

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 be addressed 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: Tamarack Mining Project

2. Proposer:

Contact Person: Christopher Wallace,
Talon Nickel (USA) LLC
Title: Environmental and Permitting, VP
Address: 165 Warren Street, Tamarack,
MN 55787
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3. RGU:

Contact Person: EAW Project Manager
Title: Environmental Review Project
Manager
Address: 500 Lafayette Road, St. Paul,
MN 55155
Email: TamarackEIS@state.mn.us

4. Reason of EAW Preparation (check one):

Required:

☒ EIS Scoping

☐ 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):

An Environmental Impact Statement (EIS) is mandatory per Minnesota Rules part 4410.4400, subpart 1, "Threshold Test" and 8.B, "Metallic Mineral Mining and Processing: For the construction of a new facility

for mining metallic minerals or for the disposal of tailings from a metallic mineral mine, the” Minnesota Department of Natural Resources (DNR) is the Responsible Government Unit (RGU).

5. Project Location:

- *County:* Aitkin County
- *City/Township:* City of Tamarack and Clark Township
- *PLS Location:* Table 5-1 provides a summary of the Public Land Survey (PLS) for the project

Table 5-1 Public Land Survey Data for the Project

Township	Range	Section	¼ ¼ Sections
48 N	22 W	3	NENW, SENW, SWNW, NWNE, SWNE, NWSW, NESW, SWSW, SESW, NWSE, SWSE
48 N	22 W	4	SENE
48 N	22 W	10	NWNW, NENW, SENW, NWNE, SWNE, NESW, SWSW, SESW, NWSE, SWSE
48 N	22 W	15	NWNW, NENW, NWNE

- *Watershed (81 major watershed scale):* Mississippi River – Grand Rapids
- *GPS Coordinates:* Table 5-2 provides the GPS coordinates of the project.

34 **Table 5-2 GPS coordinates for the project**

Tax Parcel Number	Latitude	Longitude
05-0-003400	46.67868	-93.11416
05-0-003500	46.67562	-93.11153
05-0-003700	46.67867	-93.11942
05-0-003900	46.67386	-93.12440
05-0-003901	46.67202	-93.11924
05-0-004000	46.67566	-93.11936
05-0-004400	46.66838	-93.12418
05-0-004500	46.66839	-93.11912
05-0-004600	46.67017	-93.11139
05-0-005300	46.67565	-93.12994
61-0-002100	46.66470	-93.11395
61-0-002200	46.66103	-93.11403
61-0-002400	46.66472	-93.11911
61-0-002500	46.66473	-93.12415
61-0-002600	46.66106	-93.12168
61-0-002800	46.65742	-93.11928
61-0-003000	46.65379	-93.12459
61-0-003100	46.65379	-93.11935
61-0-003300	46.65741	-93.11407
61-0-003400	46.65380	-93.11413
61-0-003700	46.65150	-93.11478
61-0-004100	46.65095	-93.11964
61-0-004200	46.65036	-93.12480
61-0-033000	46.64973	-93.12005

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

- 36 • County map showing the general location of the project; (See Figure 1)
- 37 • U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy
- 38 acceptable); and (See Figure 2)
- 39 • Site plans showing all significant project and natural features. Pre-construction site plan and post-
- 40 construction site plan. (See Figures 3 through 24)
- 41 • List of data sources, models and other resources (from the Item-by-Item Guidance: Climate
- 42 Adaptation and Resilience or other) used for information about current Minnesota climate trends and
- 43 how climate change is anticipated to affect the general location of the project during the life of the
- 44 project (as detailed below in Item 7, Climate Adaptation and Resilience).

6. Project Description:

a. Project Summary

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

Talon Nickel USA LLC proposes to construct and operate an underground mine near Tamarack, Minnesota, to extract ore containing nickel, copper, and other metals that would be shipped by rail to concentrators located in Mercer County, North Dakota, and Marquette County, Michigan. Tailings would not be generated in Minnesota, and no tailings storage would occur in Minnesota.

b. Complete Project Description

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

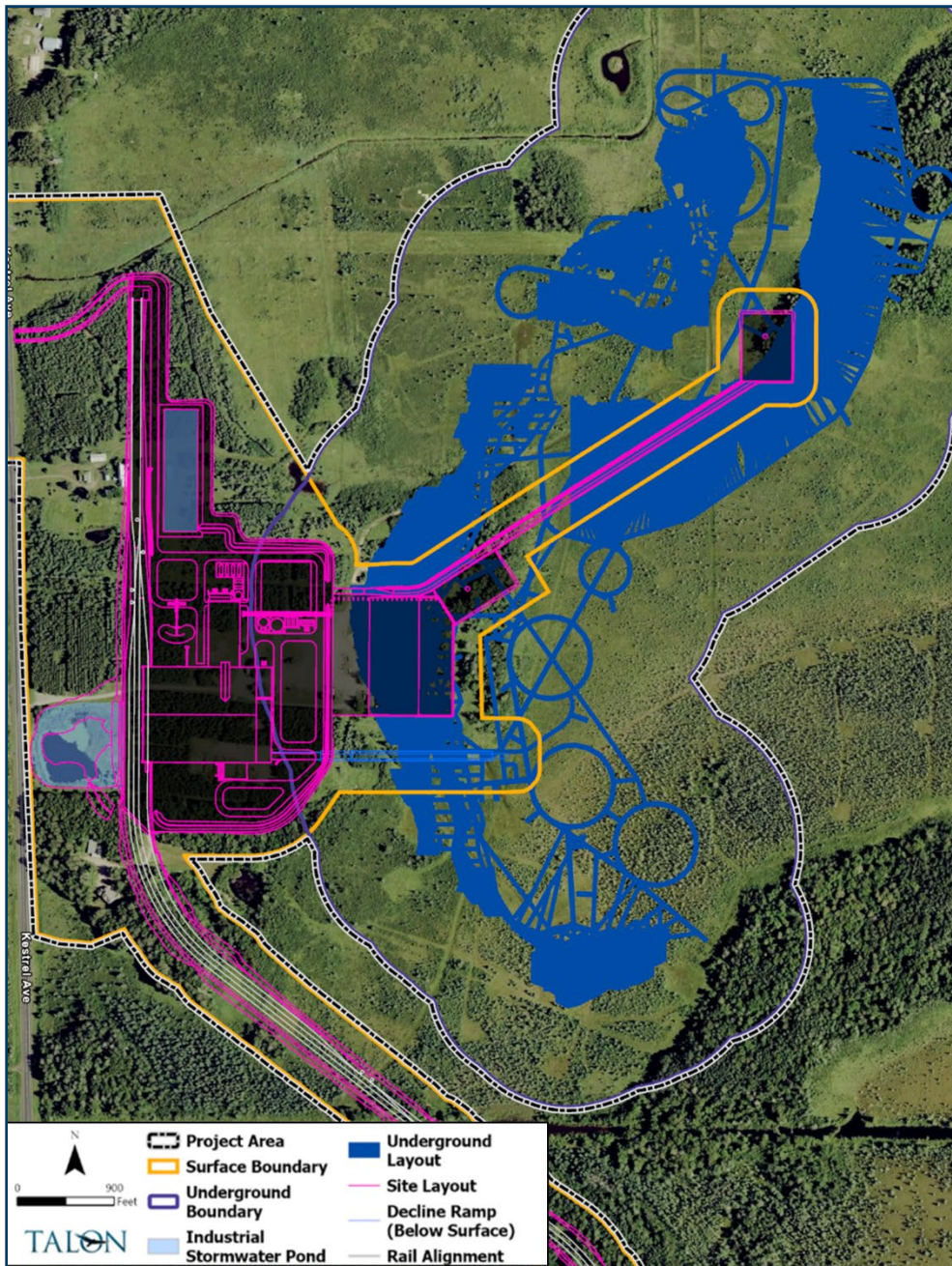
Project Overview

Talon Nickel (USA) LLC (Talon or Proposer) is the majority-owner and has operational control of the Tamarack Mining Project (Project) through a joint-venture agreement with Kennecott Exploration Company, which is part of the Rio Tinto Group of Companies. The surface land at the proposed Project Area and the underground boundary is a mix of private, state-administered, and county-administered ownerships. The Proposer may be required to secure surface use agreements on some ownerships. Mineral ownership of the underground Tamarack Resource Area is a mix of state-owned mineral interests that must be leased and privately owned mineral interests.

Talon proposes to construct an underground mine and surface facilities at the Project Area near Tamarack, Minnesota (Project) (Figure 1). Graphic 6-1 shows the co-located surface facilities in magenta and the underground facilities in blue. Graphic 6-2 is a three-dimensional representation of the surface facilities layout.

Proposed Action: Construct and operate an underground mine to excavate ore from the Tamarack Resource Area of the Tamarack Intrusive Complex.

73 **Graphic 6-1 Co-Located Surface and Underground Facilities**



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 78 Note: see Figure 3 for details.

79 The Project Area is defined by the surface boundary and the underground boundary that together
 80 comprise 378.8 acres as shown on Table 6.1. The total acreage of the surface boundary, composed of the
 81 long-term facilities, temporary staging areas and a buffer around the mine site boundary for facility siting,
 82 would be 206.4 acres. The acreage of new plus existing developed surfaces to support the long-term
 83 facilities for the Project would be 64.4 acres. Approximately 13.4 acres within the Project Area already
 84 consist of developed surfaces, with some features to be replaced for the Project. The total additional
 85 surfaces developed for the Project would amount to approximately 58.5 acres (57 acres
 86 developed/impervious surfaces and 1.5 acres industrial stormwater pond) after construction is complete.
 87 This encompasses the buildings, parking areas and various other facilities for production operations
 88 including the railway spur to connect to the existing Burlington Northern Santa Fe (BNSF) railway line.

89 *Proposed Action:* Construct the surface portion of the Project Area across approximately 206.4
90 acres.

91 *Proposed Action:* Construct total Project Area (surface and underground) over approximately 379
92 acres.

93 Project surface components include the following:

- 94 • Long-term facilities, buildings, and developed surfaces for production operations would occupy
95 approximately 64.4 acres, (7.0 acres of existing developed/impervious surfaces, 2.3 acres of an
96 existing excavated pond, 40.6 acres of new developed/impervious surfaces, 13.0 acres of created
97 upland, and 1.5 acres of an industrial stormwater pond). The 64.4 acres would be divided between
98 the mine site (43.2 acres) and the railway spur (21.2 acres).
- 99 • Temporary staging areas may be used for staging equipment and materials during construction
100 but would not result in a long-term developed surface after construction is complete. The area
101 identified as Area G in Graphic 6-2 to be used during operations as the outdoor backfill materials
102 buffer, would be used during construction as a temporary laydown area. The two additional
103 construction staging areas (temporary) are shown on Figure 3. Both areas comprise an additional
104 17.6 acres of uplands within the project boundary that is suitable for use as temporary equipment
105 staging without disrupting other construction activities. The equipment stored in temporary
106 staging areas during construction would be removed following construction, and these areas
107 would be reclaimed to their pre-construction use or condition, rather than being retained for open
108 storage or other permanent uses. This area has some overlap with the developed surfaces
109 described above and temporary access surfaces described below. Not all this area is expected to
110 be used for temporary staging of construction equipment and supplies, but it is available, if
111 needed.
- 112 • An area of approximately 100 ft (30.5 m) in width by 750 ft (228.6 m) in length would be accessed
113 during construction to support ground improvement activities associated with the construction
114 of the SEM section of the Decline Ramp (Graphic 6-4). The area would support access, equipment
115 setup, construction of the cutoff cell and other construction activities. It would not be utilized for
116 storage of overburden. Portions of this area would be utilized as needed, and no long-term
117 developed surface would remain following construction.
- 118 • Temporary-use areas include access points to the property, areas used to maneuver equipment
119 and place construction cranes, areas needed for earthwork activities (clearing, grading, grubbing),
120 aerial or underground utility lines installation and other necessary short-term activities. For these
121 activities, an offset distance of approximately 100 ft (30.45 m) has been applied between the
122 extent of the developed surface and the project boundary (with variability as appropriate to align
123 with public roadways, certain property boundaries and other project features). These activities
124 would not result in a developed surface after construction is complete.

126 *Proposed Action:* Construct long-term facilities such as the mine site and the rail spur over 64.4
127 acres.

128 *Proposed Action:* Use 17.6 acres of uplands for temporary construction laydowns and staging
129 areas.

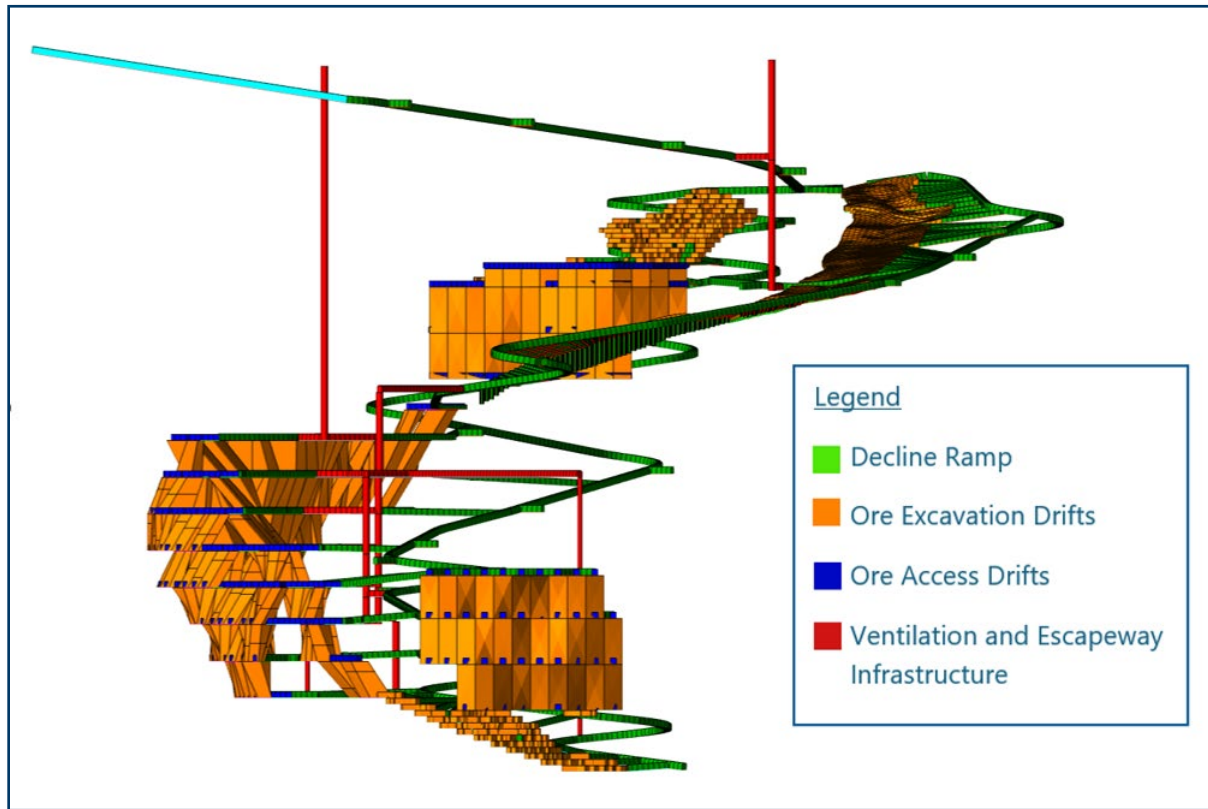
Proposed Action: Use 124.4 acres of land for temporary uses such as construction access or equipment maneuvering.

The underground boundary area is the area in which mining would occur below the surface. It encompasses approximately 206.2 acres and overlaps with the surface boundary area by approximately 34.6 acres (Graphic 6-3).

Table 6-1 Summary of Project Area Acreage

Project Component	Acres
Surface Boundary	206.4
New Developed/Impervious Surfaces (40.6 acres)	
New Industrial Stormwater Pond (1.5 acres)	
Existing Developed/Impervious Surfaces (6.95 acres)	
Existing Excavated Ponds (2.3 acres)	
Created Upland (13.0 acres)	
Temporary Construction Laydowns & Staging Areas (17.6 acres)	
Other Potential Temporary Uses (ex. Construction Access, Equipment Maneuvering) (124.4 acres)	
Underground Boundary (surface acreage above underground workings)	206.2
Overlap between the Surface Boundary and Underground Boundary	-33.8
Project Area (sum of the above)	378.8

Graphic 6-3 Three-Dimensional Sketch of Underground Mine Workings (Not to Scale)



Final ore processing and tailings disposal would take place off-site at facilities located in Mercer County, North Dakota, and Marquette County, Michigan. These off-site processing facilities are not part of the project. An approximately 1.5-mile railway spur would be constructed to connect the Ore Transfer Building to the existing BNSF railway line located immediately north of Tamarack. The Project Area would be accessed from an existing two-lane paved road – County State Aid Highway (CSAH) 31.

Proposed Action: Transport ore via principally the BNSF railway to conduct ore processing and tailings disposal off-site in Mercer County, North Dakota, and Marquette County, Michigan.

Once operational, the Project is expected to employ at least 300 workers during full steady-state production. Staffing levels would be further refined to inform the EIS.

The Project would involve the construction and operation of several facility elements, including:

- Underground mine, accessed via the Decline Ramp
- Mine ventilation infrastructure (e.g., primary intake fans, mine exhaust)
- Ore Transfer Building (e.g., including ore transfer area, rail loadout, air compressors, and backfill plant)
- Contact water treatment building and plant
- Sanitary water collection
- Industrial stormwater ponds
- Outdoor backfill materials buffer

- Rail spur to connect to the BNSF
- Electrical substation and transmission line
- Supplies storage including propane and diesel fuel storage tanks
- Utilities, roadways and minor supporting infrastructure

Timing and Duration of Construction

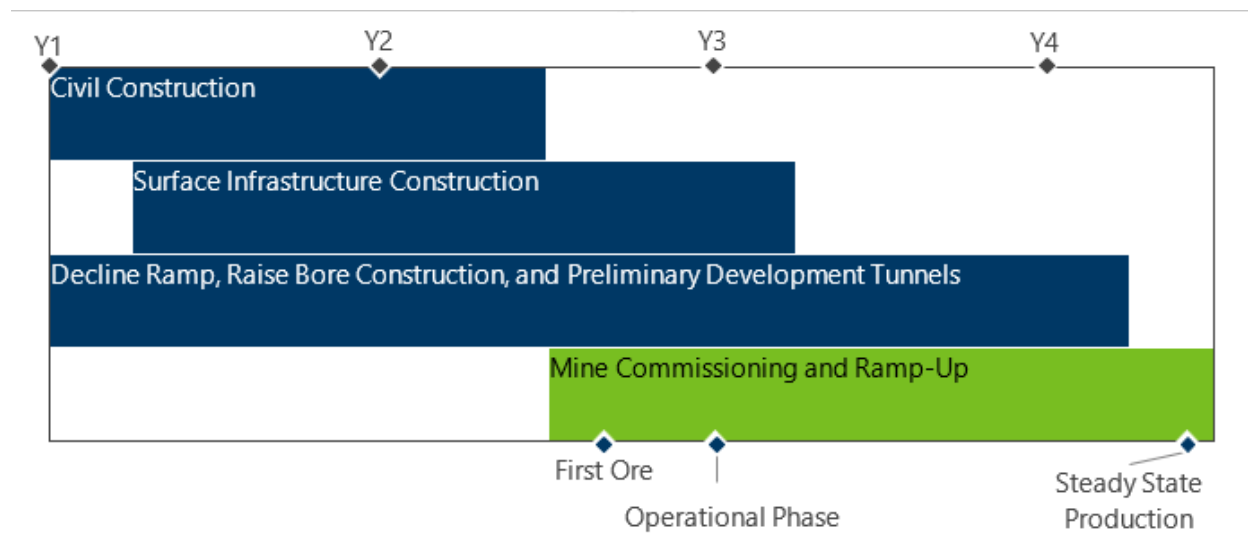
Project construction would start after the completion of environmental review and issuance of all necessary permits and approvals. Initial production-related activities would begin approximately 18-24 months after the start of construction, after which the Project would transition through a ramp-up period before reaching full production. Table 6-2 shows this progression, including the anticipated start of operational activities around the end of the construction period. A description of the ramp-up to full production over the subsequent 1.5 years can be found in the Mine Production section below.

Proposed Action: Begin construction of the facility pending completion of Environmental Review and issuance of permits.

Proposed Action: Begin mining ore 18-24 months after the start of construction.

The Project's design encompasses all facilities required to complete the mining cycle and transport the ore to the concentrators.

Table 6-2 Preliminary Project Construction, Commissioning, and Ramp-Up Schedule



Surface Facilities Construction

The first phase of construction activity would be mobilizing the civil contractor to site. The civil works would include the following activities:

- Erection of fencing and access control installations
- Construction of Stormwater Pollution Prevention control measures
- Construction of access roads to the site
- Clearing and grubbing the site
- Demolition of the existing buildings on site (a house, a barn and several small agricultural

182 outbuildings) and removal of septic tanks

183 • Bulk earthworks to prepare the construction site for the construction of the Decline Ramp, and

184 all other structures intended to be erected on the site, including preparing a temporary

185 construction laydown area for site support facilities (this includes grading, leveling, earthmoving,

186 etc.)

187 • Construction of onsite roads and parking facilities

188 • Constructing bases for diesel and propane storage tanks

189 • Construction of permanent industrial stormwater ponds

190 The Decline Ramp construction area would be leveled to allow the Portal and Sequential Excavation

191 Method (SEM) sections' construction teams to set up the site infrastructure and resources. A level graded

192 area of approximately 200 ft by 300 ft (61 m by 91.44 m) would be prepared for the Decline Ramp

193 contractor(s) to establish the surface-based equipment and facilities to commence with the Decline Ramp

194 construction.

195 *Proposed Action:* Construct access roads to the Project site, onsite roads and parking facilities

196 *Proposed Action:* Demolish existing buildings, remove septic tanks and clear and grub the site.

197 *Proposed Action:* Construct permanent industrial ponds and stormwater prevention and control

198 measures.

199 *Proposed Action:* Level a 60,000 square foot area to prepare for construction of the Decline Ramp.

200 The next phase would include establishing temporary utilities and infrastructure required for construction

201 (power, offices, staging areas, support facilities and maintenance facilities). Once completed, the

202 excavation of the mine portal, tunnel and decline would occur concurrently with construction of the

203 remainder of the mine surface facilities.

204 *Proposed Action:* Construct temporary infrastructure required for construction.

205 *Proposed Action:* Excavate the decline sections at the same time as the mine surface facilities.

206 Conversion of wetlands to uplands for the railway spur to the existing BNSF railway would also begin. The

207 railway spur would be routed along uplands and wetlands. Areas of shallow peat would be excavated and

208 replaced with fill material, while limited areas of deeper peat would require installation of pilings as

209 indicated by the location of the load transfer platform shown on Figure 4. Exact depths would be

210 determined by future geotechnical testing. Fill material would be placed and compacted in a layer of at

211 least 3 ft (1 m) over peatland sections where pilings are required. Conversion of the wetlands to uplands

212 for the railway spur would use appropriate materials (e.g. coarse rock) or features (e.g. culverts) to enable

213 water to flow across and/or under the developed surface to facilitate water movement between each side

214 of it and address the potential for differences in water levels and/or other hydrological impacts. The total

215 length of rail track that would be installed on the upland, inclusive of the mainline connection within the

216 BNSF right-of-way and the rail yard comprising of three parallel unit train tracks, the loading track through

217 the Ore Transfer Building, and 14 track switches is 29,320 ft (8,937 m).

218 *Proposed Action:* Convert portions of wetlands to uplands to prepare for the railway spur and use

219 appropriate materials and features to enable water movement.

220 *Proposed Action:* Excavate shallow peat and replace with fill material to prepare for the rail spur.

221 *Proposed Action:* Install pilings to support imported material over deep peat sections.

222 Construction work on the Ore Transfer Building would also begin immediately after site preparation. Once
223 the site for the building has been leveled, the foundations would be excavated, concrete poured and the
224 concrete slab on grade would be constructed after compaction of the sub-base. The pre-engineered steel
225 structure (which would be fabricated off-site prior to site mobilization) would be transported to site and
226 erected on the building foundations. The dust control system would be installed by the time the facility is
227 operational and would use temporary construction electrical power until the electrical substation is
228 commissioned.

229 *Proposed Action:* Construct the Ore Transfer Building by laying a concrete slab on a sub-base and
230 erecting a steel structure onto the foundation.

231 *Proposed Action:* Install a dust control system in the Ore Transfer Building.

232 Construction of the Contact Water Treatment Building would begin in parallel with or immediately
233 following completion of the Ore Transfer Building, due to the need for contact water treatment to be
234 available once the construction of the Bedrock Section of the Decline Ramp commences. Once the area
235 for the building has been leveled, the foundations would be constructed. The engineered steel structure
236 (which would be fabricated off-site prior) would be transported to site and erected on the building
237 foundations.

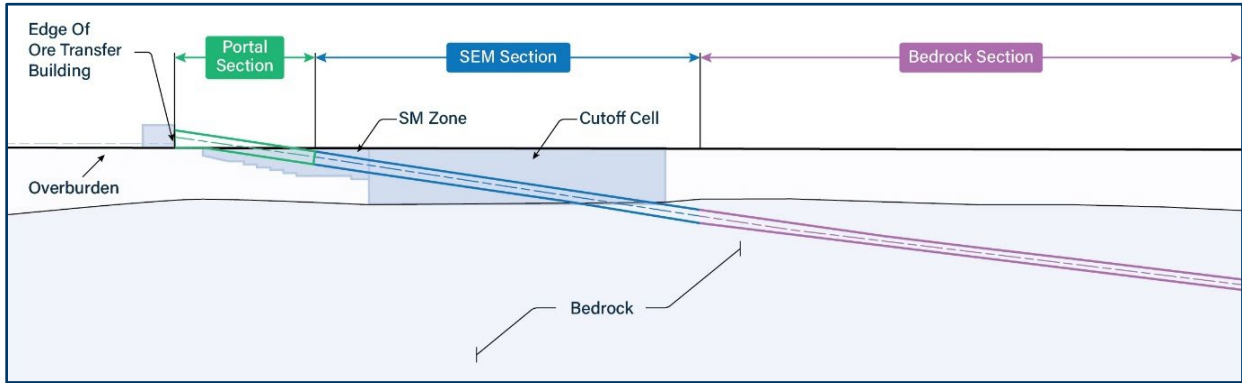
238 *Proposed Action:* Construct the Contact Water Treatment Building for treatment of contact water
239 beginning with construction of the Bedrock Section of the Decline Ramp.

240 *Decline Ramp*

241 The primary access to the underground mine would be via a Decline Ramp from surface originating in the
242 Ore Transfer Building. The decline would be constructed in three sections (Graphic 6-4):

- 243 • Portal Section – A ramping open cut portal would utilize Soil Mixing (SM) (described in detail
244 below) to create a low permeability excavation. When the tunnel is completed, a steel-canopy
245 shell would be placed in the portal and backfilled to isolate mine access from weather.
- 246 • SEM Section – SEM tunneling would advance from the end of the open cut portal through the
247 overburden soil until reaching bedrock. Two ground improvement strategies would be used in
248 conjunction with SEM tunneling to control groundwater during tunneling: 1) Soil Mixing to create
249 a block of soil-cement with low permeability; and 2) construct a cutoff cell to form a groundwater
250 barrier wall around the tunnel alignment. The ground improvement strategy used would be
251 dependent on depth and applicability, with safety being the primary criterion.
- 252 • Bedrock Section – Once in bedrock, drill-and-blast methods would be used to develop the Decline
253 Ramp to the orebody.

Graphic 6-4 Illustration of the Decline Ramp comprising the Portal, SEM and Bedrock Tunnel sections (Not to Scale)



The construction details for the three sections of Decline Ramp are summarized below.

Portal Excavation in Soil Mixing Zone

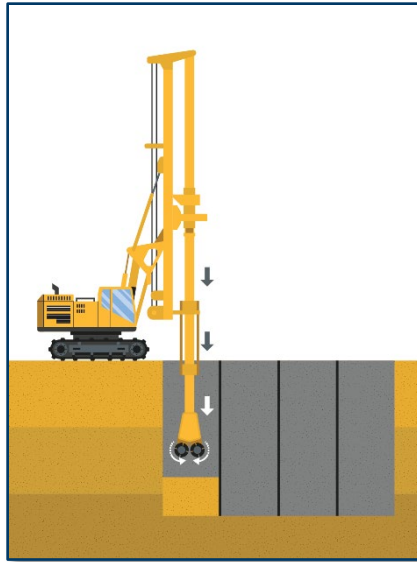
The first two sections of the Decline Ramp would be constructed in unsaturated and saturated overburden, consisting of fine overburden that is unsuitable for traditional excavation methods such as open-cut excavation and cut-and-cover. The fine overburden extends to depths up to 65 ft (19.8 m) and is primarily composed of silty sand and silty clay, with scattered lenses of silt and clay. Localized pockets of non-silty sand are also present.

The Portal section of the Decline Ramp would extend from the Ore Transfer Building into an SM zone. This zone would gradually deepen (Graphic 6-4), with maximum dimensions of 320 ft (98 m) in length, 40 ft (12 m) in width, and 60 ft (18 m) in height. A second SM section (Block section), joining the Portal area to the Cutoff Cell (see below) would extend for approximately 98.5 ft (30 m) in length, 40.5 ft (12.3 m) in width, and 50 ft (15 m) in height. SM involves mechanically mixing cementitious binders and soil using rotating mixing tools. This process creates overlapping columns of soil-cement, forming solid blocks of improved ground (Graphic 6-5). This height was selected due to the limitations posed by employing the SM mixing equipment in the dense, coarse-grained overburden at greater depths.

Proposed Action: Construct a Decline Ramp to access the underground mine.

Proposed Action: Utilize SM to prepare two blocks of ground for the Decline Ramp construction by mixing cement binders and soil to create solid blocks of improved ground.

275 **Graphic 6-4 An example of the Soil Mixing Process (Not to Scale)**



276 Upon completion of the SM ground preparation, the project would begin excavation using an excavator
277 or a roadheader (a machine that excavates using a rotating head on the end of a boom). The project would
278 excavate a tunnel with a diameter of 19.7 ft (6 m) through the SM zone at a downward gradient of
279 approximately 15%.

280 When completed, this tunnel would be covered with the previously excavated fine overburden. A
281 concrete driving surface would be established for vehicle use.

282 *Proposed Action:* Excavate the SM-prepared ground using an excavator or roadheader to
283 construct a tunnel.

284 **SEM Section of Decline Ramp**

285 Once through the fine overburden, the Decline Ramp would continue into the coarse overburden
286 consisting predominantly of sand and silty sand with scattered gravel lenses. The coarse overburden is
287 typically very dense and consists of saturated unconsolidated sediments (Quaternary deposits) to a depth
288 between approximately 65-115 ft (20 - 35 m).

289 The Project proposes use of a Cutoff Cell for construction of the SEM section of the Decline Ramp. On I-
290 35 in Minneapolis (Graphic 6-6), the State of Minnesota recently used a similar approach to construct six
291 113 ft (34.4 m) deep shafts to function as stormwater storage tanks.

Graphic 6-6 Similar construction methods to the planned cutoff cell were used in Minnesota on I-35 in Minneapolis to prevent the highway from flooding during storm events



To prepare this portion of the overburden for tunneling, a roughly 40 ft (12 m) wide, 570 ft (174 m) long, and 65-115 ft (20-35 m) high cutoff cell would be constructed. This cell would be formed in stages using SM methods to construct roughly 3 ft (1 m) thick panels that extend from surface down to competent bedrock. The resulting structure cell would form a groundwater cutoff wall, fully enclosing the future tunnel area.

Proposed Action: Prepare the coarse overburden by constructing a cutoff cell to create a groundwater cutoff wall that encloses the tunnel area.

Once the cutoff cell is completed, the interior would be dewatered using approximately six wellpoints installed along the interior perimeter. Preliminary calculations estimate a total dewatering volume between 1.6 and 3.9 million gallons (6.1 to 14.8 million liters), which, when averaged over a 14-day pumping period, would result in a flow rate of 81-196 gallons per minute (gpm) (307-741 L/min). The dewatering of the SEM Section of the Decline Ramp during construction would be done by pumping the water into the industrial stormwater management system. Sediment would be allowed to settle, and the water would be released into the watershed near the northern boundary of the Project Area. This water would be treated as construction stormwater in accordance with applicable Minnesota Pollution Control Agency (MPCA) permitting. The EIS data submittal would provide additional analysis regarding the flow and level of treatment required for discharge.

Proposed Action: Dewater inside the cutoff cell by pumping water into the industrial stormwater management system and releasing water to the northern boundary of the Project Area.

Dewatering the soil would improve ground stability and mitigate pooling of water at the face during excavation, allowing for the safe tunneling to continue. Beginning in the SM block from the portal excavation's lowest point, the project would use the SEM to tunnel through the remaining SM zone, the cutoff cell and the dewatered cutoff cell until bedrock is exposed. The precise excavation sequence would adapt based on ground conditions but would generally involve partial face excavation. This would entail using a combination of a front-end loader in softer ground and a roadheader in harder ground where mechanical breakage is required. Probing would precede excavation and spiles (steel dowels or cables encased in grout) would be installed in advance of excavation around the perimeter of the tunnel. After completion of an excavation round, tunnel support would be placed, consisting of a combination of steel ribs, shotcrete (pneumatically applied concrete, reinforced with either steel or resin fibers) and wire mesh. Face support, which could include bolts, dowels, and/or shotcrete, would also be required during tunnel advancement to maintain face stability during excavation. If large boulders are encountered that could not be safely removed using a front-end loader or fractured using a roadheader, packaged explosives may be used to fragment these larger rocks. Similarly, once the transition zone between soil and bedrock has been reached, a mix of SEM and blasting would be required until the full excavation face is within bedrock.

Excavated material consisting primarily of overburden from the Portal and SEM Sections of the Decline Ramp would be hauled to the surface and loaded onto trucks for transport off-site to a licensed landfill. Preliminary estimates suggest that approximately 20,200 tons (18,400 tonnes) of material would be excavated over the 12-month construction period. Using 20-ton (18-tonnes) haul trucks, this haulage would require approximately four truckloads per day.

Proposed Action: Excavate the remainder of the Decline Ramp to bedrock using SEM.

Proposed Action: Dispose of excavated overburden from the Decline Ramp at a licensed off-site landfill via truck.

Portal and SEM Sections Construction Supporting Infrastructure

Additional service equipment to support SEM excavation through the SM zone and Cutoff Cell would include scissor lifts and/or telehandlers for installing piping, power cables and other systems. The project would also use a shotcrete sprayer and hauler, a supply truck, and various light-duty service equipment to support the SEM crew. A crane would be required for moving heavy equipment, including ground support and portal segments. The excavation process would also require several temporary facilities: 1) a laydown area; 2) office trailers; 3) electrical generators; 4) a grout-batch plant; 5) water handling and treatment; 6) materials storage; 7) shop facilities, and 8) other supporting facilities and equipment. Some of the equipment would be shared with other aspects of the project and/or retained for mine operations (pickup trucks, roadheader and fuel tanks). An evaluation of these combined efforts would be completed during the EIS.

Proposed Action: Construct temporary facilities to support SEM excavation through the SM zone and Cutoff Cell.

Portal and SEM Sections of the Decline Ramp Construction Water Management

Talon anticipates that water from the SM zone and Cutoff Cell would be considered construction stormwater and would be routed to the construction stormwater treatment system. The EIS data submission would clarify these requirements.

While the SM zone and Cutoff Cell would limit inflows during construction, the designs for the Portal and SEM sections of the Decline Ramp incorporate long-term water mitigation, because the overburden within the Cutoff Cell would slowly saturate once the construction is complete and dewatering has ended. While the primary function of spiles is to provide structural support, it would also offer early protection from groundwater inflows. As the SEM excavation advances, groundwater inflow would be minimized by applying a lining consisting of two passes of shotcrete to the back and ribs of the tunnel. When required, these would be separated by a waterproof membrane.

Proposed Action: Line the Decline Ramp walls with shotcrete to minimize groundwater inflow.

Bedrock Section of the Decline Ramp

Once the SEM Section of the Decline Ramp has been completed (which would take approximately 12 months), construction would proceed with the excavation of the Decline Ramp into bedrock. This section of the Decline Ramp would be built by drill-and-blast methods. The process of drilling, blasting and moving rock and equipment used closely resembles road and highway construction projects and surface and quarry mining operations. A detailed analysis of potential impacts from vibrations and air blasts will be provided for the EIS. This analysis will consider potential effects on fractures and faults, groundwater inflow, wetlands, mine infrastructure, existing drinking water wells, nearest residents and sensitive receptors.

Proposed Action: Construct the Decline Ramp into bedrock using drill-and-blast methods.

The railway spur and the Ore Transfer Building would be completed before bedrock excavation commenced. This setup would allow excavated rock to be transported within a fully enclosed system, loaded into gondola railcars and transported to the concentrators.

Some rock mass from the Bedrock Section of the Decline Ramp and development areas would be treated as ore since the material could be processed at the concentrators to extract associated mineral products (this material is not included in the mine's mineral reserve) or otherwise managed at the off-site concentrators. This rock would be brought to surface using an underground haul truck, directly into the Ore Transfer Building, loaded into a gondola railcar using a front-end loader, and transported to the off-site concentrators. The remaining rock mass from the Bedrock Section of the Decline Ramp and development would be treated as waste rock and used as backfill. The criteria for determining whether this material would be considered ore or waste rock would be provided in the EIS data submittal.

Proposed Action: Utilize some rock from the Bedrock Section of the Decline Ramp as backfill and send the rest to off-site processing plants as ore and/or construction material.

Construction of the Bedrock Section of the Decline Ramp would require several types of temporary facilities including a lay down area, office trailers, electrical generators, water management, construction supplies storage, shop facilities and other supporting equipment. Many of these facilities would be shared with the SEM and surface contractors. Water used for excavating (drilling, etc.) the Bedrock Section of the

Decline Ramp would be classified as Contact Water due to its contact with the waste rock and ore present in the underground mine.

Proposed Action: Construct temporary facilities to support construction of the Bedrock Section of the Decline Ramp.

Ventilation Raises

In addition to the Decline Ramp, two vent raises from the underground mine to the surface would be constructed for ventilation purposes; these are designated as Surface Raise #1 and Surface Raise #2, where the former would also serve as a secondary emergency egress route.

- Surface Raise #1 would be approximately 295 ft (90 m) deep, with a finished diameter of approximately 17-20 ft (5.2-6.1 m). It would be constructed using Raise Bore methods described in the Vertical Development Section. Traditional raise boring is a “bottom-up” excavation method, where a pilot hole is drilled in the first pass downward from the drill platform until it breaks through the bottom access. Once the pilot hole has broken through, a reamer head is attached to the bottom of the drill steel, and the reamer head is pulled up toward the drill platform until it breaks through to the surface bedrock. Depending on the finished diameter of the raise, this could require 2-3 passes. In this case, the raise bore machine would be situated on a surface pad around the raise collar. Consequently, except for establishing access to the raise bottom and removal of cuttings, all work would be conducted and managed at the surface. This includes:
 - The surface raise bore pad setup
 - Providing and managing services to the raise bore pad, including power, service water, water management, communications and roadway access
 - Removal of cuttings from the pilot hole
 - Installation of any necessary ground support, such as shotcrete or rock bolts, which would typically be applied from the top of the raise downward
- Surface Raise #2 would be approximately 1,000 ft (305 m) deep, with a finished diameter of approximately 17-20 ft (5.2-6.1 m). This raise would be constructed as a raise bore, using the method described in the Vertical Development Section and using similar requirements described for Surface Raise #1.

For further discussion of the project’s overall ventilation design, consult the Mine Ventilation Section. For further descriptions of the ventilation equipment, consult the Mine Ventilation- Fans, Heaters, and Wet Scrubber Section.

Proposed Action: Construct two surface raises, one for ventilation and the other for both ventilation and egress.

Temporary Services and Construction Laydown Area

Temporary services would be provided for the site support facilities erected at the Construction Laydown area. These temporary services would consist of water, electrical power and temporary washroom facilities.

Lake Country Power has indicated that a 2 MW temporary electrical construction connection would be available from the nearby power transmission line. This capacity would be directed to and connected with the temporary construction site power network for use during the construction phase.

429 *Proposed Action:* Construct temporary water, electrical and washroom facilities.

430 *Primary Mine Access/Egress*

431 All personnel, equipment, and supplies would enter and exit the mine via the Decline Ramp within the
432 Ore Transfer Building. Given that this section of the mine access would experience heavy traffic in addition
433 to serving as a primary ventilation intake, strict controls would be maintained to ensure that activities are
434 efficient and safe. All areas of the mine would be accessed through the same decline artery that would be
435 driven at a maximum grade of -15% and an average grade of -13%. The decline would terminate at the
436 bottom of the mine, approximately 2,000 vertical ft (609.6 m) below surface.

437 *Proposed Action:* Use the Portal to the Decline Ramp as the primary mine access and primary mine
438 egress.

439 *Secondary Mine Access/Egress*

440 A secondary mine egress network, which would serve as the secondary mine access in the case of a
441 blockage of the primary mine access and/or mine emergency, would be constructed in an independent
442 fresh air system (separate from the primary mine access). Surface Raise #1 would be collared east of the
443 Ore Transfer Building. Once underground, a network of dedicated fresh air lateral and vertical tunnels
444 would connect into each working area of mine. Raises within the secondary escape route, including
445 Surface Raise #1, would be equipped with permanent ladderways where the vertical length of the raise is
446 less than 300 ft (91.4 m) or a mechanical lifting device where the raise length is greater than 300 ft (91.4
447 m). While the full ventilation system for deeper parts of the mine plan may not be complete at the start
448 of production, dual independent means of egress would be completed prior to the first production blast
449 and the function of those vent drives and raises established at the start of production would be modified
450 to meet ongoing production requirements, if needed. In the case of a mine emergency, employees would
451 exit the mine via the primary mine egress unless it is unsafe to do so. If this were the case, miners would
452 exit via the secondary mine egress network once it is deemed safe to proceed.

453 *Proposed Action:* Construct a secondary mine egress network with an independent fresh air
454 system as a secondary mine access in case of emergency or blockage.

455 *Ore and Waste Rock Extraction*

456 Selection of mining method is dependent on several factors, which include but are not limited to resource
457 thickness and orientation, ground conditions, economics, sensitivity to dilution (planned or unplanned
458 low or zero grade material that is typically unavoidable, that gets mined as a consequence of its proximity
459 to desirable ore), recovery, grade, proximity to surface and geological features. Several conventional
460 methods for material extraction would be employed underground. These include:

- 461 1. Construction of the Bedrock Section of the Decline Ramp through means of drill-and-blast.
- 462 2. Mining of ore through Drift and Fill and Long Hole Stopping methods.
- 463 3. Vertical development, which is used primarily for ventilation and secondary egress, would be
464 completed by either traditional drill-and-blast raising or raise boring equipment.

Lateral Development

Drill-and-Blast Development

Underground development includes ore and waste development excavated laterally or vertically for the purpose of accessing ore zones and/or constructing infrastructure required to support mining activities. This category includes the Decline Ramp which would link level access tunnels, ventilation excavations to enable airflow, infrastructure excavations such as underground shops and pump stations and various miscellaneous excavations.

The majority of underground development would consist of horizontal or declined excavations ranging from approximately 15-25 ft (4.6-7.6 m) wide and 15-25 ft (4.6-7.6 m) high, with certain areas (such as maintenance shops) possibly requiring larger dimensions. The ventilation and escapeway systems would also require vertical development (raises), which may range from approximately 10-18 ft (3-5.5 m) in diameter and would be excavated using methods as described in the Vertical Development section.

Bedrock material (i.e., waste rock) generated by development activities during the construction phase would be shipped to the off-site concentrators. During mine commissioning, ramp up and full production, waste rock generated by development activities would be used as backfill feed or shipped to the off-site concentrators.

Inflows from groundwater, mining equipment, water sprays and underground services would be pumped from the underground mine to keep the workings dry. All water pumped from the mine workings will be routed to the Contact Water Treatment Plant for treatment.

The lower areas of the ore body would be accessed by constructing the Decline Ramp. The majority of underground development would occur during the first few years of mine life, concurrently with the early years of production. There would be a lesser residual amount of development activity continuing until the final year of mine life.

Underground development would also include various types of underground construction activities in addition to excavation work. These activities would extend through the first few years of mine life, even after production has begun. For a full list of these facilities, please consult the Support Facilities Section.

Drift and Fill Mining

Drift-and-fill mining would be the preferred method where the ore body thickness and orientation are not easily amenable to bulk mining methods and where the ore body orientation and host rock surrounding the ore body render them highly sensitive to dilution. The geometry of the ore body in these areas is highly variable, ranging in thickness from approximately 6-30 ft (1.8-9.1 m) and dip on an average angle of approximately 23 degrees downward from North to South. Use of drift-and-fill mining enables the mining excavations to closely fit the ore geometry and minimize dilution. This approach is an important environmental and economic consideration since ore would be transported to the out-of-state processing facilities located in Mercer County, North Dakota, and Marquette County, Michigan.

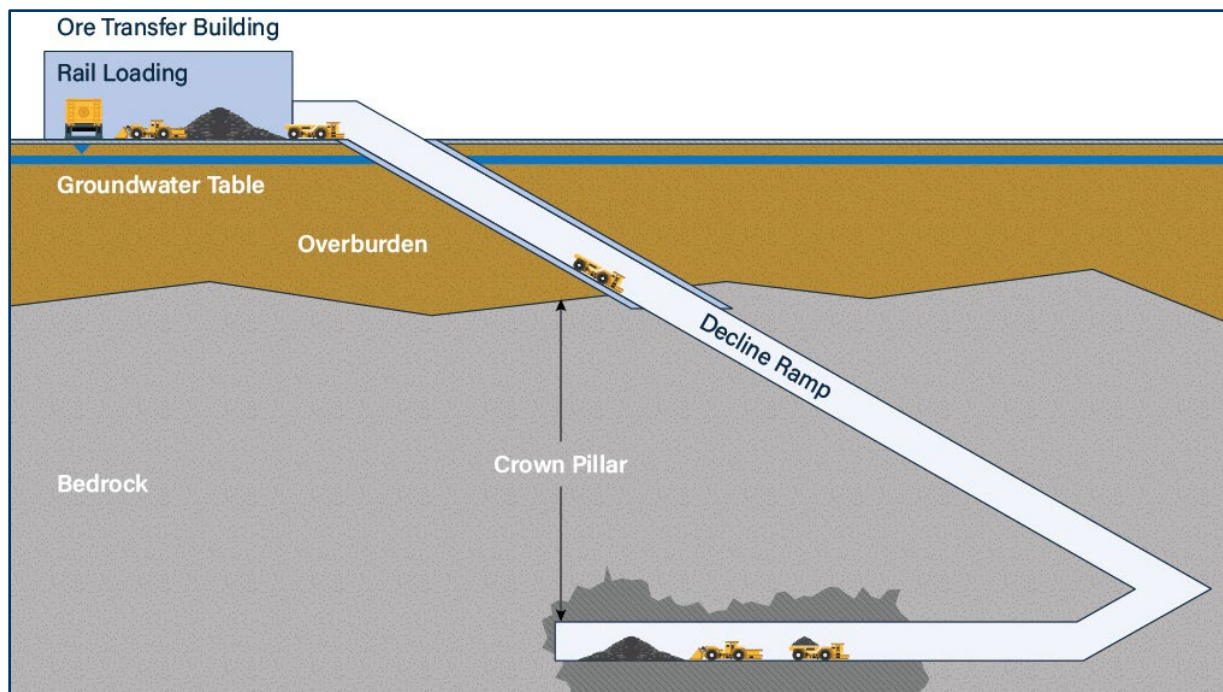
Proposed Action: Conduct drift-and-fill mining in areas not easily amenable to bulk mining methods.

Drift-and-fill development would be driven in a square profile (drift) up to 22 ft (6.7 m) wide and from 13-18 ft (4.0-5.5 m) high, using temporary support (friction bolts and screen). Development would advance

from the access drift across the full width of the ore body. Once the full cut has been excavated backfill would be placed in the drift, allowed to cure, and then subsequent cuts would be excavated per the mine sequence. In areas where the ore geometry is wider than a single drift, multiple drifts at the same elevation could be utilized, with the first being backfilled prior to beginning the second. Similarly, where the ore geometry is too thick to enable full recovery within the height of a single drift plus bench (a vertical cut into the floor from the main drive), multiple drifts at different elevations would be utilized, with the first being backfilled prior to beginning the second. Drift-and-fill zones would be developed using primary/secondary sequencing, meaning that a series of primary cuts (cuts that are in virgin ground and are not exposed to fill material adjacent to them), would be mined first in ground that is not adjacent to the fill material. After the primary cuts are backfilled, secondary cuts may be mined adjacent to the backfilled primary cuts. An illustration of the facility's rock transportation cycle is shown below in Graphic 6-7.

Proposed Action: Conduct primary/secondary sequencing of drift-and-fill mining in the ore body.

Graphic 6-7 Simplified Illustration of Rock Transportation Method from the Face to the Surface (Not to Scale)



Drift and Fill Mining Cycle

Development and drift-and-fill mining would follow nearly identical mining cycles, highlighted below in Graphic 6-8.

