases cross-sectional area of peak flow. The increased cross-sectional area and wetted perimeter decreases velocity of flow. The floodplain is also rougher (> manning's "n" factor) which further reduces velocity. A reduced velocity decreases erosive potential and as flows decrease areas of the floodplain retain water. These areas capture sediment, provide wetland habitat, and decrease the total volume of water in flood flows beyond that point. The tree species planned for the Stream Mitigation Sites, such as cedar and spruce, are native to the area and are flood-tolerant, and as such these species should perform well in an environment that may have increased flood risk. Once established, the trees would provide an overstory, and maintain cool water and air temperatures.
Water Resources	Address in EAW Item 12	Address in EAW Item 12	Address in EAW Item 12
Contamination / Hazardous Materials / Wastes	Not Applicable	Not Applicable	Not Applicable

Resource Category	Climate Considerations (as identified above in 7a)	Project Information (what features of this resource category addresses vulnerabilities because of/due to climate and climate trend)	Adaptations (effect on that feature)
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	More frequent and intense rain events. Increased temperatures.	The Tailings Basin Features would result in loss of wetland and upland habitat. The Stream Mitigation Sites would enhance habitat through installation of woody debris, bedform diversity, and restoration of the riparian area with trees and native vegetation.	Loss of wetland habitat would be mitigated for by purchasing wetland bank credits. The Stream Mitigation Sites would increase floodplain access, increase wetland habitat, prolong post precipitation/snow melt impact on flow (keeping baseflow higher) and capture sediment. The increase in woody debris and increased bedform diversity would provide habitat diversity, thermal refuge, and spawning areas.

8. **Cover types:** Estimate the acreage of the site with each of the following cover types before and afterdevelopment:

Tables 5 and 6 summarize the cover types estimated using NLCD 2019 Land Cover Data unless otherwise noted; see Figure 3. The values indicated in Tables 5 and 6 do not include field calculated data unless otherwise noted.

Table 5 Existing and Proposed Cover Types for Stream Mitigation Sites

Cover Types	Before (acres)[1]	After (acres)[2]
Wetlands and shallow lakes (<2 meters deep)	8.15	8.15
Deep lakes (>2 meters deep)	0	0
Wooded/forest	123.61	123.61
Rivers/streams	20,880 LF	20,665 LF
Brush/grassland	1.11	1.11
Cropland	0	0
Livestock rangeland/pastureland	0.58	0.58
Lawn/landscaping	0	0
Green infrastructure TOTAL (from Table 6)	0	0
Impervious surface	0	0
Developed or barren land[3]	1.75	1.75
Other (none)	0	0
TOTAL	135.2	135.2

[1]Before calculations include the project area for the six individual stream mitigation projects.
[2]Wetland values were obtained from field-collected data.
[3]This acreage is a combination of land classifications of developed, low intensity, medium intensity, open space, and barren land that overlap the individual stream mitigation project sites.

Table 6 Existing and Proposed Cover Types for Tailings Basin Features

Cover Types	Before (acres)[1]	After (acres)[2]
Wetlands and shallow lakes (<2 meters deep)[3]	66.73[4]	22.95[4]
Deep lakes (>2 meters deep)	0	0
Wooded/forest	249.54	0
Rivers/streams	0.58	0
Brush/grassland	8.83	8.83
Cropland	0	0
Livestock rangeland/pastureland	0	0
Lawn/landscaping	0	0
Green infrastructure TOTAL (from Table 6)	0	0
Impervious surface	0	0
Developed or barren land[5]	13.42	0
Other (describe): Dam 1, Dam 2, rail switchback, rail embankment, borrow site	0	322.85
TOTAL	339.1	339.1

[1]Before calculations include areas within the proposed Tailings Basin Features.
[2]After calculations include the area of the proposed Tailings Basin Features and does not include land cover changes as part of the fine tailings deposition progression.
[3]Wetland data was obtained from field-collected data.
[4]Includes the clay borrow area wetlands.
[5]This acreage is a combination of land classifications of developed, low intensity, medium intensity, open space, and barren land that overlap the southern borrow pit, Dam 1 features, and railroad embankment.

Table 7 Existing and Proposed Green Infrastructure

Green Infrastructure	Before	After
Constructed infiltration systems (infiltration basins/infiltration trenches/ rainwater gardens/bioretention areas without underdrains/swales with impermeable check dams)	N/A	N/A
Constructed tree trenches and tree boxes	N/A	N/A
Constructed wetlands	N/A	N/A
Constructed green roofs	N/A	N/A
Constructed permeable pavements	N/A	N/A
Other (describe)	N/A	N/A
TOTAL	N/A	N/A

Table 8 Existing and Proposed Trees

Trees	Percent	Number
Percent tree canopy removed or number of mature trees removed during development	Stream Mitigation Sites: Unknown Tailings Basin Features: 100%	Stream Mitigation Sites: Unknown Tailings Basin Features: Unknown
Number of new trees planted	N/A	Stream Mitigation Sites: approximately 12,000 Tailings Basin Features: Determined at the time of reclamation and closure

9. Permits and approvals required: List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. *All of these final decisions are prohibiteduntil all appropriate environmental review has been completed.*

See Minnesota Rules, Chapter 4410.3100.

Table 9 Permits and Approvals

Unit of Government	Type of Application/Approval	Status
USACE	Clean Water Act Section 404 approval Section 106 consultation Section 7 consultation MN SQT uplift	Nationwide Permit 27 Authorization 2015-02528-RMM issued 11/09/22 for Big and Little 39 Creeks Stream Mitigation Sites Section 404 authorization MVP-2015-02528-RMM issued 09/23/2021 for Tailings Basin Features To be submitted for remaining 4 Stream Mitigation Sites
DNR	Permit to Mine Amendment	Pending Northshore's response to DNR's initial comments for Tailings Basin Features
DNR	Wetland Conservation Act (WCA) Replacement Plan approval	WCA Notice of Decision issued 05/09/2019 for Tailings Basin Features
DNR	Natural Heritage Information System / Protected Species Review	Completed 10/07/22
DNR	Work in Public Waters approval for each individual Stream Mitigation Site (x6)	Application for Big 39 and Little 39 Creeks Stream Mitigation Sites pending submittal To be submitted for remaining 4 Stream Mitigation Sites
DNR/MPCA	2024-2028 Mile Post 7 Five Year Operations Plan[17]	Will not be completed and submitted until 12/2023

[17]Tailings dams in Minnesota are subject to DNR's Dam Safety Program pursuant to Minn. Stat. § 103G.501 through 103G.561. *Also see Minn. R. 6115.0300 through 6115.0520*. Because the laws governing dam safety were not in place until 1979, the Master Permit regulates dam safety at Mile Post 7. Because the dams at Mile Post 7 are Class 1 dams,

Unit of Government	Type of Application/Approval	Status
MPCA	Construction Stormwater – General Permit MNR100001	Pending submittal for Tailings Basin Features (West Ridge Railroad and switchback)
MPCA	Construction Stormwater – General Permit MNR100001	Pending submittal for Big and Little 39 Creeks To be submitted for remaining 4 Stream Mitigation Sites
MPCA	Section 401 Water Quality Certification	Issued for Tailings Basin Features on 09/23/2021
MPCA	Section 401 Water Quality Certification	Pending submittal for Big and Little 39 Creeks[18]
MPCA	Section 401 Water Quality Certification	To be submitted for remaining 4 Stream Mitigation Sites[19]
MPCA	NPDES Permit MN0055301 Reissuance	In progress for Tailings Basin Features (including SWPPP for Dams 1 and 2 extensions)
MN State Historical Preservation Office (SHPO)	Historic Properties Review	Received 01/2023
Lake County	Conditional Use Permit	Pending submittal
Lake County	Land Use Application Grade/Fill	Pending submittal

they are monitored daily by the basin engineer and other employees working on the dam. The Factors of Safety consistently assessed at the Mile Post 7 dams include various scenarios for Effective Stress Stability Analysis (ESSA) and Undrained Strength Stability Analysis (USSA); these scenarios include various iterations around block failure, fine tailings yield strength, and liquefied strength. DNR accepts the following values for minimum Factors of Safety: ESSA = 1.50; USSA = 1.30; and liquefied = 1.10. The current Factors of Safety for the Mile Post 7 dams exceed the DNR minimum values. *See J19-2019-2023 5YOP at 19-26*.

[18] MPCA indicates each individual stream mitigation project will require its own Section 401 Water Quality Certification.

[19] MPCA indicates each individual stream mitigation project will require its own individual Section 401 Water Quality Certification.

Unit of Government	Type of Application/Approval	Status
Lake County	WCA	To be submitted if required for Stream Mitigation Sites

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos.10-20, or the RGU can address all cumulative potential effects in response to EAW Item No.22. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 21.

10. Land use:

a. Describe:
   i. Existing land use of the site as well as areas adjacent to and near the site, including parksand open space, cemeteries, trails, prime or unique farmlands.

Tailings Basin Features

Existing land use within the planned and permitted area of the Tailings Basin is idled forested lands located on mine property designated for eventual tailings storage. Land immediately adjacent to the east comprises the active Mile Post 7 tailings pond and deposition area, with adjacent lands to the north, west, and south representing idled forest land uses. The clay borrow pit part of the site is actively used for tailings storage related activities. The Northshore Mining Railroad is located to the southwest/west of the site; it is 47 miles long and connects the Peter Mitchell Mine to the processing plant at Silver Bay.

No parks, cemeteries, trails, or prime farmland are located within the Project area.

Lands within the Superior National Forest (SNF) are located approximately 0.6 miles west of the proposed railroad embankment. The SNF was established by the US Forest Service in 1909. It exhibits a forest ecosystem dotted with lakes exhibiting plants and animals typical to a boreal ecosystem. The SNF provides a range of outdoor recreation opportunities, including hiking, camping, nature viewing, and both motorized and non-motorized vehicle trails. No designated SNF facilities or special recreation opportunities occur in the project vicinity.

The western boundary of Tettegouche State Park is located approximately 1.5 miles of the Tailings Basin. This park is typical of state parks along the Lake Superior shore in providing scenic vistas, high cliffs, and hiking opportunities. The park is centered around the Baptism River and surrounding highlands. Picnicking and camping opportunities are present at the western Bean Lake part of the park.

The general area along the North Shore of Lake Superior has both motorized and non-motorized recreational trails but not in the immediate project vicinity. These include:

- C.J. Ramstad/North Shore State Trail. This is a 146-mile-long multi-purpose, natural surface trail from Duluth to Grand Marais. Although primarily a snowmobile trail, some sections are suited for summer uses. This trail is located approximately 1.3 miles west of the proposed

railroad embankment in the SNF.

- Superior Hiking Trail. This is a 310-mile-long hiking trail that extends from Jay Cooke State Park to Lake Superior. This trail parallels the shore of Lake Superior and is located outside the western limits of Beaver Bay and Silver Bay, between the Tailings Basin and these two cities.

- Red Dot Trail. This is a 30-mile-long all-terrain vehicle (ATV) and snowmobile trail that runs from Silver Bay through the Palisade Valley Recreation Unit of Tettegouche State Park before connecting the Moose Walk and Moose Run trails. The Red Dot Trail goes from southeast to northwest with a nearest approach approximately 0.5 miles east of the Tailings Basin.

- Gitchi-Gami State Trail. This is a 29-mile stretch of paved trail, currently being constructed in segments, that eventually will run for 88 miles. The trail connects Silver Bay with Beaver Bay, where from there the longest trail segment connects Beaver Bay with Gooseberry Falls State Park. This trail is 2.5+ miles from the Tailings Basin.

Stream Mitigation Sites

Existing land use for five of the sites proposed for the individual stream mitigation actions is principally idled forestland and wetlands located outside the current and proposed active areas of the Tailings Basin. The exception is White Rock Creek, which flows through the City of Silver Bay; it is adjacent to residential parcels, the Lake County Services Center, Essentia Health Pharmacy, and United Protestant Church, and continues to flow through open space behind the Silver Bay Youth Hockey Club. The land use for White Rock Creek is therefore considered as forested, wetlands, and urban.

There is a cemetery approximately one-half mile northeast and upgradient of the East Branch Beaver River.

Recreation resources in the vicinity are the same as identified for the Tailings Basin, with distances varying slightly depending on the location of each individual stream mitigation site. The Silver Bay Loop Trail, which is part of the greater Red Dot ATV and Snowmobile Trail, is located to the south of the White Rock Creek stream mitigation site on the opposite side of Penn Boulevard. The proposed White Rock Creek stream mitigation project is separate and removed from the Red Dot Trail.

ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and anyother applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

The Lake County Comprehensive Plan is the legal basis of its official controls to promote the “health, welfare, moral, and general welfare of the community.” Official controls include zoning and subdivision regulations that the county uses to establish standards for development and regulate land use. The Lake County Land Use Ordinance relies on zoning districts as the main means of implementing the comprehensive plan, which is further refined through the ordinance text and official zoning map. Private parcels of project-related land subject to the Comprehensive Plan include: Tailings Basin Features; East Branch Beaver River; East Branch Beaver River Tributary Berm and Ditch; Big Thirtynine Creek; and Little Thirtynine Creek. The White Rock Creek stream mitigation project occurs on City of Silver Bay and Lake County right-of-way with a small portion on private property, all of which is subject to the Comprehensive Plan.

The Lake County Local Water Management Plan was first adopted in 2005 and subsequently amended in 2010, 2012, and 2015. According to the Board of Soil and Water Resources (BWSR), the current plan (amended 2015) expires at the end of 2025. The purpose of the plan is to address a county's water problems in the context of watershed units and groundwater systems. All the proposed Project is subject to the water management plan.

The Lake Superior South Watershed Restoration and Protection Strategy Report (2018) employed water quality assessment, watershed analysis, civic engagement, planning, implementation, and measurement of results into a 10-year cycle to address both watershed restoration and protection. The Beaver River Watershed was identified as a targeted geographic area for restoration in the report, which includes the Stream Mitigation Sites.

The Lake Superior North One Watershed One Plan (2017) addresses surface water and groundwater resources, water quantity and quality, and land use to leverage the existing requirements for local government comprehensive water management plans to achieve the goals of the Plan. The Plan identifies priorities, management goals, and implementation activities for Cook and Lake Counties. The Beaver River Watershed is identified as a Tier 1 Priority Area for water resource management, protection, and restoration within the Lake Superior North Watershed. This includes the Stream Mitigation Sites.

The Project area is entirely within the 1854 Ceded Territory, which was created by the 1854 Treaty of La Pointe that ceded the northeast portion of present-day Minnesota to the United States. Along with other federally recognized Tribes, the Bois Forte Band of Chippewa, the Fond du Lac Band of Lake Superior Chippewa, and Grand Portage Band of Lake Superior Chippewa that reside within the 1854 Ceded Territory retain hunting, fishing, and other usufructuary rights that extend throughout the entire 1854 Ceded Territory. These tribes jointly-manage treaty resources within the 1854 Ceded Territory with federal, state and county management entities. See Figure 1 that includes an insert depicting the 1854 Ceded Territory.

