

Appendix B

Project Screening

Class EA Part 2 Screening Criteria

Project Name:

Long Lake Gold Mine Rehabilitation Project and Access Road Improvements

Location:

Eden Township, Sudbury District

Project Description:

The abandoned Long lake Gold Mine (AMIS #05292) is located at the south end of Long Lake, in Eden Township, Sudbury District, approximately 6km south of the City of Greater Sudbury limits. The mine site borders the community of Atikameksheng Anishnawbek First Nation (AAFN) to the west and was historically accessed by a mine road that transected reserve land. Access to the mine is currently provided via a series of public roads and trails along the southeast side of Long Lake.

The Long Lake Gold Mine operated intermittently from 1908 to 1939. The ore body consisted of gold-bearing arsenopyrite and pyrite that was mined through underground mining methods. A mill was historically present that discharged tailings to low-lying areas where they would be naturally contained by the surrounding topography. The mine features three uncontained tailings' areas (referred to as TA-01, TA-02 and TA-03) estimated to contain approximately 163,000 m³ of tailings. The tailings areas are interconnected by a surface water drainage channel. Over time, the tailings have eroded into the receiving environment resulting in the deposition of tailings into Luke Creek and the south bay of Long Lake. A tailings "delta" has formed in Long Lake at the outlet of Luke Creek.

Long Lake is a densely populated lake with approximately 1,000 permanent and seasonal residents. The waterbody is the source of drinking water for most residents on the lake. Surface water samples collected from the south bay of Long Lake have arsenic concentration greater than the applicable Ontario Drinking Water Standard (ODWS) of 10 µg/L. In response to the elevated arsenic, the Sudbury and District Health Unit issued a drinking water advisory to property owners located in the affected area of the lake. The Ministry of Mines has been providing bottled water to affected residence since the advisory was issued in November 2012. The objective of the Long Lake Gold Mine rehabilitation project is to reduce arsenic concentrations in the south basin of Long Lake to below the drinking water standard of 10 µg/L.

The preferred rehabilitation approach is the construction of an impoundment area within TA-01 and consolidating all tailings, waste rock and contaminated soils that contribute to the arsenic loading to Long Lake within the impoundment. The consolidated tailings and contaminated materials will be covered by an impermeable liner and a vegetative cover to prevent surface water infiltration, oxidation, and transport. The proposed rehabilitation strategy will effectively remove all major sources of arsenic loading to Long Lake. The cover system will also eliminate the pathway for transport of leaching tailings to human and ecological receptors by limiting the infiltration of water into the waste.

The project boundary is defined by the following:

- The three sources of arsenic loadings to Long Lake proposed for remediation and surrounding natural area; and,
- The preferred access road route along the southside of Long Lake.

This Class EA Part 2 Screening was originally prepared by MINES in 2014. It was amended in 2016 and 2023 to address changes to the project design and additional technical studies completed.

Proposed Category:

Category B

Category C

Category D

Individual EA

Rationale / comments:

A Category C Project is identified as those with at least one potential negative effect that cannot be readily mitigated or one unknown environmental effect; and a moderate level of localized public interest.

The project has been screened as a Category C due to the following:

- The project will result in the permanent loss of approximately 10 to 30 representative tree species from within the Conservation Reserve. This is a negative environmental effect that cannot be readily mitigated. However, it is noted that the work is not expected to affect the overall representational value of the conservation reserve on the landscape.
- The project has moderate interest from the public. The interest in the project is not widespread, but rather limited to residences along the proposed access road route, the south bay of Long Lake, and the community of AAFN.