Graphic 6-8 Drift-and-fill Mining Cycle (Not to Scale)

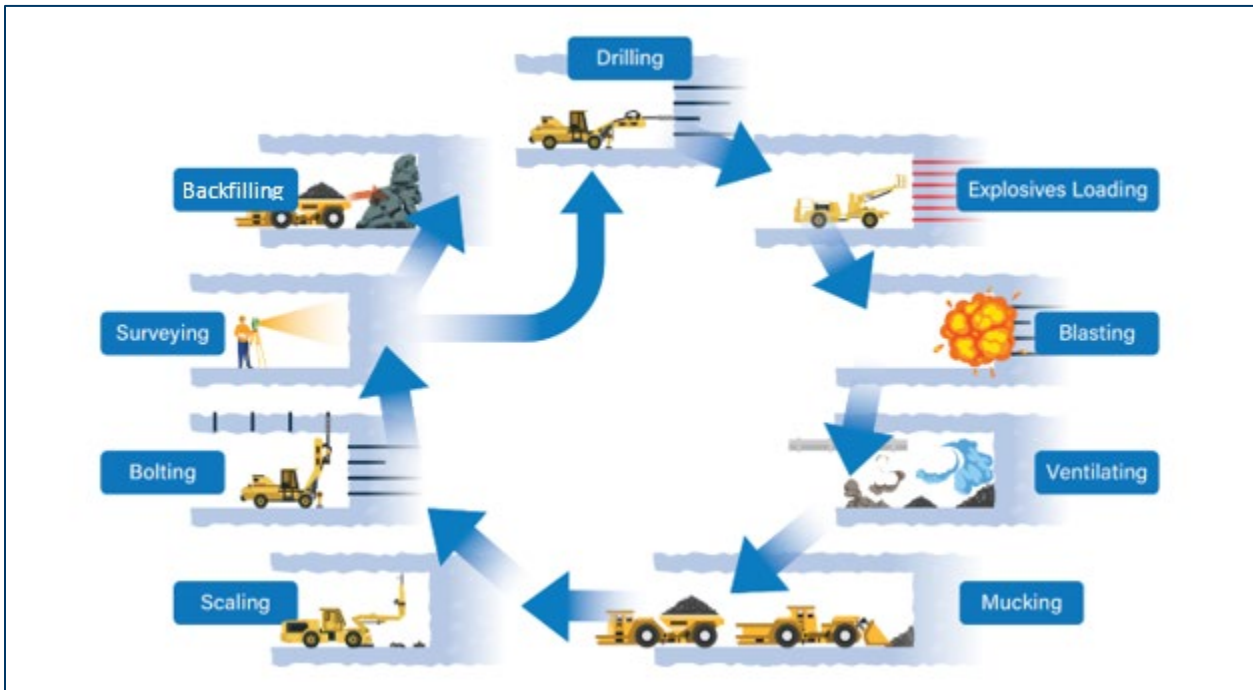


Image Credit: Inspired by Sandvik (Heiniö, 1999)

- Drilling – Lateral holes that are typically around 1.75–2 inches (4.4-5.1 cm) in diameter are drilled into the rock face using a “Jumbo” drill, which typically has 2 drill booms that operate simultaneously. Typical drill penetration into the rock is approximately 10-16 ft (3.0-4.9 m) per blasted round depending on the design requirements and ground conditions. In some headings, longer “probe holes” would also be drilled in advance of development along the same azimuth of the mine heading to check for geotechnical and groundwater conditions.
- Loading – The drill holes would be loaded with explosives, consisting of a water-resistant emulsion composed of ammonium nitrate dispersed within a fuel phase. Two forms of emulsion would be used: packaged “boosters,” which connect directly to the detonators and help initiate the blast, and bulk emulsion, which would be pumped into the holes in front of the detonator to the collar of the hole.
- Blasting – Detonation of the explosives would be done from a central blasting location. This would typically be done from surface, using an electronic control system and would occur at set times (typically during shift changes). All personnel must be out of the mine and accounted for prior to any blast.
- Ventilating – Workers are not permitted to re-enter the mine until blast fumes have cleared the underground workings. For this reason, fans and ducting are used to remove dust and blasting gases such as carbon monoxide (CO) and nitrogen dioxide (NO₂) from the immediate area, and the primary mine ventilation system would then convey the gases to the mine exhaust circuit. Prior to release, the exhaust air would undergo a filtration or scrubbing process to reduce the amount of suspended dust and particulates.
- Removing Dislodged Material (Mucking) – The broken rock is then removed using a load haul-dump, or loader (LHD). It would be loaded directly into a haul truck for transport to surface or

placed in a nearby storage bay if no haul truck is available.

- Scaling – Any loose or unstable pieces of rock attached to the tunnel back or ribs would be removed using a pneumatic rock pick, water cannon and/or a hand-held scaling bar prior to the installation of ground support.
- Bolting – Rock support systems are installed in the blasted area to ensure long term stability of the excavation. Steel bolts typically between 6-8 ft (1.8–2.4 m) in length are installed in a regular grid pattern in the back and ribs, spaced 3-5 ft (0.9-1.5 m) apart. Wire mesh is also installed to catch any smaller rocks located between the bolts. Multiple types of bolts could be used, including “friction bolts” (with steel directly in contact with the rock) or grouted/tensioned bolts (where a rebar or cable is grouted to the rock using a cementitious or resin grout and tensioned by active or passive means through the installation of a bolt and plate that is placed in contact with the rock face along the perimeter of the excavation). Bolts could be made of galvanized steel where corrosion resistance is required. During this phase, shotcrete could also be applied to the back and ribs, as necessary.
- Surveying – The area is surveyed to document the extents of the area excavated by the blast, and to align the drill in the proper direction for the next set of blast holes.
- Backfill – In the case where drift-and-fill-mining would require backfill, ground support would be employed. Sized aggregate sourced from waste rock and/or local quarries could be mixed with a binder in the case of Cemented Rock Fill (CRF) and placed into the mined-out voids. Aggregate would be sized and mixed in a batch plant on the surface. The final product would be loaded into haul trucks and transported to the mined-out heading. The backfill would be subsequently pushed into the stope using a flat jamming plate mounted to an LHD, and rock would be tight filled from floor to back. The CRF mix would be sufficiently thick to remain in place during the jamming process.

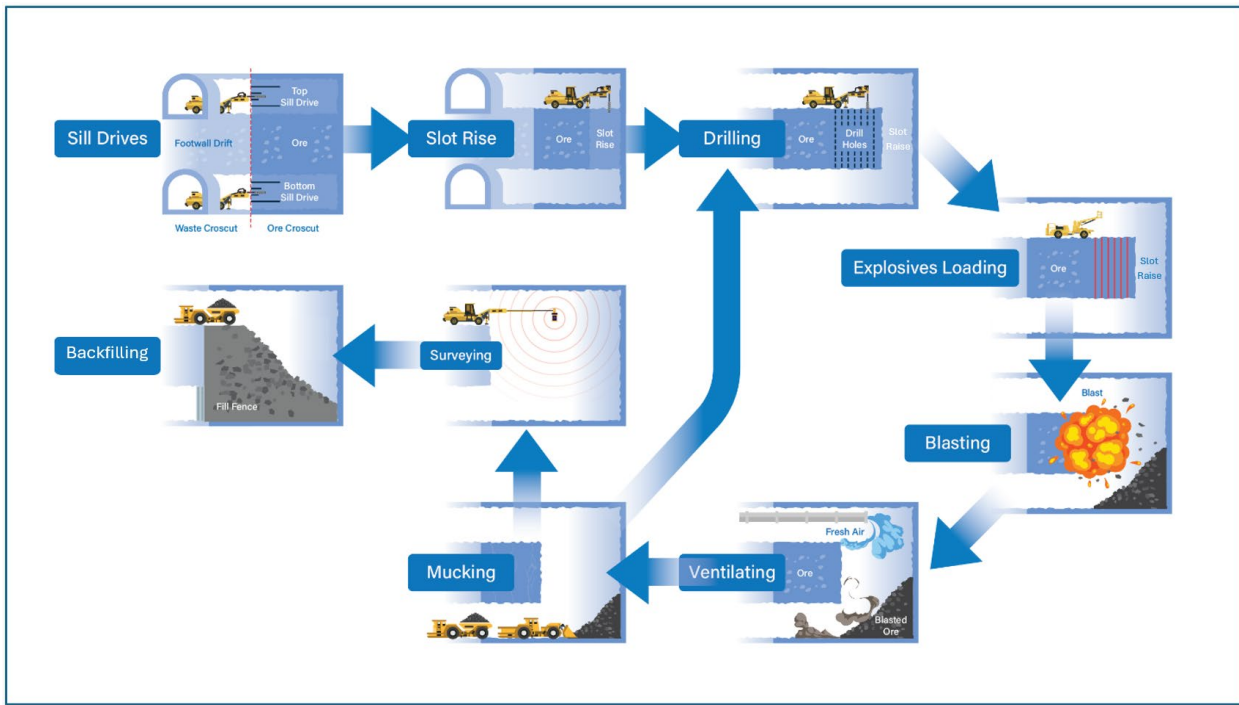
Longhole Stoping

Bulk mining would be used where the ore body geometry is more massive and vertically oriented. Bulk mining would be done using a longhole stoping method, which consists of a top and bottom access and the ore between the two levels. Stopes are drilled and blasted from the top level and subsequently mucked from the bottom. A typical longhole stope (Graphic 6-9) would be approximately 50 ft (15.2 m) wide by 100 ft (30.5 m) long by 100 ft (30.5 m) high; however, each stope is modeled independently and can vary in size and/or shape depending on a number of conditions including, but not limited to:

- Ore body geometry
- Geotechnical and hydrogeological considerations
- Proximity to backfill
- Grade
- Sensitivity to dilution
- Mining sequence

Proposed Action: Conduct bulk mining using a longhole stoping method.

Graphic 6-9 The Longhole Stoping Mining Cycle (Not to Scale)



Longhole Stopping Mining Cycle

Major elements of the longhole stopping method are described below.

- Sill Drifts – Longhole stopes require access to the top and bottom extents of the stope, commonly referred to as “sill drifts.” The top sill is used for drilling and blasting, whereas the bottom sill is used for mucking. These drifts are typically driven wider than the main stope access drives to maximize working space and improve ore recovery. Sill drives are, therefore, often driven in two passes: the first being similar to a typical lateral development (described above), and the second pass being a “slash” cut, to widen the drift, with drilling and blasting perpendicular to the direction of the sill drift.
- Slot Raise – A large vertical hole is excavated from within the stope to create void space or a free face for blasted rock to blast into. This raise is drilled from the top sill downward until it breaks through the bottom sill drift. The cut is then blasted bottom-up. The size of this raise can vary depending on the location and purpose.
- Drilling – Vertical holes are then drilled into the floor using either a Top Hammer (also known as “longhole”) drill or an ITH (In-the-hole) drill that typically has 1 drill boom. Drill holes would be approximately 85-135 ft (25.9-41.1 m) in length (the portion of the stope that is mined is the total height of the stope, less the excavated height of the bottom sill drift). The actual height of each stope would vary depending on the shape of the deposit and design considerations.
- Loading – The drill holes would be pumped with bulk emulsion from the top sill. The base of the holes would typically be loaded with packaged emulsion gel cartridges (boosters) which, similar to development mining, connect directly to the detonators to help initiate the blast. The stope is typically blasted in 2-4 vertical blasts from the end furthest away from the stope access to the front of the stope.

- Blasting – Detonation of the explosives would be done from a central blasting location. This would typically be done from surface, using a central electronic control system and would occur at set times (typically during shift changes). All personnel would be out of the mine and accounted for prior to any blast.
- Ventilating – Workers are not permitted to re-enter the mine until blast fumes have cleared the underground workings. For this reason, fans and ducting would be used to remove dust and blasting gases such as CO and NO₂ from the immediate area. The primary mine ventilation system would then convey the gases to the mine exhaust circuit. Prior to release into the environment, the exhaust air would pass through an engineered emissions control device to reduce the amount of particulate matter.
- Removing Dislodged Material (Mucking) – The broken rock would then be removed remotely using an LHD from the bottom sill. This work would be done by remote operation (the operator typically works from an elevated stand under supported ground, typically in the crosscut drive, where they have a line-of-sight view of the LHD). The mucked material would be either loaded directly into a haul truck for transport to surface or placed in a nearby storage bay if no haul truck is available.
- Surveying – Once the stope has been mined-out, the area would be surveyed with a cavity monitoring system (CMS), which is a scanner that typically uses LIDAR technology. The scanner would be attached to either a long boom that extends into the stope, or a drone, to measure the extent of the excavated area, determine the amount of fill that would be required, and plan subsequent stopes.
- Backfill – Stopes would be backfilled with sized aggregate, sourced from waste rock and/or externally sourced quarries, which could be mixed with a binder for CRF and placed into the mined-out voids. The recipe for the CRF application would be sufficiently fluid to self-place and fill the voids. A fill fence, constructed by placing aggregate at the stope access and subsequently shotcreted to create a barrier wall in the bottom sill would mitigate spillage of water and/or fill material from the bottom sill. Aggregate would be mixed using a batch plant on surface. The final product of CRF or uncemented rockfill would be loaded into haul trucks and transported to the mined-out stope. Backfill would be placed into the stope from the top sill drift until the stope is filled up to the floor level of the top sill. The top sill would then be used as the bottom sill of the stope directly above it or filled similar to drift-and-fill drifts, as described above.

Vertical Development

Vertical development would be required for ventilation, stope slot raises, secondary egress, and any boreholes for mine services. Vertical development would be completed by means of a drop raise (or longhole raise), which employs drill-and-blast methods or by mechanical boring methods (raise bore). Talon does not plan to use conventional hoist/lift-powered raising equipment (e.g., Alimak), where raises are developed bottom-up using hand-held equipment, as this method would require miners to work directly in the raise, underneath unsupported ground.

Proposed Action: Construct ventilation, stope slot raises, secondary egress and boreholes using drop raise or raise bore methods.

Drop Raise

Drop raises would be used to construct the stope slot raises, short connections between levels, and/or where a raise bore is either not available or needed. A drop raise is a type of vertical development that is

655 mined from a top level, using conventional drills to drill into a level below it. It is then blasted from the
656 bottom of the raise upwards in a series of lifts until it breaks through the top level. This methodology
657 typically does not yield a smooth profile, which can reduce ventilation flow due to turbulence and
658 resistance created by the uneven surface.

659 *Proposed Action:* Use drop raises to construct the stope slot raises, connections between levels,
660 and where raise bores are not available or needed.

661 **Raise Bore**

662 Raise bores would be the preferred method of developing ventilation raises. The Project would have two
663 bored raises that would originate from surface, which would both be developed conventionally (bottom-
664 up). The underground raises would also be driven conventionally.

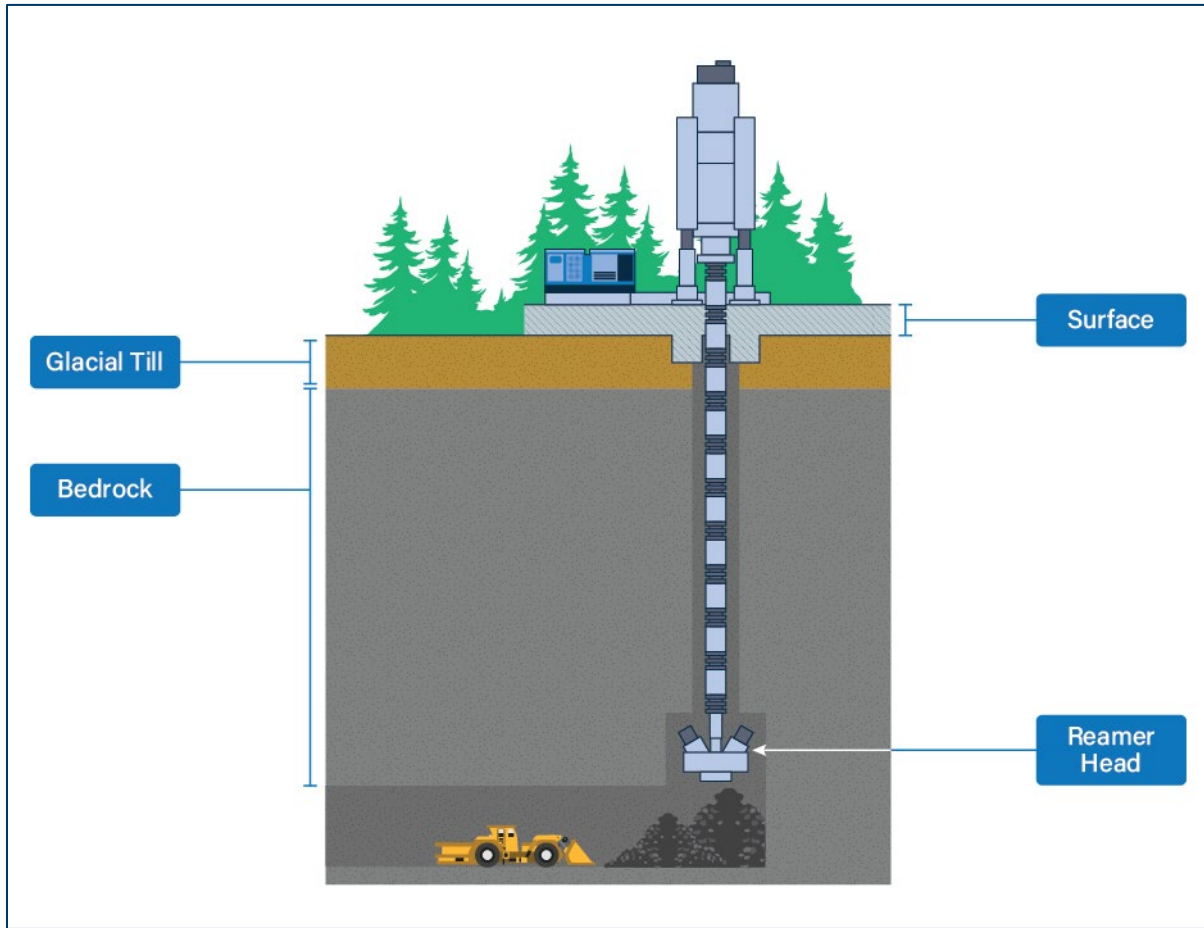
665 *Proposed Action:* Use raise bore method to develop ventilation raises.

666 A raise bore is a type of vertical development driven by a boring machine that is stationed on a drill
667 platform on the top collar of the hole (Graphic 6-10). A pilot hole drills a first pass downward from the
668 drill platform until it breaks through the bottom access. Once the pilot hole has broken through, a reamer
669 head is attached to the bottom of the drill steel and the reamer head is pulled upward towards the drill
670 platform until it breaks through to surface. Depending on the finished diameter of the raise, this could
671 require 2-3 passes. The waste rock is collected at the bottom using an LHD and loaded into haul trucks.
672 The perimeter of the raise's overburden section would be supported by a structural lining.

673 It is anticipated that most of the raises would be vertical and be between 10-20 ft (3-6.1 m) in diameter
674 and all raises that are required for ventilation and emergency escape that are longer than 80 ft (24.5 m)
675 would be constructed using a traditional raise bore machine.

676 *Proposed Action:* Use a traditional raise bore machine to develop raises longer than 80 feet,
677 including the surface raises.

Graphic 6-10 Raise Bore (Not to scale)



Underground Backfill

The bedrock material generated by development activities would be ore or waste rock. Some of the waste rock generated by this activity would be utilized for underground backfill.

After ore extraction in a drift is complete, the excavation could be backfilled using CRF or uncemented rock fill. CRF would be produced in a Concrete Backfill Batch Plant (backfill plant) within the Ore Transfer Building and transported to the underground mine by haul trucks.

Proposed Action: Backfill excavated sites with CRF or uncemented rock fill where appropriate.

The shallowest planned ore mining is located approximately 300 ft (91.4 m) below surface, leaving a “crown pillar” (distance between the shallowest orebody excavation and the bedrock surface) of approximately 200 ft (61 m) of bedrock plus approximately 100 ft (30.5 m) of overburden. Numerical and empirical analysis of these planned excavations indicates crown pillar deflection would be negligible; thus, surface subsidence is not expected. Additional subsidence analysis and supporting data would be incorporated into the EIS data submission.

Proposed Action: Begin mining at 300 ft below the surface, leaving a crown pillar of bedrock that is covered by overburden.

Current modeling indicates that the coarse-grained orthocumulate (CGO) East and West zones have sufficient structural integrity that backfill would not always be required. Similarly, the massive sulfide unit (MSU), semi-massive sulfide unit (SMSU) and 138 (net textured sulfide mineralization) zones would require some stopes to be backfilled, however, there would be opportunities in the secondary stopes to either partially fill, or use uncemented rock fill, given the sufficient structural integrity of this area. The fill requirements would be further evaluated and detail would be provided in the EIS data submittal.

Preliminary estimates are that approximately 4-7 million tons (3.6-6.4 million tonnes) of backfill would be required; this is a conservative estimate. Of this, approximately 0.8-2.8 million tons (0.7-2.5 million tonnes) would be supplied by waste rock, which would account for a portion of the requirements. Eventually externally sourced materials would be required to satisfy backfill requirements once the Decline Ramp is completed and mine development tapers off. Aggregate from external sources would be needed starting in the third year of mine production.

Proposed Action: Utilize CRF created from waste rock and externally sourced materials to backfill stopes as necessary for structural integrity.

Cemented Rock Fill

The CRF recipe would be composed of a binder, such as cement, waste rock/externally sourced aggregate, and admixtures needed to help set the concrete (which may include stabilizers, retardants or accelerants). Admixtures may be required depending on factors that may include time from the batch plant to placement, recipe and climate. Varying proportions of binder would be added depending on the strength requirement of the area to be backfilled. Typical binder additions would be in the range of 3% to 10% by weight. Final addition rates would be determined during operation based on onsite strength tests. No tailings would be used as backfill during mine operations.

Water proportions would range from 2% to 5% of the CRF volume. Water for CRF production would typically be sourced from the Contact Water Treatment Plant, though additional water could sometimes be sourced from a well or potentially the stormwater management system. Water used for CRF production would be suitable for concrete mixing and consistent with standard industry practices for hydraulic cement concrete. Potable water may be used without additional qualification, while non-potable water sources may be used if they do not negatively affect concrete performance such as strength, development, or setting.

At this stage, water for CRF production is anticipated to be sourced from groundwater (e.g., well water) and/or treated water from the Contact Water Treatment Plant. These sources are commonly used in concrete production and would be suitable for CRF production based on performance considerations rather than prescriptive chemical thresholds.

The CRF would provide structural support for the subsequently mined drifts that would be located directly alongside or above the previous drift once the backfill has cured (i.e., hardened). At full production, several active areas would be in the mining and backfill phases simultaneously. After being deposited into the backfill area by a haul truck, the CRF would be pushed forward to the end of the excavation by an LHD with a jammer plate attachment.

733 *Proposed Action:* Utilize CRF to backfill drifts from ore extraction.

734 *Proposed Action:* Create CRF using binder such as cement, crushed rock, water and add-ins like
735 stabilizers and accelerants.

736 *Mine Ventilation*

737 Underground ventilation would be facilitated through the Portal-Decline Ramp, Surface Raise #1, and
738 Surface Raise #2, all of which would connect to the atmosphere at the surface. The function of the Portal
739 and raises would vary during the construction phase, but upon completion of the permanent vent circuit,
740 the following ventilation concept would exist:

- 741 • Portal – fresh air intake and primary mine access/egress.
- 742 • Surface Raise #1 – fresh air intake and secondary mine egress
- 743 • Surface Raise #2 – dedicated exhaust air, no personnel access

744 The ventilation system is designed as a "push-pull" system, featuring both fresh air and return surface fan
745 installations. The mine would utilize propane-fired heaters located near the portal and intake raise
746 (Surface Raise #1) if required (further heat modeling to be completed to support the EIS would finalize
747 the heating requirements). During colder months, intake air would be heated to approximately 41°F (5°C)
748 to prevent roadways and services from freezing during winter months. The mine ventilation air would be
749 marginally warmer at depth due to a combination of thermal gradient, air resistance caused by pulling air
750 over distance and utilization of mine equipment underground. Ventilation air would be drawn into the
751 Portal and Surface Raise #1 to ventilate the workings down to the bottom of the mine. Fresh air would
752 sweep across each of the levels and be channeled into the exhaust system, which would comprise a series
753 of raises and transfer drifts that would terminate in the main exhaust raise. As the main exhaust raise,
754 Surface Raise #2 would be equipped with a scrubber system to remove dust and diesel particulate matter
755 (DPM), before exhausting the air.

756 *Proposed Action:* Utilize propane heaters near the portal and Surface Raise #1 to heat cold air
757 brought in from outside to prevent freezing during winter months.

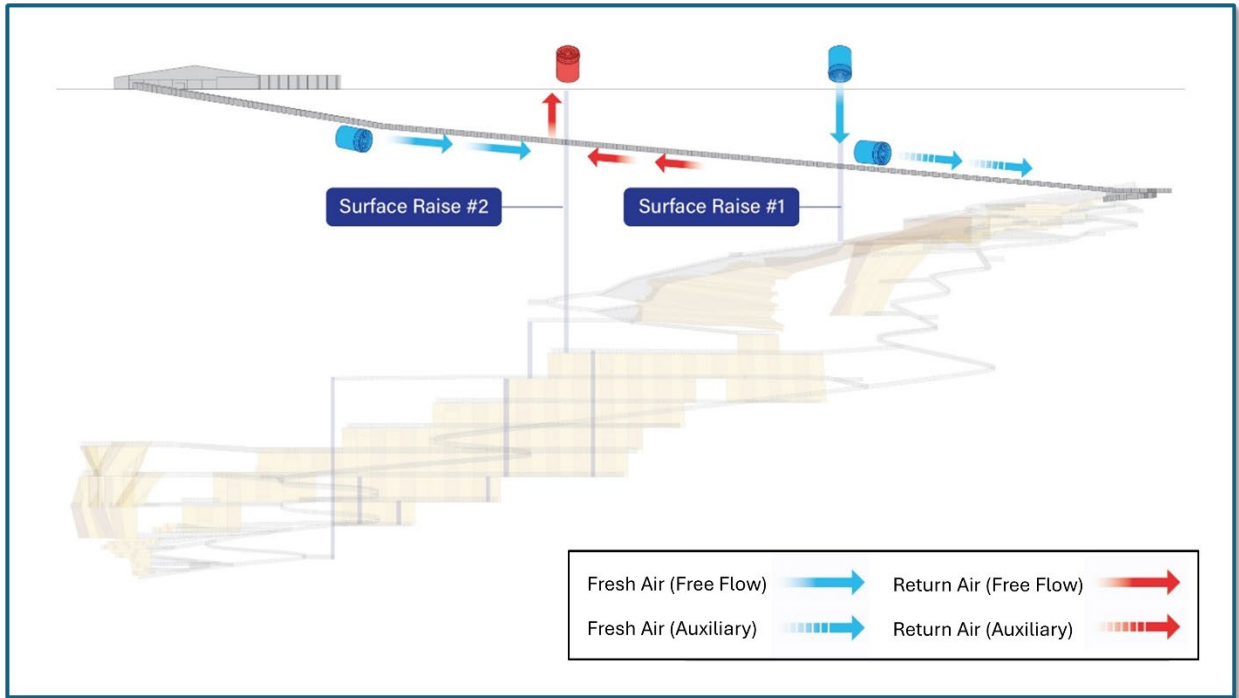
758 *Proposed Action:* Draw in ventilation air through the Portal and Surface Raise #1 to ventilate
759 workings down to the bottom of the mine.

760 *Proposed Action:* Construct an exhaust system of raises and drifts that lead to a main exhaust raise
761 to be treated by a scrubber system before exhausting.

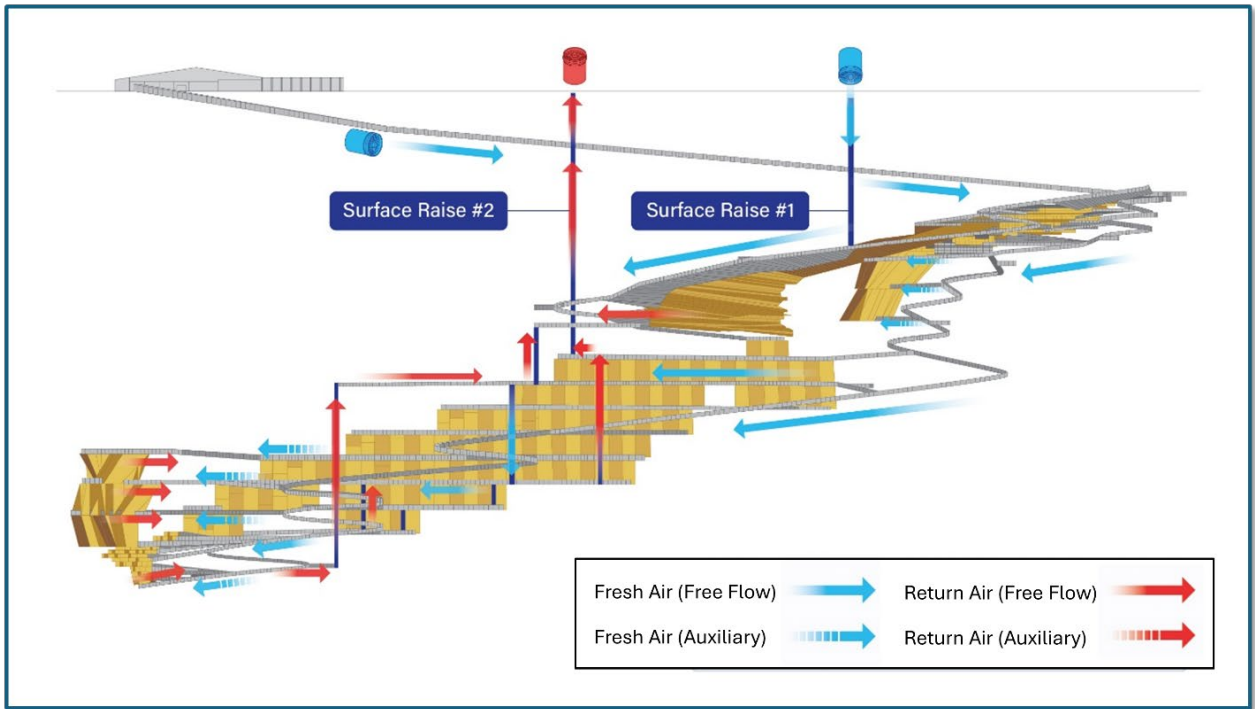
762 As the mine advances, additional underground fans, including booster fans, will be utilized to maintain air
763 velocity underground. Level (or "stope") fans would be required to force air from the main ventilation
764 circuit into each active heading where people and/or equipment would be present (Graphic 6-11 and
765 Graphic 6-12). Generally, level fans are connected to flexible vent ducting that is placed in the main vent
766 circuit. Air is pulled from this circuit and directed to the active area. Exhaust air then naturally flows back
767 to the main vent circuit.

768 *Proposed Action:* Utilize underground fans and level fans to maintain underground ventilation and
769 air flow.

Graphic 6-11 Ventilation during the construction phase (Note the final design for the excavation would include maintenance bays and other small facilities that are not depicted in this image) (Not to Scale)



Graphic 6-12 Ventilation during the Operational Phase (Not to Scale)



776 *Note: when tunnel appears to have bidirectional ventilation, fresh air would be ducted to the face and*
777 *exhausted back out via the same excavation.*

778 Ventilation on Demand (VOD) is a strategy that has been adopted by mines in recent years. VOD is an
779 operational strategy whereby a series of fans and regulators are controlled to minimize air flow in non-
780 working areas and to better manage air flow in the event of an emergency. The ventilation system would
781 be designed to meet overall ventilation requirements, ensuring compliance with Mine Safety and Health
782 Administration (MSHA) standards even without VOD. A global ventilation management strategy would be
783 evaluated in future studies to assess how these controls could be integrated operationally and to explore
784 potential opportunities for enhanced efficiency.

785 *Proposed Action:* Utilize Ventilation on Demand to control airflow and ensure compliance with
786 MSHA standards.

787 *Explosives Storage and Use*

788 In compliance with MSHA regulations, bulk explosives and detonators would be stored in separate
789 magazines at least 25 ft (7.6 m) apart. The magazines would be constructed in separate excavated
790 chambers, sealed with fire rated doors and locked when not attended by trained personnel. These
791 excavations would be among the first to be developed in bedrock along the main Decline Ramp. During
792 the short period while drill-and-blast excavation of these magazines is ongoing, the necessary explosives
793 would be delivered to site and utilized the same day to avoid the need for a temporary surface explosive
794 storage facility.

795 *Proposed Action:* Store explosives and detonators in excavated chambers and in compliance with
796 MSHA.

797 *Mobile Equipment*

798 A diesel equipment fleet has been assumed as the basis for both mine development and operations. Talon
799 reports it would continue to evaluate the adoption of battery electric vehicles (BEV) technology, and in
800 the meantime intends to avoid design choices that could hinder a future transition to BEV.

801 *Proposed Action:* Purchase a diesel equipment fleet for mine development and operations.

802 The underground fleet purchased for mine construction would continue to be used during mine
803 production, and equipment would be sourced from as few vendors as possible to optimize maintenance
804 capabilities and minimize the number of spares. Heavy equipment, including haul trucks and LHDs, would
805 be rebuilt approximately every three years and replaced every 5-6 years, whereas service and light duty
806 equipment would be rebuilt approximately every 5 years and would not require replacing given the
807 planned mine life. No rebuilds would take place in the last 2 years of production and no replacements
808 would be required within the last 4 years. When equipment is scheduled to be replaced toward the end
809 of production, the equipment would instead undergo a subsequent rebuild or sufficient maintenance to
810 keep it operational until the end of mine life. Table 6-3 summarizes the anticipated fleet and quantities of
811 each equipment type during production.

812 *Proposed Action:* Rebuild and replace heavy and light equipment on regularly set schedules
813 throughout the life of the Project.

814 **Table 6-3 Preliminary Underground Vehicle Fleet by Year**

Equipment	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9
Haul Trucks	2	5	9	9	9	9	9	8	
LHD	3	5	9	9	9	9	9	7	
Jumbo	3	3	3	2	2	2	2	1	
Production Drill	1	2	3	3	4	4	4		
Bolter	4	6	6	5	5	2	2	2	
Emulsion Loader	2	2	2	2	2	2	2	2	
Scissor Lift	3	3	3	2	2	2	2	1	
Shotcrete Sprayer	1	1	1	1	1	1	1	1	
Transmixer	2	2	2	2	2	1	1	1	
Telehandler	1	1	1	1	1	1	1	1	
Road Grader	1	1	1	1	1	1	1	1	
Boom Truck (supplies Handling)	2	2	2	2	2	2	2	2	
Personnel Carriers - for UG Laborers	1	3	3	3	2	2	2	2	
Light Vehicles (i.e., Pickup)	7	11	11	11	11	11	11	11	11
Fuel Truck	1	1	1	1	1	1	1	1	
Maintenance Vehicle	1	2	2	2	2	2	2	2	
Exploration Drill	1	2	2	2	2	2	2	2	
Backhoe	1	1	1	1	1	1	1	1	
Water Truck	1	1	1	1	1	1	1	1	
Mine Rescue Vehicle	1	1	1	1	1	1	1	1	
Total Fleet Count	39	55	64	61	61	57	57	48	11

815 Several surface-based vehicles would be used primarily inside the Ore Transfer Building to manage the
816 handling of ore and waste rock as they are delivered to the building from underground (Table 6-4). These
817 vehicles would include: wheeled front-end loaders; skid steer loaders; manlift; forklifts; and a railcar
818 mover to shunt the gondola railcars in and out of the Ore Transfer Building. Apart from the railcar mover,
819 wheeled front-end loader and warehouse forklift, all vehicles would remain confined to the inside of the
820 Ore Transfer Building to prevent contamination of the ground outside the building.

When necessary, vehicles would only exit the building through the vehicle wash bay where high pressure water hoses would be used to remove ore/waste rock residue from the tires and body before the vehicle would exit the building.

Proposed Action: Keep most surface-based vehicles inside the Ore Transfer Building to prevent contamination outside of the building.

Proposed Action: Wash vehicles exiting the Ore Transfer Building in the vehicle wash bay.

Table 6-4 Preliminary Surface Vehicle Fleet by Year

Equipment	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9
Front Wheel Loader	3	3	3	3	3	3	3	3	
Railcar mover	1	1	1	1	1	1	1	1	
Forklift	2	2	2	2	2	2	2	2	
Skid Steer Loader	1	1	1	1	1	1	1	1	
Manlift	1	1	1	1	1	1	1	1	
Light Vehicles (i.e. pickup)	2	2	2	2	2	2	2	2	
Total Fleet Count	10	10	10	10	10	10	10	10	

Mine Production

Mine production would start within 18-24 months after the start of construction. First ore, which is the first batch of economically valuable mineralized rock, is contingent on completion of one of the raises to surface; this is because MSHA regulations require a secondary mine egress prior to first ore production. First ore would be initiated in the CGO East and West zones, after the completion of Surface Raise #2. Once the MSU/SMSU zones have been reached, production would prioritize these higher-grade zones. Overall production is expected to reach steady-state mining in approximately an additional 24 months at an average rate of approximately 3,968 tons (3,600 tonnes) per day or 1.45 million tons (1.31 million tonnes) ore per year. Steady-state mining is expected to be maintained over a period of approximately 6-7 years and then taper off over approximately 12 months, yielding approximately 7-10 years of production with a total yield of approximately 10.5 million tons (9.5 million tonnes).

Proposed Action: Complete one of the ventilation raises to provide secondary mine egress prior to first ore production.

Proposed Action: Begin mine production in the CGO East and West zones within 18-24 months after the start of construction.

Proposed Action: Mine for approximately 7-10 years to yield approximately 10.5 million tons of ore.

Ore Transfer Building

The Ore Transfer Building would connect to the Portal section of the Decline Ramp to ensure that ore and waste rock would be hauled to the surface and into the building without being exposed to precipitation or wind.

The building would be sized to include three major buffer areas: a rail loading buffer area that could hold 13,227 tons (12,000 tonnes) of mined material; an ore buffer area that could hold 11,023 tons (10,000 tonnes) of ore; and an area that could hold 5,511 tons (5,000 tonnes) of waste rock that would be used for backfill or transported to the concentrators. Other sizing factors would include minimum turning radiuses of vehicles, space for six rail cars within the rail loadout, the provision for two refueling bays, 3 heavy vehicle maintenance bays, 3 light vehicle maintenance bays, an emergency vehicle bay and a vehicle wash bay. Lubricants and coolants would be stored within a dedicated area within the vehicle maintenance area. The building will occupy 173,654 ft² (16,133 m²). Overall, the building would contain the following:

- Ore buffer area
- Material conveyors, including a tramp metal removal system
- Crushers to reduce the top size of ore and waste rock
- Waste rock buffer area
- Concrete Backfill Batch Plant with cement silo and aggregate feed system
- Rail loadout area
- Service areas including:
 - Vehicle Maintenance Workshop
 - Warehouse
 - Wash Bay
 - Refueling Bays
 - Emergency Vehicle Bay

Proposed Action: Construct an Ore Transfer Building that connects to the Portal Section of the Decline Ramp to enclose all mined material handling activity at the surface.

Overburden, Waste Rock, and Backfill

The Project would manage materials such as:

- Overburden excavated during construction of the surface facilities, and portions of the Decline Ramp
- Bedrock excavated during the construction of the Decline Ramp and development of the mine
- Commercial aggregate
- Fines (small particles) collected from underground settling sumps

All bedrock hauled to the surface would remain inside the Ore Transfer Building throughout its handling and preparation for rail transport or use as backfill material. Waste rock would be sized and then mixed with cement within the Ore Transfer Building to create backfill material that would be 'backhauled' into the mine by the haul trucks on their return. As necessary, externally sourced aggregate would be conveyed into the Ore Transfer Building for addition to the backfill preparation system to overcome any shortfall of waste rock to meet the mine's backfill requirements in support of a safe and efficient mining operation.

885 Any waste rock that exceeds the storage capacity of the Ore Transfer building would be shipped to the
886 out-of-state concentrator facilities. Approximately 0.8 million tons (0.7 million tonnes) to 1.7 million tons
887 (1.5 million tonnes) of waste rock would be transported out of state for processing or management. The
888 final quantity would depend on the results of the material characterization program and final material
889 management criteria.

890 *Proposed Action:* Haul bedrock and store in the Ore Transfer Building until it exits by rail or is used
891 for backfill.

892 *Proposed Action:* Bring outsourced aggregate into the Ore Transfer Building for backfill as needed.

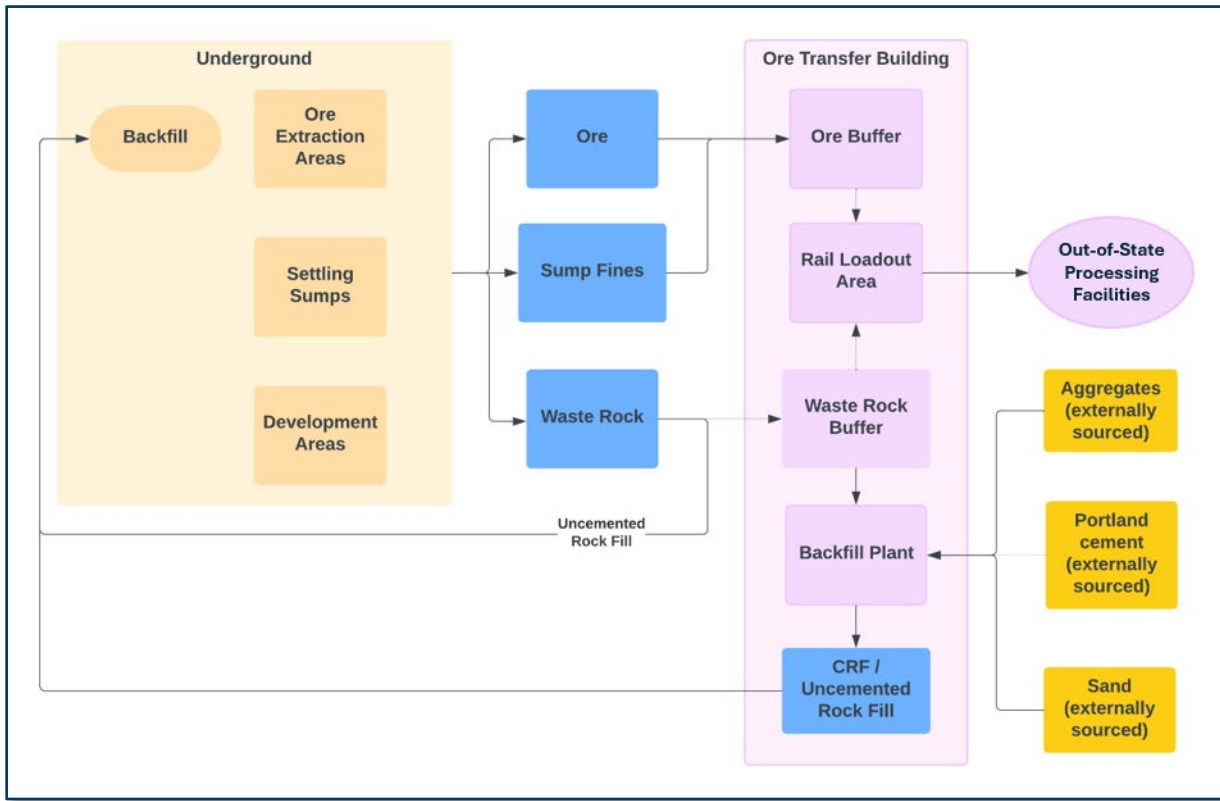
893 *Proposed Action:* Send waste rock in excess of the Ore Transfer Building's storage capacity to the
894 out-of-state concentrators.

895 A materials characterization program is in progress that includes a suite of static, kinetic and mineralogical
896 analyses on the geologic materials that would be moved during mining. These materials include
897 overburden, waste rock, CRF and ore. The geochemical data from this program would be used to support
898 materials management. Graphic 6-13 depicts the flow of materials between the underground and the
899 surface.

900 *Proposed Action:* Conduct a materials characterization program to analyze materials from mine
901 operations.

902 Overburden excavated during construction of surface facilities such as SM areas and surface raises would
903 be transported off-site to an appropriately licensed landfill.

Graphic 6-13 Flowchart of Material Transfer between Surface and Underground



Materials Management

The Decline Ramp’s construction through the bedrock would generate ore and waste rock. This rock would be managed in the Ore Transfer Building and shipped via rail to the off-site concentrators.

Once the mine is fully constructed and operations have begun, waste rock would be used to produce CRF and uncemented rockfill or transported to processing facilities in Mercer County, North Dakota, and Marquette County, Michigan.

On days when the waste rock buffer is depleted, externally sourced commercial material would be needed for backfilling. Material would be sourced from a suitable permitted commercial aggregate supplier(s). A preliminary and conservative estimate projects that the mine will require 551,000-772,000 tons (500,000-700,000 tonnes) per year during steady-state operations. This material would be delivered to the mine site via over-the-road truck and stored in the outdoor backfill material buffer. Provisions may also be made to receive aggregate via railway.

Proposed Action: Source aggregate from a permitted commercial supplier(s) and receive via truck and store in an outdoor stockpile.

Cemented Rock Fill (CRF)

For CRF, waste rock collected from underground operations, would be brought to the Ore Transfer Building via haul trucks and transferred to the waste rock buffer, designed for 5,511 tons (5,000 tonnes).

923 Some waste rock would be fed into the backfill material crushing plant where the material would be
924 crushed to less than 4 inches (10.2 cm). Dust would be controlled using best management practices in
925 accordance with the project's Fugitive Dust Control Plan developed as part of the EIS and permitting
926 process.

927 *Proposed Action:* Bring waste rock from the mine to the Ore Transfer Building, store it, then crush
928 it in the backfill material crushing plant to be used for CRF.

929 These backfill materials would be brought into the backfill plant. The waste rock or externally sourced
930 aggregate would be fed into a crusher to produce the smaller particles needed to produce the CRF mix.
931 The crushing facility would be in an enclosed building with dust-control systems. This crushed material or
932 externally sourced aggregate would then be fed into a mixer where it would be blended with cement and
933 water to make CRF. The blended CRF would be placed into the bed of a haul truck for return underground.

934 *Proposed Action:* Crush waste rock and aggregate in a backfill plant and blend it in a mixer with
935 cement binders and water to be brought back underground via haul truck.

936 There would be occasions when the backfill material would not require cement. These may include end-
937 of-life stopes or secondary sequence stopes where adjacent mining would not take place and a
938 comparable structural integrity is not required. On these occasions, waste rock would be transported from
939 the mining face and dumped into the stope being backfilled. When waste rock is unavailable, externally
940 sourced aggregate from the surface would again be used.

941 *Proposed Action:* Fill stopes with adequate structural integrity with waste rock (or aggregate)
942 instead of CRF.

943 **Rock Transport**

944 Ore and waste rock would be brought to the surface by haul truck to their respective buffer areas within
945 the Ore Transfer Building. These piles would be sized and conveyed to the rail loading buffer area. This
946 facility would include exhaust air scrubbers or fabric filters to control dust emissions.

947 The railcars would be loaded while positioned on rail scales to ensure optimal loading is achieved;
948 minimizing rail traffic, energy use and overall environmental impacts. Inside the Ore Transfer Building, the
949 railcar cover would be opened, then a front-end loader would load the ore and waste rock into the railcars.
950 Ore and waste rock would not be comingled in the same railcar to ensure metal recovery and processing
951 performance at the receiving facilities is not impacted. The covers would be closed and secured before
952 railcars exit the ore transfer facility. Railcar movement and loading operations would be conducted during
953 day shift hours, although occasional activity outside day shift hours could occur as needed. This would
954 minimize noise and outside activity disrupting the local community.

955 Empty and loaded railcars would be stored at the railway yard adjacent to the Ore Transfer Building. The
956 Project would utilize a railcar mover to transport the railcars between the rail loadout area and adjacent
957 railway yard. BNSF locomotives would arrive to the site at regular intervals to collect loaded cars and
958 return empty cars. An outgoing shipment of approximately 140 railcars would be collected by the BNSF
959 approximately every 4 days. Ore would be transported by rail from the Project Area to the off-site
960 concentrators located in Mercer County, North Dakota, and Marquette County, Michigan. The Project's
961 rail routes are depicted in Figure 5.

962 *Proposed Action:* Store empty and loaded rail cars in the railway yard.

963 *Proposed Action:* Ship approximately 140 railcars from the Project site via BNSF to the off-site
964 processing facilities approximately every 4 days.