The 1854 Treaty Authority is an Inter-tribal Natural Resources Management Organization that manages the off-reservation hunting, fishing, and gathering rights of the Grand Portage Band of Lake Superior Chippewa and Bois Forte Band Chippewa in the 1854 Ceded Territory under legal agreement with the State of Minnesota. The 1854 Treaty Authority's mission statement is to "provide an Inter-Tribal natural resource program to ensure that the rights secured to member Native American tribes by treaties of the United States to hunt, fish, and gather within the 1854 Ceded Territory shall be protected, preserved and enhanced for the benefit of present and future member Native American tribes in a manner consistent with the character of such rights, through provisions of services." The 1854 Treaty Authority's management of natural resources focuses on resources most important to and commonly utilized by the Bois Forte and Grand Portage Bands and as directed by their Tribal Councils.

The exercise of usufructuary rights to hunt, fish, and gather by the Fond du Lac Band in the 1854 Ceded Territory is governed by the Fond du Lac Tribal Council.

iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The Tailings Basin Features, East Branch Beaver River Tributary Berm and Ditch projects, and Big and Little Thirtynine Creeks are located on private property within unincorporated Lake County zoned as FR/Forest-Recreation District. The FR district provides for remote residential development distant from public services, restricts destruction of natural or man-made resources, maintains large tracts for forest recreation purpose, provides for the continuation of forest management and production programs, and fosters certain recreational uses and other activities which are not incompatible with the public welfare. Aggregate pits are listed as an interim use with the FR district. In addition, the stream mitigation work is considered a permitted use in the FR District according to section 9.02 of the Lake County Comprehensive Plan and Land Use Ordinance (Ordinance #12).

The East Branch Beaver River is in the Lake County Residential (R-1) District, which provides low density residential development on large lots in areas not requiring public water and sewer services. This district also supports general agriculture and forest-related development.

There are no mapped floodplains, wild and scenic rivers, or agricultural preserves within the Project area.

iv. If any critical facilities (i.e. facilities necessary for public health and safety, those storing hazardous materials, or those with housing occupants who may be insufficiently mobile) are proposed in floodplain areas and other areas identified as at risk for localized flooding,describe the risk potential considering changing precipitation and event intensity.

The Project does not include any proposed critical facilities in floodplain areas or other areas identified as at risk for localized flooding.

b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9aabove, concentrating on implications for environmental effects.

The Lake County Comprehensive Plan and Land Use Ordinance identifies the goals of the county and acts as a guide for achieving them. The goals related to the Project include the plan's commercial/industrial development Goal 2 that identifies the following objectives:

- Identify commercially viable aggregate resources within the county.
- Establish aggregate extraction districts that identify the location of possible future aggregate mining operations based upon an aggregate resource evaluation study.
- Establish protocols to inform developers and residents interested in developing land near aggregate production districts of the potential for noise, dust, traffic, and visual impacts associated with such industrial operations.
- Act to reduce conflict in aggregate industrial operations.

The Tailings Basin Features are compatible with the Lake County Comprehensive Plan and Land Use Ordinance because the Tailings Basin Features were approved under Northshore's existing conditional use permit.

The City of Silver Bay Comprehensive Plan lists the following goals and objectives specifically for the Northshore Mining operations.

- Support ongoing operations and improvements to processing operations.

- Work with Northshore Mining to identify land use and design opportunities to announce the City of Silver Bay along the Highway 61 corridor.

The Project would support the first goal based on the ongoing operations and improvements to Northshore's facility. Therefore, the Project would be compatible with the City of Silver Bay's Comprehensive Land Use Plan.

The Project would support the first goal based on the ongoing operations and improvements to Northshore's facility. Therefore, the Project would be compatible with the City of Silver Bay's Comprehensive Land Use Plan.

The proposed Project would not restrict access to public lands for pursuit of usufructuary rights to hunt, fish, and gather within the 1854 Ceded Territory. Although not considered a cumulative environmental effect for the purpose of an EAW, Project-related changes to covertypes and habitats would contribute to reductions in areas potentially available to band members to exercise treaty rights within the 1854 Ceded Territory.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 10b above and any risk potential.

No incompatibilities have been identified.

11. Geology, soils and topography/land forms:

a. Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

The Project area straddles the Duluth Complex and the North Shore Volcanic Group that is predominantly gabbro and basalt. Surficial geology primarily consists of glacial sediment deposited by the Superior Lobe, including the Cromwell formation and Barnum formation.

No sinkholes or karst geology are present in the Project area.

Previous geotechnical investigations around Northshore's property have not encountered shallow aquifers. Because the soils in the area are predominantly low permeability glacial sediment underlain by gabbro and basalt, aquifer soils are generally absent from the region. Test borings performed along the railroad embankment and dam extension project areas indicate subsurface conditions consist of glacial till soils underlain by bedrock. Glacial till soils are mainly comprised of lean clay, sandy lean clay, silty sand, and silty clayey sand with thin layers of glacial outwash present in a few select

locations. Alluvial soils in the two valleys north of the landfill consist mainly of silty sand, with a near-surface layer at one location comprised of gravel. The igneous bedrock also has limited groundwater available for use as water supply. No impacts to site geology are anticipated.

b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highlypermeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed inresponse to Item 12.b.ii.

Elevations across the Project area range from approximately 850 to 1,388 feet amsl. The lowest elevations are associated with the White Rock Creek stream mitigation project. The highest elevations are associated with the northern part of the railroad embankment project area.

The Natural Resources Conservation Service (NRCS) Web Soil Survey allowed identification of near surface soil types that occur across the Project area. The text below describes the dominant soil types for both the Tailings Basin Features and Stream Mitigation Sites; the potential impacts are also identified.

Tailings Basin Features

The NRCS identifies 21 soil map units in the railroad embankment and dam extension project area; see Figure 5-1 and Figure 5-2. Seven soil map units collectively make up approximately 75 percent of the railroad embankment and dam extension project area; see Table 10. These seven soil map units are all non-hydric or predominantly non-hydric and primarily consist of silt loams and sandy loams, often with gravel; see Figure 5-1 and Figure 5-2. Only 6 percent of the railroad embankment and dam extension project area has soil mapped as hydric or predominantly hydric; see Figure 5-1 and Figure 5-2; these soil map units are generally located in wetlands and contain soils with high organic matter content.

The NRCS maps four soil types within the south borrow pit project area, and as shown in Table 10 and on Figure 5-1, two soil types represent over 80 percent of the project area. Soils in the south borrow pit consist of silt loams, silty clay loams, silty clay, and clay. There is one hydric soil type in the project area, which is in a wetland and represents just under 11 percent of the project area. Because 21 soil types were identified in the railroad embankment and dam extension project area, only the dominant seven soil types are listed in table; these seven soil types represent approximately 75 percent of the project area.

The south borrow site is approximately 108.3 acres in size, of which 14.7 acres have been previously excavated, and 17.3 acres include delineated wetlands that would not be disturbed, leaving approximately 76.3 acres available for borrow material. The remaining area would be excavated to a depth of 5 to 10 feet as needed for the construction of Dam 1. It is not anticipated that the entire area would be excavated as part of the Project.

Table 10 Soil Types in Tailings Basin Features Area

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
A1-40B	Normanna-Greysolon complex, 2 to 8 percent slopes, very rocky	Loam and gravelly sandy loam	Non-hydric	Railroad Embankment and Dam Extension Project Area	20.1%
B1-40B	Augustana-Hegberg complex, 1 to 8 percent slopes	Silt loam and very fine and gravelly sandy loam	Predominantly non-hydric	Railroad Embankment and Dam Extension Project Area	18.9%
F2-41D	Aldenlake-Ahmeek complex, 8 to 18 percent slopes	Sandy loam, very gravelly loamy sand, and very gravelly sand	Predominantly non-hydric	Railroad Embankment and Dam Extension Project Area	11.9%
A1-41D	Ahmeek-Normanna-Mesaba, stony complex, 4 to 18 percent slopes, very rocky	Silt loam and gravelly sandy loam	Predominantly non-hydric	Railroad Embankment and Dam Extension Project Area	7.7%
A3-31D	Ahmeek-Normanna-Canosia complex, 0 to 18 percent slopes	Fine sandy loam over gravelly sandy loam	Predominantly non-hydric	Railroad Embankment and Dam Extension Project Area	6.6%
A1-20D	Mesaba, stony-Barto, stony-Rock outcrop complex, 15 to 35 percent slopes	Gravelly sandy loam	Non-hydric	Railroad Embankment and Dam Extension Project Area	5.9%

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
E1-9D	Ahmeek-Udifluvents, frequently flooded-Rock outcrop complex, 1 to 18 percent slopes	Silt loam and gravelly sand loam	Predominantly non-hydric	Railroad Embankment and Dam Extension Project Area	4.3%
C3-41D	Sanborg-Badriver complex, 1 to 18 percent slopes, very rocky	Silt loam, silty clay loam, clay, silty clay	Non-hydric	Clay Borrow Pit	47.6%
D1-50B	Cuttre complex, 0 to 8 percent slopes	Silt loam, silty clay loam, clay	Predominantly non-hydric	Clay Borrow Pit	36.2%
C1-10A	Palmers, depressional-Badriver complex, 0 to 1 percent slopes	Silt loam, clay	Hydric	Clay Borrow Pit	10.7%
E1-39E	Miskoaki-Fluvaquents, frequently flooded-Rock outcrop complex, 0 to 45 percent slopes	Silt loam, silty clay loam, clay	Predominantly non-hydric	Clay Borrow Pit	5.5%

Prior to construction, topsoil and organic soils, and soft-loose materials unsuitable for support, would be removed throughout the Dams 1 and 2 extension footprints and railroad embankment footprint. Topsoil of varying depth is present in areas where existing basin features are absent. Investigations to date have not identified any specific zones of unsuitable soils, however, consistent with any construction project, it is anticipated soft, wet, and/or disturbed soils would be encountered over the course of foundation preparation and will require removal.

Soils from the south borrow pit would be excavated and used for construction of select areas of the railroad embankment and dam extensions. As discussed below in EAW Item 12, wetlands and associated hydric soil would be avoided when excavating soil from the south borrow pit; see Figure 5-1. Both dam extensions would ultimately be constructed to their permitted maximum elevation of 1,315 feet amsl.

Construction activities under the proposed Project would be subject to applicable BMPs that are identified in the Tailings Basin Features Construction Stormwater SWPPP. The purpose of these measures is to minimize runoff and potential erosion during and after construction.

Stream Mitigation Sites

The NRCS maps several soil types across the individual stream mitigation project areas; see Table 11, Figure 5-1, Figure 5-2, and Figure 5-3. Additional information on the soils within and adjacent to the individual stream mitigation projects areas can be found in Appendix B through Appendix F.

Table 11 Soil Types in Stream Mitigation Site Areas

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
E2-11D	Forbay-Fluvaquents, frequently flooded complex, 0 to 18 percent slopes	Loam and gravelly sandy loam	Predominantly non-hydric	East Branch Beaver River	60.7%
K2-10A	Bowstring and Fluvaquents soils, 0 to 2 percent slopes, frequently flooded	Muck and stratified fine sand to loamy find sand	Hydric	East Branch Beaver River	36.8%
C1-20A	Bad River complex, 0 to 3 percent slopes	Silt Loam, silty clay loam, and clay	Partially hydric	East Branch Beaver River	2.1%

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
B1-20B	Hegberg-Eldes complex, 0 to 3 percent slopes	Loam and gravelly sandy loam	Partially hydric	East Branch Beaver River	0.4%
K1-14	Tailings Basin	Metal ore extraction mine spoil	Non-hydric	East Branch Beaver River Tributary Ditch	44.1%
B1-40B	Augustana-Hegberg complex, 1 to 8 percent slopes	Loam	Predominantly non-hydric	East Branch Beaver River Tributary Ditch	28.4%
E2-11D	Forbay-Fluvaquents, frequently flooded complex, 0 to 18 percent slopes	Loam and gravelly sandy loam	Predominantly non-hydric	East Branch Beaver River Tributary Ditch	18.4%
B1-41D	Forbay-Augustana complex, 3 to 18 percent slopes	Loam and gravelly sandy loam	Predominantly non-hydric	East Branch Beaver River Tributary Ditch	8.9%

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
B2-41D	Forbay, moderately deep-Augustanna, moderately deep complex, 3 to 18 percent slopes, very rocky	Loam	Non-hydric	East Branch Beaver River Tributary Ditch	0.2%
B1-40B	Augustana-Hegberg complex, 1 to 8 percent slopes	Loam	Predominantly non-hydric	East Branch Beaver River Tributary Berm	100%
E1-30F	Odanah-Udifluvents, frequently flooded rock outcrop complex, 1 to 70 percent slopes	Silt loam to silty clay loam	Predominantly non-hydric	White Rock Creek	95.6%
K1-21B	Urban land-Cuttre complex, 0 to 8 percent slopes, very rocky	Fill material	Predominantly non-hydric	White Rock Creek	1.8%
A1-20C	Mesaba, stony-Greysolon-Rock outcrop complex, 2 to 15 percent slopes	Gravelly sandy loam	Non-hydric	White Rock Creek	1.3%

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
A1-11D	Quetico, stony-Barto, stony-Rock outcrop complex, 15 to 35 percent slopes	Fine sandy loam and gravelly fine sandy loam	Non-hydric	White Rock Creek	1.3%
A3-12A	Giese muck, depressional, 0 to 1 percent slopes	Muck, silt loam, gravelly sand loam	Hydric	Big and Little 39 Creeks	29.7
K2-10A	Bowstring and Fluvaquents soils, 0 to 2 percent slopes, frequently flooded	Muck	Hydric	Big and Little 39 Creeks	22.2
A3-20A	Canosia loam, 0 to 2 percent slopes	Loam, sandy loam, gravelly sandy loam	Predominantly hydric	Big and Little 39 Creeks	15.8
F2-41D	Aldenlake-Ahmeek complex, 8 to 18 percent slopes	Sandy loam, very gravelly loamy sand	Predominantly non-hydric	Big and Little 39 Creeks	13.8

Map Unit Symbol	Map Unit Name	Typical Profile	Hydric Status	Project Component	Percent of Project Component Area
A1-40B	Normanna-Greysolon complex, 2 to 8 percent slopes, very rocky	Loam, gravelly sandy loam, gravelly sandy loam	Non-hydric	Big and Little 39 Creeks	8.1
E1-9D	Ahmeek-Udifluvents, frequently flooded-Rock outcrop complex, 1 to 18 percent slopes	Silt loam, gravelly sandy loam	Predominantly non-hydric	Big and Little 39 Creeks	6.9
A3-21A	Hermantown silt loam, 1 to 3 percent slopes	Loam, sandy loam, gravelly sandy loam	Predominantly non-hydric	Big and Little 39 Creeks	1.7
A3-11A	Twig-Tacoosh-Giese complex, 0 to 1 percent slopes, depressional	Mucky peat, mucky silt loam, gravelly sandy loam	Hydric	Big and Little 39 Creeks	1.4
A3-30B	Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes	Loam, sandy loam, gravelly sandy loam	Predominantly non-hydric	Big and Little 39 Creeks	0.5

The soils in the individual stream mitigation project areas consist primarily of rocky soils, mucky soils,

loamy soils, and fluvial deposits associated with these soil types. The soil K-factor is a measure of erodibility, with the higher the value the more susceptible a soil is to erosion. The K-factor for soils in the individual stream mitigation project areas ranges between 0.15 to 0.43. As such, soils in the individual stream mitigation project areas have moderate to low erodibility. The entirety of the Stream Mitigation Sites (aside from material staging) would occur within the existing stream valleys. The soils and topography do not require any special considerations during construction.