Screened by:
Michaela Haring, Environmental Planner

Date:
December, 2023

Approved by:
Marc Stewart

Date:
December, 2023

Part 2 Screening Criteria	Potential Net Environmental Effects								Description of Positive, Negative or Unknown Effect	Description of Mitigation Measures / Studies Required to Address Negative or Unknown Effects
	Is there a potential environmental effect?			Is the known effect positive or negative?						
	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes	No		
1. Physical Environment										
Protected areas / Areas of Natural and Scientific Interest (ANSIs) (overlapping or adjacent)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>The proposed access road route transects through the Eden Township Conservation Reserve. The Eden Township Conservation Reserve represents the best example in the area of red pine and cedar dominated forest. The proposed road improvements will result in the permanent loss of representative tree species.</p> <p>According to the NHIC Map, there are no ANSIs, provincially significant wetlands, or other environmentally significant areas on or adjacent to the mine or access road route.</p>	<p>The removal of trees from within the Conservation Reserve will be limited to the smallest footprint possible. The approximate number of trees will be estimated prior to removal.</p> <p>An agreement will be prepared with the MECP to minimize the loss of mature conifers while still allowing for the same and feasible movement of equipment and haul trucks.</p> <p>The road width will be kept as narrow as safely possible to minimize the loss of values within the Conservation Reserve.</p>
Proximate First Nations Reserves/ Aboriginal Communities	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	A portion of the fugitive tailings' requiring rehabilitation is located on reserve land. Water flow from the south bay of Long Lake, empties into Round Lake located on AAFN reserve lands via the Whitefish River. The proposed activities will	No environmental effects identified.

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	Is there a potential environmental effect?			Is the known effect positive or negative?			Can the effect be mitigated using standard measures?			
	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes			No
									address a legacy of contamination on AAFN land.	
Noise limits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	There is the potential to impact residences along the proposed access road route due to increased noise associated with the movement of equipment and construction vehicles.	Haul truck traffic and construction work will be limited to daytime hours. All construction equipment will operate to not exceed noise levels guidelines and municipal by-laws. Speed limits will be contractually enforced along the access road and at the mine site.
Vibration limits	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	There is the potential to impact residences along the proposed access road route due to increased vibrations associated with the movement of equipment and construction vehicles.	Mitigation measures for vibrations are provide above for <i>Noise Limits</i> .
Views / aesthetics	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	The proposed work will improve the overall aesthetic of the site by remediating the three uncontained tailings area and removing fugitive tailings from impacted waterbodies.	No environmental effects identified.
Climate Change	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The project design has been optimized to include sources of aggregate closer to the mine site, thereby minimizing the haulage of	The removal of trees will be minimized to the smallest footprint possible. The area will be allowed to revegetate

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	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes			No
									<p>material on public roads and reducing greenhouse gas emissions from vehicular traffic.</p> <p>Standard construction equipment will be used to complete the work. The emission of greenhouse gases from this equipment is expected to be consistent with the use of similar equipment for short-term projects.</p> <p>Trees and vegetation removal will be required to facilitate the road upgrade work and access to the tailings' excavation areas. The removal of trees will have a negative impact on carbon sequestration.</p>	<p>naturally allowing pioneer species to cultivate previously disturbed areas of the land.</p> <p>The unnecessary idling of construction vehicles will not be permitted during the construction work.</p> <p>The remediation of the three tailings' areas will create soil conditions favourable for new vegetation growth, which will off-set the loss of trees carbon sequestration at other locations.</p> <p>Wetlands have been shown to efficiently sequester carbon. TA-01 and TA-02 will be rehabilitated as wetlands, thus mitigating much of the negative impacts from the tree clearing.</p>
<p>Additional Information / comments:</p> <ul style="list-style-type: none"> Project activities will result in the permanent loss of approximately 10 to 30 representative red pine and cedar tree species from within the Conservation Reserve. This is considered a negative environmental effect that cannot readily be mitigated. It is noted that the loss of these trees is not expected to affect the overall representational value of the conservation reserve on the landscape. 										
Biological Environment										

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	Is there a potential environmental effect?			Is the known effect positive or negative?			Can the effect be mitigated using standard measures?			
	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes	No		
Fish and other aquatic species or habitat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>There are numerous surface water features situated along the proposed access road route and within the project boundaries.</p> <p>Heavy equipment will be used and there is a risk of leaks and spills. There is the potential for sedimentation and/or erosion to occur.</p> <p>Heavy equipment will be required to enter Luke Creek and Long Lake to remove fugitive tailings from the water features. This may result in the resuspension and entrainment of sediment and increase concentration of contaminants in the downstream environment.</p> <p>The removal of fugitive tailings and stressed vegetation from Luke Creek has the potential to change the channel morphology and aquatic habitat structure. The removal of vegetation can reduce cover and protection from predators and physical disturbance by aquatic organisms, as well as the availability of diverse and stable habitats. The removal of fugitive tailings from Luke</p>	