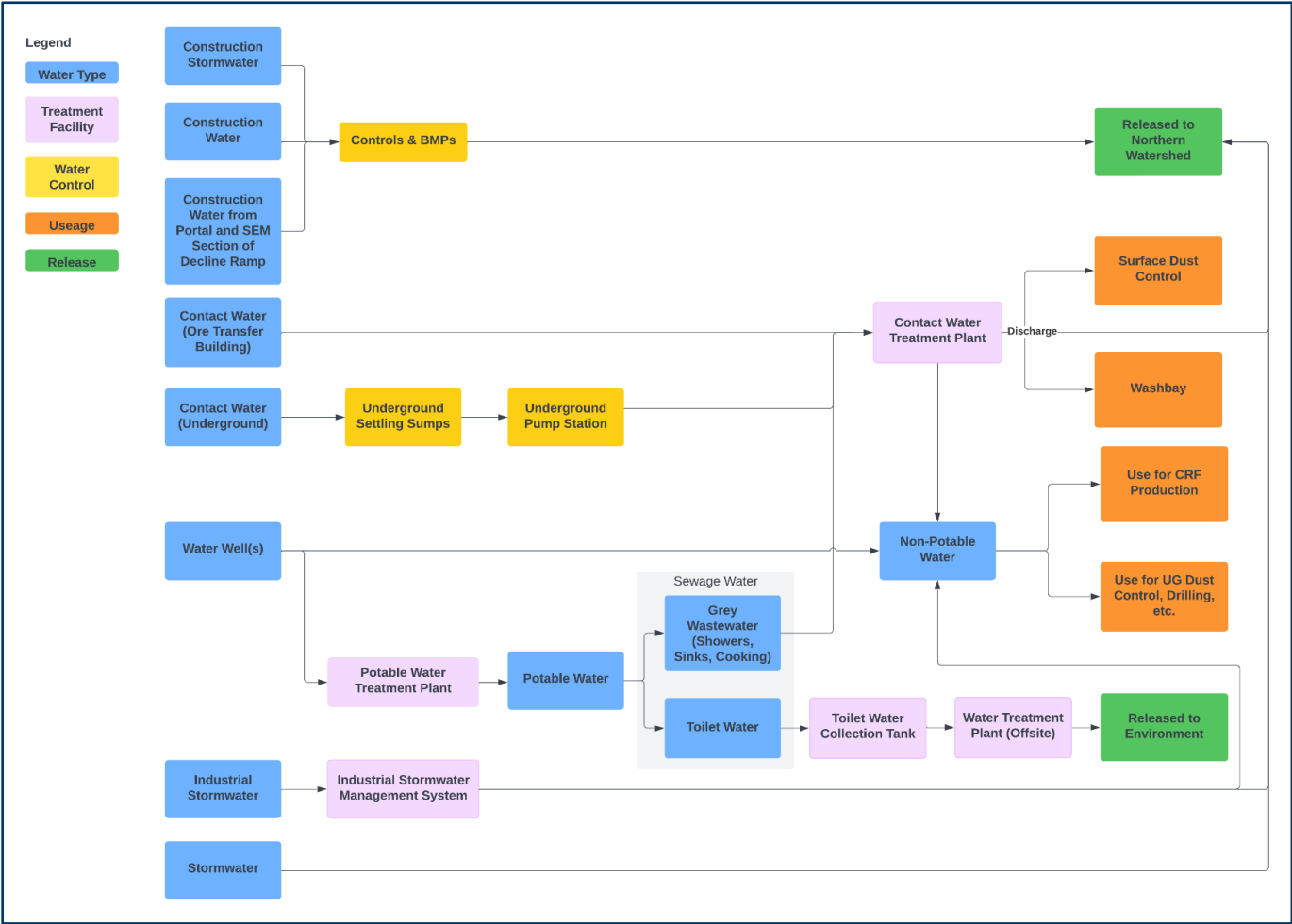
965 *Categories of Water*

966 The Project would manage the following types of water:

- 967 • **Contact water** – Water that has directly contacted ore and/or waste rock. Contact water would
968 be generated both on the surface and in the underground mine and processed at the Contact
969 Water Treatment Plant.
 - 970 ○ Contact water generated on the surface would include the wash bay and other water
971 captured within the Ore Transfer Building. This water would be collected, pumped,
972 processed at the Contact Water Treatment Plant.
 - 973 ○ Contact water captured in the underground mine would include groundwater inflow
974 (including water that flows through the backfill) and water brought down from the surface
975 for equipment use & dust control. This water would be collected underground and
976 pumped to the surface and processed at the Contact Water Treatment Plant.
- 977 • **Industrial stormwater** – Stormwater that has contacted industrial activities or areas and is not
978 contact water. The “industrial stormwater area” comprises most of the Project footprint which is
979 outside the Ore Transfer Building (including the roof) (Figure 6).
- 980 • **Construction stormwater** – Stormwater that has contacted construction activities or surfaces
981 disturbed by construction.
- 982 • **Construction water** – Surface water and groundwater encountered during excavation or
983 construction activities that is removed to dry and/or solidify a localized area to enable
984 construction.
- 985 • **Stormwater** – Water from natural, stabilized and reclaimed surfaces that has not contacted ore,
986 waste rock, industrial activities, industrial areas, construction activities or surfaces disturbed by
987 construction activities.
- 988 • **Non-potable water** – Non-potable water would include both contact water that has been treated
989 by the Contact Water Treatment Plant (producing reverse osmosis (RO) permeate), raw well water
990 (potentially the same well that would feed the Potable Water Treatment Plant), and potentially
991 water from the stormwater pond(s) (Graphic 6-14). This water would be used both underground
992 and on surface, in both the contact area and the industrial stormwater area.
 - 993 ○ On surface, this water would be utilized for dust control on roadways, washing mobile
994 equipment, washing fixed equipment and surfaces, fire suppression sprinkler systems,
995 CRF, mine ventilation scrubbing and other uses.
 - 996 ○ Underground, this water would be utilized for cleaning mobile and fixed equipment, dust
997 suppression during materials handling, dust suppression and drill bit cooling during
998 drilling operations, shotcrete batching and other minor uses.
- 999 • **Potable water** – Water to be used for drinking, showering and other purposes in the mine offices
1000 and locker room areas.
- 1001 • **Sewage waste** – Waste produced by toilets, bathing, laundry or culinary operations or the floor
1002 drains associated with these sources, or cleaning, collected from the mine offices and locker room
1003 areas.

1004 Management of each type of water is described in the sections below. Waters discharged to the
 1005 environment would undergo evaluation, with additional information to be included in the forthcoming
 1006 EIS data submittal.

1007 **Graphic 6-14 Flowchart of Generation and Management of Water Categories**



1008 **Management of Contact Water in the Underground Mine**

1009 Generation of contact water underground would be minimized by actively controlling groundwater inflow
 1010 to the mine. While most of the bedrock is highly competent with negligible primary permeability, the mine
 1011 workings are expected to intersect local discrete zones and areas of enhanced permeability. When mining
 1012 occurs in areas where enhanced permeability zones are expected to be encountered, probe holes would
 1013 be regularly drilled in front of the advancing mining faces to confirm the extent and boundary of the
 1014 upcoming permeability zone and evaluate the degree of water inflows.

1015 *Proposed Action:* Drill probe holes in advancing mine faces to determine permeability and water
 1016 inflow as needed.

1017 If a predetermined rate of inflow and duration is detected by the probe hole, additional holes could be
 1018 drilled, which would be pressure-grouted using an injected resin or cementitious grout that would reduce

1019 groundwater inflow prior to advancing the mine workings through the area. Additional grouting (filling
1020 the annular space, or space between the well pipe and external protective casing, with grout) and sealing
1021 of discrete zones of enhanced permeability would be conducted as needed to minimize groundwater
1022 inflow occurring after the mining excavation has advanced through the area. Minn. R. 4725.0100, subp.
1023 30, defines grout as “a low permeability material used to fill the annular space around a casing, or to seal
1024 a well or boring. Grout is either neat-cement grout, cement-sand grout or bentonite grout.”

1025 *Proposed Action:* Consider pressure-grouting holes prior to advancing in mine workings in areas
1026 where undesirable volumes of inflow are detected.

1027 Contact water from the underground mine would be collected at underground settling sumps where initial
1028 solids removal would take place. Overflow water from these sumps would be used in underground
1029 operations or routed to a pumping station. These pumping stations would include a secondary settling
1030 sump that would allow further settling prior to being pumped up the ramp to the Contact Water
1031 Treatment Plant on surface. Fines that accumulate in the underground settling sumps would typically be
1032 silt-sized particles consisting of varying portions of eroded roadbed material, drill cuttings from ore and
1033 waste rock, blasting fines from ore and waste rock, and shotcrete/cement fines. Fines would be
1034 transported from the underground settling sumps to the rail loading buffer area for transportation to the
1035 off-site concentrators.

1036 The volumes of water delivered to and pumped from the underground workings would be continuously
1037 monitored using flow meters and totalizers. Groundwater inflows would be estimated by calculating the
1038 difference between the measured volumes of water supplied to the mine and the volumes pumped out.
1039 This approach would provide a practical method for tracking groundwater inflow over time and evaluating
1040 the effectiveness of inflow control measures.

1041 *Proposed Action:* Install underground settling sumps for solids removal.

1042 *Proposed Action:* For overflow, install pumping stations with secondary settling sumps.

1043 *Proposed Action:* Send water from underground sumps to the Contact Water Treatment Plant

1044 *Proposed Action:* Transport fines to the rail loadout to go to the off-site concentrators.

1045 A leakage detection system for the Decline Ramp is not planned, as it is not typical for this type of tunnel.
1046 The mine’s underground water management system during operations would collect water from
1047 groundwater inflow, equipment, and general usage. These waters would be pumped to surface and
1048 routed to the Contact Water Treatment Plant. Detailed inspections of the Decline Ramp would be
1049 performed quarterly. Repairs would be carried out in accordance with General Plans of Operations.

1050 **Management of Contact Water on the Surface**

1051 On the surface, contact water would only be generated within the Ore Transfer Building. Vehicles
1052 operating within the building would be “captive,” and would rarely need to exit the building. Vehicles
1053 exiting the Ore Transfer Building would go through a vehicle wash, with water collected and managed as
1054 contact water.

Contact Water Treatment Plant

Contact water would be treated at the Contact Water Treatment Plant, primarily using reverse osmosis (membrane filtration), a technology that is successfully used by other mining operations and even in municipalities to produce potable water.

The Contact Water Treatment Building (approximately 32,722 ft² (3,040 m²)) would accommodate the reverse osmosis treatment plant, ancillary pumps and components, as well as the potable water treatment plant. A non-potable water buffer tank, a fire water storage tank, a potable water buffer tank, and the sewage wastewater collection tank and system are also accommodated in the vicinity of the building. A scrubber water handling system would be located on the Surface Raise #2 pad, whose input and output streams recirculate to the Contact Water Treatment Building.

Contact water would be pumped from the underground operations to the surface for treatment. It would undergo a series of processes, including clarification, softening, reverse osmosis membrane treatment and remineralization, to produce two water streams: one suitable for recirculation back to operations, and another for surface operational needs as well as discharge at the surface into the watershed to the north of the Project Area. Residual solid waste (e.g., brines) from the Contact Water Treatment Plant will be disposed of at a suitable licensed landfill. The precise system and configurations would be included with the EIS data submittal for evaluation.

Proposed Action: Treat contact water with clarification, reverse osmosis and softening to produce water suitable for recirculation into the underground operations and water for discharge at the surface north of the Project Area.

Proposed Action: Dispose of solid wastes from the Contact Water Treatment Plant at a licensed landfill.

Management of Non-Potable Treated Water

Contact water treated at the Contact Water Treatment Plant would become non-potable treated water. This water would be discharged to the watershed near the northern boundary of the Project Area in accordance with a future National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS) permit. The watershed drains to the Tamarack River through a public drainage system that consists of a ditch and an altered natural stream (Figure 8). The specific discharge location for the Water Treatment Plant would be decided by additional design development and would be presented in the EIS.

Proposed Action: Discharge the treated contact water to the watershed near the northern boundary of the Project Area.

A portion of the non-potable treated water would be utilized on site for dust control, the fire suppression sprinkler system, underground drill bit flushing, equipment washing, backfill mixing and other uses. It is anticipated that non-potable treated water from the Contact Water Treatment Plant would be sufficient to meet these needs. However, an additional water supply well could be installed to supply mining activities if the volume of non-potable treated water is not sufficient to meet non-potable water demand. For clarity, a well is defined in Minnesota Statutes 103I.005, subdivision 21 as an "excavation that is drilled, cored, bored, washed, driven, dug, jetted or otherwise constructed if the excavation is intended for the location, diversion, artificial recharge, monitoring, testing, remediation or acquisition of groundwater." The total volume of water to be appropriated from groundwater (mine inflows and pumping from wells)

1095 would be variable during the life of Project and dependent on but not limited to the site water balance
1096 and volume and timing of groundwater inflows into the mine. The site water balance and prediction for
1097 timing and volumes of mine inflows would be discussed in the EIS data submittal and provide input to
1098 estimating the water to be appropriated from well(s).

1099 *Proposed Action:* Utilize a portion of treated water on site for dust control, and other non-potable
1100 water uses in the mine process.

1101 *Proposed Action:* Install water supply well if the volume of non-potable water needed exceeds the
1102 supply from the Contact Water Treatment Plant.

1103 **Management of Potable Water and Treatment Plant**

1104 Potable water for the facility would be sourced from a new well situated in proximity to the facility. The
1105 EIS would provide additional details regarding the precise location and design of the well. Based on
1106 preliminary assessments, the well is expected to draw from the basal permeable outwash sediment to
1107 ensure a reliable supply.

1108 The potable water well would supply water to a storage tank upstream of the potable water treatment
1109 plant, with a capacity to produce 8,000 gallons per day of potable water for the facility. Raw water would
1110 be processed through treatment plant to meet the necessary specifications required for drinking water.
1111 Final potable water treatment design would be determined based on the results of source water quality
1112 testing.

1113 The design, construction and operation of a potable water supply system would be subject to review and
1114 approval by the Minnesota Department of Health (MDH) under Minn. R. Chs. 4720 and 4725. These rules
1115 require submission and approval of complete plans and specifications prior to construction to
1116 demonstrate compliance with state drinking water standards and the federal Safe Drinking Water Act.

1117 The potable water well would be routinely monitored, and samples analyzed as required by the Safe
1118 Drinking Water Act and applicable MDH requirements to ensure compliance with state and federal
1119 drinking water standards.

1120 *Proposed Action:* Source potable water from a new well constructed near the facility and treat it
1121 to drinking water standards in a treatment plant within the Contact Water Treatment Building.

1122 **Management of Industrial Stormwater**

1123 Industrial stormwater would be generated from portions of the site where precipitation, stormwater
1124 runoff and snowmelt runoff come into contact with industrial activities or areas, as shown in Figure 6.

1125 Industrial stormwater would be managed in accordance with the requirements of a future NPDES/SDS
1126 permit and an associated project-specific industrial Stormwater Pollution Prevention Plan (SWPPP). Best
1127 management practices (BMPs) would be specified in the industrial SWPPP and implemented to reduce or
1128 eliminate exposure of stormwater to pollutants (e.g., material storage and management practices, spill
1129 prevention practices) or remove contaminants from stormwater (e.g., stormwater treatment systems)
1130 prior to discharge from the site.

1131 Industrial stormwater would be routed through appropriate treatment systems, specifically wet sediment
1132 basins, before discharging to the watershed near the northern boundary of the Project Area, in

accordance with a future NPDES/SDS permit. The Project is designed to comply with the MPCA's requirements under the NPDES/SDS program for stormwater associated with industrial activity. Although infiltration systems were considered, Condition 18.8 of the 2025 Industrial Stormwater General NPDES/SDS Permit (MNR050000) prohibits infiltration systems in areas with less than three feet of separation between the base of the infiltration basin and the seasonally saturated soils or the top of bedrock. Given the site's depth to water, which is often near or below this threshold (as shown in Figure 9), infiltration is not considered viable.

Proposed Action: Treat industrial stormwater by utilizing wet sediment basins before discharging to the watershed near the northern boundary of the Project Area.

Surface Industrial stormwater would follow constructed ditches on the surface that would channel the water to the stormwater collection ponds. Industrial stormwater runoff from large impervious surfaces such as the vehicle parking lot would be routed via gravity to the industrial stormwater ponds. The evaluation of stormwater to ensure it meets appropriate standards, including monitoring and compliance, would be addressed during the future permitting process under the NPDES program. This process would specify monitoring requirements and establish protocols to confirm that water quality aligns with standards set forth in Minn. R. 7050.0220, subp. 3a, and other applicable regulations. Talon is investigating routing water from the stormwater ponds to the non-potable water system.

Proposed Action: Use constructed ditches to route industrial stormwater runoff from large impervious surfaces to the nearest stormwater pond.

Settled sediment within the industrial stormwater system would be managed through routine inspection and maintenance activities. Basin inspections would be conducted to monitor the accumulation of sediment. If sediment accumulation was identified, removal could occur through mechanical means such as excavation or dredging using appropriate equipment. The removed material would then be managed in accordance with applicable regulatory requirements based on the characteristics of the sediment.

Management of Construction Stormwater and Construction Water

Construction stormwater and any water removed during construction activities would be managed in accordance with the Minnesota Construction Stormwater General Permit and a project-specific construction SWPPP. BMPs would be specified in the construction SWPPP and implemented during construction to prevent erosion (e.g., temporary and permanent soil stabilization), control sediment (e.g., silt fences, sediment logs, temporary sediment basins), and otherwise prevent impacts to the environment (e.g., spill prevention practices, material storage and management practices). Construction stormwater and construction water would be treated by appropriate BMPs and discharged to the watershed near the northern boundary of the Project Area.

Proposed Action: Use BMPs to treat construction stormwater and construction water before release into the watershed near the northern boundary of the Project Area.

Management of Stormwater

Stormwater encompasses runoff, snowmelt runoff, and other surface runoff and drainage from natural, stabilized, and reclaimed surfaces that have not contacted ore, waste rock, industrial activities, industrial areas, construction activities or surfaces disturbed by construction activities. This type of runoff would

1172 not require coverage under an NPDES/SDS permit unless it mixes with stormwater from areas requiring
1173 permit coverage.

1174 **Management of Sewage Waste**

1175 Sewage waste management for the project encompasses two primary waste streams: toilet waste and
1176 gray water. Toilet waste would be managed separately from gray water, which includes water from
1177 activities such as showering and handwashing. Each waste stream follows a distinct pathway for
1178 collection, treatment and disposal to ensure compliance with environmental and health standards.

1179 **Toilet Waste**

1180 Toilet waste, defined as waste commonly disposed of in toilets, would be routed by gravity to a lifting
1181 station and then pumped into a holding tank, until it can be transported to a treatment facility. Toilet
1182 waste from the underground operations would be collected and conveyed to the holding tank, which
1183 would be sized to accommodate expected daily flows, with additional capacity to account for any
1184 temporary interruptions in disposal. A service provider would collect the toilet waste from the holding
1185 tank and transport it to a nearby municipal wastewater treatment facility for disposal.

1186 The anticipated flows and design are based on two shifts of up to 75 employees each under full production
1187 operating conditions. According to Minn. R. 7081.0130, Table 1, anticipated flows for
1188 commercial/industrial facilities—adjusted in accordance with Minn. R. 7080.2240, subp. 1.A, are as
1189 follows:

- 1190 • Employee/8-hr shift = 17.5 gpd (66 L/day) /employee x 0.4 (toilet waste) = 7 gpd (26.5 L/day)
1191 /employee
- 1192 • Employee/8-hr shift with showers: 25 gpd (94.6 L/day) /employee x 0.4 (toilet waste)= 10 gpd
1193 (37.9 L/day) /employee

1194 Based on a conservative estimate, the daily flow to the holding tank would be approximately 2,250 gallons
1195 (8,500 L), calculated as 150 people x 10 gpd (37.9 L/day) x 1.5 (adjustment from 8-hr to 12-hr shift).

1196 *Proposed Action:* Hire a service provider to collect toilet waste that was routed to holding tanks.

1197 **Gray Water**

1198 "Gray water" means sewage that does not contain toilet wastes, which would be routed by gravity to a
1199 lifting station and then pumped to the Contact Water Treatment Plant.

1200 The anticipated flows and design are based on two shifts of up to 75 people each in full production
1201 operating conditions. According to Minn. R. 7081.0130, Table 1, anticipated flows for
1202 commercial/industrial facilities—adjusted in accordance with Minn. R. 7080.2240, subp. 1.A, are as
1203 follows:

- 1204 • Employee/8-hr shift = 17.5 gpd (66 L/day)/employee x 0.6 (gray water) = 10.5 gpd (39.8 L/day)
1205 /employee
- 1206 • Employee/8-hr shift with showers: 25 gpd (96.4 L/day)/employee x 0.6 (gray water) = 15 gpd (56.8
1207 L/day) /employee

1208 Based on a conservative estimate, the daily flow to the Contact Water Treatment Plant would be
1209 approximately 3,375 gallons (12,800 L), calculated as 150 people x 15 gpd (56.8 L/day) x 1.5 (adjustment
1210 from 8-hour to 12-hour shift).

1211 *Proposed Action:* Route gray water to the Contact Treatment Plant for treatment.

1212 *Utilities*

1213 Project utilities would include electrical services, propane, diesel, compressed air, and water pipelines.

1214 **Main Incomer Substation**

1215 Electric power would be sourced from the existing 69kV Great River Energy transmission line through the
1216 north end of the Project Area. The Project would have an average electrical load of less than 12.5 MW
1217 (megawatt) when in full production, dependent on the level of equipment. A substation would be
1218 constructed to accommodate Project power demand during operations. A short overhead branch line
1219 would be constructed to connect the substation to the existing transmission line. After the substation is
1220 commissioned and online, electrical power would be distributed around the site using a mix of
1221 underground conduits, surface raceways, and/or overhead power lines.

1222 *Proposed Action:* Source electric power from Great River Energy transmission line.

1223 *Proposed Action:* Construct an electrical substation, underground conduits, surface raceways and
1224 overhead power lines to accommodate Project power demand.

1225 Prior to commissioning the substation, temporary construction power would be drawn from an existing
1226 substation near Tamarack and could be supplemented with diesel electrical generators to accommodate
1227 the larger power draw of equipment. During operations, diesel electrical generators would be used as
1228 emergency backup power generation for critical systems required to protect life, the environment and
1229 property.

1230 *Proposed Action:* Draw temporary construction power from an existing substation near Tamarack
1231 before the substation is constructed.

1232 *Proposed Action:* Use diesel electrical generators to supplement pre-substation power needs and
1233 as emergency backup power throughout operation.

1234 **Site Electrical Network and Distribution**

1235 Power supplies would be provided to the Ore Transfer Building and the Contact Water Treatment building
1236 from where power would be internally distributed to the small power and lighting circuitry. Two supply
1237 cables (for redundancy), which include one main and one redundant line, would be installed to feed the
1238 ventilation and underground electrical power consumer stations.

1239 Electrical distribution would include support for site lighting for the rail yard and main site parking area,
1240 as well as the outdoor backfill materials buffer area.

1241 *Proposed Action:* Supply power to the Ore Transfer Building and the Contact Water Treatment
1242 Building for further distribution.

1243 *Proposed Action:* Install a main and a redundant power supply cable to feed underground
1244 electrical power consumer stations.

1245 **Emergency Electrical Generators**

1246 Emergency power generation on the surface would be sized to supply emergency power to the
1247 underground infrastructure facilities, as well as to the surface-mounted mine ventilation fan motors.
1248 Diesel-driven electrical generators would supply emergency power to the underground network and
1249 surface facilities, including systems such as mine ventilation, egress lighting and water treatment system.
1250 The emergency electrical generators would be located in a central location on surface, adjacent to the
1251 fuel storage area, and farther than 100 ft from the access tunnel ventilation fan inlets. The size and
1252 quantity of the diesel-driven emergency generators will be provided during the EIS data submittal.

1253 *Proposed Action:* Keep emergency electrical generators on site to supply power to critical
1254 functions.

1255 **Support Facilities**

1256 A variety of support facilities would be required to sustain the operation. The Vehicle Maintenance Facility
1257 located within the Ore Transfer Building would have multiple heavy-vehicle repair bays sized to be able
1258 to accommodate the largest equipment utilized by the Project, including an overhead gantry crane. The
1259 Ore Transfer Building would include locker rooms, showers, crew lineout areas. It would also contain a
1260 bay for emergency response vehicles and gear.

1261 *Proposed Action:* Repair heavy vehicles on site in a Vehicle Maintenance Facility within the Ore
1262 Transfer Building.

1263 Access to the site would be controlled via a gate at the entrance. Sufficient parking would be provided to
1264 accommodate all personnel and visitors expected to be onsite during a shift, plus some additional parking
1265 to accommodate the arrival of a limited number of personnel from the subsequent shift prior to the
1266 departure of the previous shift's personnel. Employees would access the Administration and Locker Room
1267 facilities within the Ore Transfer Building.

1268 **Rail Yard**

1269 The project would access the BNSF mainline northeast of Tamarack, MN. To create an efficient exchange
1270 of unit train sets while minimizing the footprint, the rail yard would provide three parallel full unit train
1271 length tracks adjacent to the mine surface facilities connected at both ends to accommodate a loaded
1272 unit train set for release to BNSF, receipt of the empty unit train set returning for loading and a "run-
1273 through" track to maintain full access (Figure 4). The use of shorter lighter weight railcars would result in
1274 these parallel tracks being less than 1.2 miles (1.9 km) in length allowing a single 0.2-mile (0.30 km) spur
1275 track to the mainline wye connection. The mainline connection would be designed as a wye connection
1276 providing efficient access from either the west or east and allows BNSF to turn locomotives (or railcars)
1277 around as necessary. Each intersection of the wye would be accessed by a new gravel road for switch
1278 operation and maintenance. This road would be an extension of the existing driveway for the Talon-
1279 owned property immediately adjacent to the BNSF track (Figure 3).

1280 *Proposed Action:* Construct a rail yard with three parallel full unit train length tracks next to the
1281 mine surface facilities.

1282 *Proposed Action:* Construct the rail spur with a wye connection to allow for locomotive or railcar
1283 turnaround as needed.

1284 A loadout siding connecting at both ends to the rail yard tracks would allow movement of railcars into the
1285 enclosed railcar loading area within the Ore Transfer Building. Each railcar would be inspected for
1286 mechanical issues prior to loading. If an issue arose that could not be corrected immediately, the railcar
1287 would “bad ordered” and moved to the set out track for repair or shipment to a railcar repair shop. A set
1288 out track would be located north of the crossover to the ‘run-through’ track (Figure 4). This configuration
1289 would help to optimize rail operations while minimizing overall footprint.

1290 Index railcar loading would fill six railcars of a longer string of cars at a time and then move forward
1291 (indexes) to fill the next railcar(s). This method would position each railcar on track scales and move rock
1292 into the cars until they are filled to the optimum weight to provide the most efficient shipping. The covers
1293 would then be secured on each railcar after being moved out of the Ore Transfer Building. Each railcar
1294 would pass through an air-wash to remove fugitive particulates before exiting the building. After up to 20
1295 railcars are loaded and securely enclosed, the railcar mover would pull this group of loaded railcars
1296 forward on the lead track to clear the cross-over switch. After the switch is realigned, the railcar mover
1297 would push the up to 20 loaded railcars out on the release track connecting them to the previously loaded
1298 railcars. In this manner all loaded railcars would be staged for release as part of the next unit train
1299 shipment. The railcar mover would then return to the Ore Transfer Building to continue indexing railcars
1300 for loading. This loading approach could reliably fill approximately 36 railcars per day to transport a 4,000
1301 ton (3,600 tonnes) daily production rate.

1302 *Proposed Action:* Utilize index railcar loading on a track scales to load cars to the optimal weight.

1303 *Proposed Action:* Use approximately 36 railcars to transport 4,000 tons of ore daily.

1304 *Proposed Action:* Fill and cover each railcar in the Ore Transfer Building, then move cars out onto
1305 the release track to connect to other loaded railcars.

1306 *Proposed Action:* Pass railcars through an air-wash to remove dust before exiting the building.

1307 Loading of the railcars would occur within the Ore Transfer Building with a dust collection system
1308 (described below under Dust Control System) designed to meet EPA method 204 enclosure standards. In
1309 the event of a temporary BNSF slowdown, ore and waste rock would continue to be stored in the enclosed
1310 Ore Transfer Building or in the underground. The railcars would be weather-tight to prevent precipitation
1311 contact and dust emissions. Talon is currently expecting to use conventional gondola railcars with covers
1312 made of solid and impervious material that would be securely fitted, enclosing the railcars prior to exiting
1313 the Ore Transfer Building. All railcars used would be completely enclosed throughout transit between the
1314 Ore Transfer Building and the ore processing destination. Ore in transit would be delivered for processing,
1315 and empty railcars would be stored with the covers in place in the Tamarack and/or other suitable off-line
1316 rail yards.

1317 *Proposed Action:* Operate a dust collection system in the Ore Transfer building.

1318 *Proposed Action:* Store ore in the Ore Transfer Building or in the underground in the event of BNSF
1319 slowdown.

1320 *Proposed Action:* Use gondola railcars with solid impervious covers that are securely fitted.

1321 *Proposed Action:* Ensure railcars remain closed throughout transit from the Ore Transfer Building
1322 to the processing facilities in North Dakota and Michigan.

1323 With the current expected optimal payload capacity of 115.7 tons (105 tonnes) per railcar, each 140-car
1324 unit train would haul approximately 16,200 tons (14,700 tonnes). At the projected mine rate, BNSF would
1325 need to exchange train sets every 4.1 days on average. If a unit train was released every 4.1 days (about
1326 90 trains per year), the annual shipments would total approximately 1.5 million tons (1.3 million tonnes).

1327 *Proposed Action:* Send ore via the BNSF as the primary railway approximately every 4 days to a
1328 processing facility in Mercer County, North Dakota, and Marquette County, Michigan.

1329 The BNSF Railway would exchange the loaded unit train with a unit train of empty, enclosed railcars
1330 returning from the processing facilities in the on-site rail yard on a regular basis. About 36 of the empty
1331 unit train cars would be loaded each day and consolidated on the release track until the next 140-car unit
1332 train is filled and released for shipment. To accommodate some variations in BNSF's rail cycle, a buffer
1333 area with 13,277 tons (12,000 tonnes) of capacity would be available within the Ore Transfer Building to
1334 prevent interruptions in material flows.

1335 *Proposed Action:* Construct a buffer area with a 13,277-ton capacity inside the Ore Transfer
1336 Building.

1337 During transit, BNSF has responsibility for the railcars and their contents and has established protocols for
1338 managing derailments and necessary related environmental response for all commodities that they
1339 transport. Railcars would be inspected again at the destination after unloading and removed from service
1340 for repair if an issue is found.

1341 **Outdoor Backfill Materials Buffer**

1342 The outdoor backfill materials buffer would be sized to supply the backfill plant with externally sourced
1343 aggregate when waste rock production quantities are insufficient, as well as sand. A truck unloader facility
1344 would be provided at the outdoor backfill materials buffer area to facilitate rapid unloading of trucks at
1345 the mine site. The aggregate or sand would be offloaded, piled and conveyed into the Ore Transfer
1346 Building for use in the backfill plant.

1347 *Proposed Action:* Haul aggregate or sand for the backfill plant via truck to an unloader facility
1348 where it would be offloaded, piled and conveyed into the Ore Transfer Building.

1349 **Ore Crushing and Backfill Plant**

1350 The crushing and backfill plant equipment would be installed within the Ore Transfer Building. The backfill
1351 plant layout and equipment selection within the Ore Transfer Building would have a batching capacity of
1352 approximately 159 ft³ (4.5 m³), with a cycle time of roughly 2 minutes, equating to 4,767 ft³/hr (135
1353 m³/hr). This capacity was used to determine the sizing of the ancillary equipment in the batch plant.

1354 *Proposed Action:* Install crushing and backfill plant equipment in the Ore Transfer Building.

1355 Feedstock would include waste rock and commercially sourced aggregate. The waste rock would be fed
1356 into the backfill material crushing plant, where it would be crushed to less than 4 inches (10.2 cm). This
1357 crushed waste rock and/or the aggregate rock material would then be fed into the backfill plant, creating

1358 CRF or uncemented rockfill. Once batched, the CRF would be transported by haul trucks to the
1359 underground for backfilling.

1360 *Proposed Action:* Crush waste rock intended for backfill in the backfill material crushing plant to
1361 less than 4 inches in size to be fed into the backfill plant to create CRF for backfilling.

1362 Cement needed to produce CRF would be delivered via trucks and conveyed to the cement storage bin
1363 adjacent to the backfill plant. The backfill plant may also be used to mix shotcrete for use underground.
1364 Water would be sourced from the site's non-potable water sources.

1365 *Proposed Action:* Deliver cement via trucks to a storage bin next to the backfill plant.

1366 *Proposed Action:* Use the backfill plant to mix shotcrete for the underground.

1367 The ore transfer area within the Ore Transfer Building would accept run-of-mine ore from the mining
1368 operations and crush it to less than 8 inches (19.5 cm) to avoid potential for oversized rock to damage the
1369 rail cars. It would also provide an opportunity for the operators to remove tramp metal from the ore flow,
1370 which can damage the crusher and further downstream processes. The crushed ore would then be
1371 conveyed into the Rail Loading Buffer Area and loaded into the rail cars by front-end loader.

1372 *Proposed Action:* Crush ore to less than 8 inches and convey it to the Rail Loading Buffer Area.

1373 **Wash Bay**

1374 Any vehicle that has entered the ore handling areas must go through the wash facility before exiting to
1375 outside roads to prevent the tracking of mined material outside of the Ore Transfer Building. The washing
1376 bay would be equipped with a concrete slab floor, one bay and high-pressure water washer guns. The bay
1377 would be sized to accommodate all major equipment including haul trucks and pickup trucks which would
1378 be washed one at a time. Raised platforms would be included within the bay to facilitate safe and efficient
1379 cleaning of the haul trucks. Water collected in the wash bay would drain to a collection sump, where an
1380 oil separator would remove oil and lubricants from the water for subsequent disposal. The water would
1381 then be pumped to the Contact Water Treatment plant for processing.

1382 *Proposed Action:* Construct a wash bay with high pressure washer guns for any vehicle that exits
1383 the Ore Transfer Building.

1384 *Proposed Action:* Separate oil and lubricants from wash bay water, then send water to the Contact
1385 Water Treatment Plant.

1386 **Fuel Storage Area**

1387 A total of 120,000 gallons (454,249 L) of propane storage would be installed for use in the heating
1388 equipment for the various facilities. Propane is used for the ventilation fan/heater installation at the
1389 Portal, the ventilation fan/heater installation at Surface Raise #1, and heating for buildings when required.
1390 Two sets of ancillary equipment would be installed to service these users, which would include 2 vaporizer
1391 liquid feed pumps (1 x duty, 1 x emergency), an electrically heated vaporizer, piping, valves, electrical
1392 controls and instrumentation.

1393 Liquid pressurized propane would be pumped to an electrically heated vaporizer, transforming the liquid
1394 into a gas, which would then be piped to the heating appliance, where it would be ignited to provide the
1395 heating to the airstream where it would be mounted.

1396 Two 20,000-gallon (75,700 L) diesel storage tanks would store diesel for the surface, underground
1397 vehicles, and the emergency electrical generators. The double-walled fuel tanks, also known as self-
1398 bunded tanks, would be installed on tank supports. Hard stand concrete slabs on grade would be
1399 constructed adjacent to the storage tank, to allow for tanker refueling of the tanks. The diesel dispensing
1400 equipment and piping would route the diesel fuel to the inside of the Ore Transfer Building, where two
1401 dedicated refueling bays would allow surface and underground vehicles to refuel without having to exit
1402 the controlled building. Diesel from the storage tanks would also be piped to the emergency electrical
1403 generators.

1404 *Proposed Action:* Install propane storage tanks for heating equipment and two diesel storage
1405 tanks for vehicles and emergency generator.

1406 **Storage and Staging Area**

1407 An outdoor area east of the Ore Transfer Building, known as the Storage and Staging Area (SSA), would
1408 support construction and operational needs throughout the Project. During construction, this area would
1409 function as a temporary staging space to accommodate equipment, supplies and offices. Following
1410 construction, the area would transition to an ancillary support function as an extension of the enclosed
1411 warehouse, providing storage for mining supplies, critical spares and other items suitable for outdoor
1412 storage. This area is not intended for routine parking or storage of active equipment associated with
1413 underground mining or ore handling activities. The area would be designed and managed as a non-contact
1414 area. Anything relocated from operations, including underground and material handling areas, would be
1415 inspected and cleaned, when necessary, prior to placement in the SSA. All items stored outside would
1416 comply with Minn. R. Ch. 7090, Storm Water Regulatory Program.

1417 **Dust Control System**

1418 The Ore Transfer Building and the rail loadout area within it require dust filtration for two primary
1419 purposes:

- 1420 • To collect and filter air from ore handling areas and equipment, ensuring that employee dust
1421 exposure remains within safe levels as defined by the Mine Safety and Health Administration
1422 (MSHA).
- 1423 • To filter building ventilation air, removing particulates before releasing it into the environment.

1424 Based on experience designing and measuring ventilation rates from other ore processing and transfer
1425 facilities in northern Minnesota, greater than 2.0 cfm/ft² (0.6096 m³/min/m²) would be used to design
1426 this facility.

1427 Furthermore, the design would meet the requirements of Total Enclosure according to the U.S.
1428 Environmental Protection Agency (USEPA) Method 204. This criterion requires any open door to have 200
1429 fpm (1.02 m/s) inward airflow to prevent dust from leaving the facility.

1430 *Proposed Action:* Maintain negative pressure in the Ore Transfer Building.

1431 The ore transfer area within the Ore Transfer Building would be 59,837 ft² (5,559 m²) requiring a dust
1432 collection system of at least 119,673 cfm (56 m³/s). The backfill management area would be 36,748 ft²
1433 (3,413 m²) and requires at least 73,496 cfm (35 m³/s) of dust collection. The rail loadout area would be
1434 54,907 ft² (5,101 m²) and requires at least 109,893 cfm (52 m³/s) of dust collection. The rail loadout area
1435 would have localized dust collection points that function independently from the collection points
1436 elsewhere in the Ore Transfer Building but would likely ultimately feed into the main dust management
1437 system. Individual collection points on material processing equipment would come off these systems and
1438 be part of these total airflow volumes. The volume of air required at these process points would be
1439 calculated during detailed engineering design of the material processing systems.

1440 *Proposed Action:* Install a dust collection system in the Ore Transfer Building to manage dust from
1441 the ore transfer area, the backfill management area and the rail loadout area.

1442 To achieve this airflow rate, a dust collection system with sheet metal ducting would be installed inside
1443 the Ore Transfer Building. The air collected would be ducted to the dust collector and filtration baghouse
1444 located inside the building, where the air containing the dust would pass through filtration media to
1445 collect the dust particles. Periodic pulses of compressed air released into the dust filter bags would
1446 dislodge the dust particles which would then be collected and removed from the system. This material
1447 would be added to the ore transfer, which would then be loaded into gondola railcars.

1448 *Proposed Action:* Utilize a filtration baghouse inside the Ore Transfer Building to filter collected
1449 air and dust.

1450 *Proposed Action:* Transfer particles collected by the baghouse to the ore to be transferred to the
1451 off-site processing facilities.

1452 Dry cartridge baghouses would be used for the facility. Each baghouse system would have a downstream
1453 particulate monitor to detect any upset condition in the cartridges that allow dust to pass the cartridge.
1454 Should this condition arise, the baghouse fan would be stopped, and an alarm would sound, which would
1455 require a maintenance technician to investigate the cause and repair the condition. The Project would
1456 provide an estimate of particulate capture efficiency of the dust control system as part of the EIS data
1457 submittal once additional engineering work has been completed.

1458 *Proposed Action:* Install downstream particulate monitors to detect any upset in the condition of
1459 the cartridges in the baghouse.

1460 **Compressed Air**

1461 Compressed air would be produced and distributed to surface users, including dust collection and
1462 filtration baghouses, automated valves, and the gondola air wash. Additional compressed air would be
1463 supplied to the vehicle maintenance workshop for pneumatic tools and vehicle tire repairs.

1464 *Proposed Action:* Install compressed air systems in the Ore Transfer Building and Contact Water
1465 Treatment Building to provide compressed air for the gondola air wash and the dust collection
1466 and baghouses.

1467 *Proposed Action:* Install a small air compressor in the vehicle maintenance workshop.

1468 Ambient air would be the source for the compressor equipment. Compressed air systems would be
1469 decentralized with generation, treatment, and storage systems located at discrete points across the Ore
1470 Transfer Building and Contact Water Treatment Building. The main components of the compressed air
1471 system would include air receivers, dryers/filters and compressors. Refrigerant type air dryers
1472 (approximately 37°F (2.78°C) dew point) would be considered in the design where necessary to reduce
1473 the amount of condensate collected in the main pipe header on surface. Other components of the
1474 Compressed Air Plant include inline filters and water separators. Compressed air required for
1475 underground and mining operations use would be generated underground.

1476 *Proposed Action:* Source ambient air for compressor equipment.

1477 **Mine Ventilation – Fans, Heaters, and Wet Scrubber**

1478 As the SEM tunnel is constructed, the decline would be ventilated using two duct runs, each consisting of
1479 4.5 ft (1.37 m) diameter 250 hp silenced fans and temporary heaters, supplying approximately 60,000 cfm
1480 (28.3 m³/s) of air within 5 ft (1.52 m) plastic round ducts. The intake ducting, along with the fans and
1481 heater, would extend approximately 30 m back from the portal to prevent recirculation.

1482 *Proposed Action:* Install two duct runs with fans and heaters in the Decline Ramp inlet to supply
1483 fresh air during construction of the Decline Ramp.

1484 Once construction of the Decline Ramp transitions from SEM to hard rock excavation, construction of the
1485 surface raises would be priority. During this phase, the Return Air Raise (Surface Raise #2) would be
1486 prioritized for early commissioning. Surface Raise #2 would be equipped with twin fans with wet
1487 scrubbers, where each fan would have a capacity of approximately 400,000 cfm (188.8 m³/s) and have a
1488 total fan duty of approximately 800,000 cfm (377.6 m³/s). The fans would operate at a de-rated capacity
1489 until steady-state mining is reached. When Surface Raise #2 is commissioned, fresh air would continue to
1490 be ducted from the portal using the temporary fans and heaters.

1491 *Proposed Action:* Equip Surface Raise #2 with fans and wet scrubbers so that it may act as the
1492 exhaust point.

1493 Prior to the mining of the SMSU, the Fresh Air Raise (Surface Raise #1) would be completed and
1494 commissioned with twin fans and a total fan duty of approximately 730,000 cfm (344.5 m³/s), each fan
1495 having a duty of approximately 365,000 cfm (172.3 m³/s). At this time, the permanent portal heater would
1496 be commissioned and the fresh air would be drawn from Surface Raise #1 with a small amount of air
1497 (approx. 70,000 cfm (33.0 m³/s) being fed from the portal to ventilate the decline between the portal and
1498 Surface Raise #1. All air would continue to be exhausted from Surface Raise #2.

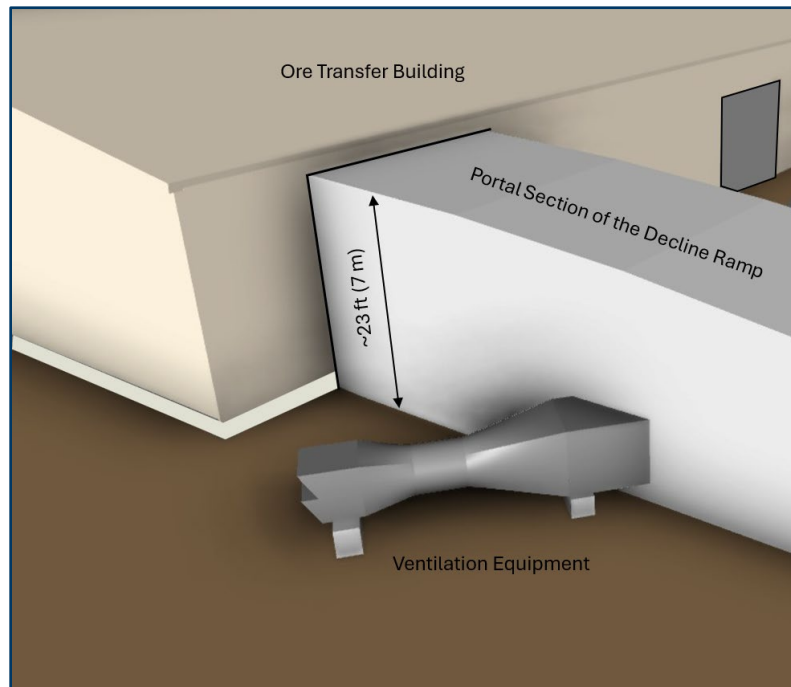
1499 *Proposed Action:* Equip Surface Raise #1 with fans and a heater so that it may act as the point of
1500 air intake.

1501 **Mine Access Portal Tie-In to Ore Transfer Building**

1502 Once the Portal and SEM Sections of the Decline Ramp are completed and the Ore Transfer Building is
1503 erected, the final tie-in and enclosure of the opening between the two structures would be installed to
1504 ensure that the ore being transported from the underground to the Ore Transfer Building is never exposed
1505 to outdoor air or precipitation (Graphic 6-15).

1506 *Proposed Action:* Install final tie-in and enclosure of the opening between the Decline Ramp and
1507 the Ore Transfer Building to keep ore from exposure to outdoor air and precipitation.

1508 **Graphic 6-15 Rendering of the Portal Section of the Decline Ramp's connection to the Ore Transfer**
1509 **Building and Ventilation Equipment**



1510

1511 **Vehicle Maintenance Workshop**

1512 The vehicle maintenance workshop, located within the Ore Transfer Building, would be equipped with
1513 equipment able to service both underground and surface vehicles. The equipment would include oil and
1514 grease lubrication dispensers, hydraulic fluid dispensers, coolant dispensers, along with hand tools and
1515 consumables.

1516 *Proposed Action:* Construct a vehicle maintenance shop in the Ore Transfer Building to service
1517 underground and surface vehicles.

1518 **Overhead Cranes and Monorail Hoist**

1519 An overhead gantry crane would be installed in the vehicle maintenance workshop, which would serve
1520 the vehicle service bays. The crane would have a lifting capacity of at least 8.25 tons (7.5 tonnes), able to
1521 lift the heaviest component from the body of a haul truck.

1522 *Proposed Action:* Install an overhead gantry crane in the vehicle maintenance workshop.

1523 Above the rail loadout area, six individual hoists with spreader beams would lift and place the gondola
1524 railcar covers during and after loading operations.

1525 *Proposed Action:* Install hoists with spreader beams to lift and place railcar covers during loading
1526 operations.

1527 **Underground Maintenance Area and Storage**

1528 The maintenance facility would accommodate light duty maintenance including, but not limited to:

- 1529 • Oil/lube top-up/replacement
- 1530 • Tire changes
- 1531 • Minor repairs, such as replacement of hoses, filters and small parts
- 1532 • Preventative maintenance

1533 In addition to the Underground Maintenance Facility, the underground would also require water filtration
1534 and pumping infrastructure, fans and ventilation infrastructure, diesel and lubricant storage areas, if
1535 needed battery charging stations, emergency refuge stations, electrical transformers and distribution
1536 equipment, explosives storage magazines, and a variety of other fixed infrastructure as typically seen in
1537 underground metal mining operations.

1538 *Proposed Action:* Construct a maintenance facility and storage area in the underground workings.

1539 *Proposed Action:* Install infrastructure, storage areas, electrical work, and other fixed
1540 infrastructure underground.

1541 **Reclamation and Closure**

1542 Reclamation would occur during operations and closure. The closure plan would be developed to ensure
1543 that, once implemented, the site would achieve a stable and self-sustaining condition without the need
1544 for ongoing, long-term maintenance.

1545 During operations, depleted ore extraction drifts would be backfilled as mining progresses, as described
1546 above. Upon mine closure, if there is no beneficial reuse for the site, most surface and underground
1547 infrastructure would be removed, and disturbed surfaces would be regraded and revegetated.

1548 *Proposed Action:* Conduct reclamation, such as backfilling drifts and regrading and revegetating
1549 disturbed surfaces, during operations and closure.

1550 Closure of the underground mine would progress in stages. When mining is complete, dewatering of the
1551 mine would cease and the mine would flood. The purpose of mine flooding is to limit and eventually
1552 minimize interaction of the mine with the atmosphere. Doing so cuts off oxygen that is a source acid rock
1553 drainage. Underground engineering controls such as water-tight barriers called bulkheads, or other
1554 controls could be constructed at various locations to minimize interaction between the deeper bedrock
1555 water and the shallower bedrock water. Other potential mitigation measures, such as increasing the rate
1556 of mine flooding would also be evaluated during the EIS.

1557 *Proposed Action:* Conduct closure of the underground mine in stages to minimize the interaction
1558 of the mine with the atmosphere.

1559 To advance this planning and provide important data for both permitting activities and EIS analysis, the
1560 project intends to develop a model to predict water quality in the underground mine post-operations.
1561 This model would incorporate the mitigation strategy of increasing the rate of mine flooding to reduce
1562 the time needed to flood the mine. Further details on water quality modeling and specific backfill and
1563 flooding plans, along with other mitigation options that could be implemented, would be available in the
1564 Reclamation and Closure Plan included in the Permit to Mine.

1565 *Proposed Action:* Develop a model to predict water quality in the underground mine post-
1566 operations.

1567 During closure, water from the underground mine would be managed to meet regulatory requirements.
1568 The mine Decline Ramp, and mine development areas excavated outside the ore body would not be
1569 backfilled. The determination of the appropriate timing for bulkhead sealing of the Ramp Decline would
1570 be guided by the requirements set forth in Minn. R. Ch. 6132, which emphasize ensuring stability and
1571 minimizing hydrologic impacts to protect natural resources. The decision on when to implement bulkhead
1572 sealing would be made in consultation with the DNR and would be detailed in the closure plan or permit
1573 to mine, with final approval by the Commissioner and County Mine Inspector.

1574 *Proposed Action:* Do not backfill the Decline Ramp and mine development areas outside of the
1575 ore body.

1576 *Proposed Action:* Implement bulkhead sealing of the Decline Ramp in compliance with Minnesota
1577 Rule.

1578 If, following closure, continued compliance with reclamation rules from Minn. R. Ch. 6132 cannot be
1579 achieved without continued maintenance of the facilities, postclosure maintenance activities would need
1580 to be implemented. No release from the permit to mine under part 6132.4800 shall be granted for those
1581 portions of the mining area that require postclosure maintenance until the necessity for maintenance
1582 ceases.

1583 Details of reclamation and closure would be further discussed in the EIS data submittal.

1584 **c. Project magnitude**

1585 Project magnitude is described in Table 6-5.

1586 **Table 6-5 Project magnitude.**

Description	Number
Total Project Area acreage	378.8 acres (153.3 hectares)
Linear project length	2.13 mile (3.43 km)
Top of Mine (below ground surface)	300 ft (91.5 m)
Bottom of Mine (below ground surface)	2,000 ft (609.6 m)
Ore Transfer Building Area	173,654 ft ² (16,133 m ²)
Ore Transfer Building Height	52 ft (15.9 m)
Contact Water Treatment Building Area	32,722 ft ² (3,040 m ²)
Contact Water Treatment Building Height	73 ft (22.3 m)
Exhaust Stack Height	78 ft (23.8 m)
Portal Tunnel Height	23 ft (7 m)

1587

1588 **d. Project Purpose**

1589 *Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for*
1590 *the project and identify its beneficiaries.*

1591 The purpose of the Project is to mine nickel, copper, and additional metals from the Tamarack Resource
1592 Area within the Tamarack Intrusive Complex near Tamarack, Minnesota, by underground mining methods
1593 and transfer metal ore and waste rock outside Minnesota to processing facilities in Mercer County, North
1594 Dakota, and Marquette County, Michigan.

1595 **e. Future Stages**

1596 *Are future stages of this development including development on any other property planned or likely to*
1597 *happen? ☐Yes ☒No*

1598 *If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental*
1599 *review.*

1600 No future stages of the Tamarack Mining Project are currently planned.

1601 Exploratory drilling in the general Project vicinity has been underway since 2002, which requires annual
1602 approval from DNR. Talon is currently authorized to drill exploratory borings at up to 24 drill pads with
1603 multiple borings possible at each pad. One purpose of the exploration program is to develop resource
1604 estimates that can be used (in part) to demonstrate potential economic viability of future mining of the
1605 deposit; an example of such activity is the massive sulfide mineralization in the Raptor Zone of the
1606 Tamarack Intrusive Complex. If the exploration program yields information that leads to new development
1607 of the Tamarack Intrusive Complex, or an expansion of the Tamarack Mining Project, then such activity
1608 would be subject to review under the Minnesota Environmental Policy Act (MEPA) and Minn. R. Ch. 4410.