Grading of the new stream alignments and floodplain would occur to allow for the project goal of an accessible floodplain (where greater than bankfull flows can access the stream's floodplain). This allows for natural stream processes to occur, including both erosion and deposition. The excess cut material would be removed from the project area and placed on Northshore property, in upland areas, within proximity of the Tailings Basin. BMPs would be used during construction to reduce risk of erosion of the temporarily exposed soil. Post-construction, the exact alignment of the streams is expected to adjust slightly due to natural stream processes, but the grade control and stabilization structures are designed to maintain the appropriate hydrology, hydraulics, geomorphology, physiochemical and biological conditions proposed. Table 12 provides a summary of the excavated material for the individual stream mitigation projects.

Table 12 Summary of Excavated Material for Stream Mitigation Sites

Project Component	Cut/Fill Volume (cubic yards)
East Branch Beaver River	12,000 cut/fill
East Branch Beaver River Tributary	2,500 cut/fill
East Branch Beaver River Tributary Berm	4,000 cut/fill
White Rock Creek	2,790 cut, 1,640 fill
Big 39 Creek	15,000 cut, 6,000 fill
Little 39 Creek	22,000 cut, 10,800 fill

Soil erosion control measures would be implemented during and after construction to prevent unnecessary erosion and stabilize disturbed slopes and stream banks until new vegetation takes hold. Construction vehicle traffic would be confined to a minimal number of access roads and routes to prevent widespread rutting and soil compaction. The contractor would not work during large rain events and would minimize impacts to soils susceptible to rutting. Access paths and areas that may experience soil compaction can be tilled at the end of construction to loosen soils. See EAW Item 14.d for information on non-native invasive plant species control measures.

- NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that

could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 12 must be consistent with thegeology, soils and topography/land forms and potential effects described in EAW Item 11.

12. Water resources:

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, shoreland classification and floodway/floodplain, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include the presence of aquatic invasive speciesand the water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

The Project is in the Hydrologic Unit Code (HUC) 10 Beaver River-Frontal Lake Superior watershed in the Lake Superior-South (No. 2) major watershed, and in the following subwatersheds: East Branch Beaver River, Lower Beaver River, Big Thirtynine Creek, and the existing Tailings Basin; see Figures 6-1 through 6-5. Table 13 summarizes the special designation waters, identifies the MPCA 303d Impaired Waters, and lists known aquatic invasive species waters within 1 mile of the Project; also see Figure 6-1.

Table 13 Summary of Special, Impaired, and Infested Waters

Project Component	Watercourse / Waterbody	Designation	Identification Number	Relative Location to Project Component	Impairment
East Branch Beaver River and Tributary	East Branch Beaver River	Trout Stream	S-035-001	Project	None
East Branch Beaver River and Tributary	East Branch Beaver River Tributary	Trout Stream (Tributary)	S-035-001-002.3	Project	None
East Branch Beaver River and Tributary	East Branch Beaver River Tributary	Trout Stream (Tributary)	S-035-001-003	Upstream	None
East Branch Beaver River and Tributary	Cedar Creek	Trout Stream	S-035-001-002	Downstream Confluence into Beaver River East Branch	None
East Branch Beaver River and Tributary	Cedar Creek Tributary	Trout Stream (Tributary)	S-035-001-002-000.5	Confluence into Cedar Creek	None
White Rock Creek	White Rock Creek	Infested	None	Project	Infested: White Perch, Viral Hemorrhagic Septicemia; Round Goby

Project Component	Watercourse / Waterbody	Designation	Identification Number	Relative Location to Project Component	Impairment
White Rock Creek	Lake Superior	Lake	16-0001-00	Downstream	Impaired: Mercury and PCB in Fish Tissue
Big and Little 39 Creeks	Little 39 Creek	Trout Stream	S-035-010-002	Project	None
Big and Little 39 Creeks	Big 39 Creek	Trout Stream	S-035-010	Project	None
Big and Little 39 Creeks	Big 39 Creek Tributary	Trout Stream (Tributary)	S-035-010-003	Upstream	None
Big and Little 39 Creeks	Beaver River	Trout Stream, Impaired and Infested	S-035	Downstream	Impaired: Fish Bioassessments; Mercury in Water Column; Turbidity; pH
Big and Little 39 Creeks	Kit Creek (Tributary to Beaver River)	Trout Stream (Tributary)	S-035-009	Confluence into Beaver River	None

According to the DNR List of Infested Waters, there are no aquatic invasive species in the East Branch Beaver River or its tributary, or Big Thirtynine and Little Thirtynine Creeks.

Wetlands within the vicinity of the Project area are shown on Figure 7. To date, wetlands were field delineated across the Tailings Basin Features including the clay borrow area, Big Thirtynine Creek, and Little Thirtynine Creek. The field delineated wetlands are classified as follows: alder thicket; coniferous swamp; fresh (wet) meadow; hardwood swamp; seasonally flooded basin; sedge meadow; shallow marsh; shrub-carr wetlands; and deepwater habitat. The wetland delineation report for the clay borrow area will be submitted to DNR, if necessary, in support of the WCA review. Additional delineation may be necessary for the remaining individual stream mitigation projects. Wetland delineation reports will be submitted to the LGU and MPCA, if necessary, in support of any required WCA review and MPCA Section 401 Water Quality Certification. Also see EAW Item 11.iv.

ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells,including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

The Project area is not within a wellhead protection area. According to the Minnesota Well Index, there are seven wells within one mile of the proposed Tailings Basin Features; see Table 14. Six of the wells have been sealed and one remains active. Most of these wells are located along the proposed railroad embankment, Dam 1 extension, and rail switchback; see Figure 6-5. The depth to groundwater ranges from approximately 2.7 feet to 24 feet.

An industrial solid waste landfill was permitted, constructed, and has been operating since 2000; see EAW Item 6f for a history of the site. The facility is currently permitted through 2027. Groundwater is monitored by a network of wells surrounding the active industrial landfill under MPCA solid waste permit SW-409. The SEEP/W model results show that an increase in the Tailings Basin pond elevation, beyond what is proposed (1,305 feet amsl), with a drainage ditch at the dam toe, would not cause the groundwater elevations at the landfill to rise. Although no impacts are anticipated, according to the landfill permit, the permittee shall take appropriate corrective action to maintain an effective leak detection and groundwater monitoring system for the landfill if the Tailings Basin pond elevation is determined to influence the groundwater under and surrounding the landfill in such a way that the landfill can no longer be monitored effectively. The Proposer's monitoring wells are shown on Figure 6-5 and listed in Table 14.

Work would generally be conducted at or below the water table to restore the streams. According to the Minnesota Well Index, the groundwater elevation near the East Branch Beaver River is approximately 1,108 feet amsl and the surface water of the East Branch Beaver River is at approximately 1,070 feet amsl. Groundwater near the White Rock Creek is approximately 602 feet amsl, or the elevation of Lake Superior. White Rock Creek flows through a steep valley at an approximate elevation of 900 feet amsl. There are few well records around White Rock Creek area; however, downgradient approximately 0.73 miles the surface water elevation is 603 feet amsl. Big and Little Thirtynine Creeks are nearest to wells related to landfill monitoring within the Tailings Basin footprint but are not in the same sub-watershed. The streams occur where the topography meets the elevation of the groundwater in the area, so depth to groundwater increases from zero at the stream's edges. Work would be conducted at or below the groundwater level/water table to restore the

streams.

Table 14 Summary of MN Well Index Wells and Northshore Monitoring Wells within One Mile of Project Sites

Project Component	Unique Well ID	Well Name	Status	Distance from Project Component (miles)	Elevation of Groundwater Table (ft amsl)	Depth to Groundwater (ft)
Tailing Basin Features	486968	MW-1	Sealed	0.07	1,283.6	24.4
Tailing Basin Features	486969	MW-2	Sealed	0.00	1,331.4	6.6
Tailing Basin Features	486970	MW-3	Sealed	0.00	1,321	8.0
Tailing Basin Features	486971	MW-4	Sealed	0.00	1,306.8	5.2
Tailing Basin Features	486972	MW-5	Sealed	0.11	1,312.3	2.7
Tailing Basin Features	486973	MW-6	Sealed	0.09	1,318	7.0
Tailing Basin Features	641875	Private	Active	0.12	Not Available	Not Available
East Branch Beaver River	613993	Private	Active	0.95	1,204	20.0
East Branch Beaver River	850421	MW-M5A	Active	0.55	1,108	-2.0

Project Component	Unique Well ID	Well Name	Status	Distance from Project Component (miles)	Elevation of Groundwater Table (ft amsl)	Depth to Groundwater (ft)
East Branch Beaver River	850422	MW-M5	Active	0.55	1,108	-2.0
East Branch Beaver River	850420	MW-M5BB	Active	0.55	1,106	0
East Branch Beaver River	773313	Private	Active	0.53	1,144	8.0
East Branch Beaver River	548413	Private	Active	0.91	1,240	20.0
White Rock Creek	551226	MW-4	Active	0.73	602.7	9.3
White Rock Creek	148934	Reserve Mining Co.	Sealed	0.55	839	16.0
White Rock Creek	341088	CP-6	Sealed	0.89	748	13.0
White Rock Creek	762010	PB-6	Sealed	0.79	759.5	8.5
White Rock Creek	701012	Private RW	Sealed	0.76	765.1	2.9
White Rock Creek	762007	PB-3	Sealed	0.76	769.9	9.1
White Rock Creek	762008	PB-4	Active	0.78	759	9.0

Project Component	Unique Well ID	Well Name	Status	Distance from Project Component (miles)	Elevation of Groundwater Table (ft amsl)	Depth to Groundwater (ft)
White Rock Creek	762011	BP-7	Active	0.79	757.4	7.6
Tailing Basin Features	NA	R-2	Active	0.82	No data	No data
Tailing Basin Features	NA	R-3	Active	1.09	No data	No data
Tailing Basin Features	NA	M010	Active	0.17	No data	No data
Tailing Basin Features	NA	M013	Active	0.66	No data	No data
Tailing Basin Features	NA	S007-366	Active	0.70	No data	No data
Tailing Basin Features	NA	M011	Active	0.00	No data	No data
Tailing Basin Features	NA	M012	Active	0.14	No data	No data
Tailing Basin Features	NA	R-8	Active	0.75	No data	No data
Tailing Basin Features	NA	S000-252	Active	0.80	No data	No data
Tailing Basin Features	NA	S006-273	Active	0.77	No data	No data

Project Component	Unique Well ID	Well Name	Status	Distance from Project Component (miles)	Elevation of Groundwater Table (ft amsl)	Depth to Groundwater (ft)
Tailing Basin Features	NA	S007-598	Active	0.29	No data	No data
Tailing Basin Features	NA	S007-948	Active	0.83	No data	No data
Tailing Basin Features	NA	S007-967	Active	0.30	No data	No data
Tailing Basin Features	NA	S007-968	Active	0.37	No data	No data
Tailing Basin Features	NA	S008-005	Active	0.32	No data	No data
Tailing Basin Features	NA	S105_SW-002	Active	0.79	No data	No data
Tailing Basin Features	NA	S106_SW-003	Active	0.79	No data	No data
Tailing Basin Features	NA	SD1-S010	Active	0.24	No data	No data
East Branch Beaver River	NA	S007-603	Active	S007-603	No data	No data
East Branch Beaver River	NA	M005	Active	M005	No data	No data
East Branch Beaver River	NA	R-4	Active	R-4	No data	No data

Project Component	Unique Well ID	Well Name	Status	Distance from Project Component (miles)	Elevation of Groundwater Table (ft amsl)	Depth to Groundwater (ft)
East Branch Beaver River	NA	S006-277	Active	S006-277	No data	No data
East Branch Beaver River	NA	S007-360	Active	S007-360	No data	No data
East Branch Beaver River	NA	S007-413	Active	S007-413	No data	No data
East Branch Beaver River	NA	S101_SW-004	Active	S101_SW-004	No data	No data
East Branch Beaver River	NA	S102_SW-001	Active	S102_SW-001	No data	No data
Little 39 Creek	NA	S007-411	Active	S007-411	No data	No data
Big 39 Creek	NA	S007-356	Active	S007-356	No data	No data
Big 39 Creek	NA	S007-367	Active	S007-367	No data	No data
Big 39 Creek	NA	S007-406	Active	S007-406	No data	No data
Big 39 Creek	NA	S007-410	Active	S007-410	No data	No data
Big 39 Creek	NA	S008-004	Active	S008-004	No data	No data

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. Wastewater - For each of the following, describe the sources, quantities and composition ofall sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

The Tailings Basin has an industrial wastewater discharge and seepage recovery system. The Dam 1 and Dam 2 extensions would become part of this greater facility system, but the dam extensions themselves would not produce or discharge wastewater. Discharge associated with the overall Tailings Basin routes through the Mile Post 7 water treatment plant.

Seepage management would consist of ditching along the toes of dam extensions to route seepage to existing seepage recovery ponds and pump stations. The natural materials at the base of the seepage recovery ponds are low permeability. For Dam 1, a segment of the railroad grade adjacent to the extension of Dam 1 would be constructed as a plant aggregate dam with a clay cutoff. Runoff water would be impounded between this dam and an existing diversion dam, which would transition to become a seepage collection pond as the elevation of the Tailings Basin pond surface increases over time. A pump station would be constructed to manage water in this pond. For Dam 2, both water that contacts its surface and seepage would be captured by the ditch closest to the Dam 2 toe, which would then be directed to the Tailings Basin seepage recovery facilities. The Project would not alter these discharges in either quantity or quality, so additional effects are not anticipated.

The Stream Mitigation Sites would not produce wastewater.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

N/A

2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system. If septic systems are part of the project, describe the availability of septage disposal options within the region to handle the ongoing amounts generated as a result of the project. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion.

N/A

3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges, taking into consideration how

current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects.

N/A

ii. Stormwater - Describe changes in surface hydrology resulting from change of land cover. Describe the routes and receiving water bodies for runoff from the project site (major downstream water bodies as well as the immediate receiving waters). Discuss environmental effects from stormwater discharges on receiving waters post construction including how the project will affect runoff volume, discharge rate and change in pollutants.Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion. For projects requiring NPDES/SDS Construction Stormwater permit coverage, state the total number of acres that will be disturbed by the project and describe the stormwater pollution prevention plan (SWPPP), including specific BMPs to address soil erosion and sedimentation during and after project construction. Discuss permanent stormwater management plans, including methods of achieving volume reduction to restore or maintain the natural hydrology of the site using green infrastructure practices or other stormwater management practices. Identify any receiving waters that have construction-related water impairments orare classified as special as defined in the Construction Stormwater permit. Describe additional requirements for special and/or impaired waters.

Tailings Basin Features

Construction Stormwater. Northshore would implement applicable BMPs, as outlined in the Tailings Basin Features Construction Stormwater SWPPP, to minimize runoff and erosion during and after construction. These BMPs generally include use of: silt fence; biorolls; mulch; erosion control blankets; check dams; and/or temporary sedimentation basins as applicable. Once covered with 6 inches of native materials and vegetated after construction, precipitation on exterior slopes of the railroad embankment would be shed and routed outside the Tailings Basin.

The approximately nine acres of remaining outer embankment slopes would drain to an impounded watershed, which in turn would not discharge downstream. Precipitation would infiltrate into the railroad embankment and dam extensions that would be collected within the interior of the basin. Any runoff from interior slopes of the embankment and dams would also be collected within the interior of the basin where it would become part of the operating water supply.

The quantity of runoff water from the outer embankment and dam slopes, discharging to non-impounded areas outside of the Tailings Basin Features, has been estimated using the Natural Resources Conservation Service SCS curve number method and XPSWMM version 2019.1.2. Runoff estimates have been modeled using a monthly time step (which overestimates actual runoff) based on current precipitation data (1980-99) and four future climate scenarios. The future climate scenarios include the periods from 2040-59 and 2080-99, and two modeled climate regimes within each of those periods: RCP 4.5 and RCP 8.5. The Intergovernmental Panel on Climate Change (IPCC) describes RCP 4.5 as the scenario in which emissions peak around 2040 and then decline, while under RCP 8.5 emissions continue to rise throughout the Twenty-First Century.

Runoff from the exterior slopes of the Tailings Basin Features will discharge to three separate receiving waters; see Figure 6-3:

- Beaver River – southwest part of the Tailings Basin Features.
- Little Thirtynine Creek – northwest part of the Tailings Basin Features.
- East Branch Beaver River – northeast part of the Tailings Basin Features.

The Tailings Basin Features area watershed draining to the Beaver River is comprised of 11.0 acres, which drains through an unnamed waterway approximately 1.1 mi. before reaching the Beaver River. The Tailings Basin Features area watershed draining to Little Thirtynine Creek is comprised of 4.4 acres, which drains via sheet flow through a 25-acre wetland complex before reaching Little Thirtynine Creek. The Tailings Basin Features area watershed draining to the East Branch Beaver River is comprised of 32.9 acres, which drains through a ditch system and unnamed creek before reaching the East Branch Beaver River approximately 1.2 mi. downstream.

The average annual runoff to the Beaver River would decrease by 0.03 acre-feet (ac-ft) in both mid-century scenarios and would increase by 0.16 ac-ft to 0.28 ac-ft under the end of century climate scenarios compared to the existing climate; see Table 15. That increase in runoff is equivalent to the amount of water that would be flowing in the Beaver River within about 30 seconds to one minute under its normal average discharge rate but represents the maximum additional runoff that would be expected over the course of a typical year. Therefore, the increase in runoff to the Beaver River under future climate scenarios would be negligible.

The average annual runoff to Little Thirtynine Creek would decrease by 0.01 ac-ft in both mid-century scenarios and would increase by 0.048 ac-ft to 0.084 ac-ft under the end of century climate scenarios compared to the existing climate; see Table 15. The increase in runoff is equivalent to 0.024 inch to 0.048 inch of water spread over the 25-acre wetland complex over the course of a typical year, which would be negligible.

The average annual runoff to the East Branch Beaver River would decrease by 0.08 ac-ft in both mid-century scenarios and would increase by 0.48 ac-ft to 0.84 ac-ft under the end of century climate scenarios compared to the existing climate; see Table 15. That increase in runoff is equivalent to the amount of water that would be flowing in the East Branch Beaver River during a 1.5-year return period storm within one to two minutes but represents the maximum additional runoff that would be expected over the course of a typical year. Therefore, the increase in runoff to the East Branch Beaver River under future climate scenarios would be negligible.

Due to the negligible increase in runoff from the Tailings Basin Features because of expected future climate change, no mitigation measures are proposed.

Table 15 Tailings Basin Features Runoff Estimates under Current and Future Climate Scenarios

Parameter	Unit	Beaver River	Little 39 Creek	East Branch Beaver River
Watershed area	acres	11	4.4	32.9
Current climate (1980 – 1999) average annual runoff	ac-ft	0.76	0.23	2.29
RCP 4.5 2040 – 2059 average annual runoff	ac-ft	0.73	0.22	2.20
RCP 4.5 2080 – 2099 average annual runoff	ac-ft	0.92	0.28	2.77
RCP 8.5 2040 – 2059 average annual runoff	ac-ft	0.73	0.22	2.20
RCP 8.5 2080 – 2099 average annual runoff	ac-ft	1.04	0.32	3.13
Average annual runoff volume change from current climate, RCP 4.5 2040 – 2059	ac-ft	-0.03	-0.01	-0.08
Average annual runoff volume change from current climate, RCP 4.5 2080 – 2099	ac-ft	0.16	0.05	0.48
Average annual runoff volume change from current climate, RCP 8.5 2040 – 2059	ac-ft	-0.03	-0.01	-0.08
Average annual runoff volume change from current climate, RCP 8.5 2080 – 2099	ac-ft	0.28	0.10	0.84

Industrial Stormwater. Industrial stormwater activities are covered under Northshore's NPDES/SDS Permit MN0055301, and by extension the 2019-2023 Five Year Operations Plan and subsequent Five

Year Operations Plans as required by Chapter 6.1.8 of the NPDES/SDS Permit. Chapter 6.1.8 states that Northshore is responsible for operating the Tailings Basin in accordance with the Five Year Operations Plan as approved by the MPCA and DNR. Northshore submitted the current Five Year Operations Plan to MPCA and DNR on January 7, 2019, for review and approval.

The intent of the industrial stormwater language in Northshore's NPDES/SDS permit is to confirm that all industrial stormwater from the site is collected. The changes described in the 2019-2023 Five Year Operations Plan included the following:

- A revised boundary that marks the ultimate basin footprint bound by the future West Ridge Railroad alignment.
- Collection and treatment (i.e., settling and filtration via existing basin operations) of industrial stormwater, discussed in Ch. 4.5.6 (Seepage Recovery Facilities) and 4.3.2 (Schedule for Fine Tailings Storage of the Five Year Operations Plan).
- A revision to Northshore's SWPPP facility map, identifying the basin progression area as an area not subject to the SWPPP requirements, because the stormwater is collected, treated, and discharged through a permitted outfall where the discharged waters are subject to effluent limitations identified in the NPDES permit.

MPCA staff reviewed the proposed 2019-2023 Five Year Operations Plan with a focus on the plan's discussion of water management issues and other aspects of the plan with relevance to the NPDES/SDS permit. A formal approval of the 2019-2023 Five Year Operations Plan was issued by MPCA on January 13, 2021; the same plan was approved by DNR on August 28, 2019.

Stream Mitigation Sites

The East Branch Beaver River and Tributary, and Big and Little Thirtynine Creeks, drain into the Beaver River and ultimately into Lake Superior. White Rock Creek flows directly into Lake Superior. Land cover will change from grassland to forested. There would also be a change to surface hydrology regarding the East Branch Beaver River – Tributary, where a mitigation of 0.24 square miles of drainage area would be reconnected.

Most of the individual stream mitigation projects would result in changes to instream hydrology by promoting a more natural stream function that attenuates the impact of increased rainfall intensity and spring runoff events by providing (improved) access to the floodplain. This is because the current site conditions rapidly remove water from the landscape that exacerbates the downstream effects of more intense and frequent precipitation events. Restored hydraulics would also reduce the sediment load from these reaches as well as provide access of higher flows to the floodplain.

The Stream Mitigation Sites would retain more water resulting from the increased access to floodplains. The topography beyond that would be altered only to add sinuosity, grade control, and habitat structures to the stream reaches. The route of water, runoff destination, and receiving waters would not change. The individual stream mitigation projects would increase the landscape's ability to absorb and reduce the downstream effects of climate change-driven increases in precipitation events. The peak runoff rate would be reduced by retaining water on the landscape, but the overall runoff

volume should remain mostly unchanged. The makeup of the surface would include an increase in woody species cover but would not create any new pollutant sources. The quality and quantity of pre- and post-construction stormwater runoff for the individual stream mitigation projects would be the same given there would not be a change to impervious surfaces.

Construction of the individual stream mitigation projects would occur during low-flow conditions. This is defined as July 1 – March 31 for White Rock Creek, and July 1 – September 14 for the other individual stream mitigation projects. BMPs would be used to minimize soil erosion, including stabilization of constructed channels prior to the introduction of stream flow. Because using a phased approach to construct the channel(s) is one way to mitigate potential stormwater pollution, the individual stream mitigation projects' SWPPP outlines the phasing proposed to minimize sediment transport downstream; see Appendix B through F.

iii. Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe anywell abandonment. If connecting to an existing municipal water supply, identify the wells tobe used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Discuss how the proposed water use is resilient in the event of changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation. Describe contingency plans should the appropriation volume increase beyond infrastructure capacity or water supply for the project diminish in quantity or quality, such as reuse of water, connections with another water source, or emergency connections.

The Project does not require appropriation of surface water or groundwater, nor does it require connection(s) to existing municipal water supply(ies). No impact avoidance or contingency measures would be necessary.

iv. Surface Waters

a) Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed and identify those probable locations.

Tailings Basin Features

Construction of the Tailings Basin Features would result in direct and indirect impacts to wetland resources.

Direct wetland impacts would occur from construction of the relocated materials supply railroad and the proposed extensions of Dams 1 and 2. Approximately 43.8 acres of wetlands would be impacted by excavation and fill due to construction activities; see Figure 7. Fragmentation effects, which are also considered to be a direct impact, would result in portions of seven (7) wetlands encompassing approximately 5.3 acres; see Figure 7. These impacts would be permanent.

Indirect wetland impacts would also occur due to the Tailings Basin Features from impoundment resulting from construction of the new railroad embankment; these impacts would be permanent. Four (4) wetlands encompassing approximately 40.2 acres would be affected as shown on Figure 7. These impounded wetlands are currently composed of hardwood swamps and would not be permanently lost but would undergo a wetland type conversion to other wetland types or deep-water habitat. These impacts would be expected to occur over time after the natural discharge routes are blocked and excess water builds within the wetlands.[20]

Table 16 summarizes the wetland impacts by affected community type. The greatest of amount of impact occurs in hardwood swamp-type wetland communities, where alder thicket and coniferous swamp together represent over 25 percent of the affected types of wetlands. See Table 16.

Table 16 Wetland Impacts from Tailings Basin Features

Wetland Community Type	Railroad Embankment and Dam Extension Impact (acres)	Fragmentation Impact (acres)	Impoundment Impact (acres)	Total Wetland Impacts (acres)
Hardwood Swamp	23.6	0.2	40.2	64.0
Alder Thicket	9.1	3.9	0	13.0
Coniferous swamp	8.7	0.6	0	9.3

[20]The 1975-76 Final EIS assessed alternatives across multiple potential locations for siting a tailings storage facility. After the EIS and permitting, the Proposer conducted detailed in-basin alternatives analyses to avoid and minimize wetland impacts under the Proposed Project. The result is the extent of the planned railroad relocation and dam extensions has reduced the overall footprint of the Tailings Basin by approximately 1,300 acres from the entire project footprint envisioned in the EIS, which has in turn reduced wetland impacts by about 300 acres compared to the original conceptual design.

Wetland Community Type	Railroad Embankment and Dam Extension Impact (acres)	Fragmentation Impact (acres)	Impoundment Impact (acres)	Total Wetland Impacts (acres)
Sedge Meadow	1.6	0.1	0	1.7
Fresh (Wet) Meadow	0.4	0.5	0	0.9
Shallow Marsh	0.4	0	0	0.4
Total	43.8	5.3	40.2	89.3

No impacts are projected to wetlands in the South Borrow Pit area; this is because borrow material would only be obtained from upland areas.

The DNR and USACE consolidated mitigation requirements for both the proposed Project and continuation of historic tailings management activities at Mile Post 7 into one regulatory action to simultaneously meet the requirements of both WCA and the Federal Clean Water Act Section 404. This included a detailed evaluation of the potential for conducting wetland mitigation within the project minor and major watersheds. That evaluation determined that there were no practicable alternatives available for wetland mitigation within the minor and major watersheds.[21]

Mitigation was ultimately identified for both direct and indirect impacts of the proposed Project and the continued progression of tailings to final permitted tailings elevation of 1,305 feet amsl.[22] A WCA Notice of Decision approval for the Project was issued on May 9, 2019.[23] The MPCA Section 401 Water Quality Certification for the Project was issued on June 29, 2021.[24] The USACE Section 404 permit for the Project was issued on September 23, 2021.[25] Wetland mitigation was accomplished by purchasing existing wetland bank credits at a 1:1 ratio from within the same Bank Service Area. The debiting of wetland bank credits that complied with the state and federal permit requirements was completed on November 4, 2021.[26]

Stream Mitigation Sites

[21] *See J22-2019 Joint Permit Application/WRP* in Appendix J.
[22] Because the relocation of the West Ridge Railroad occurs above the 1,315 feet amsl elevation in the northeast-interior part of the Tailings Basin, approximately 550 acres not permitted to be covered by tailings are effectively isolated. The 2019 Wetland Replacement Plan therefore identified these wetlands as impacted by the Proposed Project and required mitigation for these wetland losses.
[23] *See J8-DNR WCA Notice of Decision* in Appendix J.
[24] *See MPCA Section 401 Certification* in Appendix J.
[25] *See J30-USACE Section 404 Permit Decision* in Appendix J.
[26] *See J1-Debiting of WCA Credits* in Appendix J.

The individual stream mitigation projects would result in a small amount of wetland conversion to open water post-construction, with temporary impacts to wetlands projected to occur during construction associated with equipment access. The Proposer anticipates no compensatory mitigation requirement to be necessary for stream-related activities subject to final determinations to be made for the USACE Section 404 Permit, the MPCA Section 401 Water Quality Certification, and WCA permitting. The loss of an existing use(s) resulting from physical alterations to a surface water is prohibited unless appropriately replaced through mitigation. Construction and any required post-construction monitoring would occur following the conditions of the permits/authorizations identified in EAW Item 9.