1609 Talon proposes to develop the Beulah Minerals Processing Facility in Beulah, Mercer County, North
1610 Dakota, and utilize the Humboldt Mill located in Champion, Marquette County, Michigan to receive and
1611 process ore shipped by rail from the proposed project. The State of Minnesota has no jurisdiction in North
1612 Dakota or Michigan and is precluded from regulating commerce activities in another state. Because
1613 actions proposed in other states with no Minnesota permit and approval requirements are not subject to
1614 MEPA Environmental Review, the Beulah Minerals Processing Facility and the Humboldt Mill are not
1615 connected actions to the proposed project and will not be scoped into the EIS.

1616 While not subject to MEPA, the proposed processing facility in North Dakota would be subject to National
1617 Environmental Policy Act (NEPA) review with the US Department of Energy – National Energy Technology
1618 Laboratory (NETL) as the federal Lead Agency as the source of a federal grant to fund the facility.
1619 Permitting in North Dakota would likely require approvals issued by the North Dakota Department of
1620 Environmental Quality (DEQ), which could include Title V air permits, and North Dakota Pollutant
1621 Discharge Elimination System and stormwater permits. The processing facility would require a Conditional
1622 Use Permit from Mercer County, North Dakota.

1623 Talon Metals Corporation acquired the Humboldt Mill processing facility from Lundin Mining. The
1624 Humboldt Mill is an existing operation subject to existing federal, state, and local approvals.

1625 **f. Subsequent Stage**

1626 *Is this project a subsequent stage of an earlier project? ☐ Yes ☒ No*

1627 *If yes, briefly describe the past development, timeline and any past environmental review.*

1628 No, the Project is not a subsequent stage of an earlier project.

1629 **Proposed Treatment in EIS**

1630 The EIS will require a detailed Project Description that builds upon the information provided in the Scoping
1631 EAW. The Project Description will have content that supports the assessment of Project impacts and
1632 identification of reasonable mitigation measures. The full plan of operations will be provided for the
1633 construction, operations, reclamation and closure phases of the Project; similar levels of detail will be
1634 required across the construction phase and operations phase. The Project Description will identify the
1635 known or potential circumstances that would result in temporary planned or unplanned cessation of
1636 operations. All Project components will reflect a preliminary-engineering level of detail with supporting
1637 schematics where applicable. Permit-level detail may be developed and reported concurrent with the EIS
1638 where appropriate.

1639 The EIS will require additional details for the following topic areas in future Project Description
1640 submissions:

- 1641 • Process flows, including all activities associated with rock movement underground, at the surface,
1642 and transport off-site; flow supplies to the mine (e.g. cement, grout, aggregate) and materials
1643 leaving the mine (e.g. ore, reverse osmosis waste solids, fines, municipal type waste); extended
1644 suspensions of production, planned shutdowns (e.g. maintenance), and/or emergencies (e.g.
1645 equipment malfunctions); and potential contingency or adaptive measures
- 1646 • Overburden removal during construction, including the volume and characterization of the
1647 overburden removed, the timing of peat excavation, and methods for proper disposal
- 1648 • Illustration of all aspects of ore, waste rock and aggregate management that are included in all
1649 aspects of the mining operation
- 1650 • Provide all overburden, mine waste rock and ore stockpile locations, volume, height, slopes and
1651 footprints, whether located in the Ore Transfer Building or elsewhere
- 1652 • Full list of target metals to be extracted
- 1653 • Site and building sizing, safety, and control of contaminants
- 1654 • Mine portal construction
- 1655 • Sequential Excavation Methods to construct the Decline Ramp in the overburden, including
1656 engineering evaluation and specifications for Soil Mixing or Cutoff Cell methods
- 1657 • Construction of the Decline Ramp in bedrock, including engineering evaluation of drill-and-blast
1658 methods
- 1659 • Construction and reinforcement of ventilation raises
- 1660 • The volume of waste rock generated by different extraction methods and the space required to

1661 handle them, considering void space

1662 • Mine heating requirements details

1663 • Construction of the railway spur and roads and associated disturbance

1664 • Rail transport of ore and waste rock

1665 • Railcars including gondola design, ore, waste rock, and mine fines loading, cover placement;

1666 spillage prevention; and dust control

1667 • Project water balance and estimated discharge quantities

1668 • Water treatment facilities and anticipated treatment technologies

1669 • Emergency egress routes for each part of the mine, including the vertical vent shaft and ladderway

1670 dimensions and their capacity for an emergency rescue team to remove injured mine workers

1671 • Closure of and reclamation of the underground and above ground facilities

1672 • All aspects of backfill, including methods to determine the location and timing of backfill

1673 placement, subsidence prevention, sources and chemical parameters of backfill aggregate, grout

1674 and other materials, aggregate storage locations and methods, and methods to prepare backfill

1675 materials

1676 • Ore Transfer Building, including railcar handling; storage capacity at full production; portal entry;

1677 air pressure and air filtration management systems; haul truck management; crushing building;

1678 backfill plant; and all supporting operations and components

1679 • Sequential Excavation Method, including timing; equipment requirements (e.g. shotcrete hauler

1680 and loader); staging areas; earthmoving; off-site material transport; Soil Mixing; cut off wall;

1681 bedrock transport to the Ore Transport Building; dewatering; and dust control

1682 • Blasting, including blasting equipment and materials; timing; Decline Ramp construction;

1683 potential blasting designs, including space and depth of blast holes (e.g. Run of Mine); rock size

1684 optimization; dust and blasting gases controls; and expired blasting agents

1685 • Site preparation, including historic land use and existing conditions; equipment; timing; proposed

1686 demolition of existing infrastructure, buildings, and utilities; removal of existing septic systems

1687 and/or leach fields

1688 • Materials/supplies delivered to the site, including cement and amendment materials; shotcrete;

1689 maintenance deliveries; aggregate

1690 • Rail construction, including engineering proposed for upland, shallow wetlands, and deeper

1691 wetlands; dewatering; soil removal (e.g. peat; unconsolidated sediments; muck); and BMPs

1692 • Surface disturbance, including updated affected acreage estimates; temporary (e.g. construction)

1693 versus operational disturbance; equipment staging and movement such as access to various areas

1694 of the site, maneuvering equipment, placement of construction cranes, conducting earthwork

1695 activities, placement of aerial or underground utility lines.

1696 • The underground mine works, including size and depth in three dimensions of the Underground

1697 Boundary Area and mine infrastructure; equipment (e.g. haul trucks); drill and blast development;

1698 drift and fill mining; longhole stoping; mucking; backfill; grouting; sumps and fines; emergency

1699 egress; and ventilation raises

1700 • The ventilation system, including surface raises; fans; ducting; air movement pathways; volumes;

1701 ventilation circuits; exhaust stacks; and monitoring systems

1702 • CRF, including plant; cement use, transport to site, and potential sources; water use; backfill

1703 mixture(s); equipment; and aggregate management

1704 • Aggregate resources, including aggregate sources; volumes; equipment; transport; storage; and

1705 anticipated throughput

- Cold-weather mining operations, including special measures; equipment maintenance; ventilation; heat recovery; humidity control; and ventilation plume (e.g. visibility)
 - Reclamation and closure, including draft closure plan; equipment; closure and postclosure maintenance; facility removal and revegetation; post-closure infrastructure; Decline Ramp; potential beneficial uses; water management, including first flush; and potential bulkhead sealing
 - The volume of waste rock to be used as backfill without binding and CRF, including the estimated percentages of mine voids to be filled with CRF and with uncemented waste rock
 - Staffing levels for the Project
 - Waste Characterization Report for ore, waste rock, overburden, underground fines and backfill materials
 - Economic reporting that could include anticipated employment, royalties, taxes and other areas
 - Reclamation and closure conditions established to inform the DNR Permit to Mine
 - Identification of any faults, fractures and other mine conditions on which the preliminary inflow was calculated
 - Hydraulic analysis to confirm the capacity of ditches to convey discharges of treated water and remain stable
- Other topics may be expanded upon during the EIS process as potential permitting-level detail becomes available.

7. Climate Adaptation and Resilience:

a. Climate Trends

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 during the life of the project.

Project Area Historical Climate

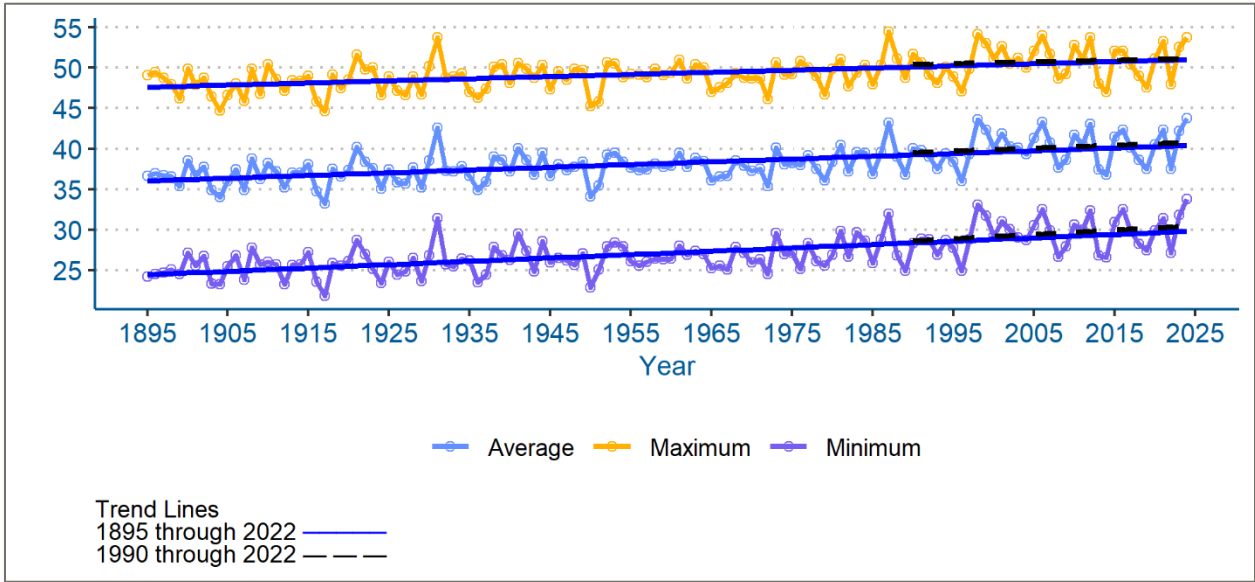
Historical climate trends for the region in which the Project Area is located were obtained from the Minnesota Climate Explorer Tool (MDNR, 2023B) and based on data provided by the National Oceanic and Atmospheric Administration (NOAA) National Center for Environmental Information (NOAA, 2023). Historical temperature and precipitation trends for the Mississippi River – Grand Rapids watershed is summarized below.

Graphic 7-1 summarizes the historical climate trends within the region where the Project Area is located. Historical annual average temperature trends have increased by a rate of approximately 0.32°F (0.18°C) per decade from 1895 through 2022 and 0.11°F (0.06°C) per decade from 1990 through 2022. Maximum annual temperature trends have increased by a rate of approximately 0.25°F (0.14°C) per decade from 1895 through 2022 and stayed nearly constant from 1990-2022 at -0.04°F (-0.02°C) per decade. Historical average minimum temperature trends have increased by a rate of approximately 0.39°F (0.22°C) per decade from 1895 through 2022 and by 0.25°F (0.14°C) per decade from 1990 through 2022 (MDNR, 2023B).

By mid-century, Aitkin County is projected to experience an increase in annual average temperatures of approximately 3°F (1.67°C), with more frequent hot days above 90°F (32.2°C) and warmer nighttime minimums, particularly in winter and spring. While annual precipitation is expected to increase, the number of wet days is projected to remain relatively constant, resulting in more rainfall during events.

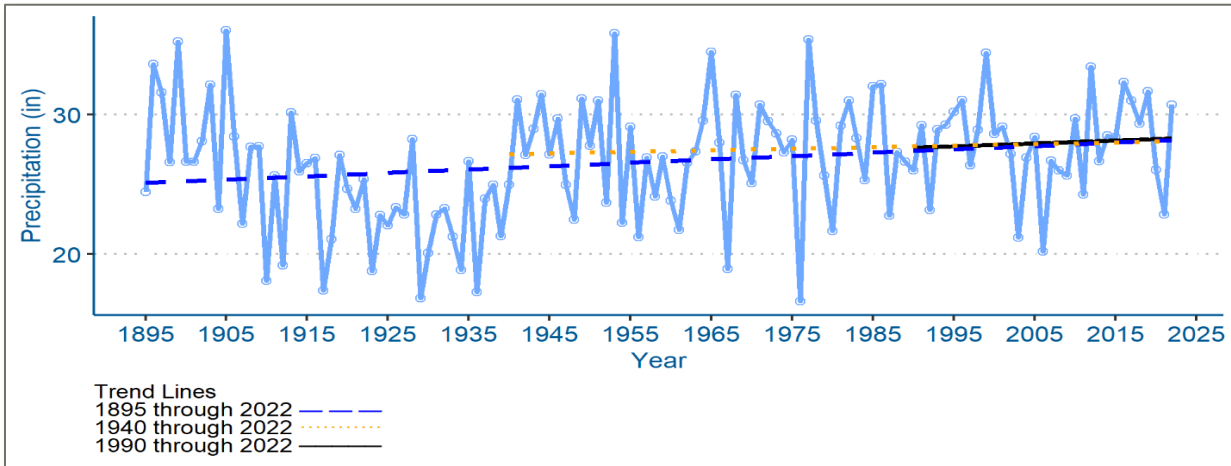
Despite these changes, the overall climate is anticipated to remain within the historical range of variability already considered in project design (U.S. Global Change Research Program, n.d.).

Graphic 7-1 Annual Temperature for the Mississippi River-Grand Rapids watershed from 1895 through 2022



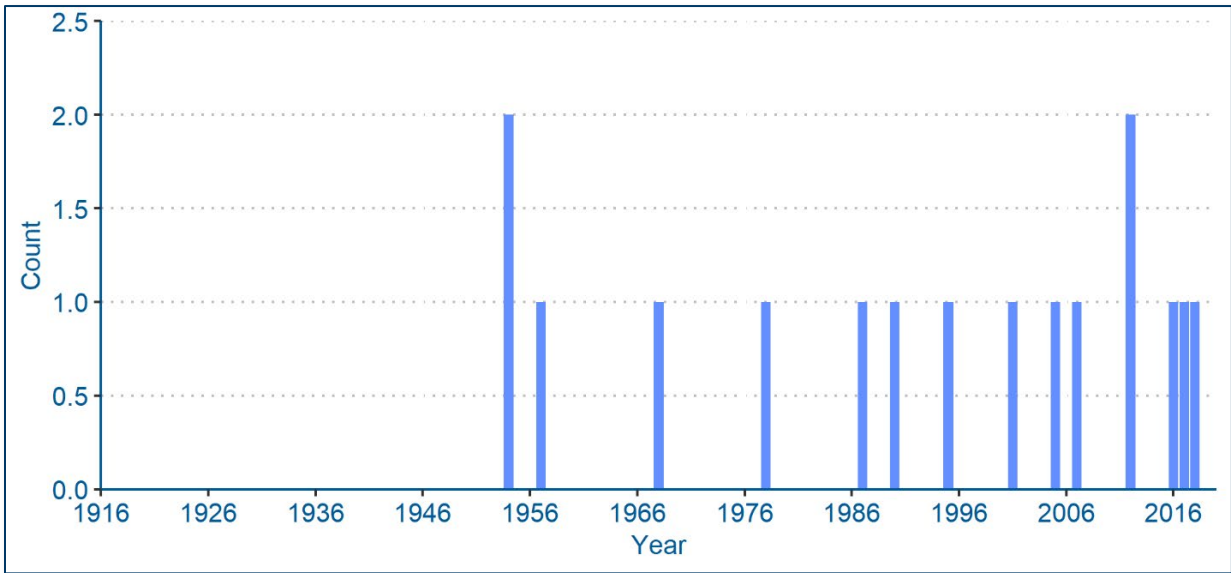
Graphic 7-2 summarizes the historical annual precipitation within the region where the Project Area is located. The overall annual precipitation trend from 1895 through 2022 shows an increase of approximately 0.24 inches (6.1 mm) per decade. This period captures both long-term climate variability and historical events, such as the drought from 1910-1940, which heavily influences the overall trend. To provide context for contemporary conditions, recent data from 1990-2022 were reviewed, showing an increased trend of 0.21 inches (5.3 mm) per decade. This recent period reflects more contemporary climatic patterns relevant to current project planning.

Graphic 7-2 Annual Precipitation for Mississippi River – Grand Rapids Watershed from 1895 through 2022



The Mississippi River – Grand Rapids watershed has experienced an upward trend in annual precipitation, accompanied by an increase in the frequency of severe storm events in Minnesota since 1950 (Graphic 7-2). The data presented in Graphic 7-3 represents the number of 100-year storm events from 1916 to 2020 for 38 precipitation monitoring stations across Minnesota, including Ada, Canby, Cass Lake, Cloquet, Collegeville, Crookston, Duluth, Faribault, Grand Marais, Grand Meadow, Grand Rapids, Gull Lake Dam, Hallock, Itasca, Leech Lake Dam, Milaca, Milan 1NW, Montevideo, Mora, Morris, MSP, Park Rapids, Pine River Dam, Pipestone, Pokegama, Red Wing, Redwood Falls (Municipal), Rochester, Sandy Lake Dam, St. Cloud, St. Peter, Tracy, Two Harbors, Waseca, Wheaton, Winnebago, Winnibigoshish and Zumbrota.

Graphic 7-3 Number of 100-year Storm Events from 1916 to 2020 for 38 Stations in Minnesota

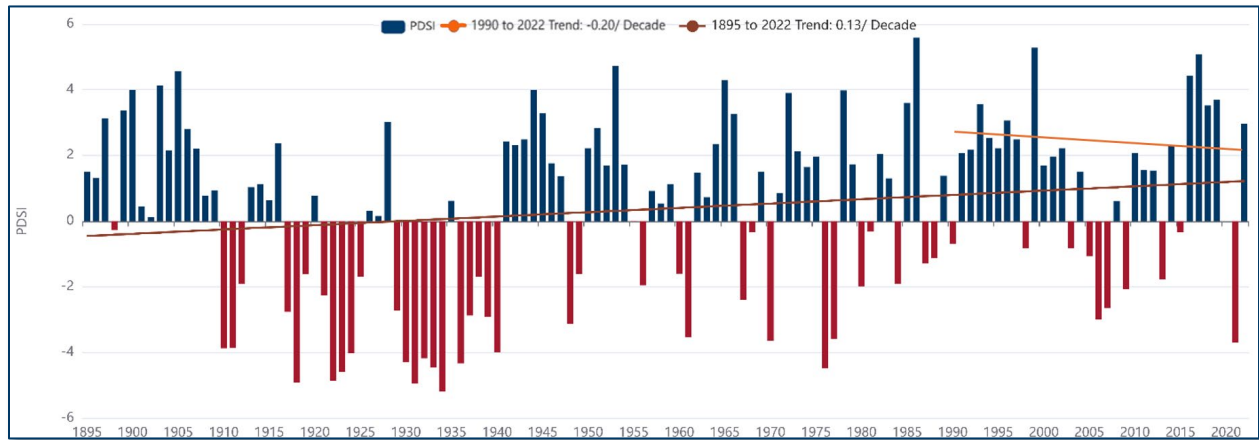


The Palmer Drought Severity Index (PDSI) evaluates the increasing risk of drought by quantifying the duration and intensity of drought-inducing circulation patterns. Drought is generally defined as a prolonged deficiency of precipitation over an extended period, typically lasting a season or more. The PDSI is calculated on a monthly time scale but accounts for cumulative effects, meaning the drought intensity during a given month depends not only on current weather patterns but also on the moisture balance from preceding months. This cumulative methodology enables the PDSI to capture both monthly variations and persistent drought conditions that span seasons or years, providing a more comprehensive measure of drought severity across different time frames.

The index utilizes temperature and precipitation data to estimate soil moisture conditions, incorporating the influence of global warming through changes in potential evapotranspiration. It is a standardized metric where positive values indicate moisture surplus, and negative values indicate moisture deficit, generally ranging from -4 (severe drought) to +4 (severe wet conditions), with extreme values falling outside this range. Graphic 7-4 presents historic PDSI values for September (MDNR, 2023B), chosen to be conservative because late summer and early fall (August and September) often experience relatively dry conditions. This period is typically marked by reduced rainfall, higher temperatures, and increased evapotranspiration rates, which can exacerbate soil moisture deficits and contribute to meteorological drought. The dataset spans 1895 to 2022 for the Mississippi River - Grand Rapids watershed. The data

reveal, a mean of 0.38, and a gradual upward trend in PDSI values, approximately 0.13 per decade, indicating a shift toward wetter conditions over this time frame. This trend is evident in the predominance of positive PDSI values over time, as depicted in the graph. To provide context for contemporary conditions, recent data from 1990-2022 were reviewed, showing a downward trend in PDSI values of -0.20 per decade, suggesting the region is drier in September but remains predominantly wet overall, with a mean PDSI of 1.26.

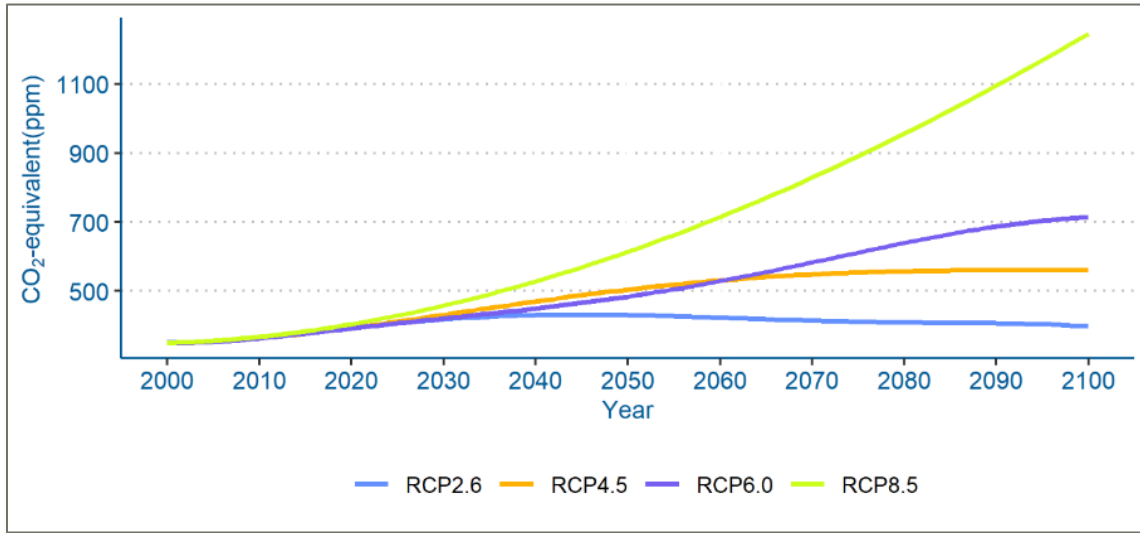
Graphic 7-4 September Palmer Drought Severity Index for the Mississippi River-Grand Rapids Watershed



Project Area Future Climate

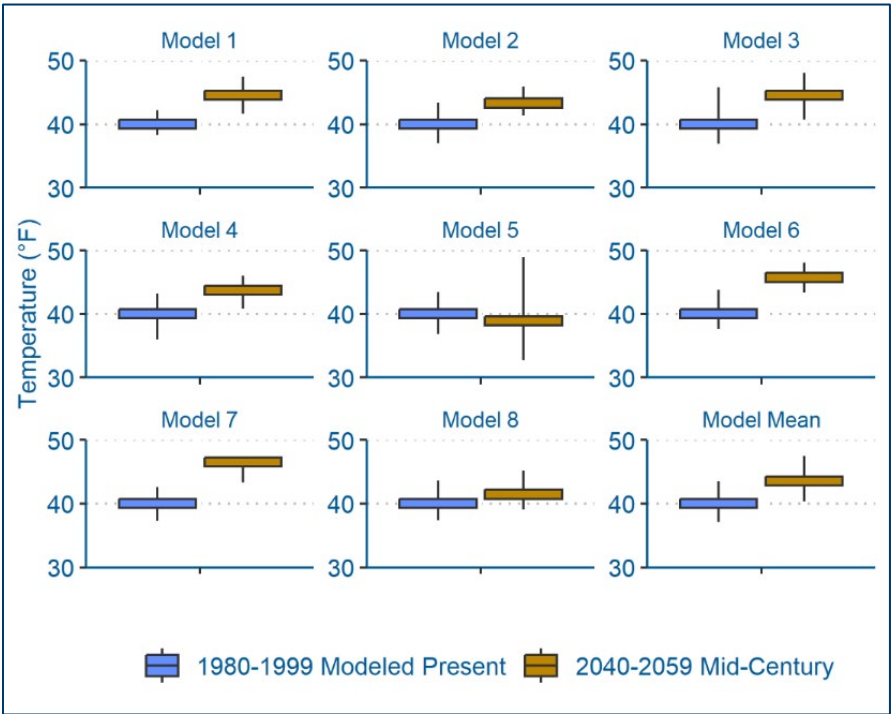
The future climate projections are based on a downscaled modeled dataset developed from the University of Minnesota (UMN). A more detailed analysis of the future climate would be addressed in the EIS. The UMN projected climate data summarized in two scenarios, Representative Concentration Pathway (RCP) 4.5 and RCP 8.5. RCP is a measure adopted by the Intergovernmental Panel on Climate Change (IPCC) to represent various greenhouse gas concentration pathways (Graphic 7-5). The RCPs model potential greenhouse gas concentrations and the warming effects on a global scale, rather than predicting specific emissions levels. This global framework facilitates the evaluation of broader climate outcomes, which are then applied regionally by downscaling data to Minnesota. 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 (UMN, 2019). Radiative forcing is the term used to describe the impact trapped solar radiation has on earth's climate. The energy from this radiation can force climate change (Massachusetts Institute of Technology, 2020).

Graphic 7-5 Intergovernmental Panel on Climate Change Representative Concentration Pathways from the Fifth Assessment Report



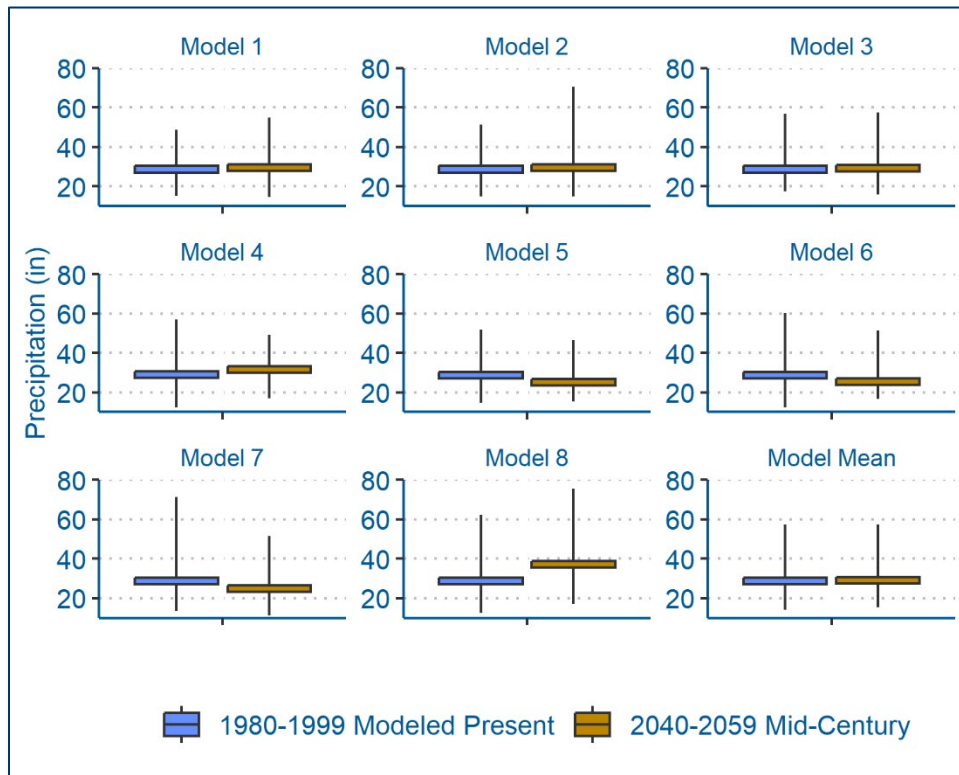
The UMN projected data is published for eight different climate models (UMN, 2019). Graphic 7-6 shows the projected change in average temperature for the Mississippi River – Grand Rapids watershed. Changes in future annual average temperature projections for the Mississippi River - Grand Rapids watershed vary by climate model from the 1980-1999 30-year average baseline. For 2040 to 2059 under RCP 4.5, the temperature is projected to change by -3% (38.9°F (3.83°C)) to +16% (46.6°F (8.11°C)) across the models with an average increase of +9% (43.6°F (6.44°C)) (UMN, 2019). Graphic 7-6 shows modeled temperature trends in a different format.

Graphic 7-6 Projected Annual Temperature Trends in the Mississippi River – Grand Rapids Watershed for Scenario RCP 4.5



Graphic 7-7 shows the projected annual precipitation trend for the Mississippi River – Grand Rapids watershed. Changes in future annual average precipitation projections for the Mississippi River – Grand Rapids watershed vary by climate model from the 1980-1999 30- year average baseline. For 2040 to 2059 under RCP 4.5, annual average precipitation is projected to change by -14% (24.8 in (0.63 m)) to +29% (37.1 in (0.94 m)) across the models with an average increase of +1% (29.0 in (0.74 m)) (UMN, 2019).

Graphic 7-7 Projected Annual Precipitation Trends for Mississippi River – Grand Rapids Watershed for Scenario RCP 4.5



The EPA Climate Resilience Evaluation and Awareness Tool anticipates an increase in 100-year storm intensity of 13.5% in 2030 and 26.3% in 2060 (EPA, 2022B). These projections suggest heightened storm intensity over the long term. Stormwater management and infrastructure design will account for current and anticipated storm intensities to support project resilience throughout its lifespan, (7-10 years). This approach will ensure that the project's systems are appropriately designed to handle foreseeable conditions as informed by current climate data.

The EPA Streamflow Projections Map anticipates an increase in annual daily average streamflow by a ratio of 1.2-1.4 for the period 2071 to 2100 under RCP 8.5, compared to baseline historical flow from 1976-2005 (Bureau of Reclamation, 2014). These projections offer a general view of potential long-term streamflow changes based on annual averages. The methodology and sources for future climate change projections used in the various assessments would be detailed in the EIS data submittal.

Project operations are anticipated to last 7-10 years and therefore long-term climate change, except for the already observed increase in extreme rainfall events, would have minimal impact on the location, during the proposed project period. A more detailed analysis of climate change impacts during the project life will be addressed in the EIS, which will include an evaluation of evapotranspiration.

b. Resource Category

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

Given the relatively short project life of 7-10 years, long-term climate changes are unlikely to have a major impact on the Project. However, the region has experienced more intense rain events in recent years, and this would be incorporated into Project design. Table 7-1 describes adaptations that could be utilized to address future intense rain events.

Table 7-1 Summary of Climate Considerations and Adaptations

Resource Category	Climate Considerations (example text provided below is to be replaced with project-specific information)	Project Information	Adaptations
Project Design	More frequent and intense rain events	The Project would convert an open area to an industrial area, resulting in loss of wetlands and associated flood storage, forest cover, and reduced carbon sequestration. A portion of the upland area may be used for agricultural production.	Maintain existing vegetation where feasible. Plant buffer strips and additional vegetation. Minimize wetland impacts by reducing the development footprint and maximizing use of uplands
Land Use	More frequent and intense rain events	No FEMA floodplains are in the Project Area; however, it includes a wetland complex.	Construct stormwater best management practices (BMPs), including two stormwater ponds to reduce runoff velocities, erosion potential, and runoff volumes.
Water Resources	Climate-related impacts addressed in item 12.	Address in item 12	Address in item 12

Resource Category	Climate Considerations (example text provided below is to be replaced with project-specific information)	Project Information	Adaptations
Contamination/ Hazardous Materials/Wastes	More frequent and intense rain events	Fuel will be stored on-site. A warmer and wetter climate may impact secondary containment. Hazardous wastes may be generated.	Use Above Ground Storage Tanks (ASTs) with double-walled construction meeting MPCA standards. Track and manage hazardous materials per regulatory requirements.
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	Address in item 14.	Address in item 14.	Address in item 14.
Site Infrastructure & Earthworks	Intense rainfall and runoff variability	Graded surfaces and drainage systems established for project layout.	Use engineered slopes and flood-resilient grading. Design site drainage to accommodate increased storm intensity.
Buildings & Facilities	Seasonal temperature extremes and freeze-thaw variability	Most project activities occur indoors with enclosed, climate-controlled environments.	Ensure buildings are designed for thermal efficiency. Incorporate passive systems where applicable.
Transportation & Access	Seasonal freeze-thaw and localized flooding	Access via CSAH 31 and rail spur to BNSF line. Increased peak traffic during shift changes.	Use durable surfacing materials. Design culverts and swales to handle heavier rainfall.

Resource Category	Climate Considerations (example text provided below is to be replaced with project-specific information)	Project Information	Adaptations
Water Management Systems	Increased storm event intensity	More frequent high-flow events.	Design ponds and conveyances to manage extreme rainfall.
Water Management Systems	Reduced annual precipitation	Contact water is collected and reused when possible	Facility is less reliant on wells to source non-potable water
Energy Systems	Climate-resilient operations and emergency readiness	Project includes surface and underground ventilation and electrical systems.	Install emergency generators. Design facilities to maintain indoor conditions under variable climate loads.
Ecological Restoration & Reclamation	Long-term climate variability, drought resilience	Closure and revegetation to be planned at end of mine life.	Use native species suited to projected climate. Apply soil stabilization techniques and adaptive erosion control.

1857

Proposed Treatment in EIS: Climate Adaptation and Resilience

☐	The topic is not significant or is adequately addressed in the SEAW. The same information from the EAW will be included in the EIS.
☒	The topic may be significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.2.
☐	The topic is significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.3.

8. Cover Types

Estimate the acreage of the site with each of the following cover types before and after development.

Cover Types within Project Boundary (Surface and Underground)	Before (acres)	Change due to Operations	During Operations (acres)	Change due to Closure	After Closure (acres)
Wetlands, shallow lakes (<2 meters deep) and ditches (public drainage systems)	271.5	-18.83	252.67	0	252.67
Deep lakes (>2 meters deep)	0	0	0	0	0
Existing Excavated Ponds	2.6	-2.3	0.3	3.8	4.1
Wooded/forest	49.4	-22.73	26.67	0	26.67
Rivers and/streams	0	0	0	0	0
Brush/Grassland	3.6	-0.1	3.5	60.54	64.04
Cropland	0	0	0	0	0
Livestock rangeland/pastureland	33.1	-13.4	19.7	0	19.7
Lawn/landscaping	0	0	0	0	0
Green infrastructure	0	0	0	0	0
Developed/Impervious surface	18.7	40.6	59.32	-47.57	11.75
Industrial Stormwater Ponds (wet sedimentation basin)	0	3.8	3.8	-3.8	0
Other (created upland)	0	12.97	12.97	-12.97	0
TOTAL	378.9	0	378.9	0	378.9

Green Infrastructure*	Before (acres)	After (acres)
Constructed infiltration systems (infiltration basins/infiltration trenches/ rainwater gardens/bioretenion areas without underdrains/swales with impermeable check dams)	0	0
Constructed tree trenches and tree boxes	0	0
Constructed wetlands	0	0
Constructed green roofs	0	0
Constructed permeable pavements	0	0
Other (describe)	0	0
TOTAL*	0	0

Trees	Percent	Number
Percent tree canopy removed or number of mature trees removed during development	23.2	Unknown

Number of new trees planted	TBD ¹	TBD
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1862 ¹As potential mitigation measures for visual and noise impacts, the Project is considering augmenting the
1863 existing natural buffer with additional trees. However, the quantity and extent have not been determined.

1864 9. Permits and Approvals Required

1865 List all known local, state and federal permits, approvals, certifications and financial assistance for the
1866 project. Include modifications of any existing permits, governmental review of plans and all direct and
1867 indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and
1868 infrastructure. All of these final decisions are prohibited until all appropriate environmental reviews have
1869 been completed. See Minnesota Rules, Chapter 4410.3100.

Unit of Government	Type of Application	Status
United States Army Corps of Engineers (USACE)	Clean Water Act Section 404 Permit Includes Section 106 Consultation with the State Historic Preservation Office and Section 7 Consultation with the U.S. Fish and Wildlife Service (USFWS)	Pending submittal
United States Fish and Wildlife Service	Section 7 determination of effect concurrence	Pending submittal; issued with Section 404 Permit
DNR	Permit to Mine	Pending submittal
DNR	Natural Heritage Information System Protected Species Review	Pending submittal
DNR	Work in Public Waters Permit	Pending submittal
DNR	Water Appropriation Permit	Pending submittal
DNR	Wetland Conservation Act Replacement Plan Approval	Pending Submittal
DNR	License to Cross Public Waters	Pending Submittal
DNR	License to Cross Public Lands	Pending Submittal
DNR	Lease/Easements on Public Lands	Pending Submittal
DNR	Aquatic Vegetation Removal Permit	Pending Submittal
MPCA	National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS) Individual Wastewater Permit	Pending submittal
MPCA	NPDES/SDS Industrial Stormwater General Permit (or combined with Individual Wastewater Permit)	Pending submittal

Unit of Government	Type of Application	Status
MPCA	NPDES/SDS Construction Stormwater General Permit	Pending submittal
MPCA	Section 401 Water Quality Certification	Pending submittal; issued with Section 404 Permit
MPCA	Air Permit	Pending submittal
MPCA	Hazardous Waste Generator License	Pending submittal
MPCA	Aboveground Storage Tank Notification	Pending submittal
MPCA	Aboveground Storage Tank Permit	Pending submittal
Minnesota Department of Administration – Office of State Archaeologist (OSA)	License	--
MDH	Water Supply Well Notification	Pending submittal
MDH	Water Supply Well Plan Review and Approval	Pending submittal
Minnesota Department of Labor and Industry	Approval of plumbing plans	Pending submittal
Minnesota Department of Transportation (MnDOT)	Railroad Warning Signal Operator License	Pending submittal
State Historic Preservation Office (SHPO)	Section 106 concurrence	Pending submittal; issued with Section 404 Permit
Aitkin County	Building Permits	Pending submittal
Aitkin County	Conditional Use Permit	Pending submittal

1870 Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos.
1871 10-20, or the RGU can address all cumulative potential effects in response to EAW Item No.22. If addressing
1872 cumulative effect under individual items, make sure to include information requested in EAW Item No. 21.

1873 10. Land Use:

1874 a. Describe:

1875 i. Existing Land Use

1876 Existing land use of the site as well as areas adjacent to and near the site, including parks and open space,
1877 cemeteries, trails, prime or unique farmlands.

1878 The Project is in Aitkin County on a combination of state and private lands within the 1855 Treaty Ceded
1879 Territory boundary and is located approximately 2.0 miles (3.2 km) west of the adjudicated 1854 Treaty
1880 Ceded Territory area.

1881 There are a handful of structures within the Project Area, including farmsteads and infrastructure
1882 associated with Talon's current exploratory drilling program. Existing land use within and adjacent to the
1883 Project Area includes industrial development (environmental studies, geophysical surveys and exploratory
1884 drilling), farmsteads and associated pastures/hay fields, areas of upland forest, timber harvesting tree
1885 plantations and large wetland complexes. Some of the land in the area was ditched and drained several
1886 decades ago for agricultural purposes.

1887 Portions of the Project Area would lie within Savanna State Forest, which would include a small section of
1888 surface infrastructure and the underground mine. The larger surrounding area includes other land areas
1889 that -- while not directly impacted by the Project -- are worth noting in the context of the local watersheds.

1890 The Savanna State Forest is a 218,450-acre State Forest in northeastern Aitkin County. It contains a mix
1891 of hilly hardwood terrain and wild grass meadows, with the Mississippi River on the western border. The
1892 DNR administers 150,000 acres of the forest, which offers both timber harvest and recreation such as
1893 camping, hunting, fishing, and various trail uses. The forest also contains Savanna Portage, a six-mile
1894 portage that links the West Savanna River of the Mississippi River system with the East Savanna River,
1895 which eventually empties into the Great Lakes.

1896 Savanna Portage State Park is located approximately 7.0 mi (11.3 km) northeast of the Project Area and
1897 is a notable recreational resource. The over 16,000-acre park was created in 1961 to preserve the historic
1898 Savanna Portage Trail, a six-mile portage across marsh, swamp and forest. The portage route was long
1899 used by the Dakota and Ojibwe people, explorers, and voyageurs. It contains diverse plants and wildlife,
1900 as well as 22 miles of hiking trails. The park also offers other forms of recreation such as fishing and
1901 camping.

1902 Grayling Marsh Wildlife Management Area (WMA) is approximately 2.5 mi (4.0 km) west of the Project
1903 Area. The WMA consists of uplands of primarily aspen and low areas that are predominantly brush and
1904 grass. A wetland impoundment is located in the west portion of the area. The lowland habitats in the
1905 WMA are managed for open land wildlife species such as sharp-tailed grouse and sandhill cranes. It
1906 provides opportunities for observation of waterfowl, deer, bear and wolves, as well as hunting
1907 opportunities for several game species.

1908 Big Sandy Lake is located approximately 8.0 mi (12.9 km) northwest of the Project Area. Big Sandy Lake
1909 has 57 mi (91.7 km) of shoreline and a surface area of 6,523 acres. The lake is a popular place for fishing
1910 and recreation, with permanent and seasonal homes and cabins, public access, resorts and the recreation
1911 area operated by the USACE. The recreation area contains a campground and offers fishing, boating,
1912 camping, swimming, and wildlife viewing opportunities. Big Sandy Lake holds significance to Ojibwe bands
1913 as the location of the Sandy Lake Tragedy, and the memorial site is located on the northwest side of the
1914 lake.

1915 These areas provide important habitat and recreational opportunities. Although the Project is not
1916 anticipated to have direct or indirect impacts on these areas, they are part of the broader regional context
1917 and watershed.

1918 A snowmobile trail traverses through the southern part of the Project Area. The trail is managed by the
1919 Tamarack Sno-Flyers snowmobile club, which grooms approximately 155 miles (249.4 km) of trails in Aitkin
1920 County. Funding comes from the DNR's grant-in-aid (GIA) program. The DNR has been delegated the
1921 responsibility of administering the funds appropriated by the legislature for the GIA program

1922 No parks or other recreational resources are present in the immediate Project Area. Public access to the
1923 active Project Area would be restricted year-round for safety reasons, precluding hunting within the mine
1924 site. No additional seasonal restrictions beyond existing state hunting regulations are proposed. Hunting
1925 opportunities on adjacent public lands would remain available subject to DNR regulations. Additional
1926 information regarding the cultural resource potential for the Project is discussed in Section 15 (Historic
1927 Properties).

1928 There are no cemeteries located in the Project Area. Small areas of prime farmland (6%) and prime
1929 farmland if drained (10%) are located in the southern part of the Project Area. However, the majority of
1930 the Project Area (84%) is not classified as prime farmland per the United State Department of Agriculture
1931 - Natural Resources Conservation Service classifications (NRCS, 2022).

1932 **ii. Planned Land Use**

1933 *Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan*
1934 *for land use, water, or resources management by a local, regional, state, or federal agency.*

1935 The Project Area is located just north of the City of Tamarack in Clark Township. The City of Tamarack is
1936 currently in the process of developing a comprehensive land use plan. No comprehensive land use plan
1937 exists for Clark Township (City of Tamarack, 2021).

1938 The Project Area is located in Aitkin County and falls under the Aitkin County Comprehensive Land Use
1939 Management Plan (Aitkin County Plan) (Aitkin County, 2000). The mining activity associated with the
1940 Project would result in a further conversion of land use from open to industrial land use. The Aitkin County
1941 Plan discusses mineral resources in the context of commercial and industrial development and promotes
1942 continued (but careful) exploration of mineral resources so the location and extent are known.
1943 Additionally, the Aitkin County Plan emphasizes that extraction of minerals should follow state mineral
1944 regulations and assures environmental protection for all new non-sand and gravel mining proposals
1945 (Aitkin County, 2000).

1946 The Project Area falls under the Upper Mississippi Grand Rapids Comprehensive Watershed Plan (Grand
1947 Rapids Watershed, 2025). The plan discusses short and long-term goals for lakes, streams, farms, forests,
1948 wetlands, stormwater and groundwater in the watershed, and was developed through collaboration
1949 between local governments within the watershed. Since the Project is in this watershed, Talon will need
1950 to ensure that project elements and impacts are compatible with the plan. Mining impacts to groundwater
1951 and surface water quality were identified as local concerns, citing monitoring as a key to best protecting
1952 resources.

1953 There are Aitkin County-administered parcels of forested land in the vicinity of the project. These parcels
1954 are managed under the Aitkin County Tactical Forest Management Plan 2022-2026 (Aitkin County, 2021).
1955 The plan accompanies the Aitkin County Strategic Forest Management Plan (100-year plan) which has
1956 several initiatives, including but not limited to; enhancing northern hardwoods, maintaining forest cover
1957 types, and focusing recreational management on provision of dispersed recreation and trails. The five

1958 2022-2026 plan objectives are to invest in forest resource development, ensure ecosystem services,
 1959 source traditional and non-timber forest products, construct and maintain infrastructure and provide
 1960 other direct county services. Talon would need to ensure that any project impacts are compatible with
 1961 these plans and any subsequent plans that are published during the life of mine.

1962 The Proposed Project is located entirely in the 1855 Treaty Ceded Territory. The lands within the 1855
 1963 Treaty Ceded Territory were ceded by the Mississippi, Pillager, and Lake Winnibigoshish Bands of Ojibwe
 1964 to the United States government in the 1855 Treaty of Washington (1855 Treaty). The ceded lands are to
 1965 the west of the 1854 Treaty of La Pointe (1854 Treaty) Ceded Territory. Unlike the 1854 Treaty with the
 1966 Fond du Lac, Boise Forte, Grand Portage Bands of Ojibwe et.al., and the 1837 Treaty of St. Peters with the
 1967 Mille Lacs Band of Ojibwe et.al., the 1855 Treaty has no language in it expressly reserving the rights of the
 1968 signatory Bands to hunt, fish and gather in the 1855 Treaty Ceded Territory.

1969 There are two Ojibwe Reservations within the 1855 Treaty Ceded Territory, the White Earth Reservation,
 1970 and the Leech Lake Reservation. The larger Leech Lake Reservation is located approximately 65 miles
 1971 northwest of the Proposed Project. The Leech Lake Reservation encompasses over 864,000 acres within
 1972 the reservation boundaries. Within the Leech Lake Reservation boundaries is a mixture of tribal, state,
 1973 federal and private land holdings. Within the boundary of the Reservation, the State and the Leech Lake
 1974 Band each undertake management activities of the fish and wildlife resource. The Leech Lake Band
 1975 regulates the harvest of fish, wildlife, and wild rice by its members within the Leech Lake Reservation
 1976 boundaries in accordance with its tribal code. The state regulates the harvest of fish and wildlife by non-
 1977 tribal members within the boundary of the Leech Lake Reservation on all non-tribal lands and public
 1978 waters. The harvest of wild rice within the boundaries or the Leech Lake Reservation by non-tribal
 1979 members, except in rare circumstances, is precluded by state statute. Minn. Stat. § 84.111, subd. 5(1).
 1980 The White Earth Reservation is located west of the Leech Lake Reservation, approximately 104 miles from
 1981 the Project Area.

1982 The Project is located approximately two miles west of the boundary of the 1854 Treaty Ceded Territory,
 1983 which was created by the 1854 Treaty of La Pointe that ceded the northeast portion of present-day
 1984 Minnesota to the United States. There are three Ojibwe Reservations within the 1854 Treaty Ceded
 1985 Territory, the Bois Forte Reservation, the Fond du Lac Reservation and the Grand Portage Reservation.
 1986 The Fond du Lac Reservation within the 1854 Treaty Ceded Territory is approximately 18.5 miles east of
 1987 the Project Area. Along with other federally recognized Tribes, the Bois Forte Band of Chippewa, the Fond
 1988 du Lac Band of Lake Superior Chippewa and Grand Portage Band of Lake Superior Chippewa that reside
 1989 within the 1854 Treaty Ceded Territory retain hunting, fishing and other usufructuary rights that extend
 1990 throughout the entire 1854 Treaty Ceded Territory. These tribes jointly manage treaty resources within
 1991 the 1854 Treaty Ceded Territory with federal, state and county management entities. See Figure 1 that
 1992 includes an insert depicting the 1854 Treaty Ceded Territory.

1993 Along with these reservations in both the 1855 and 1854 Treaties Ceded Territories, there are a number
 1994 of Tribal Trust Parcels for several Minnesota tribes located within the greater project vicinity. These are
 1995 lands whose title is held by the United States government for the benefit of Native American tribes or
 1996 individual tribal member(s). Trust parcels identified to date include, but are not limited to:

- 1997 • Mille Lacs' Minnewawa Community (located ~seven miles to the west of the Project site)
- 1998 • Fond du Lac's Savanna Tribal Trust Parcel (located ~seven miles to the north of the Project site)

1999 • Mille Lacs' Sandy Lake Community (located ~ten miles to the northwest of the Project site)

2000 • Mille Lacs' Sandy Lake Community (located ~ten miles to the northwest of the Project site)

2001 • Mille Lacs' East Lake Community (located ~ten miles to the southwest of the Project site)

2002 • Fond du Lac's Prairie Lake Tribal Trust Parcel (located ~15 miles to the northeast of the Project site.)

2003 site.