Requirements of the MPCA Section 401 Water Quality Certification include but are not limited to:

- Delineate all potentially-impacted wetlands prior to restoration to ensure no net-loss of wetlands at the project site(s);

- Conduct Floristic Quality Index (FQI) surveys at each site prior to restoration to assess the health and type of vegetation communities to ensure no net-loss of wetland quality at the project site(s);

- Observe and record the hydrologic regime at each site prior to restoration to ensure no more than a 20% departure from the existing hydroperiod (magnitude and timing) post-project(s); and

- Conduct monitoring prior to restoration work, and every five years after the restoration work, until the hydrology and vegetation have stabilized.

Reports would be submitted to MPCA in 2028, 2030, and 2032 to document the progress and success in meeting mitigation objectives.

Regarding the proposed Project's potential mitigation of predicted local climate trends, the individual stream mitigation projects would increase floodplain capacity (e.g., flood storage) that would make the post-project area more capable of sustaining any potential increase in the frequency and intensity of precipitation events.

b) Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water BMPs that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of

watercraft on any water body, including current and projected watercraft usage.

Tailings Basin Features

The proposed construction of the realigned railroad and dam extensions would impact the remnant reaches of Big and Little Thirtynine Creeks and the Beaver River Watershed.

Big and Little Thirtynine Creeks. Approximately 1,710 LF of these remnant creeks within the Tailings Basin would intersect the realigned materials supply railroad and the extended dams, thus resulting in their elimination from the site. Permanent indirect impoundment impacts, which would result from impoundment from railroad embankment construction, would affect 3,535 LF of the Big and Little Thirtynine Creeks' remnants.

The streamflow modeling methods are described in Section 5.1 of the Watershed Assessment Report. U. S. Geological Survey's (USGS) web-based GIS application, StreamStats v4.3.11, was used to predict streamflow changes resulting from the Tailings Basin Features. The USGS regression equation determined that watershed area, and percent of the watershed comprised of ponds and lakes, provided the information necessary to estimate streamflows in the Tailings Basin watershed. The bankfull events were estimated using the 1.5-year recurrence interval and streamflows for the 100-year recurrence interval were also modeled.

The construction of the railroad embankment and dam extensions would result in the removal of approximately 85 acres from the Beaver River subwatershed, which has a total drainage area of 78,727 acres. No streams or ditches are proposed to be impacted. Low flows downstream of the Project are estimated to increase 0.5 percent. Bankfull and 100-year flows are estimated to stay the same as existing similar flows. Downstream stream resources are not expected to be negatively impacted from a physical perspective.

No changes would occur within the remaining Little Thirtynine Creek or Big Thirtynine Creek watersheds. As noted in EAW Item 6f, both streams were routed to a diversion ditch when the Tailings Basin was initially constructed in the late 1970s into early 1980s. The diversion ditch was planned just outside the planned extent of the basin, so that the future Tailings Basin would not impact any resources upstream.

The MPCA and USACE consolidated mitigation requirements for both the proposed Project and continuation of historic tailings management activities at Mile Post 7 into one regulatory action to simultaneously meet requirements of the federal Clean Water Act Sections 404 and 401.[27] An MPCA Section 401 Water Quality Certification was issued on June 29, 2021. The USACE Section 404 authorization for the Project was issued on September 23, 2021. Mitigation was identified for both direct and indirect Project impacts to stream resources and the continued progression of tailings to the final permitted elevation of 1,305 feet amsl. Mitigation would be accomplished according to the Final Stream Mitigation Plan.[28]

[27] *See J16-MPCA MP7 Section 401 Certification and J30-USACE MP7 Section 404 Permit* in Appendix J.
[28] *See J21-Final Stream Mitigation Plan* in Appendix J.

The proposed mitigation for the impacts to the remnant portions of Big and Little Thirtynine Creeks affected by the proposed Project is described below in the Stream Mitigation Sites section of EAW Item 11.iv.c.

Beaver River Watershed. The construction of the railroad embankment and dam extensions would result in the removal of approximately 85 acres from the Beaver River subwatershed, which has a total drainage area of 78,727 acres. No streams or ditches are proposed to be impacted. Low flows downstream of the Project are estimated to increase 0.5 percent. Bankfull and 100-year flows are estimated to stay the same as existing. The physical functions and values of downstream water resources are not projected to be adversely affected from the proposed Project.

Approximately 997 acres of the Project area are within the East Branch Beaver River subwatershed, which has a total drainage area of 32,320 acres. The proposed Project directly impacts approximately 5,040 LF of streams and 5,780 LF of ditch within the sub-watershed. The proposed Project indirectly impacts approximately 3,530 LF of streams within the sub-watershed. Post-Project low flows in the East Branch Beaver River are estimated to be 12 percent lower than existing flow, which would correspond to a 0.25-inch decrease in stream water level. It is estimated that bankfull flows would be reduced by 3 percent, which would correspond to a 0.25-inch water level reduction. Flows for the 100-year recurrence interval are estimated to decrease by 1 percent that would correspond to a 0.1-inch stream water level reduction. The physical functions and values of downstream water resources are not projected to be adversely affected from the proposed Project.

Stream Mitigation Sites

The proposed individual stream mitigation projects require physical alteration to the existing bed, floodplain, and adjacent riparian zones to achieve the objective of increased long-term functionality in terms of improved stream hydrology, hydraulics, and geomorphology compared to the existing condition. This is accomplished by providing uplift to the current environmental condition via the Minnesota SQT standards. Thus Project-related construction would have temporary physical impacts on stream channels and riparian areas but exhibit sustainable riparian functions and values long-term.

Existing conditions of note that impede natural riparian functions and values at each of the individual stream mitigation projects are noted below:

East Branch Beaver River. The channel is unstable due to historical logging, road crossings, watershed diversions, and other disturbances. This land use has caused the channel to be unstable with high rates of erosion in areas where the channel does not have access to its floodplain. During flood events, this causes high shear stresses and high near-bank stresses resulting in erosion along the banks and valley walls. The watershed area contributing to the lower end of the project site is approximately 30 square miles.

East Branch Beaver River Tributary Ditch. This channel is downstream of the Tailings Basin. It is a high-gradient, partially-armored ditched tributary to the East Branch Beaver River that was constructed to drain water from the remnant Big and Little Thirtynine Creeks. Further

downstream the channel is highly incised and eroding both sides of its banks while lacking a floodplain. This channel lacks geomorphic features and channel and floodplain connectivity. The existing contributing watershed area is 2.64 square miles.

East Branch Beaver River Tributary Berm. This is a high-gradient, historic diversion caused by a berm that forced water to flow northeast directly into the East Branch Beaver River. In the past, approximately 60 percent of the watershed flow was diverted away from the Mile Post 7 facility by the berm, leaving the channel oversized with its new smaller watershed and resulting lower flows.

White Rock Creek. The White Rock Creek channel is a moderate to high-gradient channel. The channel occurs in an urban setting and receives stormwater contributions from surrounding urban land use, which includes high road density and multiple culvert crossings. The watershed disturbances have made this channel unstable, thus causing channel degradation and aggradation throughout the system.

Little Thirtynine Creek. The Little Thirtynine Diversion Ditch is an excavated channel that redirected flow that would have gone into Reserve Mining Company's Mile Post 7 Tailings Basin. The flow was redirected southwest to the Big Thirtynine Creek very near the point that the Big Thirtynine Creek was diverted to the Beaver River channel as part of the Mile Post 7 Tailings Basin construction in the 1970s. The watershed area contributing to Little Thirtynine Creek is approximately 6.5 acres. The existing channel is mostly an excavated ditch and downstream diversion berm designed to efficiently move water away from the Mile Post 7 Tailings Basin. The existing diversion lacks sinuosity, an appropriately sized floodplain, large woody debris, bedform diversity, and habitat diversity.

Big Thirtynine Creek. The Big Thirtynine Creek is an excavated channel that redirected flow from the remnant channel southwest to the Beaver River as part of Reserve Mining Company's Mile Post 7 Tailings Basin. Big Thirtynine Creek now receives water from the diverted Little Thirtynine Creek watershed, the lower watershed being slightly less than 17.26 square miles. The existing channel is an excavated ditch with the remnants of a weir that was used to temporarily divert flow back into the basin via a water supply culvert. The existing diversion lacks sinuosity, a connection to its floodplain at channel forming flow, large woody debris, bedform diversity, and habitat diversity. The riparian vegetation is mostly reed canary grass, which is an invasive species, with stretches of overhanging shrubs.

Each individual stream mitigation project itself would require vegetation clearing in the riparian zone for construction access; the width of disturbance along the streams range from 10 to 30 feet. Heavy equipment would reshape the channels by grading back the floodplain and excavating new channel alignments, if required. The individual stream mitigation projects would establish a stream pattern like the previous, historic channels through excavation of a new channel. The channels are designed to the appropriate bankfull width and cross-sectional area, as determined by the reference cross-sections in stable riffles from the reference reach. Riffle and pool morphology would be created along with habitat features such as toe wood and riffle rock and gravel structures; see Appendix B through Appendix F for detailed schematics for each mitigation action.

The individual stream mitigation projects would be phased and stabilized as they are completed in

500-foot segments. Construction may require pumping and diverting the stream flow to complete the work when working in the main flow of the channel. This would limit the turbidity created during the construction of the project, resulting in minor and temporary effects on the dewatered section. The diversion channels would remain until construction is complete and the diverted water would be redirected back into the newly constructed channel. This would limit sediment transport and impacts to water quality both at the project site(s) and downstream during construction.

All construction and post-construction activities would follow the prescriptions of each SWPPP. As noted in EAW Item 14.d, site restorations would include re-establishment of trees and vegetation with vegetation monitoring and reporting required annually. Permits would likely include performance standards for mortality-related parameters and invasive species cover. In particular, the Minnesota SQT includes specific performance standards for canopy cover (%) and woody stem basal area (sqm/hectare), both of which would require successful establishment of potential deer-browsed woody species.

Requirements of the MPCA Section 401 Water Quality Certification include but are not limited to:

- Completing two functional stream restorations in 2023, 2025, and 2027 at the locations identified in the June 2020 Stream Restoration Plan;
- Reporting stream work completed the previous year;
- Annual reporting of project compliance with the objectives of the June 2020 Stream Restoration Plan until the goals are obtained;
- Ensure invasive species control; and
- Meet requirements for: USACE escrow; adaptive management planning; erosion and sedimentation control; and implementing a SWPPP.

To address potential climate change, the purpose of the proposed Project would attenuate flood flows by retaining high-water flows over bankfull conditions in the floodplain, release those same flows over a greater time, thus improving the reliance of the system to changing hydrology related to climate change. This would contrast the existing condition that is effective at moving water downstream and creating higher peak flows, which would not address frequent and more intense precipitation events as projected in the future.

The streams are not navigable by typical watercraft.

13. Contamination/Hazardous Materials/Wastes:

a. Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from

existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

According to the MPCA *What's In My Neighborhood*, there are no known hazardous contamination conditions within the Tailings Basin Features and Stream Mitigation Sites areas; see Figure 8.

As noted above in EAW Item 12, an industrial solid waste landfill was permitted, constructed, and operated since 2000, with the facility currently permitted through 2027. Given the location of the ash landfill on the site, both the Dam 1 extension and relocation of the West Ridge Railroad must be designed to go "around" the landfill in ways that avoid impacts to this existing site infrastructure. In addition, any impacts that might result from tailings continuing to progress westward, upgradient to ten feet less than the ultimate dam height of 1,315 feet amsl, must be addressed in the Project design. The proposed corridors of disturbance for the dam extension and relocated railroad are thus designed to avoid impacts to the ash landfill and vice versa.

A site with underground tanks and petroleum remediation site is 90 feet upgradient of the White Rock Creek stream mitigation project component. The investigations and associated cleanup were completed in 1997. A letter from the MPCA, dated in 1997, states that if there is any development of this property or surrounding area, it should be assumed that petroleum contamination may still be present. If it is encountered, the MPCA staff should be notified immediately. Excavation of soils near the leak site described above could expose some hidden contamination at White Rock Creek. If unknown materials are encountered (i.e., underground storage tanks, unknown seepage, petroleum), Northshore would evaluate the risk of contamination and remove the materials under guidance from local or MPCA hazardous material authorities after being contacted.

b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solidwaste including source reduction and recycling.

Construction of the Tailings Basin Features and Stream Mitigation Sites would generate small amounts of municipal solid wastes, such as plastic and paper containers and packaging. Any waste produced would be removed from the Project sites either at the end of each workday or during final clean-up and properly disposed.

The proposed Project would not generate wastes during operation. Therefore, measures to avoid, minimize, or mitigate effects from the generation/storage of solid wastes during operations are not proposed.

c. Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any new above or below ground tanks to store petroleum or other materials. Indicate the number, location, size and age of existing tanks on the property that the project will use. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of

chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

Hazardous materials used for the proposed Project would be stored and handled in accordance with Northshore's Spill Prevention Control and Countermeasures (SPCC) Plan. Each Department at Northshore has a specific Spill Reporting Environmental Standard Operating Procedure (ESOP) that would be implemented should spills occur. Emergencies would be handled in accordance with Northshore's Emergency Response Plan/Disaster Management Plan that covers the entire Northshore facility.

There are no existing storage tanks near the Project. It is likely that fuels, lubricants, diesel exhaust fluid (DEF) and hydraulic oil would be stored onsite. The contractor would determine if storage tanks would be necessary (even temporarily) during construction. Northshore maintains agreement with all contractors that they follow applicable federal and state rules regarding the storing of such materials, clean up, and the reporting of spills. The agreement requires contractors to have spill response materials available and to complete vehicle inspections. Northshore would also periodically inspect the site and note spills or leaks if discovered.

Northshore and their contractors would be prepared to respond to spills and to recover and contain spilled materials as quickly and thoroughly as possible. For petroleum spills that are five or more gallons, Northshore or their contractors are required to contact the State Duty Officer. Reporting procedures are found in Northshore's ESOPs as described above.

d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

The proposed Project would not generate or require storage of hazardous wastes during construction or operation. No measures are proposed.

14. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

The proposed Project occurs in the North Shore Highlands Subsection of the Northern Superior Uplands Section of the Laurentian Mixed Forest Province. This is a narrow strip 20 to 25 miles wide that follows the shoreline of Lake Superior from Duluth to the easternmost tip of Minnesota. A mosaic of forest habitats stretches across this landscape, which is heavily influenced by aspen-birch, with minor amounts of white and red pine, mixed hardwood-pine, and conifer bogs and swamp. Numerous short streams, some 10 to 15 miles in length, run from the highland to the shore of Lake Superior, with most ending in waterfalls near the shoreline.

Native plant communities at the Tailings Basin Features and Stream Mitigation Sites are typical to the North Shore Highlands Subsection. Existing vegetation consists of herbaceous plants and woody

vegetation dominated by speckled alder, black ash, black spruce, tamarack, quaking aspen, red pine, white pine, paper birch, reed canary grass, and other species typical of this subsection.

Regarding representative aquatic biota, the MPCA has conducted surveys within the Project stream reaches and identified the following:

Fish Resources. Types of fish identified include but are not limited to: blacknose dace; brook stickleback; brook trout; central mudminnow; common shiner; creek chub; fathead minnow; finescale dace; Johnny darter; longnose dace; mottled sculpin; northern redbelly dace; pearl dace; and white sucker.

Invertebrate Resources. Types of invertebrates include but are not limited to: alderflies; balloon flies; black flies; caddisflies; chiggers; circular-seamed flies; clubtails; common stoneflies; darners; finger-Net; caddisflies; fingernail clam; gastropods; giant stoneflies; long-horn caddisflies; long-toe water beetles; mayflies; midges; net-spinning caddisflies; northern caddisflies; riffle beetles; and small winter stoneflies.

The Tailings Basin Features and Stream Mitigation Sites are in a larger complex of scrub-shrub wetlands, forested wetlands, and forested uplands adjacent to the existing Tailings Basin. The area is likely used by commonly occurring species such as: migratory songbirds; small mammals such as voles, mice, shrews; and medium to large mammals such as snowshoe hare, bobcat, Canada lynx, red fox, gray fox, American marten, fisher, moose, white-tailed deer, bear, and gray wolf among others.

b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota Biological Survey Sites of Biodiversity Significance, andother sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-__) and/or correspondence number (MCE 2022-00465) from which the data were obtained and attach the Natural Heritage Review letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

State Listed Species

The Proposer queried the current Minnesota Conservation Explorer (MCE), which includes information from the Natural Heritage Information System (NHIS) database, to identify any state listed species that have been previously recorded within one mile of the Project features. The database review indicated that no ETSC species have been previously identified within the proposed Project features. However, 10 special concern species, 2 state-listed threatened species, and two colonial waterbird nesting areas have been identified within one-mile of the Project features; see Table 17. The review was submitted to the DNR through the MCE on July 13, 2022; it was assigned project ID 2022-00465. Appendix H contains the MCE's October 7, 2022, response to the inquiry.

Table 17 State Listed Species Documented within One Mile of the Project Area According to the DNR Natural Heritage Information System

Scientific Name	Common Name	State Status	Habitat
Aeshna sitchensis	Zigzag Darner	Special Concern	Zigzag darner's prefer sedge and moss dominated northern poor fens and small (< 8.4 m² [10 sq. yds.]) cold northern open bogs in acidic peatland systems. Although normally wet throughout the year, these habitats may dry out temporarily in times of drought. These types of wetlands are classified as seasonally flooded/saturated emergent wetlands.
Carex media	Intermediate Sedge	Special Concern	Intermediate sedge occurs on the shore rocks of Lake Superior, more specifically in the peaty vegetation mats that develop in rock crevices and along the margins of small rock pools. Inland habitats typically develop where water seeps out from seams and crevices in a cliff, creating a small and unique microhabitat.
Cladium mariscoides	Twig Rush	Special Concern	Twig rush is typically found in sunny, sedge-dominated habitat that is saturated and has peat soils. Twig rush is typically found in prairie rich fens, northern rich fens, and calcareous fens according to the DNR.
Colonial Waterbird Nesting Area	N/A	N/A	Colonial waterbird nesting sites are generally shallow water areas where colonial birds can forage for fish. These sites are typically used by gulls, terns, herons, night-herons, egrets, and cormorants.
Crataegus douglasii	Black Hawthorn	Special Concern	Black hawthorn is found within about ten miles of Lake Superior in a narrow band from the Gooseberry River (Lake County) northeastward to the Canadian border at Grand Portage (Cook County). The species is typically found in streamside thickets with rocky, gravelly, or clayey substrates. These habitats are often flooded in the spring but rarely experience much sedimentation.

Scientific Name	Common Name	State Status	Habitat
Eleocharis nitida	Neat Spikerush	Special Concern	Neat spikerush may be found in temporary and seasonal wetlands typically in small depressions such as ditches, pits, and trails.
Falco peregrinus	Peregrine Falcon	Special Concern	Peregrine falcons nest primarily on buildings and bridges in urban settings and use historic eyries on cliffs along Lake Superior and several lakes in the Boundary Waters Canoe Area Wilderness. Because peregrine falcons specialize in direct aerial pursuit of avian prey, they prefer open non-forested areas for hunting.
Huperzia appalachiana	Appalachian Fir Moss	Special Concern	Appalachian fir moss is found on shaded mesic cliffs and sometimes adjacent mesic talus. Suitable cliffs tend to vary from northeast- to northwest-facing and consist of diabase, basalt, and other weakly alkaline to circumneutral bedrock types.
Huperzia porophila	Rock Fir Moss	Threatened	Rock fir moss is found at several sites in northeastern Minnesota, typically on diabase cliffs. Sites in the northeast are typically northerly facing, wooded habitats that are moist and well shaded.
Sorex fumeus	Smoky Shrew	Special Concern	Smoky shrews have been found in: glacial boulder streams; second-growth black spruce, fir, paper birch forests; mossy, talus slopes; and sphagnum bogs.
Torreyochloa pallida	Torrey's Mannagrass	Special Concern	Torrey’s mannagrass occurs in a wide variety of wetland habitats including the shores and shallows of streams, lakes, vernal ponds, and beaver ponds. Water is often slower moving, and substrates are typically mucky.

Scientific Name	Common Name	State Status	Habitat
Trisetum spicatum	Spike Trisetum	Special Concern	All the Minnesota occurrences of spike trisetum are found in full sunlight on exposed bedrock within a short distance of Lake Superior. The habitat is characterized by a cool summer microclimate, low winter temperatures, variable snow depth, high desiccating winds, intermittent wave action, and potentially scouring ice.
Woodsia alpina	Alpine Woodsia	Threatened	Alpine woodsia is found in crevices and on small ledges of moist and partially shaded cliffs. The cliffs are composed of circumneutral to weakly alkaline bedrock, including basalt and diabase. They occur mostly in cool river gorges near Lake Superior and sheltered Lake Superior shorelines that are not exposed to storm waves and ice scouring. A few populations occur on cliffs located further inland as well.

Other state listed species of special concern whose range overlaps the Project area, but were not identified in the NHIS database review, includes moose (*Alces alces*), Canada lynx (*Lynx canadensis*), and mountain lion (*Puma concolor*).

On July 22-24, 2015, and August 12-14, 2015, Barr conducted a botanical survey for the proposed realignment of the West Ridge Railroad and the Dams 1 and 2 extensions to inform planning and permitting activities. During the surveys, no federal or state listed threatened or endangered plant species were found. Two state special concern species were identified: neat spikerush (*Eleocharis nitida*) and twig rush (*Cladium mariscoides*).

Federally Listed Species

The Proposer reports a review of USFWS Information for Planning and Consultation (IPaC) tool was used to identify federally listed species that may occur within the Project area. The review identified three threatened mammals including the Canada lynx (*Lynx canadensis*), northern long-eared bat (*Myotis septentrionalis*), gray wolf (*Canis lupus*); one endangered bird, the piping plover (*Charadrius melodus*); and one candidate species for the monarch butterfly (*Danaus plexippus*).

Rare Features

Data from the DNR Minnesota Biological Survey (MBS) were reviewed to determine if any Minnesota Biological Survey sites of biodiversity significance, native plant communities, scientific natural areas, or other sensitive ecological resources are present within or near the proposed Project area.

There is one site of biodiversity significance within the East Branch Beaver River stream mitigation project. This is the *Silver Bay SW – Mile Post 7 Ridges* site of biodiversity significance, which is ranked as high. Sites ranked as high contain very good quality occurrences of the rarest species, high quality examples of rare native plant communities, and/or important functional landscapes. This site contains the following native plant communities (listed with their conservation status rank) in the direct vicinity of the proposed East Branch Beaver River stream mitigation project:

- Upland White Cedar Forest – vulnerable to extirpation
- Aspen – Birch Forest, Balsam Fir Subtype - secure
- Alder – (Maple – Loosestrife) Swamp – secure

None of the proposed Tailings Basin Features are located within sites of biodiversity significance.

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project including how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

General Impacts to Fish, Wildlife, and Plant Communities

Construction of the Project features would have temporary minor impacts on the local wildlife and

ecological communities. Noise, dust, and construction activity would temporarily dislocate species sensitive to those activities. For riparian habitats, it is anticipated the temporarily displaced species would return to use them upon final restoration.

The Project would also result in minor adverse impacts to common wildlife species due to the loss of approximately 339.1 acres of wildlife habitat because of the conversion of land use for the construction of Dam 1, Dam 2, rail switch back, railroad embankment, and clay borrow pit. For common wildlife species, this loss is considered minor because their populations are stable, and as such small losses of habitat is not concerning at the population level. Furthermore, most common species are habitat generalists with a relatively high tolerance of disturbance and human presence.

Fish and invertebrate species at the Stream Mitigation Sites would be subject temporary habitat disruption during construction that could result in injury and/or mortality, however at a very localized level. Post-project, habitat creation and enhancement are an integral part of the project design and would provide beneficial effects for fish and invertebrate species. For fish in particular, new pools would provide thermal refuge, cover, feeding and resting and nursery areas; riffles would improve oxygenation of the water column and provide spawning areas; and root wads would provide woody cover and habitat and stabilize stream banks.

As part of the individual stream mitigation projects, invasive species would be removed and the areas would be revegetated with native species. Vegetation management would adhere to the Minnesota SQT standards, which require a minimum of 5 years of post-construction vegetation monitoring and maintenance to confirm native vegetation is restored/established. A monitoring report would be submitted to the LGU annually to ensure performance standards for vegetation are met.

After construction is complete, the individual stream mitigation projects would enhance fisheries and wildlife habitat. Access trails and staging areas would be restored to a condition that is equal to or better than the existing conditions. The site's ability to resist impacts related to climate trends would be enhanced by the completion of this Project. Increased floodplain access, roughness, and woody vegetation increases the streams' ability to handle greater frequency and intensity of storms by reducing peak flows and reducing erosive power of stream flow.

State Listed Species

According to the desktop review, there are two threatened species known to occur within one mile of the Project features: rock fir moss and Alpine woodsia, for which the MCE provided detailed information. The remaining state listed species that occur within one mile of the Project features are listed as species of special concern, of which the MCE provided detailed information on the smoky shrew, twig rush, neat spike rush, black hawthorn, and Torrey's mannagrass. Although special concern status species are not protected by Minnesota's Endangered Species Statute or the associated Rules, their status in the state is being carefully monitored.

Rock Fir Moss. The previously recorded population of rock fir moss was identified in 1943 along what is now Marina Drive Road located adjacent to Lake Superior. There is no suitable habitat within the Project area; as such, the Project would not adversely impact rock fir moss.

Alpine Woodsia. This species occurs mostly in cool river gorges near Lake Superior and sheltered Lake Superior shorelines that are not exposed to storm waves and ice scouring. A few populations

of alpine woodsia occur on cliffs located further inland as well. The proposed Project would not impact any cliffs or gorges that the alpine woodsia would inhabit; as such, the Project would not adversely impact alpine woodsia.

Smoky Shrew. The smoky shrew has been found in the Project vicinity. This species prefers larger and older forest blocks where the preferred microhabitat includes a cool, damp forest floor with a thick litter layer, mossy-covered rocks, and decaying debris. The riparian areas and wooded wetlands within the individual stream mitigation projects would be considered suitable habitat for this species. Impacts, if any, would most likely be due to post-project revegetation measures if measures to minimize impacts were not deployed.

Twig Rush; Neat Spike Rush; Black Hawthorn; Torrey's Mannagrass. As noted in EAW Item 14b, twig rush and neat spike rush were documented in wet meadows in direct vicinity of the proposed Project. Black hawthorn and Torrey's mannagrass have been documented along streams in the vicinity of the proposed Project, where they are found in shallow wetlands or along the edges of streams and lakes. Impacts could result from construction of the Tailings Basin Features or Stream Mitigation Sites if these species were present.

For other state listed species of special concern whose range overlaps the Project site identified in EAW Item 14b, see the Federally Listed Species section for Canada lynx. Regarding moose and mountain lion, specifically:

Moose. Habitat for moose is likely available within the Project area. The key habitat types considered moose habitat include mature forest, grassland/brushland, and aquatic environments. As such, the project would likely affect individuals in the vicinity through habitat loss and fragmentation for the Tailings Basin Features, though not likely at the population level.

Mountain lion. There is no evidence that the mountain lion has a self-sustaining, breeding population in Minnesota, although some sightings are confirmed in the state including on camera near the Project site. The species is highly mobile and seems to be nomadic in their presence in the state. Given the secretive and transient nature of the individuals that may be present in Minnesota and in the Project area, no discernable impacts are anticipated due to the Project.

Federally Listed Species

Potential impacts to federal listed species in the Project vicinity are detailed below.

Piping Plover. The piping plover occupies open sandy areas such as sandbars and shores of lakes and rivers, and, in St. Louis County is found only along the shores of Lake Superior. No open sandy coastal areas would be impacted. As a result, the proposed Project would have no impacts on the piping plover.

Canada Lynx. Suitable habitat for the Canada lynx, broadly characterized as northern forest, is present within and adjacent to the Project. USFWS designated critical habitat (DCH) for the lynx is in the Project area. While patches of suitable habitat are present, impacts to the Canada lynx are unlikely as they prefer large tracts of dense, contiguous northern boreal forest with a high abundance of snowshoe hare. The Project location within the greater landscape amidst current Tailings Basin operations does not provide the amount or quality of habitat lynx prefer. Lynx are

a mobile and highly secretive species and field surveys are not likely to provide reliable presence or absence information. It is possible for construction activities to impact the movements of the species as the lynx could travel through the area, however it is unlikely for lynx to inhabit the Project area due to the proximity to the existing Tailings Basin and the presence of more suitable habitat in the surrounding areas. As a result, the Project is unlikely to adversely impact the Canada lynx.

Gray Wolf. The Project is located within designated critical habitat (DCH) for the gray wolf and suitable habitat for the gray wolf is present within the Project and surrounding landscape. In Minnesota, gray wolves occupy a variety of habitats but are generally closely tied to northern forests and ungulate (e.g., white tailed-deer; moose) populations. Den sites for wolves are found in natural berms or hillsides and beneath fallen timber, while rendezvous sites, which are used seasonally, are typically openings within wooded areas. The highly mobile, migrant nature of wolves is advantageous for the species in responding to disturbance at a given location within suitable habitat. It is likely the species would avoid the Project site due to the level of surrounding human disturbance. The Project would have a negligible impact on the suitable habitat for the species in Minnesota, and as a result the Project is unlikely to adversely impact the gray wolf.