2004 Mille Lacs' Sandy Lake Cemetery is located 10.6 miles to the northwest of the Project site.

2005 The 1854 Treaty Authority is an Inter-tribal Natural Resources Management Organization that manages

2006 the off-reservation hunting, fishing, and gathering rights of the Grand Portage Band of Lake Superior

2007 Chippewa and Bois Forte Band Chippewa in the 1854 Treaty Ceded Territory under legal agreement with

2008 the State of Minnesota. The 1854 Treaty Authority's mission statement is to "provide an Inter-Tribal

2009 natural resource program to ensure that the rights secured to member Native American tribes by treaties

2010 of the United States to hunt, fish and gather within the 1854 Treaty Ceded Territory shall be protected,

2011 preserved and enhanced for the benefit of present and future member Native American tribes in a manner

2012 consistent with the character of such rights, through provisions of services." The 1854 Treaty Authority's

2013 management of natural resources focuses on resources most important to and commonly utilized by the

2014 Bois Forte and Grand Portage Bands and as directed by their Tribal Councils.

2015 The exercise of usufructuary rights to hunt, fish, and gather by the Fond du Lac Band in the 1854 Treaty

2016 Ceded Territory is governed by the Fond du Lac Tribal Council. The Great Lakes Indian Fish and Wildlife

2017 Commission (GLIFWC) is directed by the Fond du Lac Tribal Council to provide technical support to the

2018 Fond du Lac Band in its exercise of usufructuary rights.

2019 *iii. Zoning*

2020 *Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical*

2021 *area, agricultural preserves, etc.*

2022 The Project is located in an area zoned by Aitkin County as Open and Farm Residential, and the portion of

2023 the Project Area located near the City of Tamarack is identified as "City" in the Aitkin County zoning map.

2024 Figure 11 shows tax-forfeited county-administered lands, state trust lands and state-administered lands

2025 within the consolidated conservation (Con-Con) area.

2026 The Project Area is not located within a designated shoreland area as defined by the Aitkin County

2027 Shoreland Management Ordinance.

2028 Example land uses in areas zoned as Open include: 1) duplex dwelling, dwelling – secondary unit; 2)

2029 agricultural and forestry uses; and 3) floodplains, swamp lands, and other areas unsuitable or unsafe for

2030 development (Aitkin County, 2017). Per the Aitkin County Zoning Ordinance, mining in areas zoned as

2031 Open or Farm Residential may occur in accordance with the Aitkin County Mining and Reclamation

2032 Ordinance.

2033 As stated in the Aitkin County Zoning ordinance, Section 6.01 "the Mining of metallic minerals ...", as

2034 defined in Minnesota Statutes, sections 93.4-93.51, are regulated under the provisions of the Aitkin

2035 County Mining and Reclamation Ordinance (Aitkin County, 2009). No amendment to the zoning

2036 classification would be required for the proposed mining activities, as the project aligns with the existing

2037 zoning regulations. A conditional use or interim use permit from Aitkin County is likely.

2038 **iv. Critical Facilities**

2039 *If any critical facilities (i.e., facilities necessary for public health and safety, those storing hazardous*
2040 *materials, or those with housing occupants who may be insufficiently mobile) are proposed in floodplain*
2041 *areas and other areas identified as at risk for localized flooding, describe the risk potential considering*
2042 *changing precipitation and event intensity.*

2043 No critical Project facilities would be located in Federal Emergency Management Agency (FEMA)-
2044 delineated floodplains or areas identified as at risk for localized flooding. Additionally, the Project has
2045 eliminated the outside storage of materials that could be potentially hazardous, further reducing potential
2046 risks related to flooding. Additionally, during the June 2012 500-year event which saw between 7 and 10
2047 inches of rainfall in a 24-hour period, the proposed upland location for the main surface facility was not
2048 affected by flooding. Given these measures and the site's resilience during past extreme events, the
2049 Project is well-positioned to mitigate potential flood-related risks.

2050 Additional assessment work will be performed, including hydrology and hydraulic modelling for the EIS.

2051 **b. Project Compatibility**

2052 *Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above,*
2053 *concentrating on implications for environmental effects.*

2054 The conversion of land use from open to industrial land use would occur as a result of the Project. The
2055 Project would be compatible with current zoning and the Aitkin County Plan. The Aitkin County Plan
2056 promotes exploration of mineral resources that follow state mineral regulations and assure
2057 environmental protection (Aitkin County, 2000).

2058 **c. Mitigation**

2059 *Identify measures incorporated into the proposed project to mitigate any potential incompatibility as*
2060 *discussed in Item 10b above and any risk potential.*

2061 With a conditional or interim use permit from Aitkin County, the Project would be compatible with
2062 current land uses. Consequently, no land use mitigation measures are incorporated into the
2063 Project.

2064 **Proposed Treatment in EIS: Land Use**

☐	The topic is not significant or is adequately addressed in the SEAW. The same information from the EAW will be included in the EIS.
☒	The topic may be significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.2.
☐	The topic is significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.3.

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.

Surficial Geology

Quaternary deposits include glaciolacustrine (glacial lake) sediments, till and re-worked till deposited by glacial ice, outwash and glaciofluvial sands and gravels (Figure 12). The glaciolacustrine deposits in the Project Area appear to be composed of clayey sediment and fine-grained sand with silt and clay layers (Lusardi, 2019). Various layers of till, outwash and glaciolacustrine sediments are present below the surficial sediments. These deposits represent a complex sequence of sediment recording multiple advances and retreats from the last glaciation which spanned 10,000-100,000 years ago. The glacial stratigraphy in the Project Area includes a relatively thick (typically 100-130 ft (30.5-39.6 m)) package of glacial sediments, with western-sourced pre-Wisconsinan tills and pre-Late Wisconsinan or pre-Wisconsinan Superior lobe tills overlain by the Wisconsinan Rainy Lobe (northeast-sourced) Independence Formation. In turn, the Independence Formation is overlain by the Superior-basin sourced Cromwell Formation, and lastly by the Aitkin Formation. The Aitkin Formation consists of Glacial Lake Aitkin 2, Prairie Lake, Nelson Lake and Alborn members containing sediments deposited from the advance and retreat of the St. Louis-sublobe. The result of this depositional history is a complex layering of coarse and fine-grained sediments, ranging from predominantly sand to predominantly silt/clay, along with mixed layers of diamicton. Individual layers vary in thickness and may or may not be laterally extensive.

Bedrock

Bedrock in the Project Area primarily consists of the Tamarack Intrusive Complex (TIC) and the Thomson Formation. The TIC was a mafic to ultramafic intrusion emplaced into slates and metagraywackes of the Thomson Formation during the early stages of the Mid-Continent Rift some 1.1 billion years ago (1.1 Ga) (Figure 13); ((Jirsa, 2011) and (Boerboom, 2009)). The Thomson Formation is part of the Paleoproterozoic Animikie Group which consists of sedimentary rocks that were deposited in a deep-water basin that formed adjacent to a newly forming mountain belt to the south during the Penokean Orogeny (approximately 1.8 Ga) and subsequently regionally metamorphosed. In the Project area, the Thomson Formation metasedimentary rock (SED) has been subsequently thermally metamorphosed by the TIC in a zone approximately 100-300 ft (30.5-91.5 m) thick along the TIC contact (Boerboom, 2009). The Thomson Formation strata are folded by nearly upright, open regional folds with single, subvertical axial-planar slaty cleavage (Boerboom, 2009). Sedimentary rock of the Cretaceous Coleraine Formation is locally present overlying the Thomson Formation though it is not mapped in the Project Area.

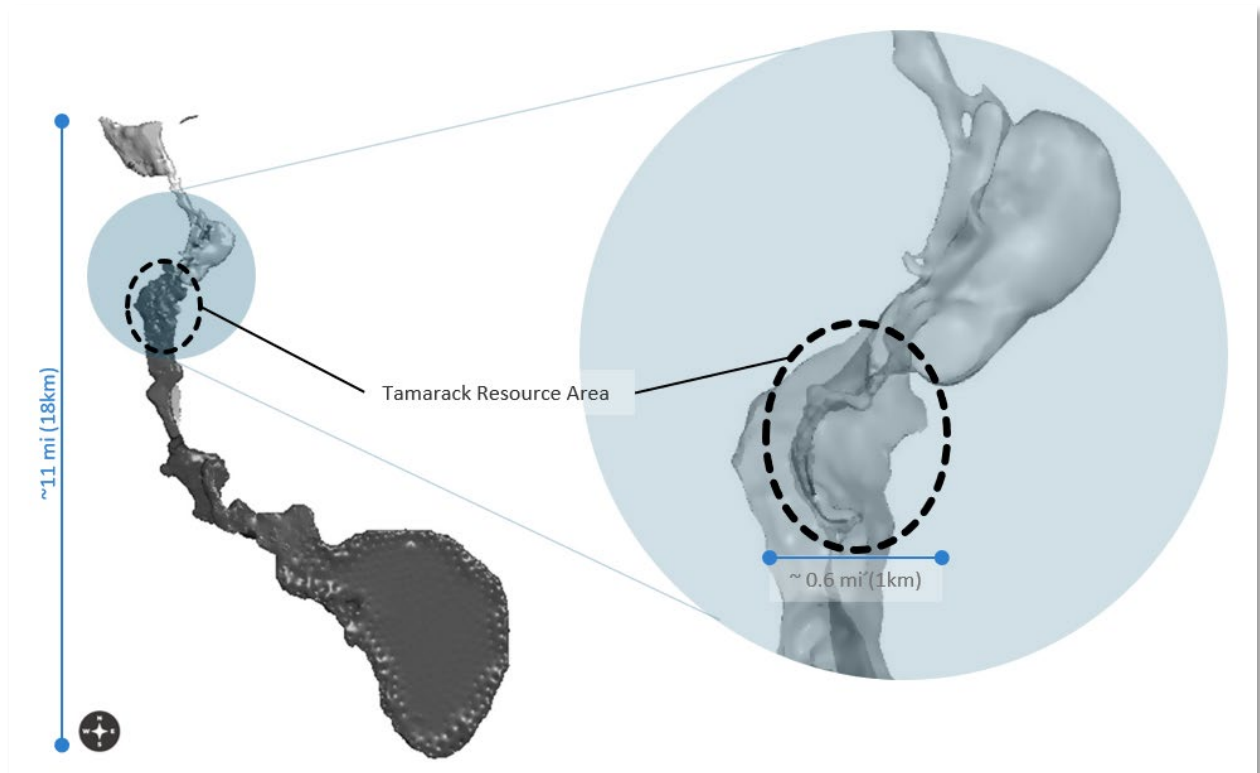
The resource area is interpreted to consist of a multistage magmatic event which emplaced mafic to ultramafic intrusions into Thomson Formation slates and metagraywackes. The different intrusions include FGO (fine grained orthocumulate), CGO (coarse grained orthocumulate), and MZNO (mixed zone). The FGO can be found approximately 80-1,800 ft (25-550 m) below surface. The 138 zone is net textured

sulfide mineralization in the FGO. The CGO can be found between approximately 130-2,300 ft (40-700 m) below surface. The MZNO is typically found between the FGO and CGO. The intrusive package dips at approximately 15-20 degrees to the south. Sulfide mineralogy is predominately pyrrhotite, pentlandite, and chalcopyrite and typically hosted along the FGO/SED contact. Much of the original igneous mineralogy of the TIC has been variably altered to serpentine and other materials. Although the exact mechanism of alteration has yet to be confirmed, some of the alteration may have the potential to contain elongated mineral particles (EMPs).

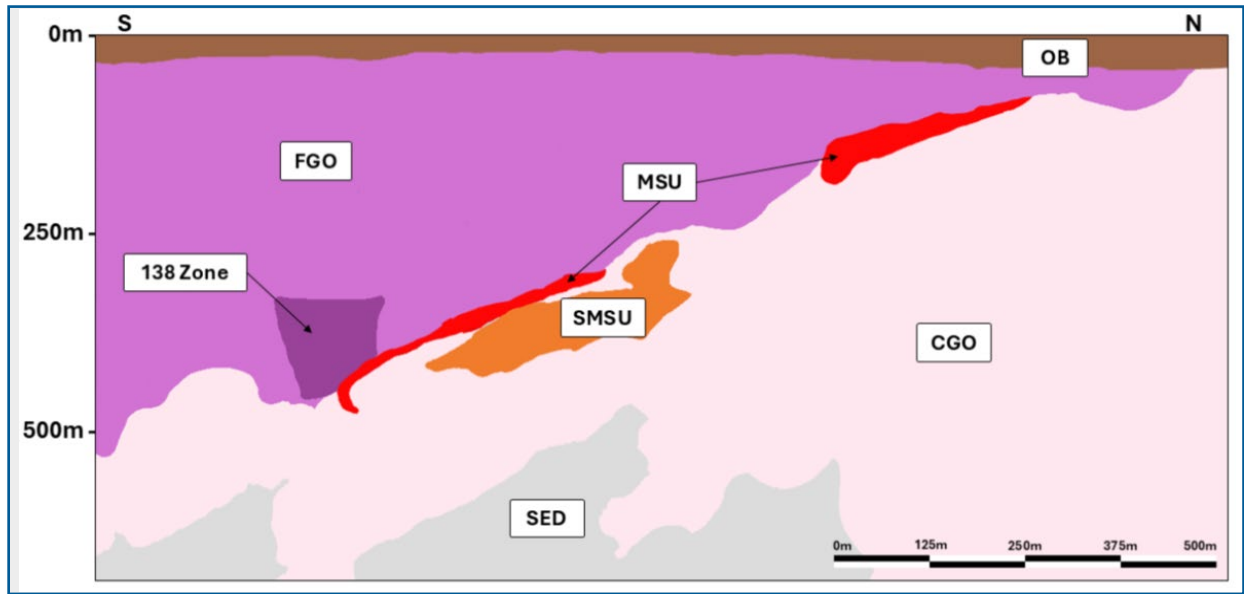
The TIC hosts nickel-copper-cobalt sulfide mineralization with associated platinum, palladium, and gold. The intrusion, which is completely buried beneath the Quaternary-age glacial and fluvial (unconsolidated) sediments, consists of a curved, elongated, unit striking north-south to southeast over 11 miles (17.7 km).

The configuration resembles a tadpole shape with its elongated, northern tail up to 0.6 miles (1 km) wide and large ovoid shape body, up to 2.5 miles (4 km) wide, in the south (Graphic 11-1). The northern portion of the TIC hosts the mineral resources that would be developed as part of the Project (2). Mineralization within the TIC can be divided into three basic types: a massive sulfide unit (MSU) hosted in the metamorphosed sediment (~12.5%); a semi-massive sulfide unit (SMSU) composed of net textured sulfides within the intrusion (~37.5%); and a disseminated sulfide unit composed of mostly intrusive rock with discrete sulfide blebs (~50%). In general, the intrusive body is massive, competent rock.

Graphic 11-1 Tamarack Resource Area within the Tamarack Intrusive Complex



Graphic 11-2 Cross-sectional Sketch of the Intrusive Body



Susceptible Geologic Features

No susceptible geologic features are present in the Project Area related to bedrock or unconsolidated deposits. Limestone deposits are not present in the region, and no sinkholes or karst conditions exist. Shallow groundwater is present, and groundwater information is presented in the water resources section (Item 12).

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, highly permeable 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 in response to Item 12.b.ii.

Topography

Approximately 85% of the Project Area has very low relief with a near level 0-3% slope as the area is within the former lake plain of Glacial Lake Aitkin. A few small hills are locally present with slopes greater than 3% and isolated areas greater than 9% (Figure 14).

Soil Descriptions and Characteristics

Soil description and characteristics data were obtained from the Natural Resources Conservation Service, United States Department of Agriculture, Web Soil Survey (NRCS, 2022). The soil map is presented as

Figure 15 and soil descriptions and characteristics are presented in Table 11-1. Approximately 32% of the surficial soil within the Project Area is sandy loam to loamy sand, and approximately 10% is silt loam. Hydric or predominantly hydric soils cover approximately 67% of the Project Area, including peat, muck, and standing water areas. The non-sandy soil is present on slopes of less than 1%.

Table 11-1 Soil Characteristics

Map Unit Symbol	Map Unit Name	Hydric Status	Percent of Project Area
531	Beseman muck	Predominantly hydric	3.9
540	Seelyeville muck	Predominately hydric	2.3
549	Greenwood peat	Predominantly hydric	4.9
625	Sandwick loamy sand	Predominantly hydric	6.6
628	Talmoon muck, depressional	Predominately hydric	2.1
980	Blackhoof and Mahtowa soils	Predominately hydric	0.3
1115	Newson loamy sand	Predominately hydric	3.3
1983	Cathro muck, stratified substratum	Predominantly hydric	10
1984	Leafriver muck	Predominately hydric	2.8
B111A	Markey muck, occasionally ponded, 0%-1% slopes	Hydric	4.3
B147A	Rifle-Rifle, ponded, complex, 0%-1% slopes	Hydric	24.3
		Hydric and Predominantly hydric subtotal	64.8
502	Dusler silt loam	Predominantly non-hydric	10.5
564	Friendship loamy sand	Predominantly non-hydric	8.2
504B	Duluth fine sandy loam, 1%-6% slopes	Predominantly non-hydric	5.1
B39A	Meehan loamy sand, 0%-3% slopes	Predominantly non-hydric	2.6
D458B	Menahga loamy sand, 1%-8% slopes	Predominantly non-hydric	8.8
		Predominantly non-hydric subtotal	35.2
W	Water	Not Applicable	0.2
	Total		100.2

Impacts to Soils

The Project would use underground mining techniques, which minimize impacts to soils outside of direct construction or operation areas. Topographic slopes in the Project Area are low which minimizes erosion. An engineering evaluation of soils would be conducted as part of Project design for areas that would be impacted for construction and operational purposes. Areas with peat or muck soils would be avoided to the extent possible. Surface facilities would be constructed in upland areas with well-drained sandy soil, to an extent practicable. This choice supports efficient construction and reduces the need for additional

2158 fill material, as these soils are naturally more suitable for building. However, the feature that would be
 2159 built on peat or muck soils would be the upland corridor for the rail spur.

2160 *Excavation, Grading, and Cut and Fill Balance*

2161 Some excavation and grading would be required to develop the Project infrastructure. Table 11-2 provides
 2162 an estimate of the volumes of cut and fill material that would be needed to bring the site to final grade.

2163 **Table 11-2 Estimated Excavation, Grading, and Cut and Fill Balance**

Description	Estimated Quantity	Unit of Measure
Site Clearing and Grubbing	60.5	acres
Cut	60,249	yd ³
Fill	376,455	yd ³

2164 yd³ – cubic yards

2165 **Proposed Treatment in EIS: Geology, Soils, and Topography/Landforms**

☐	The topic is not significant or is adequately addressed in the SEAW. The same information from the EAW will be included in the EIS.
☒	The topic may be significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document “Draft Scoping Decision Document” in Section 3.2.
☐	The topic is significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document “Draft Scoping Decision Document” in Section 3.3.

2166 **12. Water Resources:**

2167 **a. Surface and Groundwater**

2168 *Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.*

2169 *i. Surface water*

2170 *Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any*
 2171 *special designations such as public waters, shoreland classification and floodway/floodplain, trout*
 2172 *stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value*
 2173 *water. Include the presence of aquatic invasive species and the water quality impairments or special*
 2174 *designations listed on the current MPCA 303 Impaired Waters List that are within 1 mile of the project.*
 2175 *Include DNR Public Waters Inventory number(s), if any.*

2176 The Project is within the USGS, Upper Mississippi River Region, Hydrologic Unit Code (HUC) 7 by 8-digit
 2177 legacy classification (for a reference, HUC 2 for the 12-digit HUC classification). The watershed is further

divided into the USGS HUC 8 Prairie-Willow (HUC-8, 07010103) watershed that is equivalent to DNR Major Surface Water Watershed, Mississippi River-Grand Rapids. The Project Area sits within two Watersheds, as delineated by the hydrologic unit code 10 (HUC10) level: the Headwaters to Big Sandy Lake (HUC10 #0701010305) and the Big Sandy Lake Outlet (HUC10 #0701010306) (Figure 16). Watershed delineations aid in identifying areas for potential surface water impacts. The entire Project Area is located within the watershed tributary to Big Sandy Lake. The HUC10 watersheds are further subdivided into multiple USGS HUC12 and DNR level 8 watersheds (Figure 16). The Project Area is located within two HUC12 watersheds: Mud Lake watershed (HUC12 #070101030603) and Tamarack River watershed (HUC12 #070101030504). The watersheds in the vicinity of the Project Area are characterized by many tributary ditches, stream channels and lakes (flow through and landlocked). The portion of the Project Area within HUC12 Tamarack River watershed (Figure 17) flows north through a ditch network to the Tamarack River then into the Prairie River. The portion of the Project Area within HUC12 Mud Lake watershed (Figure 17) flows south and west through a ditch network to Minnewawa Creek and the Sandy River. The Prairie River and the Sandy River generally drain from east to west discharging into Big Sandy Lake.

Public waters basins located in HUC12 watersheds that include the Project Area (HUC12 #070101030603 and HUC12 #070101030504) are presented in Table 12-1 and on Figure 17. There are no public waters basins located within one mile of the Project Area (MDNR, n.d.) as shown on Figure 18. None of the Public Water Basins located in HUC12 watersheds #070101030603 and #070101030504 are classified as trout lakes, wildlife lakes, or migratory waterfowl lakes. Within HUC12 watersheds #070101030603 and #070101030504, Mud Lake (ID# 01-0029-00), Tamarack Lake (ID# 09-0067-00), Tamarack River (ID# 07010103-757, 07010103-758), Sandy River (ID# 07010103-508), Prairie River (ID# 07010103-515), and Big Sandy Lake (ID# 01-0062-00) are listed by the MPCA as wild rice waters (Figure 16).

The DNR has assigned shoreline classifications of “natural environment” or “recreational development” to some public waters basins in the HUC12 watersheds (Table 12-1); Big Sandy Lake is assigned a “general development” shoreline classification. DNR shoreline classifications guide development by regulating lot area and width, structure and septic setbacks, and areas where vegetation and land altering activities are limited. Minnesota Rules part 6120.2600 provides the minimum standards and criteria for the subdivision, use and development of shoreland areas. Aitkin County provides additional shoreline minimum standards and criteria for subdivision in shoreland areas in the Aitkin County Shoreland Ordinance (amended 2017).

Table 12-1 Public Waters Basins Within Watersheds HUC12 #070101030603 and #070101030504 and Big Sandy Lake

ID Number	Resource Name	Public Waters Class	Area (acres)	Shoreline (miles)	DNR Shoreline Classification [1]	Listed MPCA 303d Impaired Waters [2]
01-0006-00	Mud Lake	Lake	14.8	0.6	Natural Environment	Not listed
01-0008-00	Spruce Lake	Lake	18.9	0.8	Natural Environment	Not listed
01-0011-00	Cranberry Lake	Wetland	24.7	0.8	Natural Environment	Not listed
01-0012-00	Louma Lake	Wetland	20.1	0.7	Natural	Not listed

ID Number	Resource Name	Public Waters Class	Area (acres)	Shoreline (miles)	DNR Shoreline Classification [1]	Listed MPCA 303d Impaired Waters [2]
					Environment	
01-0023-00	Round Lake [3]	Lake	553.5	3.7	Recreational Development	Yes Hg-F
01-0029-00	Mud Lake [3]	Lake	588.8	3.9	Natural Environment	Not listed
01-0254-00	Bone Lake	Wetland	14.0	0.6	Not assigned	Not listed
01-0255-00	Unnamed	Wetland	63.3	1.2	Not assigned	Not listed
09-0067-00	Tamarack Lake [3] [4]	Lake	240.2	4.5	Recreational Development	Yes Hg-F; Nutrients
09-0068-00	Cole Lake [4]	Lake	143.8	2.4	Recreational Development	Not listed
01-0062-00	Big Sandy Lake [3] [4] [5]	Lake	6,124	57.0	General Development	Yes Hg-F; Nutrients

[1] DNR assigns shoreline classifications and establishes the minimum standards and criteria for the subdivision, use and development of shorelands.

[2] MPCA maintains a list (303(d)) list of waters not meeting their intended uses (i.e., impaired waters) due to stressors including mercury in fish tissue (Hg-F) and excessive amounts of phosphorus (nutrients). Waters in this table that are classified as not listed may not have been evaluated by the MPCA at the time of completion of this worksheet.

[3] A MPCA identified wild rice water (<https://www.pca.state.mn.us/air-water-land-climate/protecting-wild-rice-waters> and 2024 Minnesota Impaired Water List). Wild rice may be present in streams, rivers and lakes that are not listed in the EAW.

[4] A DNR identified Lake of Biological Significance (https://mnatlas.org/gis-tool/?id=k_0010).

[5] Water levels in Big Sandy Lake are controlled by Big Sandy Lake Dam.

In Minnesota, the MPCA, as required by the federal Clean Water Act, assesses all waters of the state and creates a list of impaired waters – those that fail to meet water quality standards – every two years (MPCA, 2023). Such waters are classified as impaired waters and included on the State’s impaired waters 303(d) list. For such waterbodies, the State requires a total maximum daily load (TMDL) study that identifies the allowable pollutant load and/or pollutant reductions necessary to achieve the beneficial use(s) of the waterbody. Development activity upstream of impaired waters may be subject to pollutant loading limits based on applicable TMDL studies. There are no impaired Public Water Basins within 1 mile of the Project Area (Figure 18). Impaired lakes located in HUC12 watersheds #070101030603 and #070101030504 are identified in Table 12-1 and shown on Figure 17. Big Sandy Lake (Figures 16 and 17), which is further downstream from the HUC12 watersheds that include the Project Area, is listed as impaired by the MPCA due to excess nutrients and mercury in fish tissue. Sources of excess nutrients to Big Sandy Lake identified in the MPCA’s 2011 TMDL (Barr Engineering, 2011) study include internal loading and nonpoint sources including agriculture, stream channel erosion, ditched wetlands, septic systems, and stormwater plus other factors.

2234 Flowering rush, an aquatic invasive species, was identified by the DNR (MDNR, 2023A) within the Big
2235 Sandy watershed.

2236 There are many streams, ditches, and intermittent channels present in the HUC12 watersheds that include
2237 the Project Area (HUC12 #070101030603 and #070101030504) and shown Figure 17. Many of these are
2238 unnamed streams and ditches that are delineated in the national hydrography dataset but are not
2239 classified as public waters streams (MDNR, n.d.). None of the Public Waters Courses located in the HUC12
2240 watersheds that include the Project Area (Figure 17) are classified as trout streams or outstanding
2241 resource value waters (ORVW). ORVWs are waters identified under Minn. R. Ch. 7050, as having unique
2242 or sensitive characteristics (e.g., ecological, recreational) and are subject to extra levels of protection to
2243 preserve these characteristics. The nearest downstream ORVW is the Mississippi River (Figure 16; the
2244 Sandy River flows into the Mississippi River downstream of Big Sandy Lake. Two reaches of public ditches
2245 drain from east to west through the Project Area, including County Ditch 23 (CD 23) (generally draining
2246 east to west) and County Ditch 13 (CD 13) (generally draining south to north). Approximately 1.1 miles
2247 (1.8 km) of delineated public ditches are located within the Project Area (Figure 18). Streams, ditches, and
2248 channels in the HUC12 watersheds that include the Project Area (HUC12 #070101030603 and
2249 #070101030504) are included in the Public Waters Inventory summarized in Table 12-2 and shown on
2250 Figure 17.

2251 As with lakes, the MPCA's Impaired Waters list also identifies streams that do not meet designated
2252 beneficial use categories, including supporting aquatic life and aquatic recreation. There are no impaired
2253 Public Waters Watercourses within one mile of the Project Area as shown on Figure 18. Impaired streams
2254 in the HUC12 watersheds that encompass the Project Area are identified in Table 12-2. A portion of
2255 Minnewawa Creek upstream of its public waters classification is also listed as impaired for fish
2256 bioassessments and invertebrate bioassessments; the MPCA has not yet identified stressors contributing
2257 to this impairment.

2258 **Table 12-2 Public Waters Watercourses within Watersheds HUC12 #070101030603 and HUC12**
2259 **#070101030504**

ID Number	Assessment Unit Identifier (AUID) [1]	Name	Public Water Inventory (PWI) Classification	Length (miles)	Listed MPCA 303d Impaired Waters [2]
01-020a	07010103-758	Tamarack River	Public Water Watercourse	27.2	Yes E. coli [3]
01-022a	07010103-735	Unnamed Stream	Public Ditch/ Altered Natural Watercourse	1.4	Not listed
01-022a	07010103-735	Unnamed Stream	Public Water Watercourse	0.5	Not listed
01-023a	07010103-999	Unnamed Stream	Public Water Watercourse	1.1	Not listed
01-013a	07010103-518	Minnewawa Creek	Public Water Watercourse	3.2[4]	Fishes bioassessments; Invertebrate bioassessments

2260 [1] Assessment unit identifier assigned by the MPCA to specific reaches of streams.
2261 [2] MPCA maintains a list (303(d)) list of waters not meeting their beneficial use(s) designation(s) due
2262 to stressors; stressors present in streams in HUC12 #070101030603 and #070101030504 include poor
2263 indices of biological integrity (IBI) for fish and/or macroinvertebrates and bacteria (E. coli). Waters in this
2264 table that are classified as not listed may not have been evaluated by the MPCA at the time of completion
2265 of this worksheet.
2266 [3] Impaired reach is from Little Tamarack River to Prairie River; E. coli source is not specified in
2267 Mississippi River-Grand Rapids Watershed Restoration and Protection Strategies report (USGS,2022A).
2268 [4] Does not include stretch downgradient of Lake Minnewawa that is not listed MPCA as being
2269 impaired.

2270 Floodplains have been delineated by the Federal Emergency Management Agency (FEMA) for several
2271 areas and resources within the Big Sandy Lake watershed, including the Tamarack River, Prairie River and
2272 Sandy River, as well as several lakes (Figure 19). The floodplains in the Big Sandy Lake watershed were
2273 delineated approximately 40 years ago and are “unmodernized” per FEMA standards; unmodernized
2274 floodplains are based on quick digitization by FEMA and cannot be used for regulatory purposes. FEMA
2275 has not established modern, regulatory floodplains within the Big Sandy Lake watershed. The Project Area
2276 is located outside the FEMA-delineated floodplain.

2277 Talon monitors surface water flow and surface water quality at numerous locations near and within the
2278 Project Area to characterize baseline surface water conditions. Surface water baseline data would be
2279 provided for the EIS. The baseline data would be used to develop a conceptual model for surface water
2280 flow, which would be presented in the EIS. The conceptual model would form the basis for quantitative
2281 models and/or evaluations that would be conducted and presented for the EIS to estimate the potential
2282 effects of the Project on water resources.

2283 The Project Area is primarily classified as wetlands (Figure 20). A Level 3 wetland delineation across the
2284 Project Area was conducted between June and September 2022 (GEI, 2024). Approximately 302 acres of
2285 wetland are present within the Project Area. An updated delineation report was submitted to the agencies
2286 on November 4, 2025, and is pending review by the Technical Evaluation Panel (TEP), which includes
2287 representatives from the Local Government Unit (Aitkin County), the Soil and Water Conservation District
2288 (SWCD), the Board of Water and Soil Resources (BWSR), and the DNR. The USACE will provide separate
2289 concurrence on the delineation for purposes of federal permitting. All delineated wetland boundaries are
2290 considered preliminary until the technical evaluation panel review is complete.

2291 Wetlands (Figure 20) are primarily palustrine forested, palustrine scrub shrub, and palustrine emergent
2292 wetlands. These include forested coniferous and deciduous wetlands, scrub shrub wetlands, and
2293 emergent marsh, wet meadow, and sedge meadow wetlands. Eight small, excavated ponds, which were
2294 excavated over 20 years ago, totaling approximately 4.5 acres, and ranging in size from less than 0.1-2.3
2295 acres, were documented in the Project Area during the wetland delineation.

2296 Talon monitors wetland water levels and water quality within and near the Project Area to characterize
2297 baseline wetland conditions. Wetland baseline data would be provided for the EIS. The baseline data
2298 would be used to develop a conceptual model of the wetland system within and near the Project Area,
2299 which would be presented in the EIS. The conceptual model would form the basis for quantitative models
2300 and/or evaluations that would be conducted and presented for the EIS to estimate the potential effects
2301 of the Project on water resources.

Talon has collected water resources (surface water, wetlands and groundwater) monitoring data since 2007 with over 200 monitoring locations for water quality, flow and/or water level measurements with various active durations within the Project Area and vicinity. Monitoring stations and parameters were adjusted periodically using a scientific, iterative approach by continuously reviewing data and updating the monitoring program as needed for continuous improvement. The data frequency depends on the parameter and objectives; for example, a quarterly frequency for routine water quality monitoring, with greater frequency for select times and events, to hourly for routine water level measurements, with a greater frequency used for select events such as for hydraulic tests and for select parameters. Data collection and review are ongoing and being integrated with other data sources such as climate and geology information. Monitoring data would be provided, as necessary, as part of the EIS submission.

ii. Groundwater

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 nearest identified spring to the Project Area is Two River Springs, located approximately 16 miles northwest of the site. There are no mapped springs within approximately 20 miles (32.2 km) of the Project Area based on data from the Minnesota Spring Inventory (MDNR, 2022B).

The Project Area is not within a MDH wellhead protection area based on data from the Source Water Protection Web Map Viewer (MDNR, 2022B). A wellhead protection area is defined in Minnesota Statutes 2022, Section 103I.005, Subdivision 24 as “the surface and subsurface area surrounding a well or well field that supplies a public water system, through which contaminants are likely to move toward and reach the well or well field.” The nearest wellhead protection area is in McGregor located approximately 9 miles (14.5 km) west of the Project Area.

Water supply wells near and within the Project Area are installed in Quaternary aquifers. The Minnesota Well Index (MWI) identifies 32 water supply wells that are located within 1 mile (1.6 km) of the Project Area (Figure 7.) The water supply wells are classified in the MWI as domestic wells (24 wells), public supply/non-community-transient wells (5 wells), public supply/non-community nontransient wells (2 wells), and irrigation wells (1 well). All the water supply wells identified in MWI that have depth and stratigraphic information are screened within sand or gravel layers in the Quaternary unconsolidated sediments at depths ranging from 28-202 ft (8.5–61.6 m) below ground surface. Three of the wells are between 28-50 ft deep, 15 wells are 50-100 ft (15.2-30.5 m) deep, 10 wells are 100-200 ft (30.5-61 m) deep, one well is more than 200 ft (61 m) deep, and depths are not available for three wells. The sand layers in which the wells are completed are all beneath one or more layers of clay for wells where stratigraphy logs are available. Six of the wells are completed in a deep sand layer below additional layers of sand and clay sediments. Depth to water in the wells as listed on the MWI logs range from 1-25 ft (0.3-7.6 m) below ground surface. Information from the MWI indicates that most of the water supply wells (28 wells) are installed in a Quaternary buried artesian aquifer, which are buried sand or gravel units with groundwater present under confined conditions. One well is completely in a Quaternary undifferentiated aquifer, and no information is available for three wells. For the proposed Project, Talon has identified a

2342 basal outwash unit that has favorable hydraulic properties for water supply and is considered an option
2343 for dedicated water supply wells for the Project.

2344 Monitoring wells have been installed in and around the Project Area (Figure 7) to characterize baseline
2345 groundwater conditions (groundwater levels and groundwater quality). Groundwater level measurement
2346 and groundwater quality monitoring are ongoing, and this baseline data would be provided for the EIS.
2347 The baseline data would be used to develop a conceptual model for groundwater flow in and around the
2348 Project Area, which would be presented in the EIS. The conceptual model would form the basis for
2349 quantitative models and/or evaluations that would be conducted and presented in the EIS to estimate the
2350 potential effects of the Project on water resources, including the potential for any water supply well
2351 interference effects.

2352 Based on soil data from the Natural Resources Conservation Service, depth to water in surficial soils is less
2353 than 1 ft (0.305 m) in approximately 77% of the Project Area (Figure 9). Depth to water is greater than 3
2354 ft (1 m) in approximately 15% of the area, and greater than 5 ft (1.5 m) in approximately 8% of the Project
2355 Area. The depth to water map would be updated with site-specific data for the EIS data submittal.

2356 The groundwater monitoring program includes wells and multi-zone vibrating wire piezometer
2357 installations completed in the peat, the quaternary and the bedrock. Existing water supply wells within
2358 and near the Project Area, as discussed above, are completed within the quaternary. The details for the
2359 monitoring network would be discussed and reported on in the EIS process.

2360 The Project water resources modeling, monitoring data, characterization data and relevant publicly
2361 available information would be used in conjunction to evaluate the area of potential effect that would
2362 provide input into monitoring that would be recommended for construction, operation and closure
2363 phases. During these Project phases, the adequacy of the monitoring program would be accessed for
2364 continuous improvement as additional data is collected and reviewed.

2365 All applicable wells and borings would be sealed in accordance with Minn. R. Chs. 4725 and 4727 and
2366 Minn. Stat. Ch. 1031.

2367 **b. Project Effects**

2368 *Describe effects from project activities on water resources and measures to minimize or mitigate the effects*
2369 *in Item b.i. through Item b.iv. below.*

2370 *i. Wastewater*

2371 *For each of the following, describe the sources, quantities and composition of all sanitary,*
2372 *municipal/domestic and industrial wastewater produced or treated at the site.*

2373 **1) Wastewater Discharge to a Treatment Facility**

2374 *If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures*
2375 *and the ability of the facility to handle the added water and waste loadings, including any effects on, or*
2376 *required expansion of, municipal wastewater infrastructure.*

2377 The Project currently plans to dispose of toilet waste (sanitary wastewater) at a publicly owned treatment
2378 facility. However, the specific facility has not yet been identified. As part of the EIS, the Project will
2379 evaluate the capability of potential treatment facilities to manage the added water and waste loadings,
2380 including any required pretreatment measures and potential effects on municipal wastewater
2381 infrastructure.

2382 **2) Wastewater Discharge to a SSTS**

2383 *If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used,*
2384 *the design flow and suitability of site conditions for such a system. If septic systems are part of the project,*
2385 *describe the availability of septage disposal options within the region to handle the ongoing amounts*
2386 *generated as a result of the project. Consider the effects of current Minnesota climate trends and*
2387 *anticipated changes in rainfall frequency, intensity and amount with this discussion.*

2388 The Project would not discharge to a subsurface sewage treatment system.

2389 **3) Wastewater Discharge to Surface Water**

2390 *If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify*
2391 *discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or*
2392 *groundwater from wastewater discharges, taking into consideration how current Minnesota climate*
2393 *trends and anticipated climate change in the general location of the project may influence the effects.*

2394 The Project would produce two types of wastewater: contact water and sewage waste. Sewage waste can
2395 be further subdivided into toilet waste and gray water. Sources of contact water and sewage waste, along
2396 with their management, treatment, and discharge, are described in the Project Description (Item 6). The
2397 following paragraphs focus on contact water and gray water, describing their expected quantity and
2398 composition and discussing potential effects on surface water or groundwater. Toilet waste, which is
2399 managed off-site, is not addressed in this section. The composition and quantity of contact water would
2400 be modeled for the EIS.

2401 One source of contact water is mine inflow. Based on the current three-dimensional numerical
2402 groundwater model designed to predict mine inflows, the preliminary peak life-of-mine inflow rate is
2403 estimated at 180-350 gpm (0.4-0.8 cfs) (Barr, 2025). The model uses hydrogeological data collected and
2404 reviewed to the end of 2024. The range of inflows is based on a range of model parameter sets that
2405 provide similar matches to the pumping tests due to correlations between parameters. The inflow
2406 estimate would be refined and updated for the EIS to reflect the updated mine plan, additional
2407 hydrogeological information and assessment, additional understanding gained by iteratively updating
2408 mine inflows, assessment of mitigation methods to reduce inflows, and a more detailed three-dimensional
2409 numerical groundwater model to address expanded objectives.

2410 At the surface, all ore and waste rock handling and storage would be performed within an enclosed
2411 building with an impervious surface and contact water within the building would be collected and routed
2412 to the Contact Water Treatment Plant facility. As a result, there would be no surface contact water
2413 produced from storm events. The estimated peak surface contact water generated from within the Ore
2414 Transfer Building would be less than 100 gpm (379 L/min; 0.2 cfs). The estimated peak discharge rate
2415 (including mine inflow and surface contact water) from the Contact Water Treatment Plant is calculated
2416 to be 300-400 gpm (1,136-1,515 L/min; 0.7-0.9 cfs). These preliminary calculations illustrate that the

2417 discharge rate is predominantly dependent on the mine inflow. This estimate would be updated and
2418 refined with additional information, data, and models for the EIS.

2419 The composition of the gray water would be typical of domestic wastewater. The average volume of gray
2420 water would be approximately 2.4 gpm (9 L/min; 0.005 cfs), or 3,375 gpd (12,776 L/day), but the
2421 instantaneous generation rate would be highly variable throughout the day with an estimated peak of
2422 approximately 100 gpm (379 L/min; 0.2 cfs). Gray water would be routed to the Contact Water Treatment
2423 Plant for treatment and discharge.

2424 The discharges from the Contact Water Treatment Plant would increase the flow in the north ditch
2425 network above baseline flow levels. The potential effects of this increased flow on hydrology, wetlands,
2426 shallow and deep groundwater systems, and aquatic biota in the north ditch network would be evaluated
2427 for the EIS. Preliminary evaluation indicates that the ditch has the capacity to handle the estimated
2428 increased flow due to discharge of treated water based on the following:

- 2429 • Generally, a stream can adapt to an increase in flow that is up to 20% above its channel forming
2430 flow (defined as the 1.5-year recurrence flood flow).
- 2431 • The channel-forming flow at the discharge point was estimated using the United States Geological
2432 Service's (USGS) StreamStats tool to be approximately 13,500 gpm (51,100 L/min; 30.1 cfs) (USGS,
2433 2022B).
- 2434 • Twenty percent of the channel-forming flow is 2,700 gpm (10,221 L/min; 6.0 cfs), which is greater
2435 than the conservative discharge estimates enumerated above.

2436 The EIS will evaluate whether CD 13 would behave like a natural stream channel under the proposed
2437 flows, which is necessary to fully evaluate the potential effects associated with the flow increase from the
2438 Contact Water Treatment Plant discharge.

2439 The Project would be subject to a NPDES/SDS permit whose conditions would be protective of water
2440 quality and aquatic biota. The potential effect of discharges on water quality in receiving and downstream
2441 waters and surface water-groundwater interactions would be evaluated in the EIS.

2442 Current Minnesota climate trends and anticipated climate change in the general location of the Project
2443 are not expected to influence how a discharge of treated water would affect water resources. Based on a
2444 qualitative review of the discussion in the Climate Adaptation and Resilience section, the water balance
2445 in the area and the patterns of large precipitation events are expected to remain in the current range
2446 during the timeframe that the Project would be operational, which would be the timeframe with the
2447 highest discharge rate. A more quantitative assessment of climate projections would be included in the
2448 water resources modeling that would be incorporated into the EIS data submittal. Depending on the
2449 duration of discharge after operations, climate trends toward slightly higher temperature and slightly
2450 higher precipitation could affect flows in the receiving waters. However, because the discharge would be
2451 treated as described above, and because the NPDES/SDS permit must be renewed every 5 years, permit
2452 conditions would control impacts to water resources under future flow conditions. The EIS would provide
2453 additional information on the potential influence of current climate trends and anticipated climate change
2454 on potential Project effects on water resources.

2455 *ii. Stormwater*

2456 *Describe changes in surface hydrology resulting from change of land cover. Describe the routes and*
2457 *receiving water bodies for runoff from the project site (major downstream water bodies as well as the*
2458 *immediate receiving waters). Discuss environmental effects from stormwater discharges on receiving*
2459 *waters post construction including how the project will affect runoff volume, discharge rate and change in*
2460 *pollutants. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall*
2461 *frequency, intensity and amount with this discussion. For projects requiring NPDES/SDS Construction*
2462 *Stormwater permit coverage, state the total number of acres that will be disturbed by the project and*
2463 *describe the stormwater pollution prevention plan (SWPPP), including specific best management practices*
2464 *to address soil erosion and sedimentation during and after project construction. Discuss permanent*
2465 *stormwater management plans, including methods of achieving volume reduction to restore or maintain*
2466 *the natural hydrology of the site using green infrastructure practices or other stormwater management*
2467 *practices. Identify any receiving waters that have construction-related water impairments or are classified*
2468 *as special as defined in the Construction Stormwater permit. Describe additional requirements for special*
2469 *and/or impaired waters.*

2470 As described in the Project Description (Item 6), stormwater from surface areas external to the Ore
2471 Transfer Building and Contact Water Treatment Plant would be managed as industrial stormwater. Figure
2472 6 shows the boundaries of the industrial stormwater management areas.

2473 Construction of the Project would replace existing pervious surfaces (e.g., vegetation) with new
2474 impervious surfaces (e.g., gravel, asphalt) and industrial infrastructure. Project construction would result
2475 in greater than one acre of land disturbance, which would require coverage under the Minnesota
2476 Construction Stormwater General Permit. A construction SWPPP would be developed and implemented
2477 in accordance with the permit requirements. The construction SWPPP would include a range of BMPs to
2478 address soil erosion and sedimentation, including erosion prevention practices, sediment control
2479 practices, inspection and maintenance requirements, pollution prevention management measures, and
2480 permanent stormwater treatment systems, as well as controls to manage water where necessary.

2481 In accordance with the Minnesota Construction Stormwater General Permit's permanent stormwater
2482 treatment requirements, a volume of water equivalent to 1-inch (2.54 cm) of runoff from impervious
2483 surfaces created for the Project would be routed to industrial stormwater treatment systems prior to
2484 discharge to the environment. Industrial stormwater treatment systems are primarily passive treatment
2485 systems focused on removal of suspended solids and may include a combination of volume reduction
2486 practices (e.g., infiltration system(s) and retention practices (e.g., wet sedimentation basin(s)) as
2487 appropriate based on-site conditions and constraints.

2488 At the surface, all ore and waste rock handling and storage would be performed within an enclosed
2489 building with an impervious surface with contact water within the building collected and routed to the
2490 Contact Water Treatment Plant facility. As a result, there would be no surface contact water produced
2491 from storm events.

2492 The immediate receiving waters for stormwater discharged from the Project would be the nearby
2493 unnamed wetlands and/or ditches. These wetlands and ditches are within either the Headwaters to Big
2494 Sandy Lake (HUC10 #0701010305) or Big Sandy Lake Outlet (HUC10 #0701010306) watersheds that are
2495 both ultimately tributary to Big Sandy Lake (as described in Item 12.a.i). It is anticipated that the majority

of stormwater from the Project would be discharged generally northward from the Project Area to either wetlands or ditches and then follow the north ditch network to the Tamarack River within the Headwaters to Big Sandy Lake (HUC10 #0701010305) watershed.

The effect of changes in land cover from pervious to impervious surfaces on surface hydrology would be evaluated in the EIS. Runoff volumes and rates from impervious surfaces are generally greater than from pervious surfaces; however, the effect of this on the environment would be minimized by collection, treatment and discharge of stormwater via the industrial stormwater treatment systems. Modification of drainage areas as part of managing industrial stormwater would alter surface hydrology in the immediate vicinity of the Project Area. Stormwater from pervious natural, stabilized and reclaimed surfaces would not be actively managed and would continue to follow natural existing drainage pathways. Further analysis of the effects of changes in land cover would be completed for the EIS, including current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount to provide both qualitative and quantitative assessments in the EIS data submittal. In addition, any identified effects would be subject to the industrial stormwater requirements under an NPDES/SDS permit.

Based on the MPCA's special and impaired waters search tool (MPCA, n.d. A), no receiving waters associated with the project construction area have been identified with construction-related impairments or are classified as special under the Minnesota Construction Stormwater General Permit.

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 any well abandonment. If connecting to an existing municipal water supply, identify the wells to be 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 would appropriate groundwater and DNR water appropriation permits would be required. No water would be directly withdrawn from surface water or wetlands. Groundwater would be withdrawn for four purposes: temporary construction dewatering, potable use, non-potable use and inflow of groundwater to the underground mine.

Construction activities would temporarily remove groundwater to dry and solidify areas as needed to construct surface facilities as well as for the Cutoff Cell for the Decline Ramp. Surface facilities would be primarily sited in upland areas as illustrated in Figure 23, which would minimize the amount of water management required. The quantity of water would be estimated for the EIS and permitting; however, preliminary estimates are that the total amount of water would be less than 50 million gallons per year, which is the threshold for coverage under Temporary Projects General Permit No. 1997-0005. Construction activities would be conducted in accordance with the conditions of the Minnesota

2537 Construction Stormwater General Permit, which requires BMPs to control effects due to the discharge of
2538 water from the construction site.

2539 Refinement in the volumes and timing of withdrawals for construction activities would be developed as
2540 the details for the design progresses. The projected groundwater withdrawals would be included in a
2541 numerical groundwater model and used for the development of an appropriate monitoring program
2542 during construction. Whether the Project would be subject to General Permit 1997-0005 or would require
2543 an individual water appropriation permit would be determined as part of the permitting process upon
2544 submittal of a permit application.

2545 For potable use, the Project would install a new well into the basal outwash unit of the Quaternary
2546 deposits. The groundwater would be used for drinking water and to support sanitary facilities for the
2547 workforce. The potential maximum daily withdrawal from this well for potable water use could be up to
2548 approximately 8,000 gpd (2.9 million gallons per year). Groundwater for potable use would be withdrawn
2549 during the construction and operations phases of the mine. Based on preliminary site investigations and
2550 the presence of thick, saturated quaternary sediments, adequate groundwater is available in the
2551 Quaternary deposits.

2552 The Project's water use of potable water is expected to be resilient with respect to climate trends based
2553 on a qualitative review of the discussion in the Climate Adaptation and Resilience section (USGS, 2017;
2554 See Figure 1) that suggests the groundwater supply is expected to remain in the current range during the
2555 timeframe that the Project would be operational. Consistent with the discussion above, the Project Area
2556 is within a regional area that is mapped as low risk regarding water supply sustainability in Year 2050 that
2557 considers factors such as but not limited to climate change (USGS, 2017; see Figure 1). In addition, the
2558 aquifer sustainability would be evaluated quantitatively with a three-dimensional groundwater model
2559 that would include climate projections and presented in the EIS data submittal.

2560 For non-potable uses, the Project would primarily rely on the recycling of treated contact water, however,
2561 it is possible that there would be a need to supplement this source during the early stages of mine
2562 development. If needed, supplemental non-potable water would be withdrawn from a new well installed
2563 into the Quaternary deposits to supply the construction stage (if needed) and during the early stages of
2564 operations when groundwater inflow to the underground mine is expected to be minimal. Groundwater
2565 inflow to the underground mine is expected to increase as development and mining progress and it is
2566 anticipated to be sufficient to supply non-potable water needs within the first couple of years. The need
2567 for a non-potable water supply well, and the potential withdrawal rate, would be determined by water
2568 balance studies for the EIS. Recycling of treated contact water for non-potable uses, if proven feasible,
2569 would reduce the amount of water appropriated from the Quaternary deposits.

2570 Mine dewatering during project construction, operation, and initial reclamation of the underground mine
2571 works would be required because once groundwater is encountered in bedrock, it would seep as inflow
2572 into the tunnels, stopes and similar project features without preventive measures. Groundwater seepage
2573 would likely originate from bedrock at depths from 400-1,900 ft (122-579 m) below ground; the EIS
2574 analysis would confirm that mine inflow water comes from the bedrock only (and not the unconsolidated
2575 surficial Quaternary deposits). Classified as contact water, these inflows to the underground mine would
2576 be combined with other sources of contact water at the Contact Water Treatment Plant.

A result of mine dewatering would be the potential depressurization of adjacent bedrock. As the shallow and deeper bedrock units are depressurized, a cone of depressurization would occur in the adjacent bedrock units. The cone of depressurization would extend to the bottom of the deepest mine working and radiate outward to a distance controlled by bedrock hydraulic properties. This depressurized zone would occur over the life of the project operation, and once mining activities were complete and dewatering was terminated, the groundwater system would be expected to recover and return to approximate pre-mining conditions in closure.

In addition, dewatering the underground mine during construction and operation into early reclamation would remove groundwater from storage and would transfer the removed groundwater to the surface water system (e.g., Contact Water Treatment Plant discharge). This would result in a reduction of groundwater to the hydrologic system in the vicinity of the underground mine.

An assessment would be completed in the EIS that characterizes the potential impact of withdrawing groundwater inflow from the underground mine on surface water and wetland features, nearby wells, and groundwater storage. This would include both a hydrological and hydrogeochemical evaluation.

The Project would not appropriate surface water. As a result, there would be no need for contingency plans for alternate supply in the case of a drought or the suspension of a surface water appropriation permit.

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.

The Project would use underground mining techniques that can reduce the project's surface footprint and subsequently reduce or even minimize wetland impacts compared to an open-pit method. The Project Area was designed to minimize wetland impacts by aligning surface infrastructure within previously disturbed areas and upland zones where possible. Furthermore, the layout avoided certain areas to the extent practicable, particularly areas that appear to contain palustrine emergent wetlands with deeper or more persistent inundation, palustrine peatland areas with open bog characteristics and interconnected palustrine wetland complexes. While some overlap with wetlands remains unavoidable due to the extent and distribution of wetland resources within the landscape, the configuration of the Project Area reflects an effort to limit encroachment and reduce the potential for direct impacts.

However, some direct impacts to wetlands would occur in parts of the Project Area where ground disturbance is proposed and wetlands are unavoidable. As a result of grading, excavating and filling activities associated with the construction of the surface facilities and the railway spur, an estimated 21.2

acres of wetland including existing flooded borrow pits would be permanently impacted. This includes approximately 1.6 acres of wetland that could be temporarily affected during the soil mixing activities with the construction of the SEM Section of the Decline Ramp. These temporary impacts would be limited in duration and would be addressed through appropriate restoration measures after construction. Whether the proposed Contact Water Treatment Plant discharge to CD 13 could result in direct wetland impacts will be evaluated in the EIS. Additional wetlands may be temporarily impacted during construction activities, which are defined as impacts with a 6-month duration or less. Potential permanent and temporary impacts to wetlands functions and values would be further evaluated as part of the EIS, which in part would be based on a level 3 standard that can involve quantitative fieldwork including a hydrogeomorphic approach and/or biological assessments.

In addition to direct wetland impacts, there is a potential for the Project to result in indirect wetland impacts. Indirect wetland impacts could occur from wetland fragmentation, changes in wetland hydrology and type, and atmospheric deposition from dust or other air emissions, which may affect water quality. Potential indirect wetland impacts and proposed monitoring would be further analyzed as part of surface, groundwater, subsidence, and wetland studies being completed to support the EIS.

Impacts to wetlands would require a permit from the USACE under Section 404 of the Clean Water Act and from the DNR under the requirements of Minnesota's Wetland Conservation Act (WCA). The Section 404 Clean Water Act permit would also include Section 401 Clean Water Act Water Quality Certification, which is coordinated with the MPCA. Unavoidable wetland impacts would be mitigated through compensatory wetland mitigation such as purchasing wetland bank credits from approved wetland banks from the appropriate service area.

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 Best Management Practices 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.

Potential Project physical impacts to surface waters include direct and indirect impacts to stream channels and ditches. Currently planned physical alterations of surface waters are limited to construction of discharge structures for the Contact Water Treatment Plant discharge. Generally, the use of underground mining would minimize physical impacts to surface water resources. Project features on the land surface would be located to avoid existing ditches where possible. Where avoidance is not possible, existing ditches may be diverted and rerouted around Project features, and/or filled. Approximately 1.1 miles of channelized ditches are present in the Project Area. Much of this length has been previously altered for drainage purposes and is not representative of a natural stream channel.

2657 In addition to direct physical impacts, the Project could result in indirect impacts to downstream hydrology
 2658 due to discharge of treated water, alteration of upstream tributary watersheds and stormwater
 2659 management. These potential effects are described in responses above. The railway spur would be
 2660 constructed with appropriate materials and/or features to facilitate water flow between each side of the
 2661 railway spur and address potential for differences in water level or other hydrological impacts.

2662 The Project does not anticipate impacting the number or type of watercraft usage within or downstream
 2663 of the Project Area.

2664 **Proposed Treatment in EIS: Water Resources**

☐	The topic is not significant or is adequately addressed in the SEAW. The same information from the EAW will be included in the EIS.
☐	The topic may be significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.2.
☒	The topic is significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.3.

2665 **13. Contamination/Hazardous Materials/Wastes:**

2666 **a. Pre-project site conditions**

2667 *Describe existing contamination or potential environmental hazards on or in close proximity to the project*
 2668 *site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned*
 2669 *storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-*
 2670 *project site conditions that would be caused or exacerbated by project construction and operation. Identify*
 2671 *measures to avoid, minimize or mitigate adverse effects from existing contamination or potential*
 2672 *environmental hazards. Include development of a Contingency Plan or Response Action Plan.*

2673 A review of the What's in My Neighborhood (MPCA, n.d. B) web mapping tool was conducted to identify
 2674 potential areas of concern on or within 1 mile (1.6 km) of the Project Area (Figure 10). Features that were
 2675 searched included, but were not limited to, active and inactive or closed hazardous waste generators,
 2676 solid waste facilities, remediation sites, leak sites and locations with above-ground storage tanks. The
 2677 review indicated the following activities:

- 2678 • Active and inactive industrial stormwater permits
- 2679 • Active and inactive aboveground storage tanks
- 2680 • The City of Tamarack Wastewater Treatment Plant
- 2681 • Active and inactive hazardous waste generator permits

2682 No actions associated with the Project are anticipated to disturb these sites.

There are subsurface sanitary wastewater treatment systems (septic systems) located to the north and west of the Project. In and/or near the City of Tamarack, there are several closed leak sites and a closed dump (the Tamarack Dump) which has undergone investigation and cleanup since its closure in 1998.

In addition to these existing conditions, local activities related to the exploration and definition of the Tamarack Resource Area (SMSU, MSU, CGO East, CGO West, and 138 Zone) and associated baseline environmental data collection include waste and material storage and handling. These activities include drilling and surface geophysical exploration, maintenance of access roads and trails, temporary boarding of staff members and/or contractors and operating various equipment in support of these activities. Site conditions related to these activities include:

- Aboveground tanks (TS0130875) at the exploration staging area (Figure 10)
- Hazardous waste small quantity generator status (Figure 10)
- Storage and use of hazardous materials and petroleum products (e.g., oil, fuel) associated with drill pad locations and the exploration staging area
- Refuse related to work at drill pad locations and the exploration staging area
- Septic system and/or leach fields associated with the house and farmhouse at the site
- Buried drill cuttings in the exploration staging area

Potential environmental effects from existing site conditions that would be caused or exacerbated by Project construction and operation would be discussed in the EIS, for example, including existing and future groundwater flow fields, drinking water wells and location of any septic systems or leach fields. The EIS would identify measures to avoid, minimize or mitigate adverse effects from existing potential environmental hazards. A Contingency or Response Action Plan would be developed as part of the EIS for tanks, wastewater treatment, and any hazardous waste generation associated with the Project.

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 solid waste including source reduction and recycling.

To facilitate a common understanding of the terminology used in this section, the following definitions of solid waste are provided.

Solid Waste – According to the Resource Conservation and Recovery Act (RCRA) of Title 42 of the U.S. Code Chapter 82 § 6903, the term solid waste refers to “any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sanitary wastewater, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 1342 of title 33, or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended.”

Minnesota Statutes § 116.06, subdivision 22, and Minn. R. 7035.0300, subp. 100, define Solid waste as “garbage, refuse sludge from a water supply treatment plant or air contaminant treatment facility, and

2723 other discarded waste materials and sludges, in solid, semisolid, liquid, or contained gaseous form,
2724 resulting from industrial, commercial, mining, and agricultural operations, and from community activities,
2725 but does not include hazardous waste; animal waste used a fertilizer, earthen fill, boulders, rock; sewage
2726 sludge; solid or dissolved material in domestic sewage or other common pollutants in water resources,
2727 such as silt, dissolved or suspended solids in industrial waste water effluents or discharges which are point
2728 sources subject to permits under section 402 of the federal Water Pollution Control Act, as amended,
2729 dissolved materials in irrigation return flows; or source, special nuclear or by-product material as defined
2730 by the Atomic Energy Act of 1954, as amended.”

2731 The Project would produce solid waste during construction, operation, and closure. The facilities or
2732 activities anticipated to produce solid waste include general construction refuse, the maintenance shop
2733 and wash bay, the storage warehouse, general refuse associated with the shops and the locker room
2734 facilities, cement storage, use of shotcrete, and the explosives magazine. Solid waste, as defined in the
2735 RCRA, would be disposed of in accordance with federal, state and local regulations. The Project would
2736 also generate residuals from the water treatment process. These residuals are anticipated to be managed
2737 as solid waste in accordance with applicable regulations.

2738 Solid industrial wastes anticipated to be generated by the Project include tires, scrap metal, concrete,
2739 construction waste, non-salvageable demolition debris and office waste (paper, utensils etc.). Solid
2740 industrial waste generated by the Project would be taken off site by a third party and recycled when
2741 available or disposed of.

2742 Potential environmental effects from solid waste handling, storage, and disposal would be discussed in
2743 the EIS. The EIS would identify measures to avoid, minimize or mitigate adverse effects from the
2744 generation/storage of solid waste including source reduction and recycling.

2745 **c. Project related use/storage of hazardous materials**

2746 *Describe chemicals/hazardous materials used/stored during construction and/or operation of the project*
2747 *including method of storage. Indicate the number, location and size of any new above or below ground*
2748 *tanks to store petroleum or other materials. Indicate the number, location, size and age of existing tanks*
2749 *on the property that the project will use. Discuss potential environmental effects from accidental spill or*
2750 *release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the*
2751 *use/storage of chemicals/hazardous materials including source reduction and recycling. Include*
2752 *development of a spill prevention plan.*

2753 To facilitate common understanding of the terminology used in this section, the following definition of
2754 hazardous materials is provided.

2755 Minnesota Statutes 115B.02: Subd. 8. Hazardous substance. "Hazardous substance" means:

- 2756 • any commercial chemical designated pursuant to the Federal Water Pollution Control Act, under
2757 United States Code, title 33, section 1321(b)(2)(A)
- 2758 • any hazardous air pollutant listed pursuant to the Clean Air Act, under United States Code, title
2759 42, section 7412
- 2760 • any hazardous waste

2761 Hazardous substance does not include natural gas, natural gas liquids, liquefied natural gas, synthetic gas
2762 usable for fuel, or mixtures of such synthetic gas and natural gas, nor does it include petroleum, including
2763 crude oil or any fraction thereof which is not otherwise a hazardous waste.

2764 Subd. 9. Hazardous waste. "Hazardous waste" means:

- 2765 • any hazardous waste as defined in section 116.06, subdivision 11, and any substance identified as
2766 a hazardous waste pursuant to rules adopted by the agency under section 116.07
- 2767 • any hazardous waste as defined in the Resource Conservation and Recovery Act, under United
2768 States Code, title 42, section 6903, which is listed or has the characteristics identified under
2769 United States Code, title 42, section 6921, not including any hazardous waste the regulation of
2770 which has been suspended by act of Congress

2771 Minnesota Statutes 116.06, Subd. 11. Hazardous waste. "Hazardous waste" means any refuse, sludge, or
2772 other waste material or combinations of refuse, sludge or other waste materials in solid, semisolid, liquid,
2773 or contained gaseous form which because of its quantity, concentration, or chemical, physical, or
2774 infectious characteristics may (a) cause or significantly contribute to an increase in mortality or an increase
2775 in serious irreversible, or incapacitating reversible illness; or (b) pose a substantial present or potential
2776 hazard to human health or the environment when improperly treated, stored, transported, or disposed
2777 of, or otherwise managed. Categories of hazardous waste materials include, but are not limited to
2778 explosives, flammables, oxidizers, poisons, irritants, and corrosives. Hazardous waste does not include
2779 source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended."

2780 Like hazardous materials, hazardous wastes are subject to state and federal requirements regarding
2781 management, transportation, and disposal. Locally, Minnesota implements regulations for hazardous
2782 wastes through the MPCA and MnDOT.

2783 The Project would store and use common materials that are considered hazardous during construction
2784 and operation. The facilities anticipated to use and/or store hazardous waste include: the explosives
2785 magazine, the fuel storage area, propane storage, the maintenance shops and the locker room facilities.
2786 Hazardous materials stored on the Project site would include diesel fuel, gasoline, propane, lubricants,
2787 coolant, batteries, explosives and explosive devices.

2788 The chemicals and/or hazardous materials that would be used and/or stored during construction and
2789 operation of the Project, including methods of storage, would be discussed in the EIS. The EIS would
2790 indicate the number, location, and size of any new above or below ground tanks to store petroleum or
2791 other materials. In the EIS, the potential environmental effects from accidental spills or release of
2792 hazardous materials would be discussed. Measures to avoid, minimize or mitigate adverse effects from
2793 the use and/or storage of chemicals and/or hazardous materials including source reduction and recycling
2794 would be identified. Fuel storage and consumption and the use of chemicals would be estimated, a review
2795 of product Safety Data Sheets would be conducted, and a spill prevention plan would be developed for
2796 the EIS, including with respect to any wells installed onsite, and groundwater flow directions and any well
2797 capture areas.

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 Project would generate and store hazardous waste during construction and operation. The facilities anticipated to generate and store hazardous waste include the fuel storage area and the maintenance shops. To reduce the potential for incidental contact and spills, hazardous waste would be stored on site in facilities that comply with the RCRA regulations prior to being transported off site. Hazardous waste would be transported off site by an EPA licensed transporter in United States Department of Transportation approved containers for disposal at appropriately permitted RCRA hazardous waste treatment, storage, and disposal facility(s). Additionally, the Project would comply with all RCRA waste management regulations including proper labeling, employee training, recycling, and practicing proper documentation of disposal protocols to avoid potential adverse effects. The following is a list of some expected waste streams that would be generated by the project:

- Expired blasting agents: Expired or damaged containers of detonators, initiators and fuses, and other high explosives used in blasting. These items would be taken back by the explosive distributor/contractor.
- Waste maintenance products: The operations are expected to generate solvent-contaminated wipes, waste grease, lubricants, anti-freeze and solvents. Waste maintenance products that cannot be recycled would be properly characterized and disposed of as hazardous waste using appropriately licensed disposal vendors.
- Used oil: Used oil and lubricants would be collected and transported off-site by an appropriately licensed used oil recycling vendor.

Hazardous wastes generated and/or stored during construction and/or operation of the Project, including the methods of disposal, would be described in the EIS. Where possible, the facility would recycle waste. Examples of recyclable waste materials include batteries, coolant and used oil. Recyclable materials would be transported and recycled by appropriately licensed vendors. The EIS would discuss potential environmental effects from hazardous waste handling, storage, and disposal, and would identify measures to avoid, minimize, or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

Proposed Treatment in EIS: Contamination/Hazardous Materials/Waste

☐	The topic is not significant or is adequately addressed in the SEAW. The same information from the EAW will be included in the EIS.
☒	The topic may be significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.2.
☐	The topic is significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.3.

14. Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources (Rare Features):

a. Fish and Wildlife Resources

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

In collaboration with the U.S. Forest Service, the DNR developed an Ecological Classification System (ECS) for hierarchical mapping and classification of Minnesota land areas with similar native plant communities and other ecological features. Based on the ECS, the Project Area is located in the Tamarack Lowlands Subsection of the Minnesota Drift and Lake Plains Section of the Laurentian Mixed Forest Province (MDNR, 2022F). The DNR summarizes this landscape feature as follows: Level to gently rolling topography is characteristic of this region where the largest landform is a lake plain such that glacial lacustrine sediments occupy much of the subsection. Beach ridges are present but not well defined with some limited moraines and low drumline ridges. Soils include extensive areas of histosols (peats) over both fine-textured silt and clay deposits and sandy lacustrine deposits; other soils present are entisols and alfisols. Annual precipitation averages 24 inches to 27 inches from the northwest to the east of the subsection. Pre-settlement vegetation in the lowlands was dominated by lowland conifers (e.g., black spruce; tamarack; white cedar) and lowland hardwoods (e.g., ash). Forestry is the most important land use within the Tamarack Lowlands because most of the subsection is marginal for agriculture. Presently much of the land is in public ownership (MDNR, 2022F).

The general Project vicinity is dominated by palustrine wetland communities, including peatland areas with open bog or coniferous bog characteristics, palustrine scrub shrub wetland areas consistent with shrub carr and palustrine forested wetland areas consistent with hardwood swamp. Species typical to these wetland types include sphagnum moss, tamarack, black spruce, lake sedge, willow, yellow birch and common marsh marigold. Uplands consist of mixed forest, pine plantations and hay fields associated with farmsteads. The mixed forest species assemblage can include aspen, maple, basswood, birch, black spruce, tamarack and cedar.

Watercourses in the immediate project vicinity are county ditches most likely constructed in the early 20th Century to drain wetlands for agricultural use. Aitkin CD 13 flows northward to a tributary of the Tamarack River that in turn flows to the Prairie River that itself flows to Big Sandy Lake. A fish survey in 2015 indicates species known to inhabit the tributary to the Tamarack River include northern pike, central mudminnow, northern redbelly dace, largemouth bass, rock bass, tadpole madtom, common shiner, blacknose dace, yellow perch, horneyhead chub, white sucker, logperch and johnny darter (MPCA, 2015). CD 23 flows westward to Minnewawa Creek and Sandy River, which then flows north into Big Sandy Lake. A fish survey in 2016 indicates species known to inhabit Minnewawa Creek include brook stickleback, central mudminnow, golden shiner, and white suckler (MPCA, 2016).

No DNR identified wild rice lakes are located within the Project Area; however, six wild rice waters (Mud Lake (ID# 01-0029-00), Tamarack Lake (ID# 09-0067-00), Tamarack River (ID# 07010103-757, 07010103-758), Prairie River (ID# 07010103-515), Sandy River (ID# 07010103-508) and Big Sandy Lake (ID# 01-0062-00)) are located in the Big Sandy Lake Outlet and Headwaters Big Sandy Lake watersheds (MPCA, 2024).

Big Sandy Lake, Sandy River and Prairie River are located downstream of the proposed project site. According to MN DNR Lake Finder “Status of the Fishery” report, Sandy Lake is a hard water Walleye lake that has dark brown tannin-stained water entering the lake through its two main inlets Sandy River and Prairie River. Big Sandy Lake supports a diverse fishery with its naturally-reproducing Walleye as the primary management species; Black Crappie and Northern Pike are secondary management species. Walleye population surveys for Big Sandy Lake indicate catch rate is within the expected range for the lake class with the average size being relatively small. Protected slot limits for Walleye caught in Big Sandy Lake are in place to improve size structure.

The wetland and upland areas within and around the Project Area provide habitat for wildlife common to east-central Minnesota. Mammals can include fox, deer, squirrels, beaver and muskrat; bird species can include great blue heron, red-tailed hawk, LeConte’s sparrow and blue-winged teal; herpetofauna can include painted turtles, common garter snake, northern leopard frog and American toad. The Project Area also includes more developed parcels (e.g. farmsteads), roads and a railway that fragments the habitat, making it more suited to more disturbance-tolerant wildlife such as raccoons, common grackle, and gray squirrel. The DNR’s Minnesota’s Wildlife Action Plan 2015-2025: Working with Partners for Wildlife Conservation states that there are 69 Species of Greatest Conservation Need (SGCN) in the Tamarack Lowlands subsection (MDNR, 2016).

Natural resources field surveys are currently being conducted within and across the Project Area. Information gathered during these surveys would be included in the EIS.

b. Rare Features

Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number and/or correspondence number (MCE) 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.

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) online tool identifies two federally threatened species and one federally endangered species as potentially occurring near and within the Project Area. These species include the federally threatened Canada lynx (*Lynx canadensis*; state special concern) and the gray wolf (*Canis lupus*; no state status) and the federally endangered northern long-eared bat (*Myotis septentrionalis*; state special concern). IPaC also identified the monarch butterfly (*Danaus plexippus*), a federal candidate species, and the tricolored bat, a federally proposed endangered species, as potentially occurring near and within the Project Area. No designated critical habitat is present within the Project Area. While not identified by IPaC, a rusty patched bumble bee (*Bombus affinis*) high potential zone is located approximately 11 miles from the Project Area. The rusty patched bumble bee is federally listed as endangered, and is anticipated to be state-listed in 2026.

Canada lynx inhabit boreal forests of northern Minnesota, primarily in the Arrowhead region of the state (Canada Lynx, 2022). Suitable habitat for the species, broadly characterized as northern forest, is present in the project vicinity but is not USFWS designated critical habitat for lynx. While patches of suitable habitat are present, the species prefers large tracts of dense, contiguous northern forest with a high abundance of snowshoe hare (*Lepus americanus*). The Project site within the greater landscape does not

2909 provide the amount or quality of habitat lynx prefer. Lynx are a mobile and highly secretive species where
2910 field surveys are not likely to provide reliable presence or absence information. Given these factors it is
2911 unlikely lynx routinely inhabit the project site or the vicinity of the Project Area.

2912 Gray wolves primarily inhabit temperate forests in northern Minnesota (USFWS, 2022A). While suitable
2913 habitat for the gray wolf is present in the Project Area, it is not designated critical habitat by the USFWS
2914 that is mainly present in the upper Arrowhead region of Minnesota. Populations in Minnesota typically
2915 occupy a variety of habitats but are generally tied to northern forests and ungulate (e.g., white-tailed
2916 deer, moose) populations. Den sites for wolves are found in natural berms or hillsides and beneath fallen
2917 timber, while rendezvous sites that are used seasonally are typically openings in wooded areas. The highly
2918 mobile, migrant nature of wolves is advantageous for the species in responding to and avoiding human
2919 disturbance. As habitat generalists, the species choose habitats based on the presence of primary prey
2920 species. Given these factors it is unlikely gray wolves routinely inhabit the Project site or the vicinity of the
2921 Project Area.

2922 Suitable forested habitat for northern long-eared bats is present in forested areas within and near the
2923 Project Area. This species inhabits caves, mines, and forests in Minnesota. Northern long-eared bat forage
2924 in upland forested areas and use trees greater than 3-inches diameter at breast height (dbh) with loose,
2925 peeling bark or crevices as roost sites. Hibernation occurs in caves or mines. According to the DNR and
2926 USFWS, the nearest known hibernacula is located over 80 miles northeast of the Project Area. The nearest
2927 known maternity roost tree has been documented over 3 miles (4.8 km) west of the Project Area in Aitkin
2928 County (Township 48N, Range 23W). (MDNR, 2022D).

2929 Suitable forested habitat for tricolored bats is present in forested areas within and near the Project Area.
2930 This species inhabits caves, mines, and forests in Minnesota but can also roost in road culverts and other
2931 artificial structures. It is unknown if tricolored bats utilize the hibernacula located 80 miles (128.7 km) to
2932 the northeast of the Project Area used by northern long-eared bats, but the range of this species includes
2933 the Eastern one-half of the United States, including all of Minnesota. Although known to hibernate with
2934 other bat populations, the tricolored bat tends to occupy deeper, more remote portions of the
2935 hibernaculum where temperatures and humidity are higher. The species is proposed to be endangered
2936 by the USFWS (USFWS, 2022C).

2937 In December 2020, the USFWS assigned the monarch butterfly as a candidate for listing under the
2938 Endangered Species Act (ESA) due to its decline from habitat loss and fragmentation; however, candidate
2939 species are not protected under the ESA. The monarch butterfly inhabits fields and parks where native
2940 flowering plants, including milkweed (*Asclepias* species) which is required for breeding, are common
2941 (MDNR, 2022C). Suitable monarch butterfly habitat containing milkweed is present in the vicinity of the
2942 Project Area.

2943 The rusty patched bumble bee inhabits open areas with abundant flowers, nesting sites (underground and
2944 abandoned rodent cavities or clumps of grasses), and undisturbed soil for overwintering sites (MDNR,
2945 2022; CUSFWS, 2022B). While some areas of suitable habitat are present in the vicinity of the Project Area,
2946 the Project does not overlap with a rusty patched bumble bee high potential zone.

2947 The DNR has queried the Natural Heritage Information System (NHIS) for presence of ecologically
2948 significant areas or state-listed species. Parts of the Project site lie within a DNR Minnesota Biological
2949 Survey (MBS) Site of Moderate Biodiversity Significance. The site, Haugen 2, covers approximately 6,470

acres. Sites ranked as Moderate contain occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery. Haugen 2 contains several mapped Native Plant Communities (NPCs), which include: northern spruce bog, northern poor fen, northern mesic hardwood forest, and northern wet meadow/carr. None of these occur within the Project Area. Additional NPCs within the Project vicinity, but not within an MBS site, include northern poor fen, northern wet-mesic hardwood forest, northern shrub shore fen, and northern wet meadow/carr (Figure 22). No state-listed species have been documented within one mile of the Project Area. While this is valuable data, it is also important to recognize and acknowledge that to many local and indigenous people, all native plant and animals are significant, and measures should be taken to protect them.

The closest WMAs are located approximately 2.5 miles (4 km) west (Grayling Marsh WMA) and south (Salo Marsh WMA) of the Project Area (Figure 22). No scientific natural areas or other sensitive ecological resources have been mapped within the Project Area.

Wild rice (*Zizania palustris*) is a native plant found in area lakes, rivers, and streams downstream of the Project Area and is of particular significance to the local and indigenous communities. This aquatic plant is sensitive to changes in water levels, nutrients, and sulfate, along with other factors. Baseline data collection has been ongoing on or near several MPCA designated wild rice waters since 2008. Data collection includes but is not limited to desktop and reconnaissance-level wild rice surveys, surface water sulfate, and hydrology and water levels. Talon proposes to treat all lakes, streams, and ditched waterways in the Project vicinity as potentially containing wild rice.

While there are no Lakes of Biological Significance in the Project Area, there are 24 Lakes of Biological Significance located in the Headwaters to Big Sandy Lake (HUC10 #0701010305) and the Big Sandy Lake Outlet (HUC10 #0701010306) watersheds. A Lake of Biological Significance can be one of 3 classes (Outstanding, High, or Moderate) that is determined by unique plant or animal presence (MDNR, 2025). The 20 lakes that are ranked as “outstanding” are Aitkin, Big Sandy, Brown, Eagle, Flowage, Glacier, Hockey, Lower (South) Island, Minnewawa, Prairie, Rat, Rat House, Rice, Rock, Round, Salo WMA Impoundment, Sandy River, Tamarack, Upper (North) Island, and Wakefield. Additionally, two lakes are listed as “moderate” (Cole, Remote) and two are listed as “high” (Townline, Island).

c. Project Effects

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.

Construction and operation of the Project would alter and directly impact approximately 64.4 acres of upland and wetland wildlife habitat. Vegetation would be removed at most, if not all, proposed upland surface operations, which would eliminate any cover value from existing vegetation. Loss of cover reduces structural diversity as well as forage diversity, plus the Project could fragment habitat further in the Project Area. Site clearing can create conditions that may benefit some wildlife to the detriment of others. Increased human activities and noise associated with human activity and project operations create disturbances that would affect wildlife in the area. Wildlife that may be using the site and greater Project vicinity, which could include movement between blocks of publicly managed lands (e.g., WMAs; state

2991 park; state forest), would likely be displaced to adjacent or nearby habitats if available. These habitats
2992 may not be suitable for all species affected, or may increase competition for feeding, resting, and breeding
2993 habitat in adjacent refuge areas.

2994 Potential impacts to fish resources could be associated with Project-related discharges from the Contact
2995 Water Treatment Plant into CD 13 and downstream waters. Adverse impacts could result if treatment
2996 plant discharge flows caused accelerated erosion and sedimentation and/or adverse water quality
2997 impacts. If stormwater management is uncontrolled during construction and operations, it could also
2998 result in adverse impacts to instream fishery resources and nearby wetland herpetofauna species.

2999 Future climate trends in the area indicate anticipated increases in temperature and variability in
3000 precipitation. The EIS process would provide a more detailed assessment of potential direct, indirect, and
3001 cumulative climate impacts associated with the project.

3002 *Federal and State Listed Species*

3003 There are a small number of verified and probable Canada lynx sightings in Aitkin and Carlton Counties
3004 from 1996-2025, while the range of the gray wolf has expanded from the northeast to the southwest
3005 across the forested north-central part of Minnesota. Although there is suitable habitat for Canada lynx
3006 and gray wolves in the area, Project-related cover type conversion would have negligible impact on
3007 suitable habitat for these species. Similar to other wildlife, there is a general avoidance of human activity,
3008 thus these species would likely avoid the Project Area during construction and operation in favor of
3009 comparable habitat elsewhere. As such, the Project is unlikely to adversely impact Canada lynx or gray
3010 wolf.

3011 Habitat for northern long-eared and tricolored bats is present within the Project Area, and tree clearing
3012 could affect this habitat, which makes tree removal a principal source of impact, especially loss of roost
3013 trees for northern long-eared bats. In addition, because bats are known to be potentially sensitive to noise
3014 and light impacts, any species of bats with hibernacula or roosts in the Project vicinity could be subject to
3015 disturbance and displaced to neighboring habitat, if present. Population-scale impacts to either species
3016 are not anticipated.

3017 Some areas of suitable habitat for rusty patched bumble bees are present in and adjacent to the Project
3018 Area. Any impacts would be local due to loss of pollinator-friendly flora and overwintering sites, both due
3019 to project vegetative clearing and cover type conversion, which could result from mowing, cutting,
3020 prescribed fire, tree removal, spot-application of herbicide, tree clearing, and/or other activities.

3021 Some areas of suitable habitat for monarchs are present in and adjacent to the Project Area. Clearing and
3022 grading activities associated with the Project could impact the habitat for monarch butterflies within the
3023 Project Area.

3024 *Sensitive Ecological Resources*

3025 Project-related construction and operation of the following project features would directly impact
3026 portions of the Haugen 2 Site of Moderate Biodiversity Significance: Surface Raise No. 1; Surface Raise No.
3027 2; Rail Yard; Aggregate Buffer; and the Railway. Covertype conversion to impervious surface and/or
3028 wetland fill would be the primary vegetative impact. The Proposer is collecting site specific information
3029 to support the impact assessments. Regarding wild rice resources, no impacts due to construction of the

surface mine facilities are expected. The EIS will assess the potential for project-related water discharges (e.g., stormwater; WWTF discharge) to result in adverse water quality or hydrological impacts to downstream wild rice resources. The Proposer is conducting a baseline wild rice habitat delineation in downstream waterbodies. No other sensitive ecological resources have been identified within the Project Area or its immediate vicinity as such no impacts to other sensitive ecological resources are anticipated.

Invasive Species

Invasive species are non-native species that cause or may cause economic or environmental harm or harm to human health; or threaten or may threaten natural resources or the use of natural resources in the state (Minnesota Statutes, 2022, section 84D.01, subdivision 9a). Vegetation clearing and the movement of construction equipment in and out of the Project Area could make it susceptible to the introduction and spread of invasive plant species. In addition to the potential for terrestrial invasive species introduction, project activities may present a risk for the introduction of aquatic invasive species. To minimize the spread of invasive species, contractors would be required to comply with applicable Minnesota regulations, which could include measures such as cleaning construction equipment prior to arriving on site and upon leaving the site (MDNR, 2022E)

d. Avoidance, Minimization, or Mitigation

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

Potential impacts to fish and aquatic resources can be minimized by ensuring project-related wastewater discharges meet NPDES/SDS permit conditions to limit erosion, sedimentation and adverse water quality impacts. Similarly, construction and industrial stormwater discharges should comply with NPDES permit conditions, including the SWPPP. In particular, the proposed stormwater management system would capture runoff and route it through treatment processes to remove suspended solids and particulates. Specific measures could include limiting the size of staging areas, installing perimeter sediment fence to reduce sediment runoff, conducting work under frozen ground conditions when possible, using native species appropriate to existing terrestrial ecology to restore disturbed areas, especially along ditches and wetlands, and employing BMPs to identify and control invasive non-native plant species that may be encountered at the site.

Wildlife habitat impacts resulting from project-related cover type conversion may be partially offset through site reclamation and closure requirements under the Permit to Mine. Once the site is restored, post-restoration habitat values would re-emerge as a function of vegetation re-establishment over a number of growing seasons. Potential disturbance effects would be partially mitigated by enclosing a majority of surface operations within a single enclosed building; except for fencing along the ventilation raise access corridors and the rail corridor, wildlife should be able to freely move across the site and access surrounding undeveloped land.

The USFWS has adopted its Endangered Species Act Section 7(a)(2) Voluntary Implementation Technical Assistance for rusty patched bumble bee (April 2025) to assist that agency, federal action agencies, and applicants (e.g., Proposers) in implementing actions that would conserve the species. Although the rusty patched bumble bee has not been documented in the immediate Project Area specific measures to help conserve the species can include conducting a habitat survey in the terrestrial vegetation analysis area,

planting native flowering plants beneficial to pollinators where it is possible to stabilize disturbed soils and in long-term restoration efforts, and prioritizing use of low impact pesticides. Opportunities in reclamation and closure to establish pollinator friendly plant species could benefit the rusty patched bumble bee and other pollinators. Many of these measures could also benefit the monarch butterfly.

As noted above, impacts to northern long-eared and tricolored bats would be minimized by following federal laws in relation to the northern long-eared bat. The EIS would provide further details on these measures and ensure compliance with state and federal standards for protecting downstream habitats and sensitive resources.

Proposed Treatment in EIS: Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources

☐	The topic is not significant or is adequately addressed in the SEAW. The same information from the EAW will be included in the EIS.
☒	The topic may be significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document “Draft Scoping Decision Document” in Section 3.2.
☐	The topic is significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document “Draft Scoping Decision Document” in Section 3.3.

15. Historic Properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or inclose 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.

The Project is located on the traditional, ancestral, and contemporary lands of the Očhéthi Šakówin (Mdewakanton Dakota) and the Anishinaabe (Ojibwe) peoples, and many others forgotten in time. It is important to acknowledge that the Native American nations played a vital role in Minnesota’s history and continue to influence its culture today. Additionally, the wetland complex in the Project Area may have been used as burial sites, raising the possibility of inadvertent discoveries. Other potential cultural resources and traditional uses associated with the landscape may also be present. This concern requires evaluation as part of the EIS process.

The Project Area is situated within Archaeological Region 5C (Central Lakes Coniferous – Central), as defined by the Minnesota Department of Transportation’s Mn/Model framework, which is characterized by glaciated landscapes, abundant lakes and wetlands, and coniferous forests. This regional context informs the potential for undiscovered archaeological resources.

3097 Barr requested data from the Minnesota State Historic Preservation Office (SHPO) on May 9, 2022, to
 3098 identify previously recorded archeological sites and historic architectural resources located near and
 3099 within the Project Area. The OSA Portal for archeological sites was also reviewed on May 16, 2022. In
 3100 addition, Barr completed an in-person records check at the Minnesota SHPO on October 11, 2022.

3101 The data provided by SHPO and reviewed through the OSA Portal identified no known archeological sites
 3102 or historic architectural resources within the Project Area. In the area surrounding the Project Area, two
 3103 potential precontact archeological site locations have been identified. These sites are both designated
 3104 “alpha sites,” as they have not been confirmed by formal archeological survey. One site (21CLi) represents
 3105 a potential flat-topped mound as reported in The Aborigines of Minnesota (Winchell, 1911), while the
 3106 second (21Akbc) represents the potential location of a precontact village site as reported in Kathio
 3107 (Brower, 1901). The exact locations and presence of these sites is unknown. However, as they are
 3108 currently mapped in the OSA Portal, both are located over 1.0 mi (1.6 km) from the Project Area. Eight
 3109 documented historic architectural resources may be in visual proximity to the Project Area. At least three
 3110 have been demolished since their original recording (Table 15-1, Figure 21).

3111 **Table 15-1 Previously Identified Cultural Resources in Visual Proximity (1.0-mile buffer) to the**
 3112 **Project Area**

Resource Number	Resource Type	Township	Range	Section	NRHP Eligibility
AK-TMC-001	First State Bank of Tamarack	48	22	16	demolished
AK-TMC-002	Marcus Theater	48	22	15	demolished
AK-TMC-003	Tamarack Cooperative Store	48	22	15	undetermined
AK-TMC-004	Mayhall House	48	22	15	demolished
AK-TMC-005	Tamarack Town Hall	48	22	15	undetermined
AK-TMC-006	Tamarack School	48	22	15	undetermined
AK-TMC-007	Marcus Nelson Barn	48	22	15	undetermined
XX-ROD-153	Trunk Highway 210	48	22	15	not eligible

3113 Most of the previously recorded historic architectural resources are located in Tamarack, Minnesota.
 3114 Tamarack began as a railroad town and was founded in 1874 when the Northern Pacific Railroad created
 3115 a line from Duluth to Brainerd (Brower, 1901).

3116 The nearest listed National Register property is the Savanna Portage Historic Trail, located approximately
 3117 10.0 miles north of the Project Area in Savanna Portage State Park. Given the distance and the nature of
 3118 the Project, no direct or indirect effects on this property are anticipated.

3119 If historic properties or archaeological sites eligible for listing in the National Register of Historic Places
 3120 are identified within the Project Area, Talon would coordinate with the State Historic Preservation Office,
 3121 Tribal Historic Preservation Offices, and other appropriate parties to develop avoidance, minimization or
 3122 mitigation measures. Avoidance of impacts would be prioritized where feasible. If avoidance is not
 3123 possible, mitigation measures such as data recovery excavations or formal documentation would be
 3124 implemented in accordance with applicable guidelines.

3125 The cultural resources records check indicates that the Project Area has not been previously investigated
 3126 for cultural resources; therefore, it is possible that undocumented archeological sites and/or historic
 3127 architectural resources persist within the area. Based on available information and the lack of prior
 3128 archaeological survey coverage, the Project Area is inferred to have unknown site potential under the
 3129 Survey Implementation Model developed by the OSA.

3130 The Project would require a permit from the USACE, constituting an undertaking subject to Section 106
 3131 of the National Historic Preservation Act. As a result, cultural resources investigations, including tribal
 3132 cultural resources investigation, an archeological reconnaissance and a historic architectural survey,
 3133 would be completed prior to construction to determine whether historic properties eligible for the
 3134 National Register of Historic Places are located within the Project Area. As directed by the USACE,
 3135 revisiting and re-evaluation of previously recorded architectural resources may occur within the Area of
 3136 Potential Effect, as defined by the USACE. Talon would coordinate with Tribal Historic Preservation Offices
 3137 (THPOs) throughout the Environmental Impact Statement (EIS) and permitting process. Consultation
 3138 would be initiated to identify potential cultural concerns, and ongoing engagement would ensure that
 3139 THPOs have input on the studies and findings.

3140 **Proposed Treatment in EIS: Historic Properties**

☐	The topic is not significant or is adequately addressed in the SEAW. The same information from the EAW will be included in the EIS.
☒	The topic may be significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.2.
☐	The topic is significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.3.

3141 **16. Visual Resources:**

3142 *Describe any scenic views or vistas on or near the project site. Describe any project related visual effects*
 3143 *such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project.*
 3144 *Identify any measures to avoid, minimize, or mitigate visual effects.*

3145 The Project would alter the landscape from a rural setting with tree cover to an industrial setting that (in
 3146 addition to the underground mine) would include the surface features described in response to Item 6.b.

3147 The Project Area is surrounded by various land ownerships, including private and State of Minnesota
 3148 owned lands. Two private residences exist in the immediate vicinity of the Project Area. The first residence
 3149 is located directly west of the Project across CSAH 31. The other private residence is located one half mile
 3150 north of the Project along CSAH 31 and borders the Project Area's northernmost property boundary.
 3151 Within the Project's property boundary, there are three farmsteads owned by Kennecott Exploration. One
 3152 is located on the west side of CSAH 31 and two are located on the east side of CSAH 31 within Project
 3153 boundaries. The scope of the Project Area extends eastward away from the Surface Boundary of the mine
 3154 layout and into the Savanna State Forest, providing a gradual transition from a small-scale industrial
 3155 facility into a natural landscape of a mixture of wetlands, lowland conifers and lowland deciduous tree
 3156 types that help protect the aesthetic quality of the landscape. Young to middle-aged coniferous and
 3157 deciduous tree types provide a natural buffer along the stretch of CSAH 31 that runs adjacent to the
 3158 Project's western property boundary. There are no scenic vistas within or near the Project Area that
 3159 require special attention regarding adverse visual impacts.

3160 The Project would be partially visible to anyone traveling on the roadway adjacent to the Project Area
 3161 during construction and operation. It may also be visible or partially visible to the farmsteads and
 3162 residences adjacent to the Project, depending on the time of year and persistence of tree cover over time.

3163 Project-related visual effects during construction would consist of large equipment and heavy machinery
 3164 movement throughout the Project Area and increased traffic along CSAH 31. It would also include new
 3165 buildings and facilities within the Project Area. Once constructed, the Project would operate 24 hours a
 3166 day, seven days a week, 365 days of the year.

3167 During Project operation, visual effects would consist of the presence and use of the surface facilities and
 3168 buildings, which would be extant at least for the entirety of operations. Upon mine closure, if there is no
 3169 beneficial reuse for the site, surface infrastructure would be removed.

3170 Visual effects would also consist of daily activities associated with mining operations, including the
 3171 movement of haul trucks throughout the facilities, deliveries, and employee traffic on CSAH 31 and
 3172 increased railway activity for the loading and shipment of mined ore to the off-site concentrators.

3173 The Project and the surrounding area are in a rural setting. The sky in and around the city has a Class rating
 3174 of 2 or 3 on the Bortle Dark Sky Scale (Bortle, 2006) which is a qualitative index developed in 2001 to
 3175 "provide a consistent standard for comparing observations with light pollution" (Bortle, 2006). The Bortle
 3176 Dark Sky Scale groups the visibility of stars, galaxies, and zodiacal light into nine classes (Bortle, 2006). A
 3177 Class rating of 2 describes a truly dark sky and is considered excellent for stargazing (Bortle, 2006). A Class
 3178 rating of 3 describes rural sky. Under Class 3 skies, there is indication of light pollution on the horizon, but
 3179 they are still considered ideal for stargazing. The Project is located in a Bortle Class 3 area. Under Bortle
 3180 Classes 1 through 3, "most observers feel they are in a natural environment, with natural features of the
 3181 night sky readily visible" (Bortle, 2006). While there is no specific Minnesota standard for dark skies, the
 3182 Project is working to include Bureau of Land Management guidance for lighting and dark sky compliant
 3183 lights in the design (Sullivan, 2021).

3184 Savanna Portage State Park is several miles to the northwest. Despite the nearby communities of
 3185 Floodwood and the lake house communities around Big Sandy Lake, Minnewawa Lake and Round Lake—
 3186 generating light pollution, the park is known for its natural night-sky viewing experience.

It is unlikely that the Project would significantly alter the current night-sky quality in the park, based on the following considerations: 1) existing sources of light pollution from nearby communities (including Floodwood, McGregor, Cromwell, and lake house communities around Big Sandy Lake, Minnewawa Lake, and Round Lake); the Project's enclosed operations design; 3) minimized outdoor nighttime activity; and 4) intention to employ dark-sky-compliant lighting practices.

Proposed Treatment in EIS: Visual Resources

☐	The topic is not significant or is adequately addressed in the SEAW. The same information from the EAW will be included in the EIS.
☒	The topic may be significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.2.
☐	The topic is significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.3.

17. Air:

a. Stationary Source Emissions

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 preliminary air pollutants from stationary sources that would be analyzed in the EIS are criteria air pollutants, hazardous air pollutants (HAPs), and greenhouse gas (GHG) emissions. Some of the specific pollutants that would be evaluated in the EIS Include:

- Particulate matter (PM), particulate matter less than 10 microns (PM₁₀), particulate matter less than 2.5 microns (PM_{2.5})
- Sulfur dioxide (SO₂)
- Nitrogen oxides (NO_x)
- Carbon monoxide (CO)
- Volatile Organic Compounds (VOC)
- Lead (Pb)
- HAPs (Single HAP and Total HAPs)
- Elongate Mineral Particles
- Carbon dioxide equivalence (CO₂e) is the number of metric tons of CO₂ emissions with the equivalent global warming potential as one metric ton of another greenhouse gas

3215 The list of emission sources and potential pollutants would be updated, and provided for the EIS, as
3216 additional facility design is completed. The EIS would calculate emissions for all sources and air pollutants.
3217 However, anticipated sources are described further below. Specific air monitoring methods and
3218 compliance demonstrations with applicable standards, including particulate control and mitigation
3219 measures, would be developed and finalized as part of the EIS and the permitting process. Emission
3220 sources, including particulate exhaust, would meet applicable standards under the Clean Air Act and
3221 Minnesota ambient air quality standards as set forth in Minn. R. Ch. 7009.

3222 *Air Regulatory Framework*

3223 Under Minnesota Rules part 7007.0200, and Minnesota Rules part 7007.0250, an air permit is needed if
3224 EPA emission standards from 40 CFR (Code of Federal Regulation) Part 60 or 61 apply. In addition, if the
3225 potential emissions are above the air permitting thresholds for stationary sources, then an air permit
3226 would also be needed.

3227 Based on the Project's scope and scale, similar to the Eagle Mine in Michigan, which did not trigger
3228 Prevention of Significant Deterioration (PSD) review, the Project anticipates that PSD requirements would
3229 not apply, but an individual state or Title V air permit would be required. EPA has an emission standard
3230 under 40 CFR Part 60 Subpart LL for Metallic Mineral Processing that establishes a particulate matter limit
3231 for rail loadout. Minnesota rules require an air permit if this Metallic Mineral Processing standard applies.
3232 The Project plans to obtain an individual facility permit.

3233 Additional EPA emission standards apply to Project equipment. The EPA emission standard under 40 CFR
3234 Part 60 Subpart OOO or Subpart LL may apply for crushing of ore and waste rock at the Project Area. The
3235 Project may purchase a certified generator engine to meet additional EPA requirements under 40 CFR Part
3236 60 Subpart IIII. Vehicles would meet EPA's Tier 4 mobile diesel engine limits. Tier 2 and 3 certified vehicles
3237 would only be used when Tier 4 vehicles are unavailable.

3238 The Project expects to have Hazardous Air Pollutant (HAP) emissions below the Title V thresholds, so it
3239 would be a HAP area source. The emergency electrical generator engine would be subject to 40 CFR Part
3240 63 Subpart ZZZZ but would meet this standard by meeting 40 CFR Part 60 Subpart IIII.

3241 All federal and state regulations would be evaluated in detail for the EIS once equipment design is
3242 finalized.

3243 *Class I and II Modeling*

3244 To support the EIS development, modeling analysis for all federally approved Class I areas within 300 km
3245 (186.4 mi) (Figure 24) of the Project Area will be conducted. This may include an initial screening, a
3246 significant impact analysis, and a particle transport modeling analysis to assess potential project impacts
3247 on these areas. For these studies, the Project would develop a modeling protocol according to the Federal
3248 Land Managers Air Quality Related Values guidance.

3249 Additionally, the Project would complete Class II air dispersion modeling for the EIS to evaluate what
3250 modifications may be needed to meet these standards. The Project would follow MPCA's Air Dispersion
3251 Modeling Practices and EPA's Guideline on Air Quality Models. A modeling protocol, needing MPCA
3252 approval, would be developed. Talon has constructed a meteorological station and will begin using this
3253 on-site data to support the modeling once a complete year of data is available. Modeled air concentrations

3254 would be compared against the Significant Impact Levels and National and Minnesota Ambient Air Quality
3255 Standards for each pollutant and averaging period, as applicable.

3256 *Point sources*

3257 Several emission-producing activities would be located underground and would emit exhaust through a
3258 stack. Prior to release, the exhaust air would undergo a filtration or scrubbing process to reduce the
3259 amount of suspended dust and particulates. Underground excavation activities would consist of drilling
3260 holes, blasting using an explosive material, heavy and light duty truck traffic on underground unpaved
3261 roads, and underground transfer of ore, waste rock, as well as placing CRF. The explosives would produce
3262 emissions, in addition to particulates emitted from the rock and ore.

3263 Aboveground, several sources would exhaust through stacks. Ore and waste rock would be transferred
3264 from the trucks within the Ore Transfer Building, to the Rail Loading Buffer Area and then into railcars for
3265 shipping. At no time during this process would the ore be exposed to the outdoors. A backfill plant would
3266 be located on the surface inside the Ore Transfer Building. The facility would also include ore and waste
3267 rock crushers. The buffers for rail loadout and backfill would be enclosed within the building. Propane
3268 heaters for heating the mine and emergency electrical generators would produce emissions. Propane
3269 could also be used to heat buildings.