Northern Long-eared Bat. Suitable habitat for the northern long-eared bat is present within the Project area and surrounding landscape. Northern long-eared bat forage in upland forested areas and use trees greater than 3-inches diameter at breast height (dbh) with loose, peeling bark, or crevices as roost sites. Hibernation occurs in caves and mines. According to USFWS and DNR data, there are no known maternity roost trees or hibernacula in the vicinity of the Project area. Potential habitat for the northern long-eared bat would be removed because of the Project. Section 4(d) of the Endangered Species Act allows the USFWS to make special rules for species listed as threatened. This allows the USFWS to more efficiently approve projects that do not harm a species. Per the final 4(d) rule 1, no prohibited take of the northern long-eared bat would occur as part of this project due to the absence of known roost trees and hibernacula in the Project vicinity.

Other. Candidate species such as the monarch butterfly are not legally protected under the Endangered Species Act (ESA). As a result, Project-related effects to the monarch butterfly were not assessed as part of this review.

Rare Features

The White Rock Creek stream mitigation project would involve vegetation removal and restoration activities within the *Silver Bay SW – Mile Post 7 Ridges* site of biodiversity significance. However, these activities would stabilize and restore this portion of the East Branch Beaver River due to disturbance from historical logging, road crossings, and other activities. Because no permanent Project features would be located at the site, and the measures to stabilize riparian vegetation and control potential invasive species, it is anticipated the Project would improve the ecological functions and values of this portion of the site of biodiversity significance.

d. Identify measures that will be taken to avoid, minimize, or mitigate the adverse effects to fish,wildlife, plant communities, ecosystems, and sensitive ecological resources.

The Proposer commits to implement the following measures to minimize potential impacts to fish,

wildlife, native plant communities, ecosystems, and sensitive ecological resources:

- Stream mitigation construction work would occur during non-spawning periods of trout.
- The channel mitigation work would occur in phases instead of disturbing the entire area at once.
- Northshore would coordinate with the local DNR fisheries office to move fish out of the active construction area prior to diverting water, if necessary.
- Work from the upper to lower waters within the watershed.
- Limit access to the project locations to areas shown on the plans.
- Limit the size of staging areas and install perimeter sediment fence to reduce sediment runoff.
- Suspend construction during rain events if necessary to limit rutting and excess erosion from the construction equipment.
- The construction timeline for the individual stream mitigation projects would be short to minimize the amount of time that areas are disturbed.
- Use only native species that are appropriate to the existing terrestrial ecology to restore the disturbed areas.
- Avoid parking in or moving through existing patches of invasive species when getting to and from the work site. When unavoidable, clean vehicle of all visible evidence of soil and vegetation when leaving the parking site.
- Use natural netting for erosion control blanket to avoid ensnaring wildlife.
- Adhere to the construction SWPPPs for the Tailings Basin Features and Stream Mitigation Sites.
- If possible, work along stream and in wet meadows and shallow marshes would be conducted under frozen ground conditions.
- Disturbed soils would be revegetated with native species suitable to the local habitat as soon possible after construction.
- A qualified surveyor would conduct a habitat assessment in any potential habitat that would be impacted by the proposed project. If the habitat for alpine woodsia, rock fir moss, intermediate sedge, Appalachian fir moss, or other sensitive species is identified and cannot be avoided, a botanical survey would occur following DNR protocols.

The Proposer would implement appropriate actions/BMPs to prevent the spread of invasive species. Northshore would require cleaning of equipment for the Project before entering the site to minimize any introduction of invasive species. Seeding and planting of native species would be completed once grading is finalized on each stream mitigation reach. Other available measures include:

- Restoration of native vegetation, including woody species, as quickly as possible to prevent new infestations of invasives species.
- Treating local invasive species infestations first prior to soil disturbance if possible.
- Cleaning equipment of debris before moving to another project site to avoid spreading seeds or vegetation parts and creating new infestations.

Measures identified by MCE to minimize disturbance to the ecologically important *Silver Bay SW – Mile Post 7 Ridges* site of biodiversity significance may include, but are not limited to, the following recommendations:

- Minimize vehicular disturbance in the MBS Site (allow only vehicles/equipment necessary for construction activities);
- Do not park equipment or stockpile supplies in the MBS Site;
- Do no place spoil within the MBS Site or other sensitive areas;
- Retain a buffer between proposed activities and the MBS Site;
- Use effective erosion prevention and sediment control measures;
- Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species;
- As much as possible, operate within already disturbed areas;
- Revegetate disturbed soils with native species suitable to the local habitat as soon after construction as possible; and
- Use only weed-free mulches, topsoils, and seed mixes. Of particular concern are birdsfoot trefoil (*Lotus corniculatus*) and crown vetch (*Coronilla varia*), two invasive species that are sold commercially and are problematic in prairies and disturbed open areas.

Measures identified by the MCE to address potential impacts to the smoky shrew include:

- Any use of erosion control mesh be limited to wildlife-friendly materials.
- Use of erosion control blanket should be limited to “bio-netting” or “naturalnetting” types, which should not include products containing plastic mesh netting or other plastic components.

- Awareness should also be present regarding hydro-mulch products that may contain small synthetic (plastic) fibers, which if became loose could make their way to Public Waters.

To minimize potential impacts to smoky shrew, Northshore commits to use natural netting type erosion control blankets and avoid using products containing plastics.

For the twig rush, neat spike rush, black hawthorn, and Torrey's mannagrass, an additional measure from MCE not previously noted would be to conduct work, if possible, under frozen ground conditions to limit potential impacts.

Invasive species monitoring and protection is part of the pre- and post-project monitoring required by the related USACE permit and MPCA water quality certification for each stream mitigation project. Monitoring would be conducted annually for five years post construction. Invasive species performance standards and adaptive management measures would be included in permit conditions.

Existing channel vegetation would be temporarily removed during construction. Existing alder would be excavated and used as transplants in critical areas. Native seed, trees, and shrubs would be planted along the stream banks and within the adjacent riparian corridor. Further back from the channel, a natural netting erosion control blanket would be used to stabilize the soils until the vegetation establishes. Plantings would consist of native forbs and grass seed, shrubs, and trees.

15. Historic properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

As part of the Tailings Basin Features activities, a Phase I Archaeological Reconnaissance was completed throughout a large portion of the Tailings Basin property in 2016. An intensive Architectural History Survey was also completed for portions of the Project in 2020. The 2016 Phase I archaeological reconnaissance did not identify any archaeological sites within the Project footprint. The 2020 intensive architectural history survey resulted in the identification of two resources eligible for the National Register of Historic Places (NRHP): the Reserve Mining Company Milepost 7 Tailings Basin (LA-SVB-012) and Reserve Mining Company Mainline Railroad, Silver Bay to Peter Mitchell Mine (XX-RRD-047). The architectural history investigation also determined that the Reserve Mining Company Milepost 7 Tailings Basin (LA-SVB-012) is a contributing property to the previously determined eligible Silver Bay Historic District (LA-SLB-009).

The Phase I Archaeological Reconnaissance completed in 2016 included portions of the current Project activities, including the Dam 1 extension, Dam 1 Rail Switchback, and the Railroad Embankment/Dam 2 work. However, while the Big and Little Thirtynine Creeks mitigation sites were inside the investigation areas, the remaining portions of the proposed individual stream mitigation projects and the clay borrow pit are each located outside of the previous area of investigation. The Area of Potential Effects (APE) for architectural history investigated in 2020 also included most of current Project activities. However, the proposed stream mitigation on East Branch Beaver Creek and

White Rock Creek are located outside of the APE previously investigated for history/architecture.

Project activities would occur within the boundaries of the Reserve Mining Company Milepost 7 Tailings Basin NRHP property boundary (LA-SVB-012). These activities however are related to its continued use and function as an industrial mining facility and therefore do not adversely affect the resource's NRHP eligibility.

As required under EAW Item 18, a project review request was submitted to SHPO in September 2022. The SHPO responded via letter on January 17, 2023; see Appendix I. In their letter, the SHPO agreed that pursuant to Section 106 of the National Historic Preservation Act (NHPA), the proposed activities would have no adverse effect to the Reserve Mining Company Milepost 7 Tailings Basin, nor have adverse effect on the Big Thirtynine and Little Thirtynine Creeks, as potentially historic properties. They noted that they have not yet reviewed effects pursuant to Section 106 of the NHPA for the East Branch Beaver River stream mitigation project and the White Rock Creek stream mitigation project. The SHPO also acknowledged in their letter that state administrative rules only require consideration of historic properties listed in the NRHP or State Register of Historic Places (Minn. Stat. § 138.665). No listed NRHP or State Register of Historic Places properties are in the Project.

Regarding archaeological resources, the SHPO recommended a Phase I archaeological reconnaissance be completed for both the East Branch Beaver River (river, tributary, and berm) and White Rock Creek stream mitigation projects. Northshore anticipates completing a Phase I archaeological reconnaissance of these areas in 2024. Based on the findings to date, Northshore does not propose to develop an Unanticipated Discoveries Plan (UDP) for the proposed Project.

16. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project related visualeffects such as vapor plumes or glare from intense lights. Discuss the potential visual effects fromthe project. Identify any measures to avoid, minimize, or mitigate visual effects.

There are no designated scenic views or vistas within the Project sites.

Tailings Basin Features

The Dams 1 and 2 extension and railroad relocation would alter the visual features on the land in the immediate Project area. The topography of the land surrounding the Project area varies greatly and the vast majority is heavily vegetated, thus limiting visibility beyond the Project limits. To the south of the Tailings Basin, the land is generally at an elevation between 1,050 and 1,200 feet amsl. This is lower than the ultimate maximum proposed elevation of the dams at 1,315 feet amsl, thereby increasing its potential for visibility over the life of the Project, with greatest likelihood potentially along County State Aid Highway (CSAH) 3 to the southeast. Directly east of the Tailings Basin, around Bear Lake, the land is generally at elevations between 1,300 to 1,450 feet amsl. Therefore, to the east the ultimate elevation of the dams at an elevation 1,315 feet amsl would have some visibility from Lax Lake and Bear Lake Roads. To the north and west of the Tailings Basin, the land is generally at an elevation between 1,200 and 1,350 feet amsl. The greatest area for potential visibility is from CSAH 15 to the north and northwest of the Project area. Due to the varying topographic changes and dense vegetation surrounding the Tailings Basin Features, and the slow vertical rise within the Project area,

which would be indiscernible in many areas from the existing Tailings Basin, the potential for indirect visual effects during construction and operation of the Project is likely limited.

Stream Mitigation Sites

The East Branch Beaver River and Tributary sites are located within a valley, just northwest of Lax Lake Road. The East Branch Beaver River stream mitigation project would be visible from Lax Lake Road, but the Project components would not be visible.

White Rock Creek is located within Silver Bay and would be visible from Penn Boulevard. Construction activities would occur during daylight hours; therefore, temporary lighting would not be necessary or visible at any time. Most of the work related to the site would occur in the stream or adjacent riparian area. Construction activities beyond the road vantage point would most likely be hidden from view due to the relatively lower elevation of the White Rock Creek project components.

Big and Little Thirtynine Creeks are in valleys. Visibility would be limited to hilltops in the surrounding areas. Construction activities would occur during daylight hours; therefore, temporary lighting would not be necessary or visible at any time. The sites are adjacent to the existing Tailings Basin with more and bigger equipment operating during daylight hours seven days a week. The increase in equipment operation that could cause light, dust, or noise pollution would be minimal. Most of the work related to this project would be done in the stream or adjacent riparian area. These areas are the lowest elevation within the valley and from many vantage points are hidden from view from surrounding areas.

17. Air:

a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

The Project would not generate stationary source emissions. No additional measures are proposed.

b. Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimizeor mitigate vehicle-related emissions.

The generation of vehicle emissions would be from onsite mobile construction equipment and contractor's individual vehicles driving to and from the site daily associated with the individual stream mitigation projects, and mobile construction equipment associated with the Tailings Basin Features.

Specific to the individual stream mitigation projects, Northshore would encourage limiting construction time, carpooling, and trying to find nearby locations to stay during the week (to the

extent practicable) to reduce daily vehicle emissions.

c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust andodors generated during project construction and operation. (Fugitive dust may be discussed under item 17a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize ormitigate the effects of dust and odors.

Tailings Basin Features

Construction of the Tailings Basin Features would generate dust from the use of haul roads and placement of fill material. Northshore would implement measures consistent with its existing Fugitive Dust Control Plan for the facility, required by Northshore's Air Permit #07500003-010.[29] These measures include taking advantage of optimum weather conditions to avoid dust dispersal via wind. Additional measures such as applying water and crushed rock on roadway surfaces would also be considered, if applicable, to reduce and thus mitigate the amount of dust generated.

The only odors anticipated from the construction of the Tailings Basin Features would be associated with diesel exhaust from equipment for mining-related operations and temporary events from blasting. The construction of the Tailings Basin Features would not involve any increase in such odors above those associated with the facility. There are no noticeable off-site odor impacts from these activities.

Stream Mitigation Sites

The individual stream mitigation projects may create some temporary dust and noise during construction activities. Fugitive dust could arise during hauling and stockpiling of earthen materials and large tree branches and trunks. Odors are unlikely during construction. Construction would involve excavation and grading of soils and rocks and placement of boulders. Most materials handled do not generate fugitive dust during construction.

The potential for fugitive dust would be minimal due to work within the streams (wet conditions). Work in wet conditions, rapid re-vegetation, and erosion/sediment control BMPs would minimize fugitive dust.

The contractor would be required to follow BMPs to reduce dust such as:

- Covering loads during transport if wind-blown debris could be generated during hauling.
- Watering access routes and exposed soils when powdery conditions are evident.
- Placing mulch, temporary cover, and erosion control mats on exposed areas and stockpiles.
- Require fill and stone materials to be clean and free of dirt and debris, with exception of in-situ fill.

[29] *See J11-MPCA Air Permit 07500003-101.*

18. Greenhouse Gas (GHG) Emissions/Carbon Footprint

a. GHG Quantification: For all proposed projects, provide quantification and discussion of project GHG emissions. Include additional rows in the tables as necessary to provide project-specific emission sources. Describe the methods used to quantify emissions. If calculation methods are not readily available to quantify GHG emissions for a source, describe the process used to cometo that conclusion and any GHG emission sources not included in the total calculation.

Identified greenhouse gas emissions consist of direct emissions generated from mobile equipment during the construction of the proposed Project and those related to land use change. The proposed Project would not generate greenhouse gases during operations. Fuel use, horsepower, and vehicle miles were estimated from previous similar projects. Emissions were calculated for construction equipment for both on-road and off-road use. On-road vehicle emissions are generated from haul trucks, passenger vehicles, and light vehicles traveling to-and-from the Project sites. Off-road vehicle emissions are those generated by construction equipment that would remain on the Project site for the duration of the construction. This consists of earthmoving equipment such as excavators and loaders. Emission factors used to calculate emissions from construction equipment are based on the USEPA CCCL Emission Factors for Greenhouse Gas Inventories and the California South Coast Air Quality Management District.