3270 The Project would install control equipment as needed to meet applicable regulatory requirements for
3271 stack, fugitive, and engine emissions. This equipment would include bag houses for the material handling
3272 and loadout operations, along with wet scrubbers to reduce emissions from underground mining
3273 activities. Additionally, levels of relevant gases in the mine ventilation exhaust circuit would be monitored
3274 in real-time, and particulate levels would be regularly sampled in alignment with health and safety
3275 standards. Further details on these measures would be provided in the EIS.

3276 *Other sources*

3277 The Project would also include emission sources that generate mercury emissions through combustion of
3278 propane. Facilities with mercury emissions of three or more pounds per year are subject to Minn. R.
3279 7007.0502. The Project does not expect mercury emissions above the 3 lbs. per year threshold.

3280 **b. Vehicle Emissions**

3281 *Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related*
3282 *emissions effect on air quality. Identify measures (e.g., traffic operational improvements, diesel idling*
3283 *minimization plan) that will be taken to minimize or mitigate vehicle-related emissions*

3284 Mobile engine emissions would be included in the proposed air dispersion modeling completed for the
3285 EIS but would be excluded from emission totals used to evaluate permitting requirements. Electric
3286 vehicles would be used for operations, if practical. Where electric vehicles are impractical, vehicles would
3287 be equipped with Diesel Emission Fluid (DEF) to minimize NOx emissions.

3288 **c. Dust and Odors**

3289 *Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during*
3290 *project construction and operation. (Fugitive dust may be discussed under item 17a). Discuss the effect of*

3291 *dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify*
3292 *measures that will be taken to minimize or mitigate the effects of dust and odors.*

3293 *Dust*

3294 Fugitive particulate emissions at the Project Area could originate from aboveground paved and unpaved
3295 roads. Commercially sourced aggregate may be received and stored outdoors for use in CRF and as
3296 material for unpaved roadbeds. The transfer and outdoor storage of aggregate material could produce
3297 particulate emissions. Additionally, the grading of unpaved roads to maintain the surface could generate
3298 particulate emissions.

3299 The Project's Fugitive Dust Control Plan would include visible emissions checks with mitigation measures
3300 in place if emissions were observed. Mitigation measures may include sweeping and spraying of paved
3301 surfaces, dust suppressants and water sprays on unpaved surfaces, wind barriers for piles and water
3302 sprays or the use of vegetation. During construction, sources of fugitive dust are expected to be similar to
3303 those encountered during operations, and the same types of mitigation measures would be applied to
3304 control emissions.

3305 *Odors*

3306 Use of explosives and diesel trucks, if necessary, are expected to be the primary sources of odors
3307 associated with the Project. Explosives use would be entirely enclosed within the mine, and exhaust air
3308 from blasting would pass through a wet scrubber system expected to help minimize odors. Blasting is
3309 expected to occur daily, with associated emissions anticipated to dissipate within an hour.

3310 Diesel engines are recognized odor sources; however, electric vehicles would be used if available, and all
3311 non-electric vehicles would use EPA Tier 4 certified engines if available. The diesel exhaust fluid and
3312 particulate filters in Tier 4 engines are expected to further reduce odors. Underground tailpipe emissions
3313 would be vented through the mine ventilation system, while surface tailpipe emissions would exhaust
3314 near ground level. With much of the Project activity now occurring indoors or in enclosed areas, odors are
3315 expected to be minimal, temporary, and localized to the immediate project vicinity.

3316 **Proposed Treatment in EIS: Air**

☐	The topic is not significant or is adequately addressed in the SEAW. The same information from the EAW will be included in the EIS.
☐	The topic may be significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.2.
☒	The topic is significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.3.

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 come to that conclusion and any GHG emission sources not included in the total calculation.

The Project's Greenhouse Gas (GHG) emissions may consist of a combination of both direct and indirect emissions from construction and operational activities. GHG emissions from construction activities would include both on-road and non-road mobile equipment (e.g. diesel-, gasoline-, propane-, natural gas-powered), land use change, and potential electrical consumption.

Operational GHG emissions would consist of the following:

- stationary combustion equipment such as propane heaters and emergency electrical generator
- mobile source emissions (e.g., trucks, trains, and equipment)
- fugitive sources from blasting activities
- usage of Portland cement
- electrical consumption
- off-site waste disposal

GHG emissions during construction and operations would be calculated for the EIS, as summarized in Table 18-1 and Table 18-2.

The following tables are examples; other layouts are acceptable for providing GHG quantification results.

Table 18-1 Construction GHG Emission Types and Calculation Methods (to be completed for the EIS, including quantification of additional sources)

Scope	Type of Emission	EmissionSub-type	Project-related CO ₂ e Emissions (tons/year)	Calculation method(s)
Scope 1	Combustion	Mobile Equipment – On Road	TBD	Calculated using emission factors for fuel usage from EPA 40 CFR Part 98 Subpart C Table C-1 [1] Calculated using EPA CCCL (Center for Corporate Climate Leadership) Emission Factors for Greenhouse Gas Inventories, Table 3 and Table 4 [2]
Scope 1	Combustion	Mobile Equipment - Non-Road	TBD	Calculated using emission factors based on South Coast Air Quality Management

Scope	Type of Emission	EmissionSub-type	Project-related CO2e Emissions (tons/year)	Calculation method(s)
				District Emission Factor, SCAQMD EMFAC 2007 (v2.3) [3] Calculated using EPA CCCL Emission Factors for Greenhouse Gas Inventories, Table 5 [2]
Scope 2	Purchased Energy	Electrical	TBD	Calculated using emission factors from the EPA Emissions & Generation Resource Integrated Database (eGRID) or from supplier information [4]
Scope 1	Land Use	Area	TBD	Calculated using emission factors based on the following: 2006 IPCC Guidelines for National Greenhouse Gas Inventories [5] 2013 Wetlands Supplements for wetlands and sources/sinks for uplands [6]
TOTAL				

3340 [1] Source: (EPA, 2022D)

3341 [2] Source: (EPA, 2022A)

3342 [3] Source: (SCAQMD, 2022)

3343 [4] Source: (EPA, 2022C)

3344 [5] Source: (European Environment Agency, 2006)

3345 [6] Source: (IPCC, 2013)

3346 **Table 18-2 Operation GHG Emissions Types and Calculations Methods (to be completed for the**
3347 **EIS, including quantification of additional sources)**

Scope	Type of Emission	Emission Sub-type	Project-related CO2e Emissions (tons/year)	Calculation Methods
Scope 1	Combustion	Stationary Equipment	TBD	Calculated using emission factors for fuel usage from EPA 40 CFR Part 98 Subpart C Tables C-1 and C-2 [1]
Scope 1	Combustion	Mobile Equipment - On Road	TBD	Calculated using emission factors for fuel usage from EPA 40 CFR Part 98 Subpart C Tables C-1 and C-2 [1]

Scope	Type of Emission	Emission Sub-type	Project-related CO ₂ e Emissions (tons/year)	Calculation Methods
				Calculated using EPA CCCL Emission Factors for Greenhouse Gas Inventories, Table 3 and Table 4 [2]
Scope 1	Combustion	Mobile Equipment - Non-Road	TBD	Calculated using emission factors based on South Coast Air Quality Management District, SCAQMD EMFACT 2007 (v2.3) [3] Calculated using EPA CCCL Emission Factors for Greenhouse Gas Inventories, Table 5 [2] Calculated using emission factors for fuel usage from EPA 40 CFR Part 98 Subpart C Tables C-1 and C-2 [1]
Scope 1	Fugitive	Area	TBD	Calculated using emission factors from AP-42 Section 13.3 Explosives Detonation, Table 13.3-1 National Institute for Occupational Safety and Health (NIOSH) "Factors Affecting Fumes Production of an Emulsion and ANFO/Emulsion Blends" Calculated using emission factor for fuel oil from 40 CFR 98 Subpart C Tables C-1 and C-2 for any emulsion use
Scope 2	Purchased Energy	Electrical	TBD	Calculated using emission factors from the eGRID or from supplier information [4]
Scope 3	Off-site Waste Management	Area	TBD	Calculated using EPA CCCL Emission Factors for Greenhouse Gas Inventories, Table 9 [2]
Scope 3	Transportation	Rail Transport of Ore	TBD	Use EPA Greenhouse Gas Emission Factors Hub for fuel use or CO ₂ per ton-mile factors.

3348 [1] Source: (EPA, 2022D)

3349 [2] Source:(EPA, 2022A)

3350 [3] Source: (SCAQMD, 2022)

3351 [4] Source: (EPA, 2022C)

3352 **b. GHG Assessment**

3353 *i. Mitigation*

3354 *Describe any mitigation considered to reduce the project's GHG emissions.*

3355 The Project plans to apply appropriate GHG mitigation measures. However, a measure must be
3356 compatible with project operations, ensuring it does not interfere with essential functions or compromise
3357 safety. Such measures may include:

- 3358 • Using electric vehicles, if practical, to reduce mobile source combustion emissions
- 3359 • Hauling of CRF on the return trip from ore being hauled to the surface
- 3360 • Maximizing the use of uncemented rock fill
- 3361 • Purchasing certified green electricity
- 3362 • Maintaining tree canopy and reducing any unnecessary clearing and grubbing to maintain natural
3363 carbon sinks
- 3364 • Reduce use of non-road mobile construction equipment
- 3365 • Practicing good vehicle and equipment maintenance
- 3366 • Turning off equipment when not in use
- 3367 • Reducing the amount of waste generation
- 3368 • Planting trees in buffer zones and to improve habitat
- 3369 • Habitat improvement programs

3370 *ii. Quantify Reductions*

3371 *Describe and quantify reductions from selected mitigation, if proposed to reduce the project's GHG*
3372 *emissions. Explain why the selected mitigation was preferred.*

3373 GHG reduction quantifications from selected mitigation measures would be supplied for the EIS. Talon
3374 would use electric equipment if available and practical to Project needs; this would continue to be
3375 evaluated as design advances.

3376 *iii. Net Lifetime GHG Emissions*

3377 *Quantify the proposed projects predicted net lifetime GHG emissions (total tons/#of years) and how those*
3378 *predicted emissions may affect achievement of the Minnesota Next Generation Energy Act goals and/or*
3379 *other more stringent state or local GHG reduction goals.*

3380 The net lifetime GHG emissions for the Project will be evaluated in the EIS, as well as the impact on
3381 achieving the Next Generation Energy Act goals. A comparison of the estimated Project emissions to total
3382 statewide and national emissions will also be provided in the EIS.

3383

Proposed Treatment in EIS: GHG/Carbon Footprint

☐	The topic is not significant or is adequately addressed in the SEAW. The same information from the EAW will be included in the EIS.
☒	The topic may be significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document “Draft Scoping Decision Document” in Section 3.2.
☐	The topic is significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document “Draft Scoping Decision Document” in Section 3.3.

3384 19. Noise:

3385 *Describe sources, characteristics, duration, quantities, and intensity of noise generated during project*
 3386 *construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing*
 3387 *noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards,*
 3388 *and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.*

3389 Existing noise in the region of the Project Area is typical of a small town, rural setting. Surrounding areas
 3390 consist of residences, roadways, and railways. Currently, noise is generated primarily by local roadway
 3391 traffic and the BNSF railway, located along the southern border of the Project Area. Nearby sensitive
 3392 receptors include rural residences north and west of the Project Area and residences and businesses
 3393 immediately south of the Project Area in the City of Tamarack.

3394 Noise would be generated during Project construction and operation activities and would result from
 3395 several sources of equipment, such as but not limited to bulldozers, excavators, front-end loaders, haul
 3396 trucks, water trucks, ventilation fans, ore conveyors, rock crusher, water intake pumps, air compressors
 3397 and other machinery typical of mining operations, as well as from the construction of the Decline Ramp.

3398 Baseline noise monitoring data would be collected to assess pre-construction conditions for the MPCA
 3399 noise standards. These data could also be utilized for future modeling of the Project components within
 3400 the Project Area. The ambient conditions monitored in this effort would provide a baseline for comparison
 3401 to future noise levels and for use in modeling projected noise impact from the Project. Modeling analysis
 3402 of potential future Project noise impacts may consist of modeling the area using standard ISO9613 noise
 3403 propagation modeling techniques, coupled with Federal Rail Administration and/or Federal Highway
 3404 Administration noise modeling tools for ore transportation. This information would be provided in the
 3405 EIS.

3406 Noise impacts from the Project would be subject to Minnesota regulations. These rules are based on
 3407 statistical calculations that quantify noise levels over a one-hour monitoring period. The L10 calculation is
 3408 the noise level that is exceeded for 10 percent, or 6 minutes, of the hour, and the L50 calculation is the
 3409 noise level exceeded for 50 percent, or 30 minutes, of the hour. There is no limit on maximum noise. The
 3410 statutory limits for a residential location are L10 = 65 dBA and L50 = 60 dBA during the daytime (7:00a.m.–
 3411 10:00p.m.) and L10 = 55 dBA and L50 = 50 dBA during the nighttime (10:00p.m.–7:00a.m.) (Minn. R.

7030.0040). This means that during the one-hour period of monitoring, daytime noise levels cannot exceed 65 dBA for more than 10 percent of the time or 60dBA more than 50 percent of the time.

Noise area classifications (NAC) are based on the land use at the location of the person who hears the noise (Table 19-1), which does not always correspond with the zoning of an area. Therefore, noise from an industrial facility near a residential area is held to the NAC 1 standards if it can be heard on a residential property.

Table 19-1 Noise Area Classification and Associated Sound Level Limits for Various Land Uses

NAC	Land Use	Daytime (dBA) ^[1] L10	Daytime (dBA) L50	Nighttime (dBA) L10	Nighttime (dBA) L50
1	Residential housing, religious activities, camping and picnicking areas, health services, hotels, educational services	65	60	55	50
2	Retail, business and government services, recreational activities, transit passenger terminals	70	65	70	65
3	Manufacturing, fairgrounds and amusement parks, agricultural and forestry activities	80	75	80	75

[1] dBA – A-weighted decibels

With surface infrastructure enclosed within a single building, noise pollution from operational activities should be significantly attenuated. The enclosure of key noise-generating components, such as surface haulage and the maintenance shop, would further reduce the amount of noise escaping to the environment, thus enhancing overall noise mitigation and reducing potential impacts to nearby sensitive receptors.

The Project would be constructed following Minn. R. 6132.2000, subp. 3, where the location would be set back 100 ft (30.5 m) from a public roadway and 500 ft (152 m) from occupied dwellings. An augmented buffer of coniferous and deciduous trees between the western property boundary of the mine site and public structures currently exists and may have the potential to minimize effects of noise generated by the Project by 5 to 8 decibels (U.S. Department of Agriculture, 2008). The Project is also exploring options to incorporate an additional natural barrier within the pre-established screening barrier. This added barrier could have the potential to reduce the effects of noise produced by machinery and equipment by up to 10 to 15 decibels (U.S. Department of Agriculture, 2008) Furthermore, there is potential to explore engineered solutions designed to augment natural barriers. These solutions could involve the installation of sound-absorbing materials. Such materials could achieve transmission loss values of up to 30 decibels, depending on the design and environmental conditions. These engineered solutions are typically designed

for easy integration into various settings. By doing so, the combination of natural and engineered components would, if needed, provide a comprehensive noise mitigation strategy, addressing potential noise concerns from project operations while maintaining aesthetic compatibility with the surrounding environment.

Blasting vibrations would primarily be propagated through the bedrock and surrounding materials. Given that the blasting is unlikely to occur less than 100 ft (30.5 m) below the surface in bedrock during construction, the bedrock and the overburden would act as an attenuator, dissipating the energy of the vibrations over distance. When in operations, there would be no blasting above 300 ft (91.4 m) below the surface in bedrock. Blasting activities would be subject to Minn. R. 6132.2900, subp. 2. Vibration modeling would be conducted to simulate the propagation of blast-induced vibrations to predict the impact at nearby sensitive receptors, such as residences. This information would be provided in the EIS.

The vibration limits, measured as peak particle velocity (PPV), set forth in the regulations are designed to prevent structural damage to buildings and other infrastructure. By adhering to the peak particle velocity limit threshold and using blasting techniques designed to remain within these PPV limits, vibrations would be kept at levels that do not pose a risk to the integrity of nearby structures.

Proposed Treatment in EIS: Noise

☐	The topic is not significant or is adequately addressed in the SEAW. The same information from the EAW will be included in the EIS.
☒	The topic may be significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.2.
☐	The topic is significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.3.

20. Transportation:

a. Traffic-related Aspects

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 alternative transportation modes.

Roadway Transportation

Additional Existing and Proposed Parking Spaces

Future parking would consist of approximately 160 spaces to accommodate project construction and operation personnel.

Estimated Total Average Daily Traffic Generated

During both construction and operation, the Project would be accessed directly from CSAH 31, an existing rural two-lane undivided highway. Including during spring load restriction periods, CSAH 31 is designated as a 10-ton per axle truck route by Aitkin County. Traffic to and from the Project site will primarily be routed through Trunk Highway (TH) 210 via Aitkin County CSAH 6 (N Main St) through the city of Tamarack and Aitkin County CSAH 31 (Kestrel Ave).

The MnDOT Traffic Mapping Application (TMA) was used to obtain annual average daily traffic (AADT), a measure of baseline existing traffic conditions, along these roadway systems in the vicinity of the Project location (MnDOT, 2022). According to the TMA, the most recent AADT counts measured in vehicles per day (vpd) are as follows:

- CSAH 31 (north/east of CSAH 6): 223 vpd (2021) and 201 vpd (2024)
- CSAH 6 (west of CSAH 31): 474 vpd (2021) and 428 vpd (2024)
- CSAH 6 (north of TH 210): 680 vpd (2021) and 640 vpd (2024)
- TH 210 (east of CSAH 6): 2162 vpd (2023) and 2013 vpd (2024)
- TH 210 (west of CSAH 6): 2575 vpd (2022) and 1859 vpd (2024)

Workers accessing the site during construction and operation of the Project would contribute to local traffic volumes.

Estimated Maximum Peak Hour Traffic Generated and Time of Occurrence

During the construction phase, traffic volumes are expected to vary depending on construction activities and scheduling. In addition to construction workers commuting to and from the site, vehicle trips would be generated by the delivery of materials, equipment and supplies. Traffic volumes may be higher during periods of site preparation, foundation work, and equipment staging. In contrast, once operational, traffic would be more stable and consist primarily of regular employee shift changes, along with periodic deliveries for maintenance, supplies, and consumables.

While operational, the Project facility is expected to typically accommodate two 12-hour shifts. Peak hour traffic volume generation would occur during the shift changes:

- Morning shift change: Approximately 50-100 vehicles arriving and 30-60 vehicles departing
- Evening shift change: Approximately 30-60 vehicles arriving and 50-100 vehicles departing

Source of Trip Generation Rates

Trip generation estimates are based on personnel data provided in the Project description (Item 6), including anticipated staffing levels, shift schedules, and assuming all future employees drive their own vehicles to the Project site.

Availability of Transit and/or Alternative Transportation Modes

Due to the rural nature of the Project location, alternative transportation modes are impracticable.

Rail Transportation

The Project would generate rail traffic and include construction of a railway spur connecting the Ore Transfer Building to the existing BNSF railway located immediately north of the City of Tamarack. Ore would be transported principally by the BNSF railway to standalone processing facilities with concentrators

located off-site in Mercer County, North Dakota, and Marquette County, Michigan through the following operations:

- A shuttle locomotive or rubber-tired railcar mover would operate on the Project-constructed railway spur to transport railcars between the rail loadout area and adjacent railway yard.
- BNSF locomotives would arrive at regular intervals to collect loaded cars and return empty cars.
- Outgoing shipments of approximately 140 railcars would be collected by BNSF approximately every 4 days.

b. Traffic Congestion

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.

Construction and operation of the Project would increase traffic volumes in the area and potentially lead to periods of traffic congestion on local roads and intersections. A traffic impact study would be conducted to further assess the Project's impact on the regional transportation system and the need for roadway improvements to accommodate Project traffic and minimize congestion on local roads; the results would be provided for the EIS.

c. Minimization or Mitigation

Identify measures that will be taken to minimize or mitigate project related transportation effects.

It is expected that during construction and operation, all Project employees would abide by local load restrictions and speed limits. If transportation system improvements are determined to be necessary, funding responsibilities would be addressed in coordination with the appropriate transportation agencies as part of future permitting and mitigation planning.

Proposed Treatment in EIS: Traffic

☐	The topic is not significant or is adequately addressed in the SEAW. The same information from the EAW will be included in the EIS.
☒	The topic may be significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.2.
☐	The topic is significant and will be addressed in greater detail in the EIS. A brief summary of the additional information expected in the EIS can be found in the companion document "Draft Scoping Decision Document" in Section 3.3.

21. Cumulative potential effects:

a. Geographic Scales and Timeframes

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

The baseline environmental conditions for the project cumulative potential effects analysis must account for the past and present uses of the site in conjunction with larger-scale local activities including forestry, peat mining, metallic mineral exploration, transportation infrastructure (e.g., local roads; BNSF railway), permanent residential and seasonal properties, rural town development, and agricultural uses. Traditional subsistence and cultural uses may also be present within the area.

The overall geographic scale for assessing cumulative potential effects for the project includes local, regional, and statewide components:

- Local. The local geographic scale to assess the project's cumulative potential effects includes the immediate project area and surrounding parcels, the latter varying as a function of type and characteristics of impacts. Cumulative potential effects could result from the project interacting with existing land uses, such as neighboring peat mining operations, forest practices, metallic mineral exploration and agricultural uses. Potential impact areas include air resources; water and wetlands; habitat; noise; light and traffic; the analysis area for each type of impact would be determined in the EIS.
- Regional. The regional scale of the project's cumulative potential effects reflects the industrial nature of the project and any potential interaction with any other adjacent industrial activities, such as logging, farming, peat mining, aggregate mining and regional transportation. Potential impact areas include air resources; water resources; and traffic; the analysis area for each type of impact would be determined in the EIS.
- Statewide. Assessing the projects cumulative potential effects at a statewide scale requires evaluation of the project's contributions to statewide environmental conditions associated with the mining and other industrial sectors. Potential impact areas include greenhouse gas emissions; water resources management; rail transport; and air quality; the analysis area would be determined in the EIS.

The timeframe for assessing cumulative potential effects would reflect the life history of the project because the impact profile varies over the life of the project. The cumulative potential effects would also vary due to the timing of reasonably foreseeable projects over the life of the proposed project.

- Construction Phase. Cumulative potential effects that may occur during the construction phase would be short-term, limited primarily to impacts due to noise, light, traffic, covertime conversion and wildlife habitat loss and disturbance. These impacts would be considered local and would be assessed against the backdrop of current environmental conditions, which are already influenced by land use activities in the area. The construction phase is predicted to last 2-3 years.
- Operational Phase. The operational phase could result in cumulative potential effects over the 7-10 years of projected mining, including air emissions, water usage, water discharges, traffic and land use changes and disturbance. Impacts would operate locally, regionally, and statewide where the EIS would explore how these ongoing effects combine with other industrial or development

projects to produce cumulative *potential effects* over the life of the mine.

- Reclamation and Closure. The anticipated length of the reclamation and closure phase will be assigned during the EIS. The geographic scale would likely be reduced to a local and possibly regional scale, with statewide-scale consequence less likely. Because the goal of the reclamation phase is to restore the area to near-natural conditions, the cumulative potential effects would be expected to be substantially reduced, if not entirely absent in some impact areas. The EIS would explore how stopping mining, removing project features and stabilizing the site could result in cumulative potential effects until closure conditions are met.

b. Reasonably Foreseeable Future Projects

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 geographic scales and timeframes identified above.

Present and reasonably foreseeable future projects that may occur in the vicinity of the project, and therefore could potentially interact with the environmental effects of the project, consist of the following:

- Premier Horticulture, Inc. Black Lake Bog and Wright Bog Projects
- Aitkin Agri-Peat McGregor Project
- Talon Metals mineral exploration (potentially renewed annually as known over the course of the EIS)
- Timber harvest on state- and county-managed parcels
- Other reasonably foreseeable future projects as they become known to the RGU

The status of any new developments or projects would be assessed continuously over the course of the EIS.

c. Potential effects

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

The EIS will assess the cumulative potential effects of the project at the local, regional, and statewide scales that would result from the combination of the project's impacts with reasonably foreseeable projects.

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 how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

23. RGU CERTIFICATION

*The Environmental Quality Board will only accept **SIGNED** Environmental Assessment 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.

Melissa Kuskie

Digitally signed by Melissa
Kuskie
Date: 2026.07.06 11:53:17
-05'00'

Signature _____

Date _____

Title _____

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3786 **List of Acronyms**

3787	ACFM	Actual Cubic Feet per Minute
3788	AUID	Assessment Unit Identifier
3789	BNSF	Burlington Northern Santa Fe
3790	CCCL	Center for Corporate Climate Leadership
3791	CFM	Cubic feet per minute
3792	CFR	Code of Federal Regulation
3793	CFS	Cubic feet per second
3794	CGO	Coarse Grained Ortho-Cumulate
3795	CMS	Cavity Monitoring System
3796	CO	Carbon Monoxide
3797	CRF	Cemented Rock Fill
3798	CSAH	County State Aid Highway
3799	DNR	Minnesota Department of Natural Resources
3800	EAW	Environmental Assessment Worksheet
3801	ECS	Ecological Classification System
3802	eGRID	EPA Emissions & Generation Resource Integrated Database
3803	EIS	Environmental Impact Statement
3804	EPA	United States Environmental Protection Agency
3805	EQB	Minnesota Environmental Quality Board
3806	ESA	Endangered Species Act
3807	FEMA	Federal Emergency Management Agency
3808	GHG	Greenhouse Gas
3809	GPD	Gallons Per Day
3810	GPM	Gallons Per Minute
3811	GPS	Global Positioning System
3812	HAP	Hazardous Air Pollutant
3813	HUC	Hydrologic Unit Code
3814	IPCC	Intergovernmental Panel on Climate Change
3815	MW	Megawatt
3816	MDH	Minnesota Department of Health
3817	MnDOT	Minnesota Department of Transportation
3818	MPCA	Minnesota Pollution Control Agency
3819	MSHA	Mine Safety and Health Administration
3820	MSU	Massive Sulfide Unit
3821	NHIS	Natural Heritage Information System
3822	NIOSH	National Institute for Occupational Safety and Health
3823	NO ₂	Nitrogen Dioxide
3824	NPDES	National Pollutant Discharge Elimination System
3825	ORVW	Outstanding Resource Value Waters
3826	OSA	Minnesota Office of the State Archaeologist
3827	PSIG	Pounds per Square Inch Gauge
3828	PWI	Public Water Inventory
3829	RCRA	Resource Conservation and Recovery Act

3830	RGU	Responsible Government Unit
3831	SBS	Sites of Biodiversity Significance
3832	SCAQMD EMFAC	South Coast Air Quality Management District Emission Factor
3833	SDS	State Disposal System
3834	SHPO	State Historic Preservation Office
3835	SM	Soil Mixing
3836	SMSU	Semi-Massive Sulfide Unit
3837	SWPPP	Stormwater Pollution Prevention Plan
3838	TIC	Tamarack Intrusive Complex
3839	TMDL	Total Maximum Daily Load
3840	USFWS	United States Fish and Wildlife Service
3841	VOC	Volatile Organic Carbon
3842	WMA	Wildlife Management Area