Most of the Tailings Basin Features would alter forested lands, grasslands, and wetlands, resulting in a removal of a carbon sink from the area. For the Stream Mitigation Sites, Big and Little Thirtynine Creeks and White Rock Creek would result in land conversion to open water (resulting in a removal of a carbon sink), while the East Branch Beaver River project components would result in the addition of forested lands and wetlands (resulting in creation of a carbon sink).

Emission factors were calculated for GHG emissions from land use change based on CO_2e flux estimates from the EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2020. See Tables 18 through 20 that summarize the greenhouse gas emissions for the Project. Detailed calculations can be provided upon request; these are compiled as Appendix G, Climate Trend Analysis and Carbon Footprint Estimation Data Sources & Output.

Table 18 Estimated Construction Greenhouse Gas Emissions

Emission Source	CO_2 (tons)	CH_4 (tons)	N_2O (tons)	CO_2e (tons)
East Branch Beaver River	109.55	9.98E-03	9.25E-03	112.55
East Branch Beaver River - Ditch	109.55	9.98E-03	9.25E-03	112.55
East Branch Beaver River - Berm	9.13	8.32E-04	7.71E-04	9.38
White Rock River	109.55	9.98E-03	9.25E-03	112.55

Emission Source	CO_2 (tons)	CH_4 (tons)	N_2O (tons)	CO_2e (tons)
Big 39 Creek	28.27	5.54E-04	1.30E-03	28.67
Little 39 Creek	75.68	1.48E-03	3.48E-03	76.75
Dam 1 Extension	17,431.37	7.97E-01	5.78E-01	17,623.65
Dam 2 Extension	13,628.16	6.23E-01	4.52E-01	13,778.49
West Ridge RR Relocation	6,324.43	2.90E-01	2.07E-01	6,393.31
Clay Borrow Site	2,850.58	1.28E-01	9.68E-02	2,882.61
Construction - Subtotal	**40,676.27**	**1.87**	**1.37**	**41,130.53**

Table 19 Estimated Land-Use Change Greenhouse Gas Emissions

Emission Source	CO_2 (tons)	CH_4 (tons)	N_2O (tons)	CO_2e (tons)
East Branch Beaver River	N/A	N/A	N/A	(9.02)
East Branch Beaver River - Ditch	N/A	N/A	N/A	(0.11)
East Branch Beaver River - Berm	N/A	N/A	N/A	(0.002)
White Rock River	N/A	N/A	N/A	2.45
Big 39 Creek	N/A	N/A	N/A	2.49
Little 39 Creek	N/A	N/A	N/A	1.94
Dam 1 Extension	N/A	N/A	N/A	2,994.41
Dam 2 Extension	N/A	N/A	N/A	6,118.93
West Ridge RR Relocation	N/A	N/A	N/A	176.16

Emission Source	CO_2 (tons)	CH_4 (tons)	N_2O (tons)	CO_2e (tons)
Clay Borrow Site	N/A	N/A	N/A	4,102.70
Land-Use Change - Subtotal[1]	**N/A**	**N/A**	**N/A**	**13,389.95**

[1]Land-Use Change emissions are excluded from the total CO_2, CH_4, and N_2O and only included in CO_2e because the emission factor reflects CO_2e.

Table 20 Estimated Total Project Greenhouse Gas Emissions

Emission Source	CO_2 (tons)	CH_4 (tons)	N_2O (tons)	CO_2e (tons)
Construction	40,676.27	1.87	1.37	41,130.53
Land-Use Change	N/A	N/A	N/A	13,389.95
TOTAL[1]	40,676.27	1.87	1.37	54,520.47

[1]Land-Use Change emissions are excluded from the total CO_2, CH_4, and N_2O and only included in CO_2e because the emission factor reflects CO_2e.

b. GHG Assessment

i. Describe any mitigation considered to reduce the project's GHG emissions.

It is estimated that the greenhouse gas emissions from the equipment usage would result in approximately 41,131 tons during construction. An additional 13,390 tons is estimated from land use changes for a total of 54,520 tons during construction. There are no operational emissions anticipated for the Project.

Northshore is not proposing CO_2e mitigation for this Project. However, Northshore would consider adaptive mitigation for the construction site such as:

- Reduce any unnecessary clearing and grubbing.
- Maintain tree canopy when feasible.
- Practice vehicle and equipment maintenance.
- Carpool when possible and turn off equipment when not in use.

ii. Describe and quantify reductions from selected mitigation, if proposed to reduce

the project's GHG emissions. Explain why the selected mitigation was preferred.

N/A

iii. Quantify the proposed projects predicted net lifetime GHG emissions (total tons/#of years) and how those predicted emissions may affect achievement of the Minnesota Next Generation Energy Act goals and/or other more stringent state or local GHG reduction goals.

The anticipated net lifetime GHG emissions from the Project is 1,360 tons/year, which is 0.001% of the total CO_2e emissions that were emitted in Minnesota in 2018. The net annual lifetime GHG emissions from the Project are extremely small compared to the state total and therefore the effects from the Project on achieving the Next Generation Energy Act goals are negligible. Nonetheless, the Project is proposing a net increase in overall GHG emissions that would affect Minnesota's GHG reduction goals.

19. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including: 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to statenoise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigatethe effects of noise.

Additional heavy equipment would operate during construction of the proposed Project. Project work for the individual stream mitigation projects would typically occur during daylight hours Monday through Friday. Project work for the Tailings Basin Features would typically occur during daylight hours. The Northshore and stream mitigation construction crews would be required to follow local noise ordinances and restrictions. Post construction, the operation of the Project would produce no noise.

Construction on the East Branch Beaver River and Tributary and Big and Little Thirtynine Creeks is adjacent to the Tailings Basin equipment operation. At no time would the noise intensity from equipment related to this Project exceed that of equipment used in daily operation of the Tailings Basin. There are no sensitive receptors near the Project area. The East Branch Beaver River project area is directly adjacent to Lax Lake Road, CSAH 4, and approximately 0.6 miles from the nearest residence. The East Branch Beaver River project area is also approximately 0.8 miles northeast of the active Tailings Basin but is otherwise remote. Noise for these stream mitigation projects would be limited to the construction period only.

Construction on the White Rock Creek is directly adjacent to Penn Boulevard, approximately 300 feet from the Essentia Health Silver Bay Pharmacy, approximately 300 feet from residential homes, and 150 feet from United Protestant Church on Horn Boulevard. Construction southeast of Penn Boulevard would be 150 feet from the Silver Bay Recreation Buildings. Any noise impacts would be limited to the construction period where noise-limiting equipment, such as mufflers, would serve to ameliorate some of the impact. The contractor would place signs along the construction corridor and any trails to alert pedestrians of the construction activity to limit perceived disturbance.

For the Tailings Basin Features, noise from construction would be consistent with ongoing operations and would have minimal effects on existing noise levels in the area.

20. Transportation

a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternativetransportation modes.

Northshore would use existing facility roads to construct the proposed Tailings Basin Features. Most of the materials and equipment would be obtained from existing onsite sources. Therefore, additional traffic on public roads would be minimal. No additional parking spaces would be needed.

Any parking and staging areas for the Stream Mitigation Sites would be small with predicted daily traffic generation at less than 10 vehicles per day. Due to the remote nature of the work, no alternative transportation modes would be applicable.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system.*If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 *(available at: http://www.dot.state.mn.us/accessmanagement/resources.html),* or a similar local guidance.

The proposed Tailings Basin Features would be constructed using existing facility roads. As a result, construction activities would not increase peak hour traffic generation more than 250 vehicles or generate more than 2,500 daily trips.

A short period of mobilization associated with the individual stream mitigation projects would increase semi-truck traffic in the area and directly off CSAH 4 and Penn Boulevard. During construction, crews would report daily during weekdays. This would be an addition of approximately 10 vehicles per day. Most materials required for the Project would be acquired onsite; however, some additional materials may be required to be delivered for the completion of the individual stream mitigation projects. The individual stream mitigation projects may see an increase in traffic during rainfall events when there is an increase in inspections or potential maintenance.

c. Identify measures that will be taken to minimize or mitigate project related transportationeffects.

The proposed Project would have limited traffic impacts thus no minimization and mitigation measures have been identified.

21. Cumulative potential effects: (Preparers can leave this item blank if cumulative potential

effects areaddressed under the applicable EAW Items)

a. Describe the geographic scales and timeframes of the project related environmental effects thatcould combine with other environmental effects resulting in cumulative potential effects.

The overall geographic scale for assessing cumulative potential effects for the Project includes:

- the Beaver River-Frontal Lake Superior watershed, which encompasses the Tailings Basin Features areas and five of the six the Stream Mitigation Sites area; and

- the area within 0.5 miles of the White Rock Creek stream mitigation project, most of which occurs within the City of Silver Bay but outside the Beaver River watershed.

The timeframe for assessing cumulative potential effects differs between the Tailings Basin Features and the Stream Mitigation Sites as listed below.

Tailings Basin Features. The construction of the railroad embankment and dam extensions, along with the extraction from the clay borrow site, are anticipated to span over approximately 40 years. The actual length of time would depend on Northshore's production schedule as described in EAW Item 6.b. Regardless, the Project life span is likely to last several decades.

Stream Mitigation Sites. The individual stream mitigation projects would be constructed over the course of the next five years, from 2023-2027. Construction itself would take one field season per each two-action project as described in EAW Item 6.b. Once construction is complete, the environmental setting would revert over time to resemble pre-project conditions over the long term but exhibiting more natural instream and riparian corridor functions and values.

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographicscales and timeframes identified above.

Present and reasonably foreseeable future projects that may occur in the Beaver River-Frontal Lake Superior watershed, and/or within 0.5 miles of the White Rock Creek stream mitigation project, and therefore could potentially interact with the environmental effects of the project, consist of the following:[30]

- Beaver Bay water intake repair/replacement

- Housing development off Golf Course Road in Silver Bay

- Housing development off Marks Drive in Silver Bay

[30]As identified in EAW Item 6f, Northshore intends to continue placement of tailings on the remaining permitted footprint within the Tailings Basin. This is a result of continuation of ongoing mining and processing operations at the Peter Mitchell Mine and the processing facilities at Silver Bay. These impacts were assessed in the 1975-76 Final EIS and 1977 USACE Final EIS, and originally permitted in 1977, thus the ongoing tailings placement is not considered a reasonably foreseeable future project for this EAW.

- Housing along Penn Boulevard in Silver Bay
- Multimodal trailhead center off Outer Drive in Silver Bay
- Expansion of East Lakeview Drive in Silver Bay
- Boathouse Bay Housing and Resort development in Silver Bay Business Park
- New street between Outer Drive and Banks Boulevard in Silver Bay
- Water treatment facility upgrades and booster station in Silver Bay
- Renovation of William Kelley High School and bus garage in Silver Bay
- Silver Bay City Street Improvement project (city wide, not shown on Figure 9)
- Renovation of Silver Bay Library
- North Shore Camping Company Project
- Minnesota Department of Transportation Bridgework at Silver Creek and Stewart River
- Black Beach Campground in Silver Bay
- Sanitary Trunk Line Improvement Project in Silver Bay
- Lakeshore Residential Development south of Beaver Bay

These present and reasonably foreseeable future projects are all relatively small-scale utility/street repair and residential/resort development projects, primarily located in the Silver Bay and Beaver Bay area. The projects within 0.5 miles of the White Rock Creek stream mitigation project, located in the City of Silver Bay, are shown on Figure 9. General short-term construction related impacts associated with these projects may include increased noise, dust generation, traffic, and associated equipment and vehicular emissions. Longer term impacts would primarily be associated with the residential/resort development projects, whose potential impacts may include minor loss of wetlands, trees/forested areas, and associated wildlife habitat.

c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmentaleffects due to these cumulative effects.

Tailings Basin Features[31]

[31]The USACE prepared an Environmental Assessment for the "Northshore Mine Mile Post 7 Tailings Basin Project, Department of Army Environmental Assessment and Statement of Findings; September 16, 2021" that evaluated the direct, indirect, and cumulative impacts of the Proposed Project if the final permitted height of Dams 1, 2, and 5 were completed to 1,315 feet amsl. *See J28-USACE Environmental Assessment*. The EA was informed by the following report: "Cumulative Effect Analysis – Aquatic and Forest Resources, Tailings Basin Progression, Barr Engineering, prepared for Northshore Mining Company; October 2019." These documents informed DNR's

None of the present or reasonably foreseeable future projects in Silver Bay or Beaver Bay listed above in EAW Item 21b occur within the vicinity of the proposed relocated railroad embankment and new rail switchback, dam extensions, or clay borrow site for the Tailing Basin Features. Therefore, construction-related impacts, such as noise, dust generation, traffic, and associated emissions, would not interact to result in cumulative effects.

The primary long-term effects of the railroad embankment and dam extension Project components are due to covertype conversion, specifically: approximately 89 acres of wetland and associated stream remnants; approximately 249 acres of forest; and the subsequent habitat conversion associated with these resources. Though not anticipated, the projects listed above in Silver Bay and Beaver Bay could result in minor additional loss of wetlands, forest, and associated habitat in the Beaver River-Frontal Lake Superior watershed. Depending on final reclamation requirements for the Tailings Basin Features, it is likely there will be some return in vegetative cover and possibly some limited wetlands with some restored habitat. When compared to the existing landcover in the Beaver River-Frontal Lake Superior Watershed, these impacts are negligible in terms of cumulative effects due to wetlands, streams, and forest covertype conversion especially considering final reclamation and closure requirements. Regarding development in the remaining 650 acres of permitted tailings deposition capacity along with the proposed Project, potential cumulative impacts are still considered negligible as approximately 98-98% of the total resource base remains unaffected and this area too will be subject to revegetation requirements in reclamation and closure.

Stream Mitigation Sites

As discussed above, the individual stream mitigation projects would result in permanent positive effects to streams by stabilizing channels, restoring floodplain connectivity, and improving aquatic and riparian corridor habitat.

The potential for negative effects resulting from the individual stream mitigation projects would be temporary, lasting primarily during construction. These effects are discussed in the resource-specific sections above. Since these effects would be temporary and localized in nature, they are not likely to interact with the present and reasonably foreseeable future projects identified in EAW Item 21b and result in cumulative effects. This is especially the case for the White Rock Creek stream mitigation project, which is not scheduled to be constructed until the 2027 construction season, which is after the reasonably foreseeable projects in Silver Bay are expected to be complete.

22. Other potential environmental effects: If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environmentwill be affected, and identify measures that will be taken to minimize and mitigate these effects.

No other potential environmental effects have been identified.

assessment of potential cumulative impacts. *See J20-Northshore Cumulative Effects Analysis*.

RGU CERTIFICATION. *(The Environmental Quality Board will only accept **SIGNED** EnvironmentalAssessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60,respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature Bill Johnson Digitally signed by Bill Johnson Date: 2023.04.07 14:15:11 -05'00' Date April 7, 2023

Title Mining Planning Director