Attachment: Figures 1-24

Attachment: Figures 1-24

Figure 1 Project Location

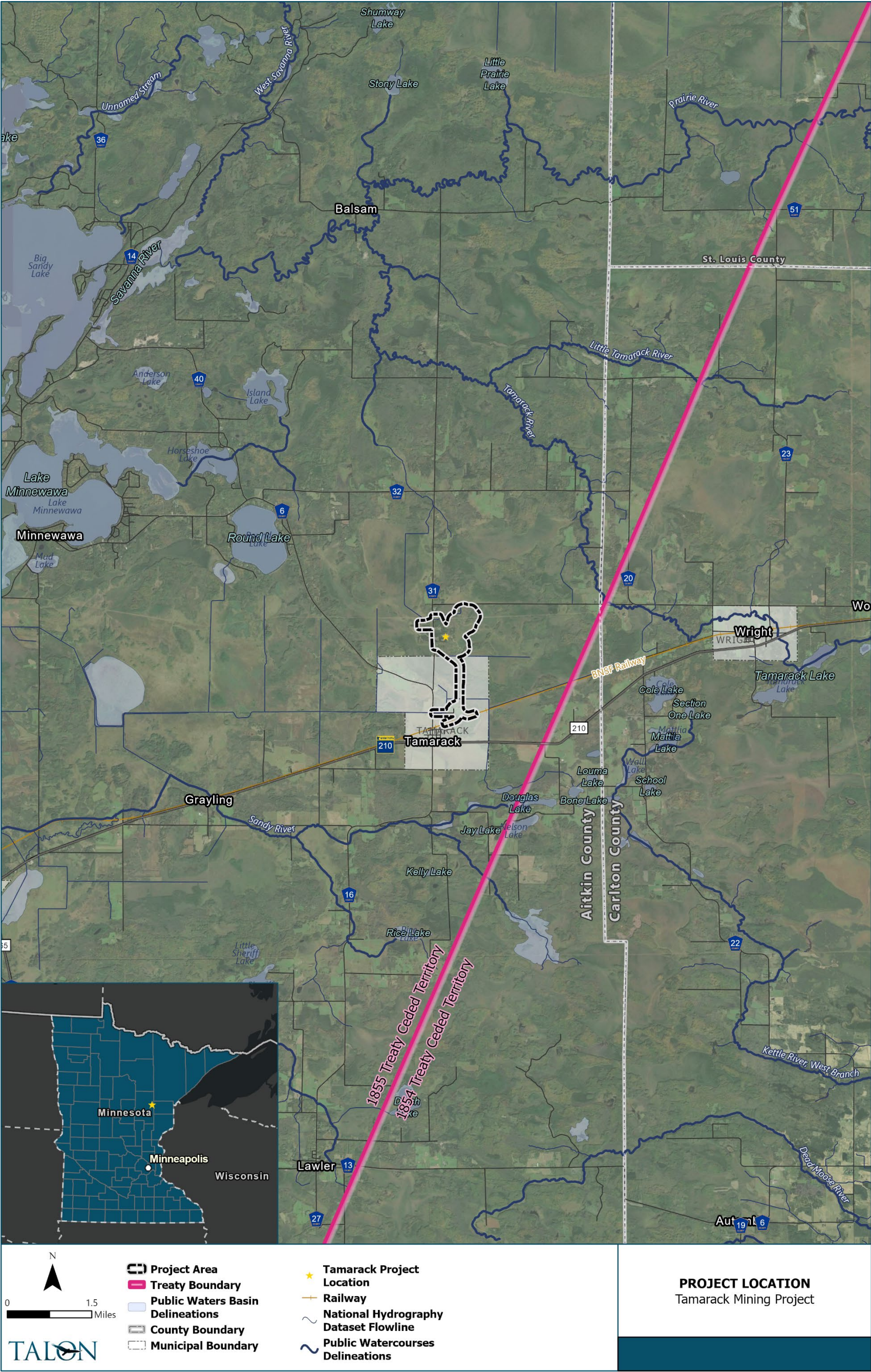


Figure 2 USGS 7.5 Minute Map

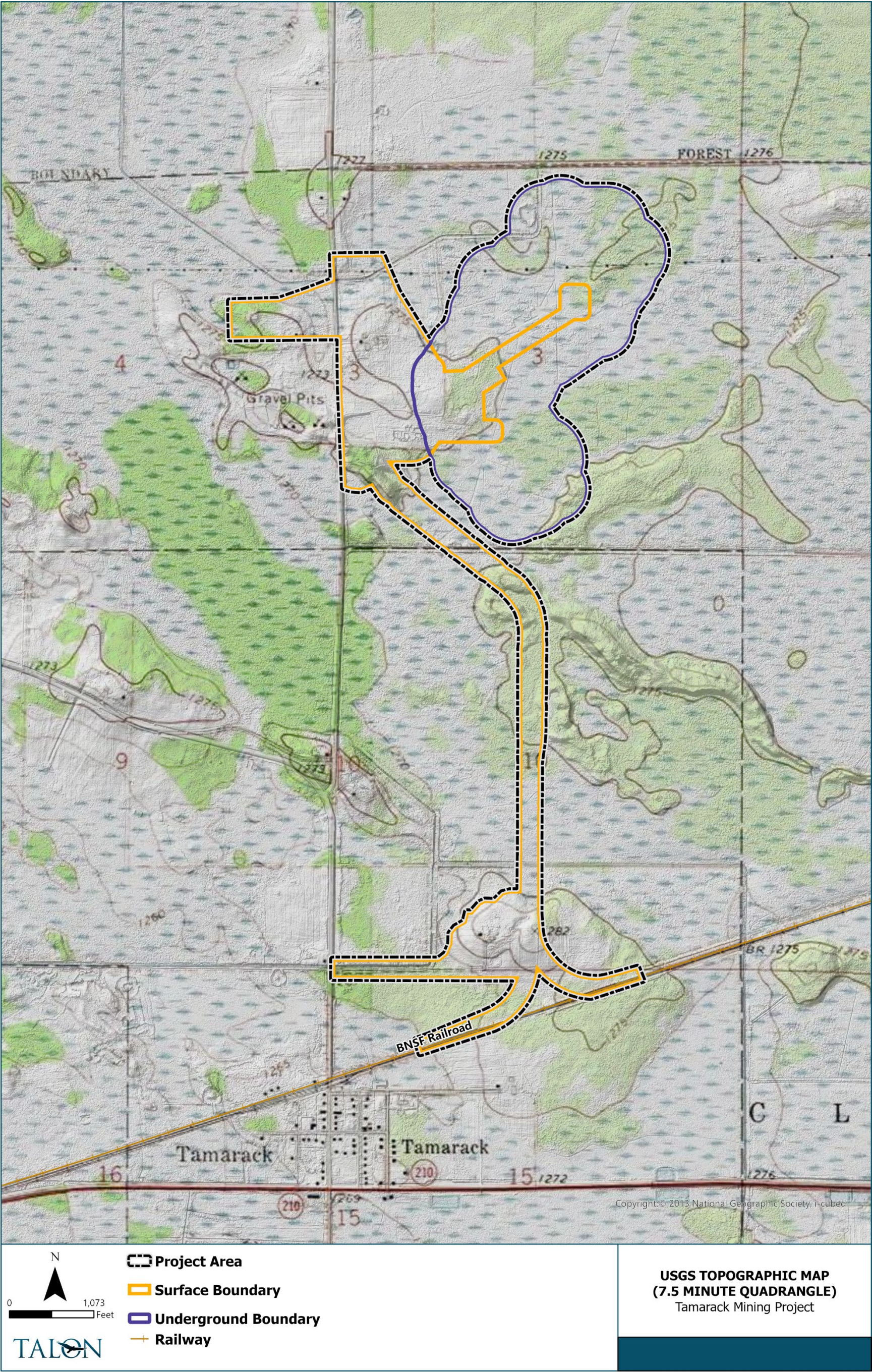


Figure 3 Site Layout

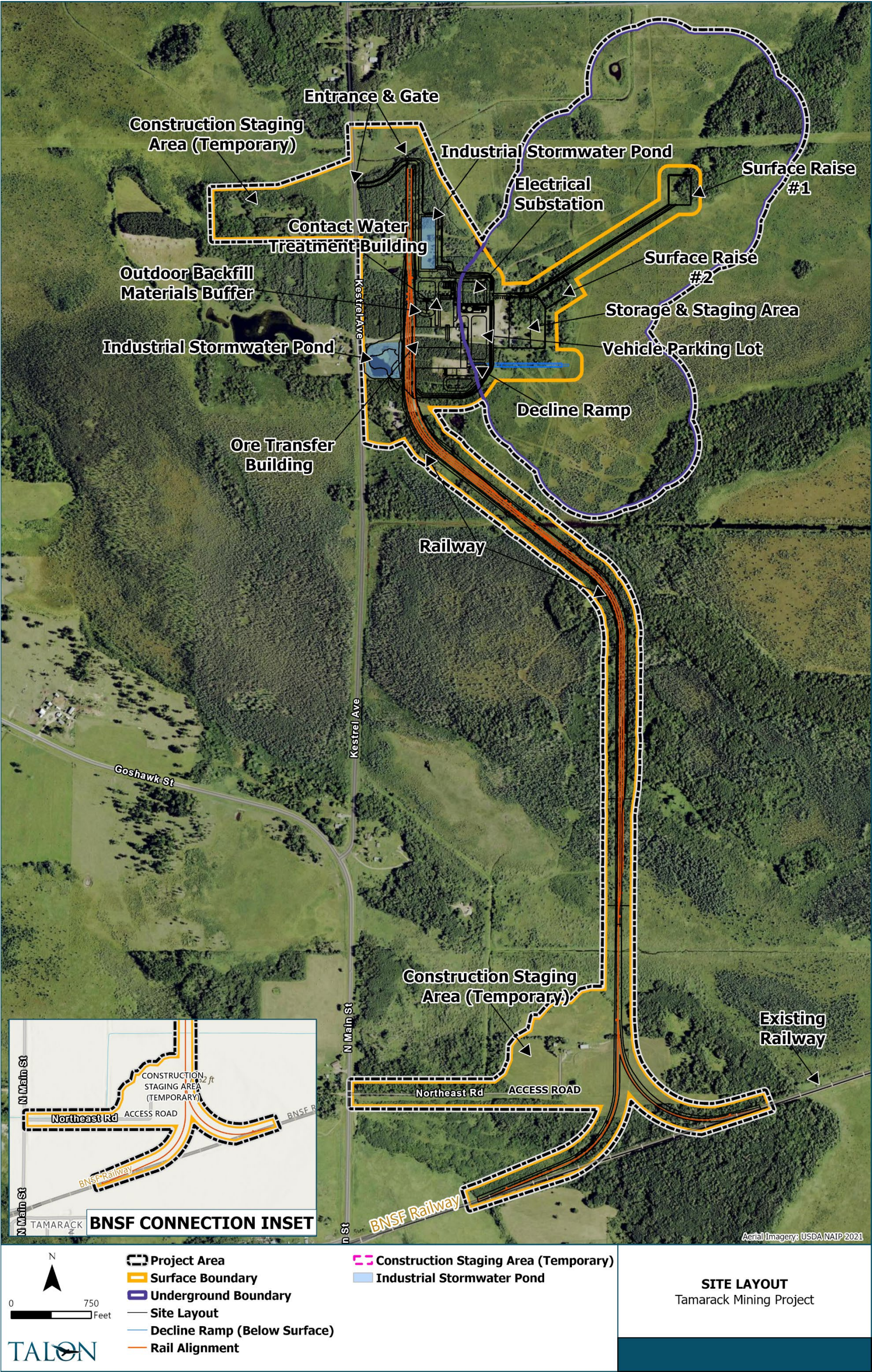


Figure 4 Railway Layout



Figure 5 Rail Routes

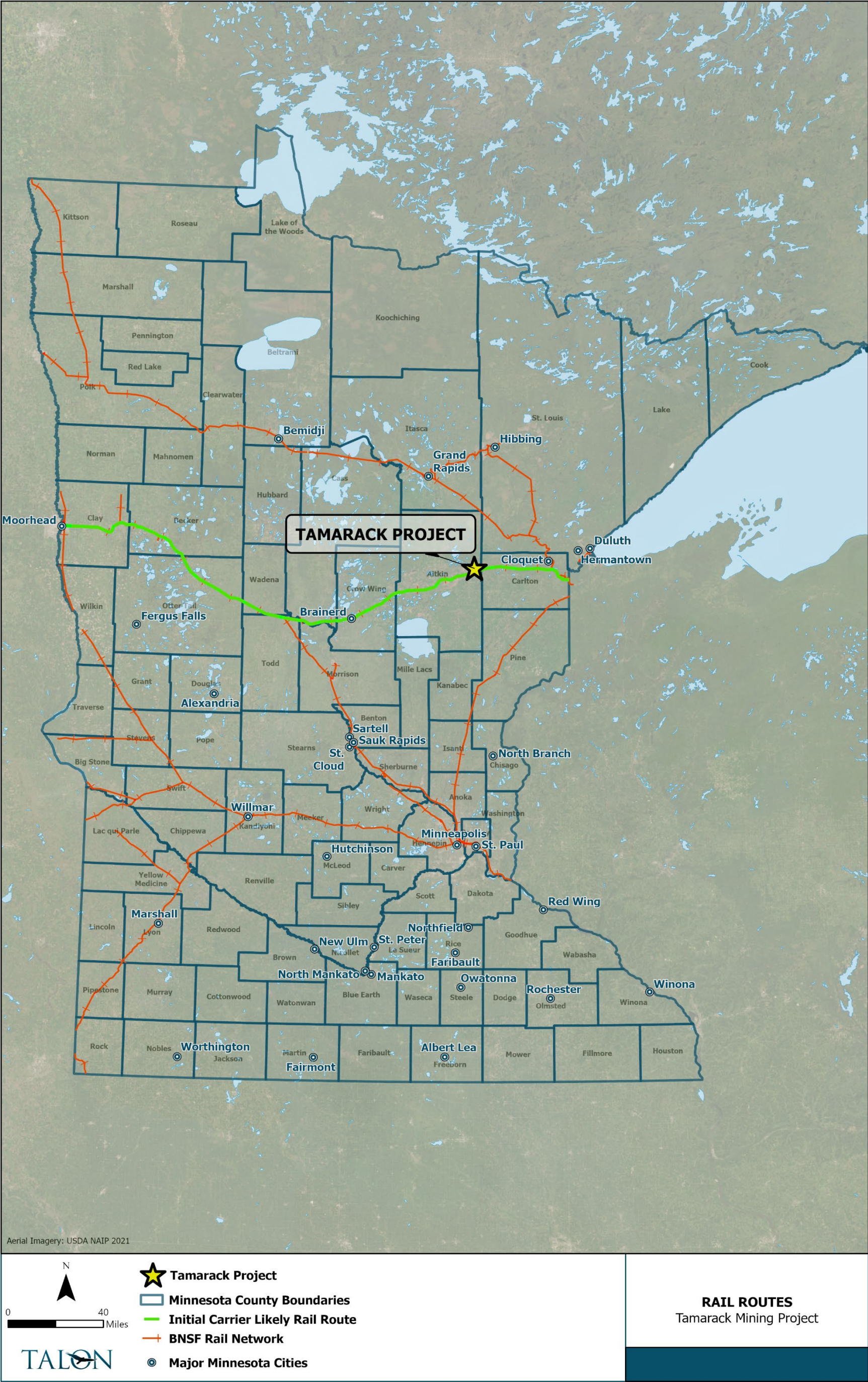


Figure 6 Surface Drainage



Figure 7 Minnesota County Well Index

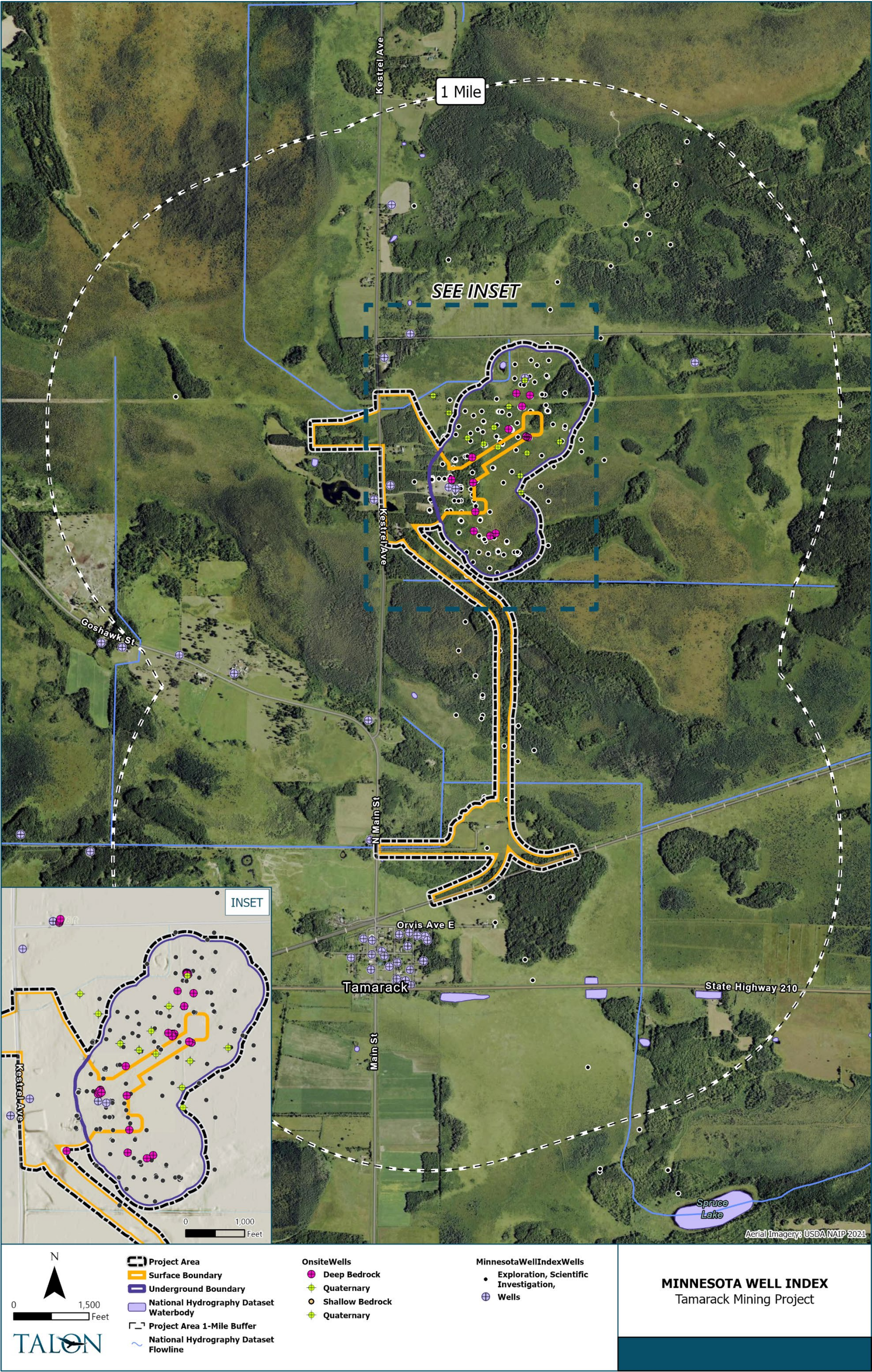


Figure 8 Water Treatment Plant Discharge Route

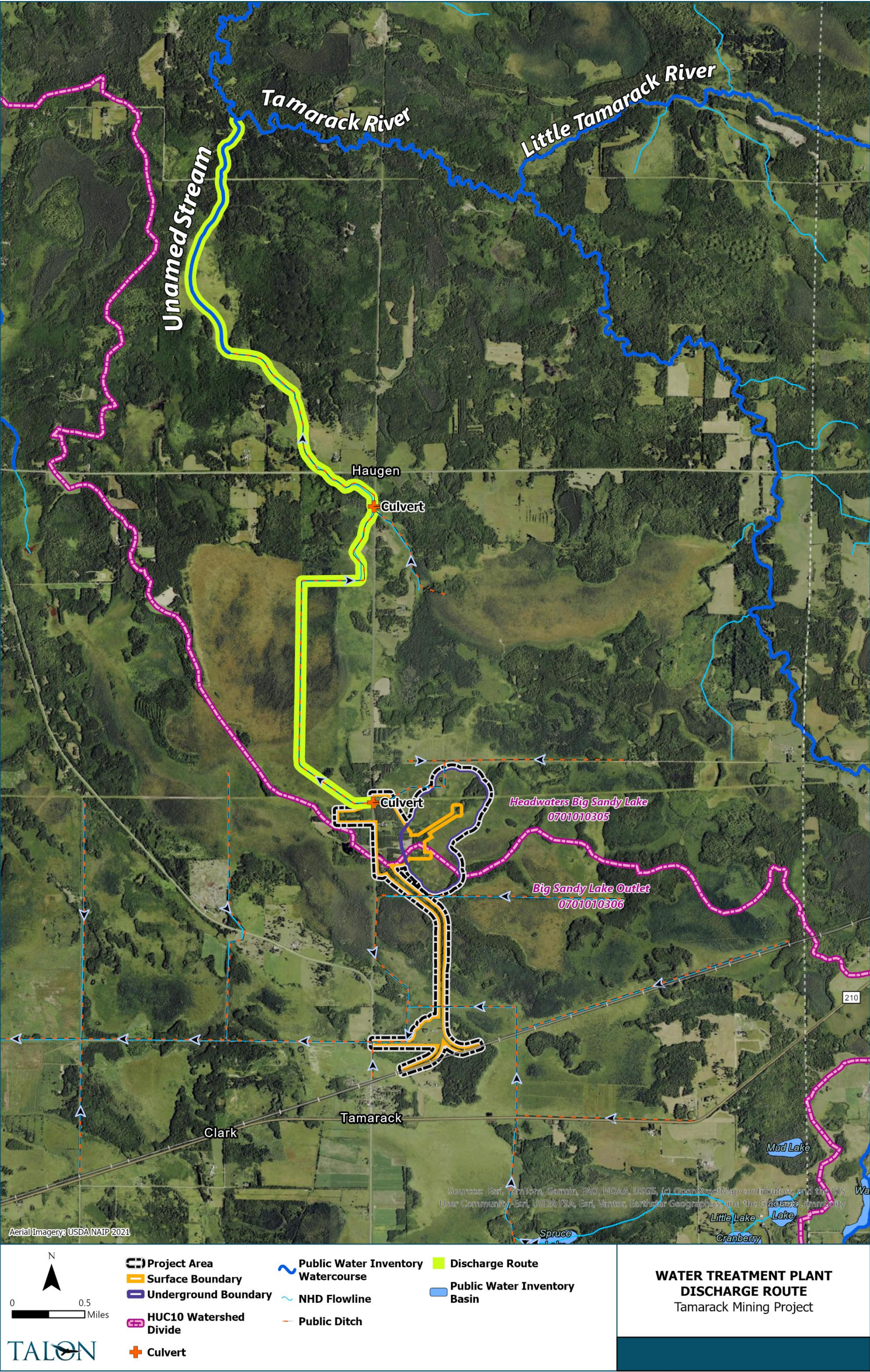


Figure 9 Depth to Water

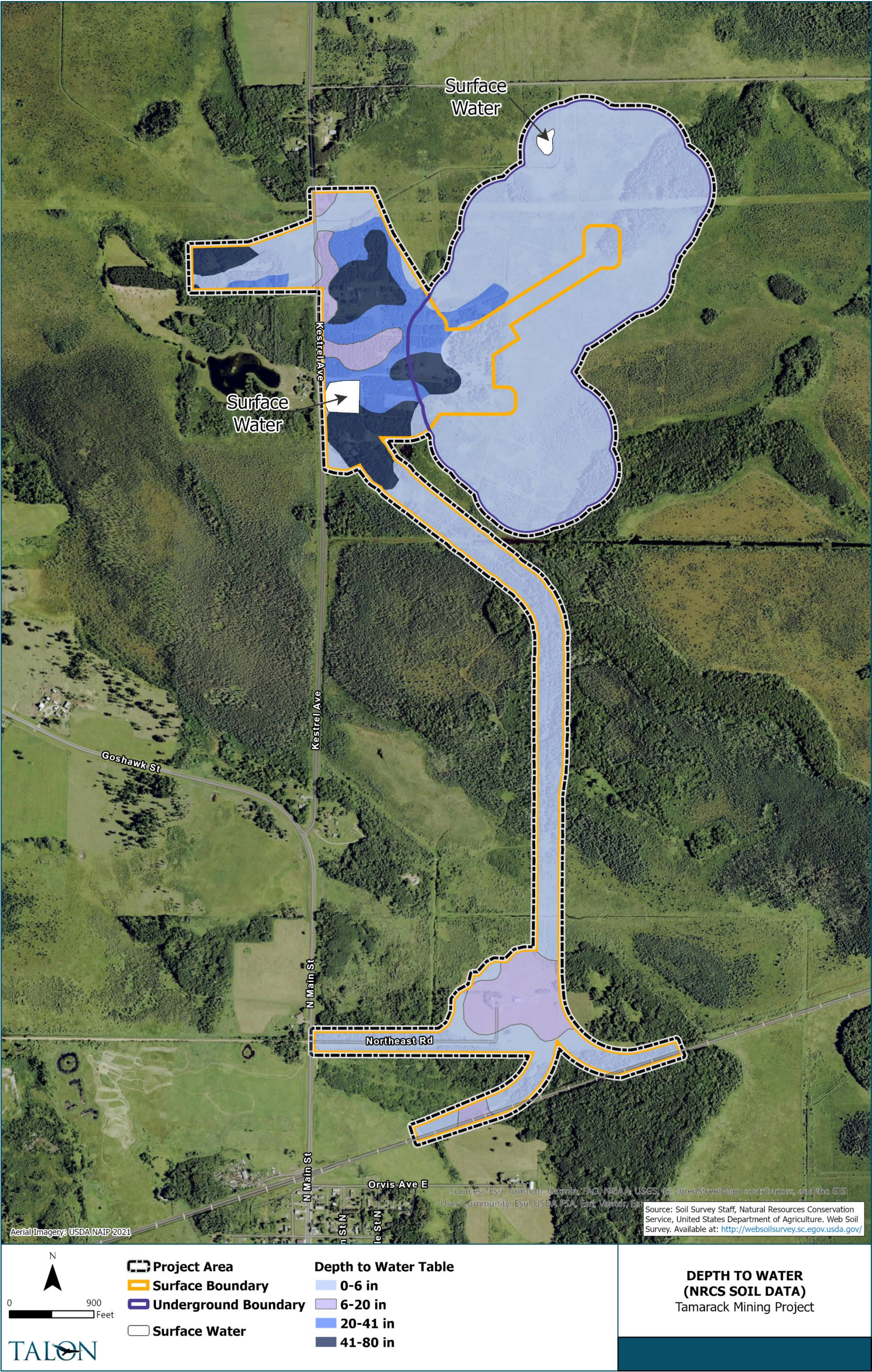


Figure 11 Zoning and Land Use

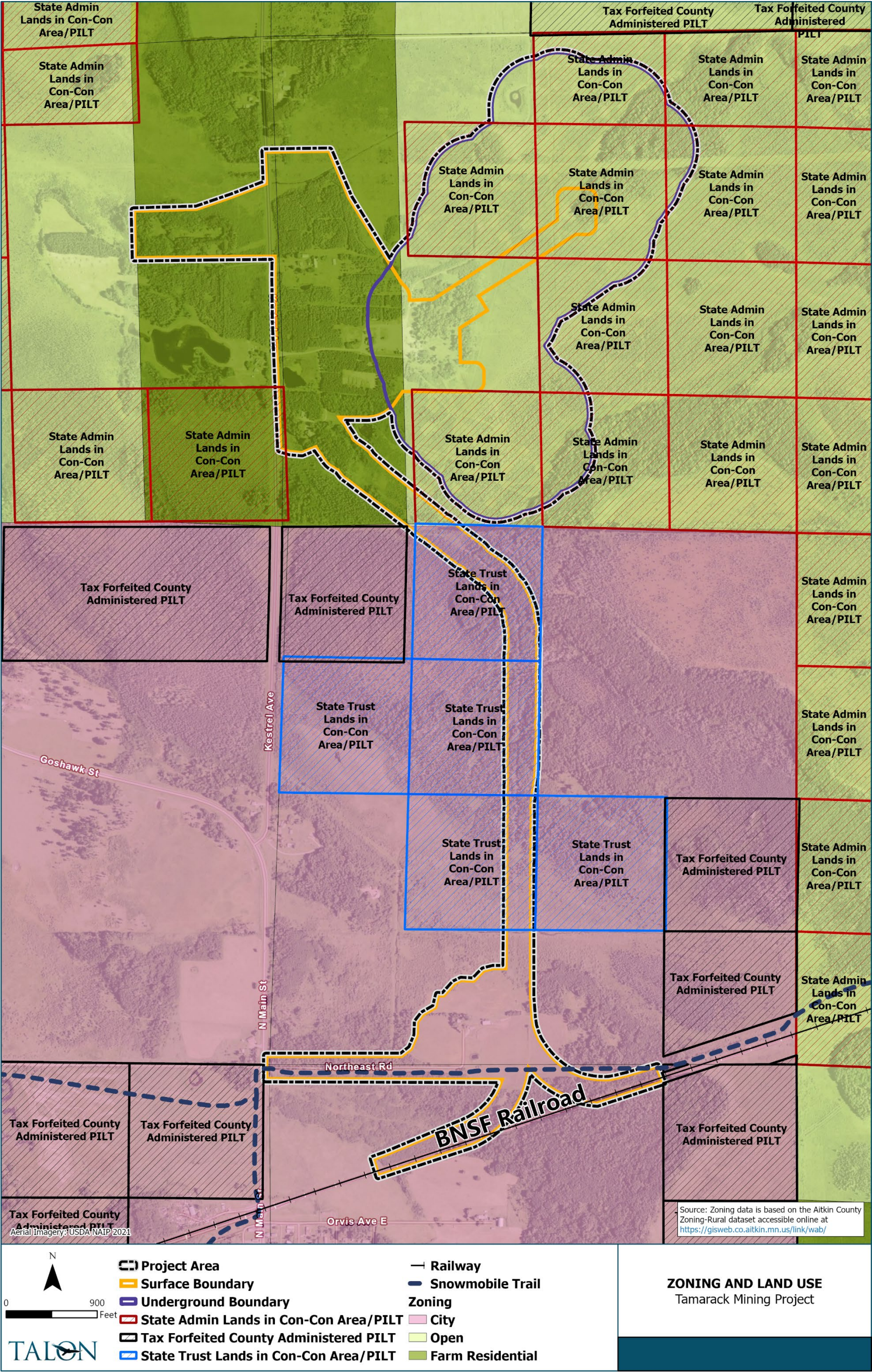


Figure 12 Surficial Geology

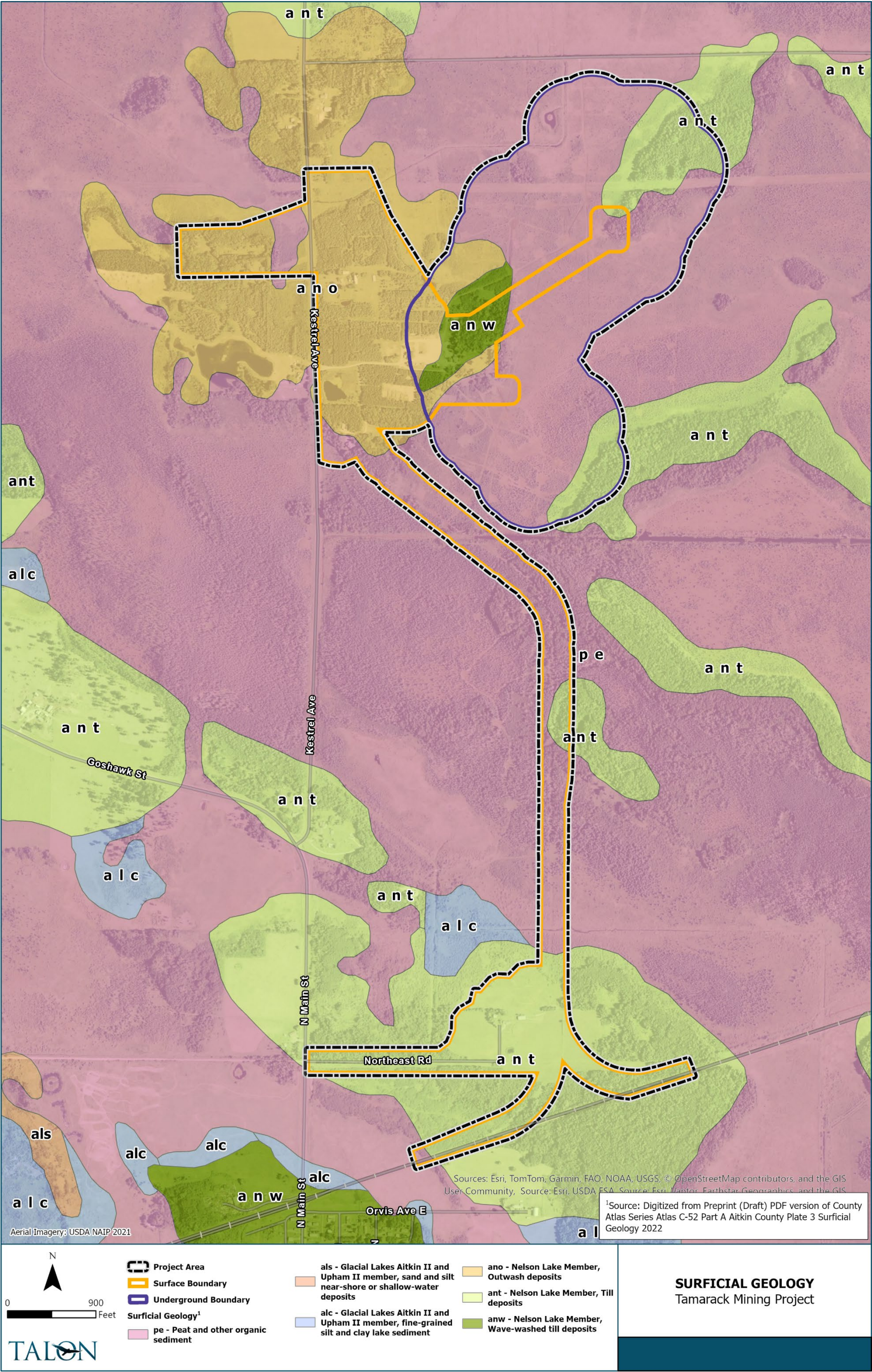


Figure 13 Bedrock Geology

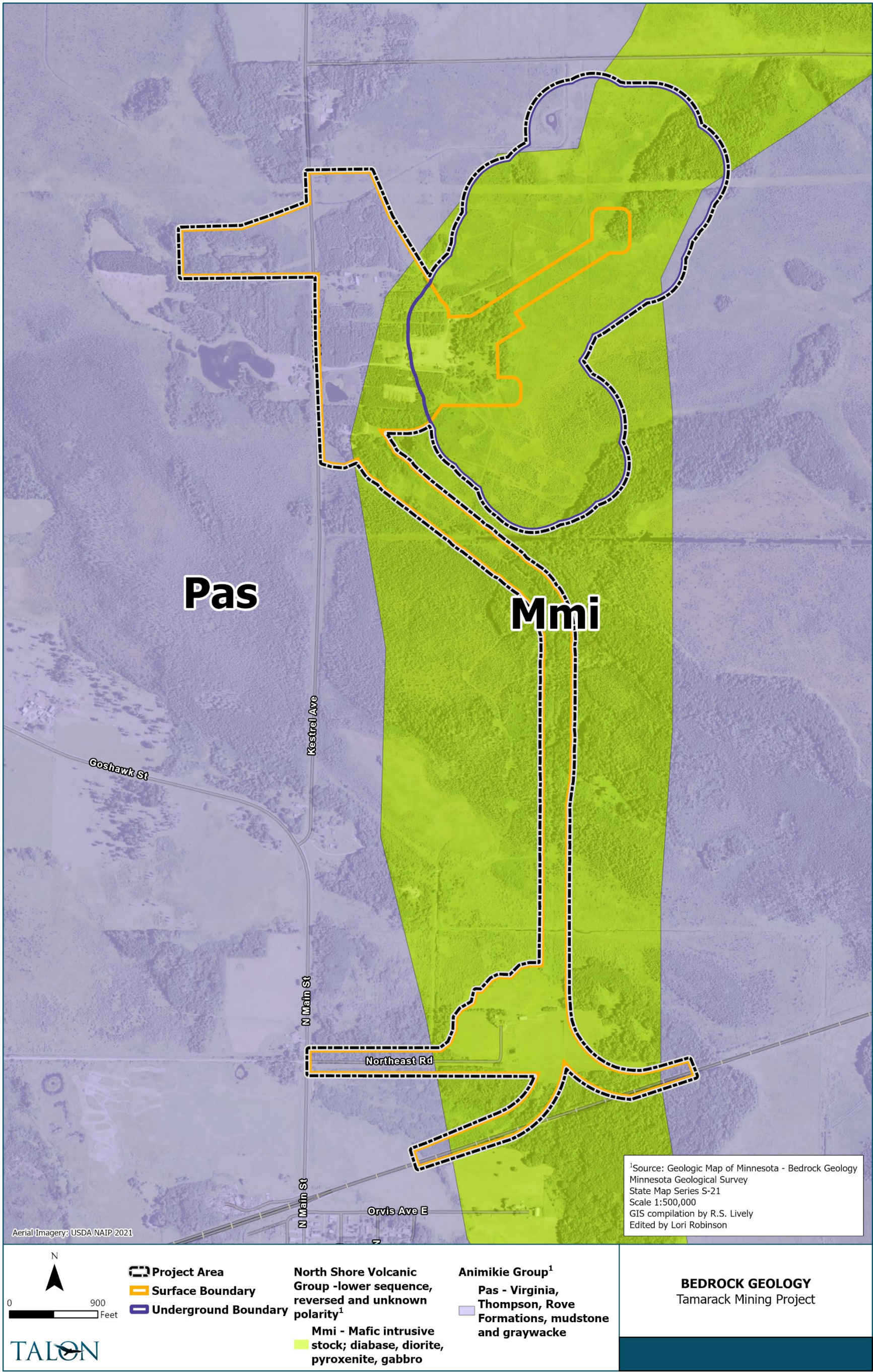


Figure 14 Topographic Relief In Project Area

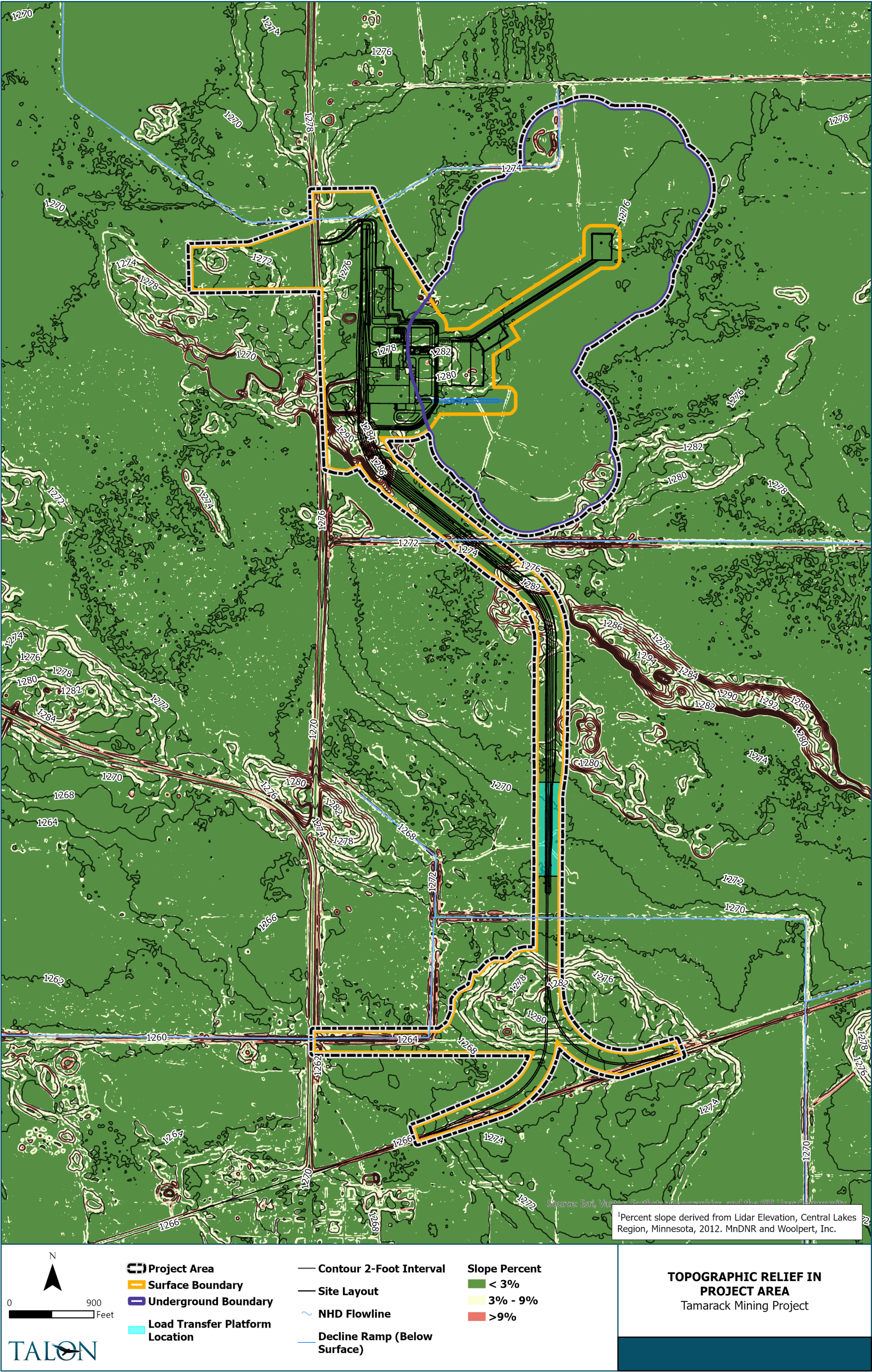


Figure 15 Soils

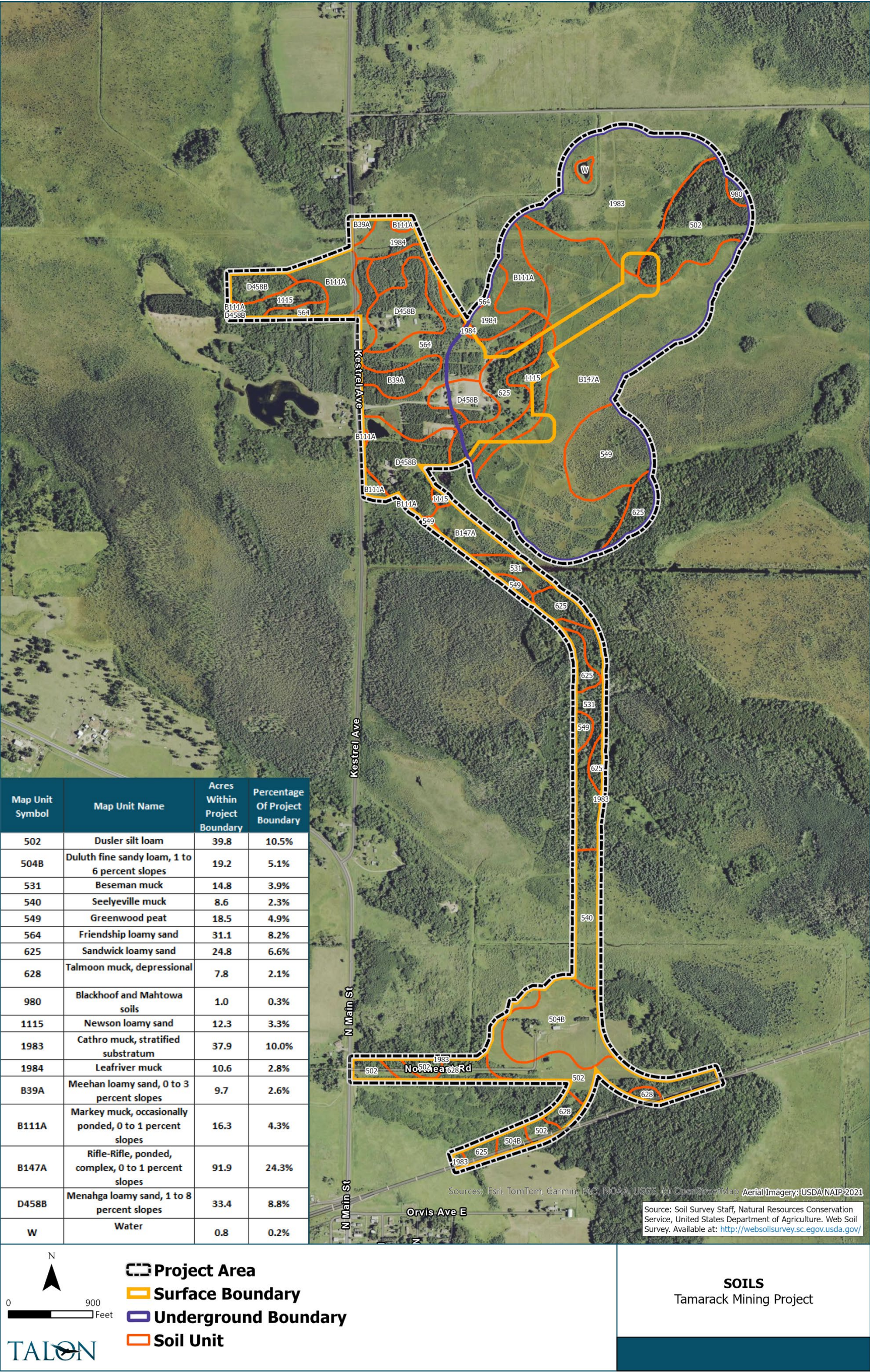


Figure 16 USGS Hydrologic Level 10 and 12 Watersheds

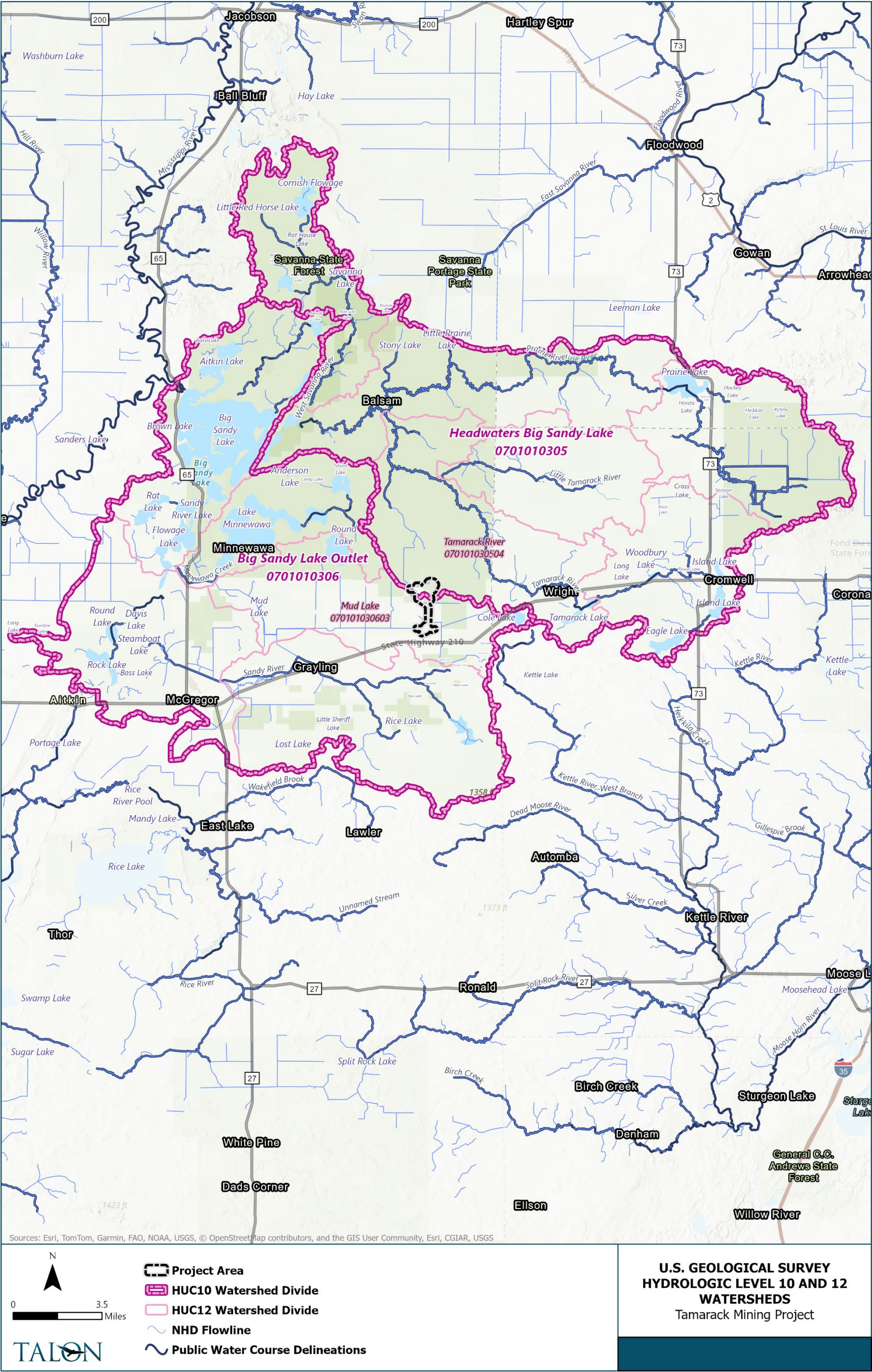


Figure 18 Surface Waters

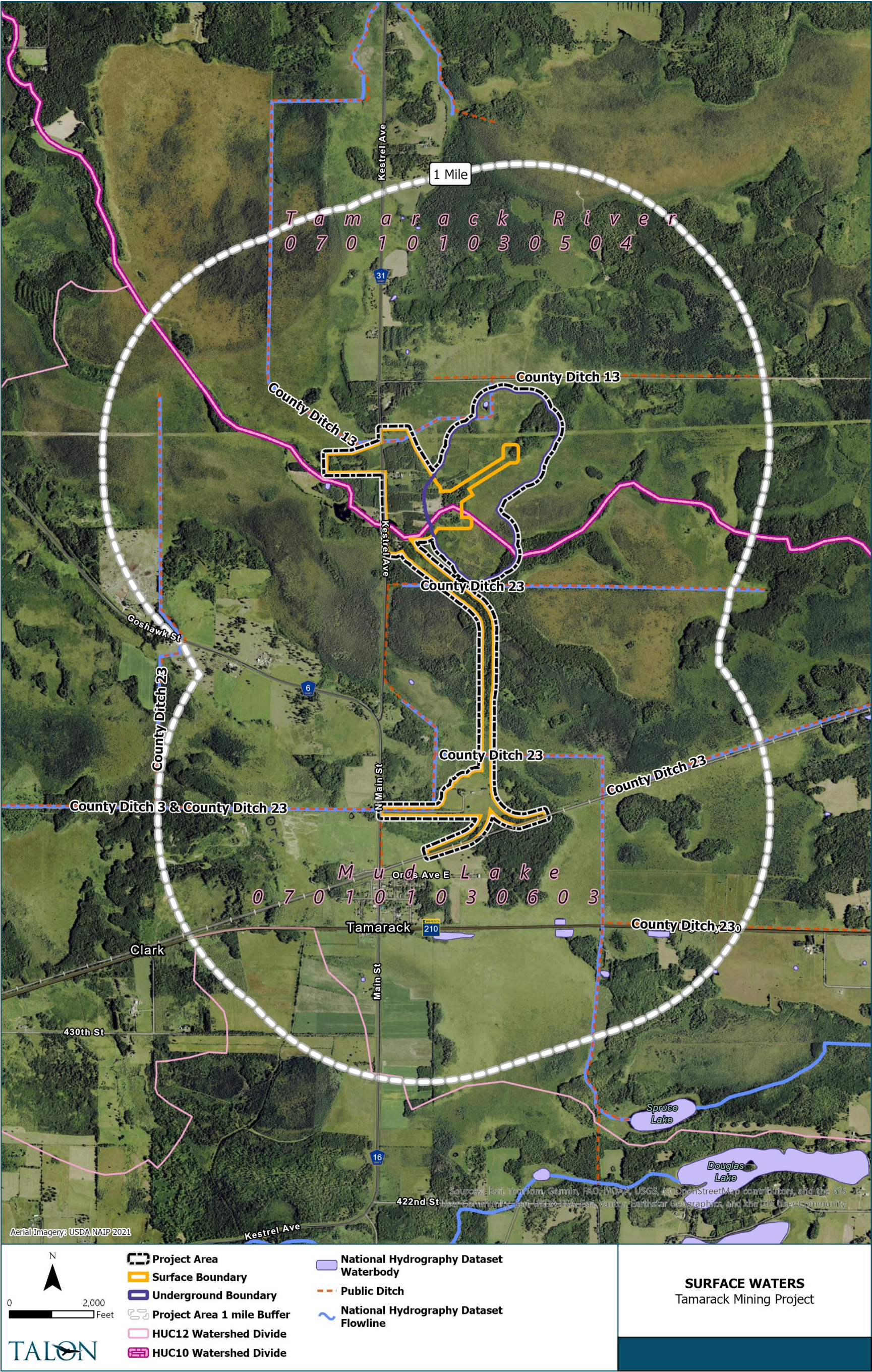


Figure 19 Floodplains

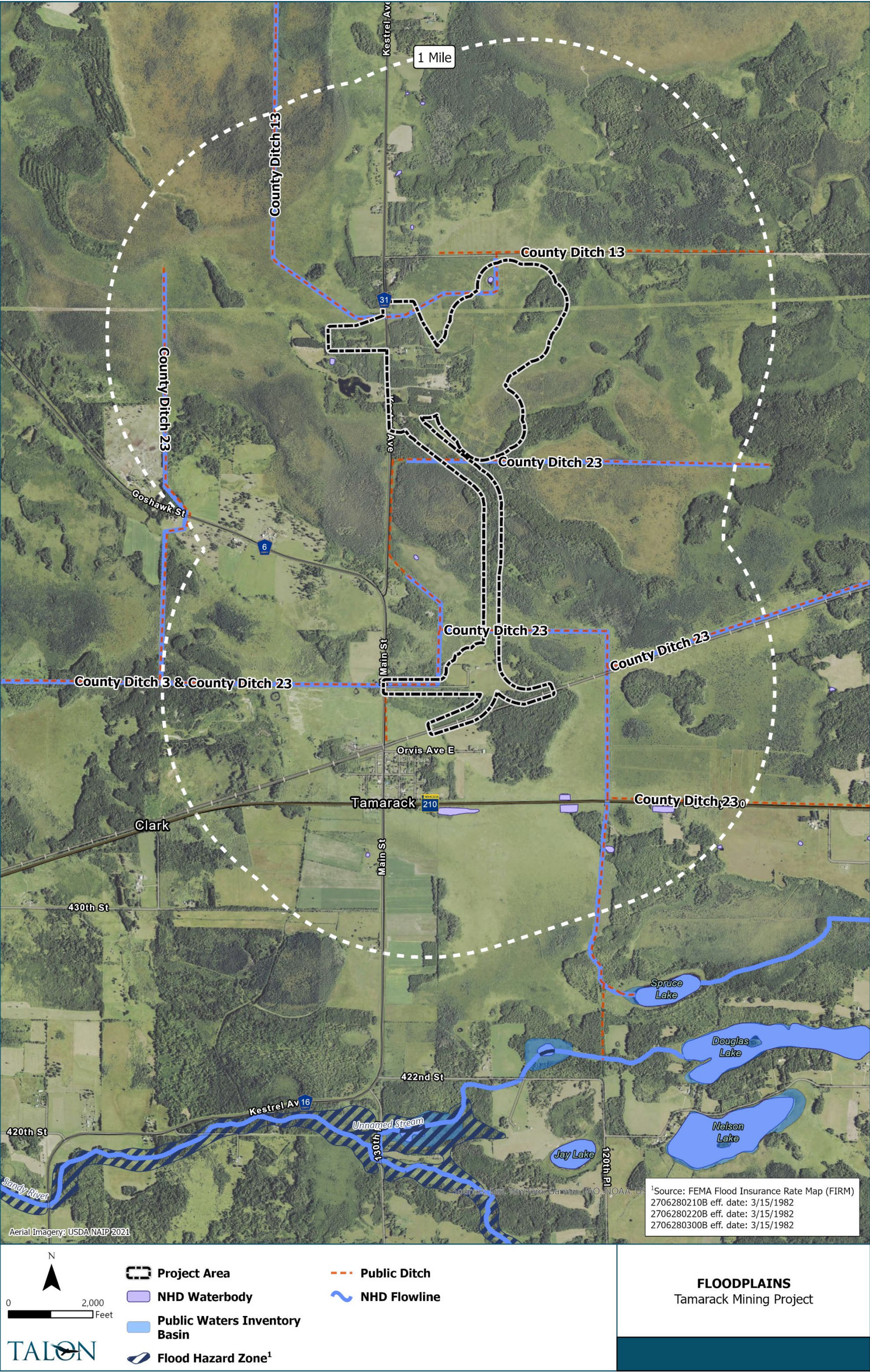


Figure 20 Wetlands

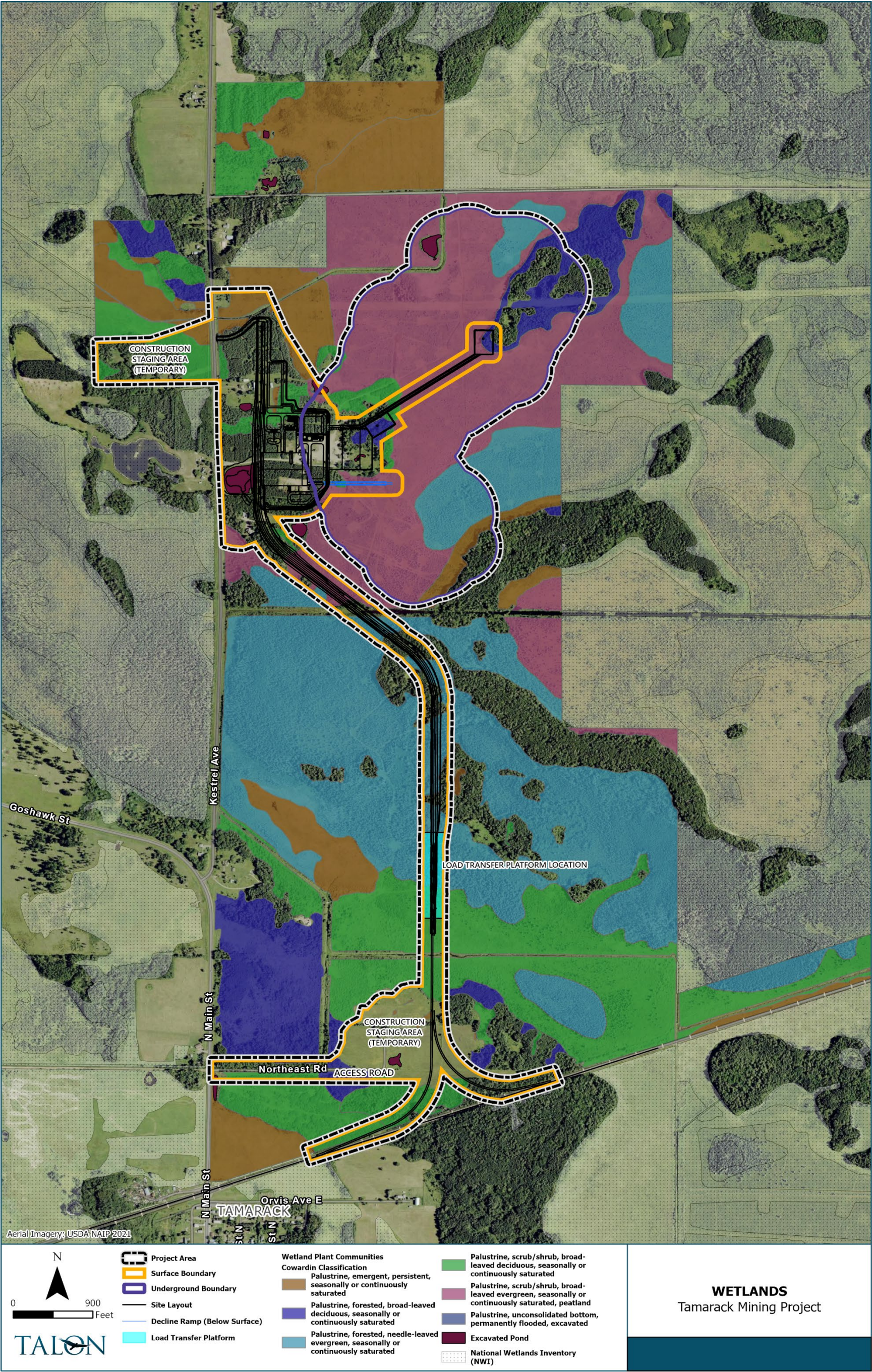


Figure 21 Cultural Resources

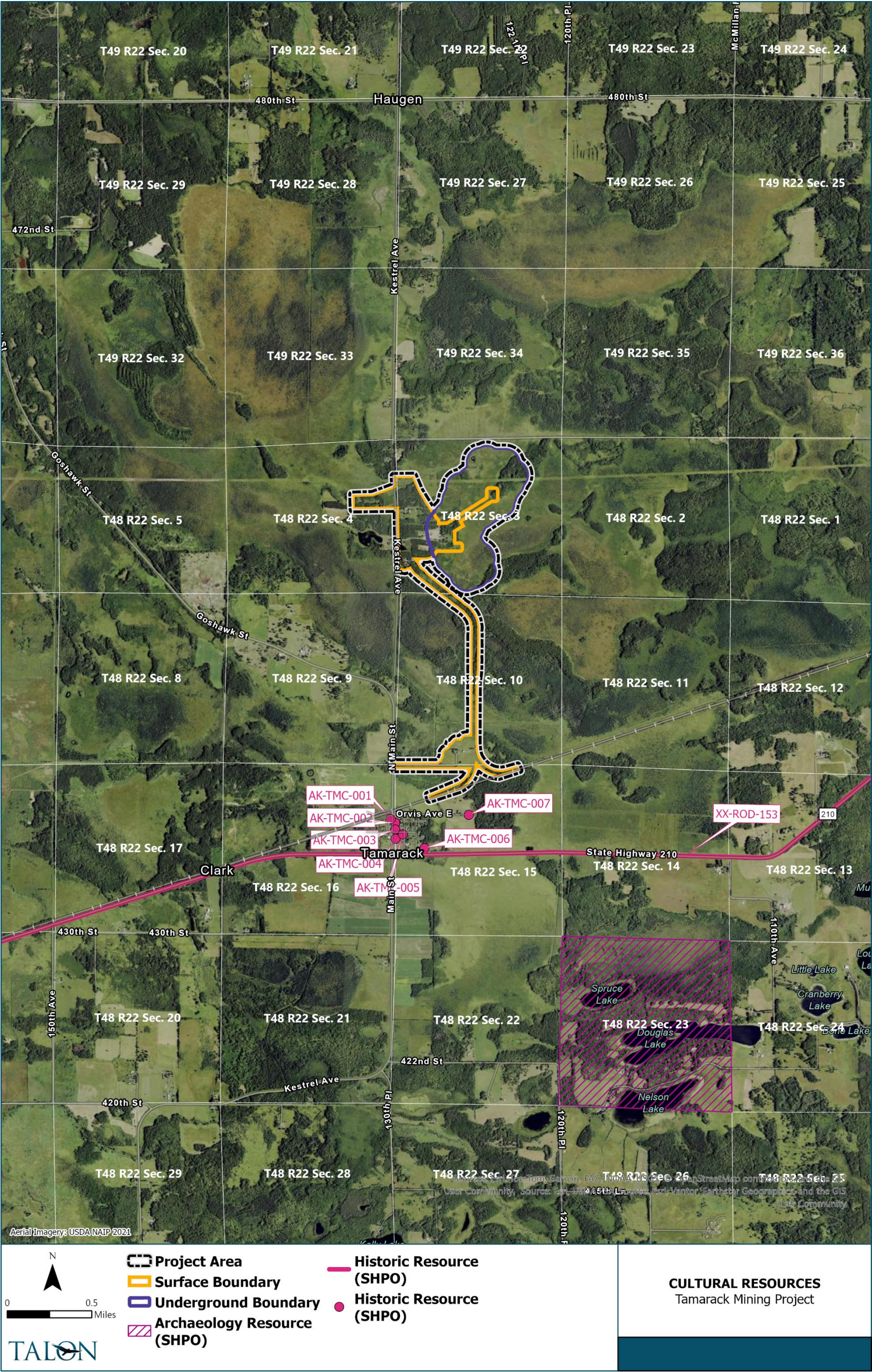


Figure 22 Sensitive Ecological Resources

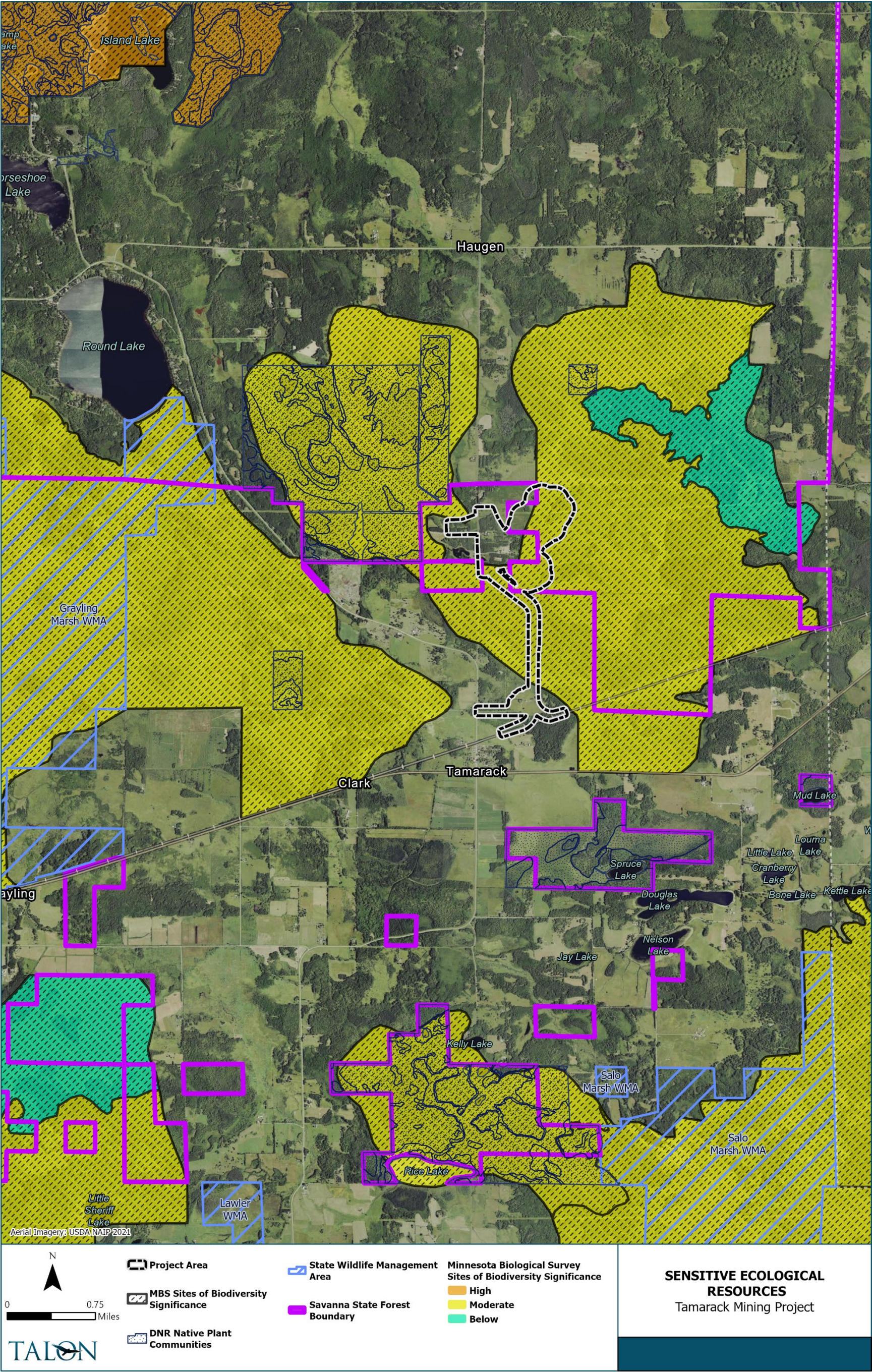


Figure 23 Site Layout and Wetland Delineation

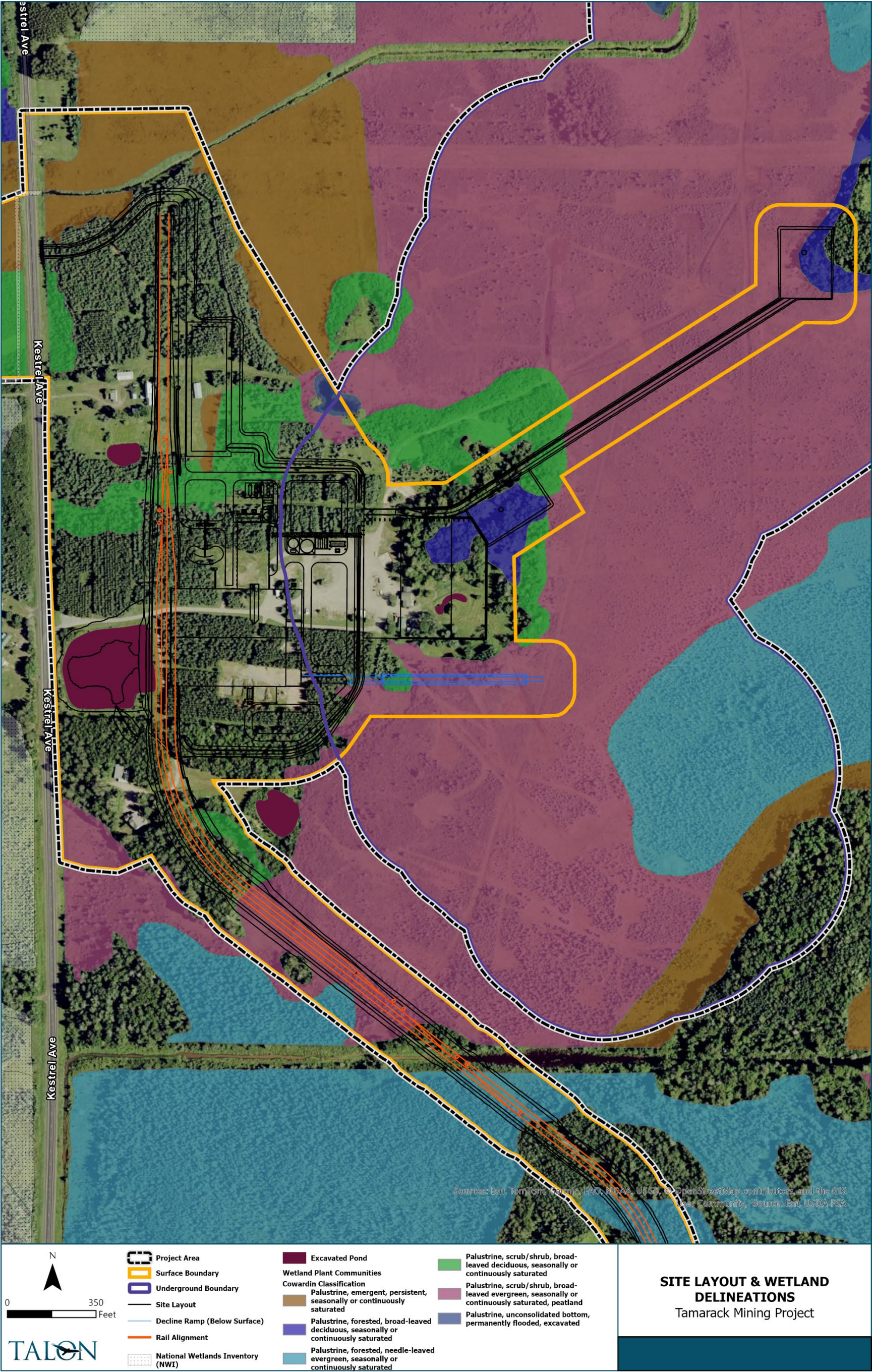


Figure 24 EPA Class 1 Designated Areas