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									Creek will be achieved by damming a section of the channel and diverting water away from the work area. This will result in temporary changes in flow in the downstream environment, and temporary disruption in access to fish habitats. It is also possible that fish may become trapped or entrained during the completion of the in-water work.	
Terrestrial species or habitat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>The mine and proposed access road route are surrounded by a mix of coniferous and deciduous tree species.</p> <p>Vegetation and tree removal will be required, which will result in the loss of terrestrial habitat and potential impacts to wildlife and migratory bird species.</p> <p>Wildlife may be temporarily displaced due to increased noise, vibrations.</p>	<p>The removal of trees and vegetation will be limited to the smallest footprint possible.</p> <p>Tree/vegetation removal activities will preferentially be completed outside of the migratory bird active period which is from approximately mid-April to late- August. If necessary, during the breeding bird season, vegetation proposed for removal will be surveyed by a qualified biologist to confirm the presence/absence of migratory birds or nests. If avian nests are identified, work around the nest will cease and a setback buffer established. All work inside the buffer avoided until</p>

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	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes			No
									<p>the young have fledged and left the area.</p> <p>Progressive rehabilitation will be implemented to promote the reestablishment of native plant species, reduce the potential for erosion, and enhance the natural recovery of the ecological communities.</p> <p>Any potential impacts to wildlife associated with habitat loss or temporary sensory disturbance is not expected to impact the overall landscape structure and function of the surrounding terrestrial ecosystem.</p> <p>Mitigation measures for noise and vibration are provided above in <i>Noise and Vibrations</i>.</p>	
Endangered Species / Species at risk or habitat	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>The area surrounding the mine is known to provide habitat to a Blanding's Turtles and Eastern Whip-poor-will. Based on habitat requirements, it is possible that Massasauga Rattlesnake may additional be encountered, however no individuals have historically been observed at the site.</p> <p>Applicable permits required under Section 17(2) of the ESA (2007) will be obtained prior to the rehabilitation activities and all work completed in accordance with the permit conditions.</p>	

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	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes	No		
Surface water - quality/ quantity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>The objective of the Long Lake Gold Mine Rehabilitation project is to reduce arsenic concentrations in the south basin of Long Lake. The project is expected to have an overall positive long-term effect on surface water quality.</p> <p>There are numerous surface water features situated along the proposed access road route and within the project boundaries.</p> <p>There is the potential for leaks and spills, sedimentation and/or erosion.</p>	<p>Mitigation measures for leaks and spills is provided above in <i>Fish and Other Aquatic Species or Habitat</i>.</p>
Soils - contaminants, sedimentation, erosion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>The construction of the impoundment and cover will require a significant quantity of aggregates and topsoil. Although considered low risk, there is the potential for the backfill to introduce new contaminants to the environment.</p> <p>Workers and the environment will be exposed to contaminated tailings, soil, surface water, and groundwater during the completion of the work.</p> <p>Workers and/or the environment may be exposed to previously</p>	<p>All backfill material mobilized to site will be transported in clean trucks and will be free of contaminants.</p> <p>All workers assigned to this project will be aware of contaminants at the site and the risks they may pose to human health.</p> <p>Personal protective equipment will be available to all personnel.</p>

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	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes			No
									unidentified contamination during the work.	
Wells / drinking water sources	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	N/A	<p>The project area falls within the Nickel District Source Water Protection Area. There are no Wellhead Protection Areas, Intake Protection Zones, Significant Groundwater Recharge Areas, Highly Vulnerable Aquifers, or other vulnerable areas that overlap with the project area.</p> <p>The rehabilitation activities will not further degrade the quality or quantity of drinking water sources.</p>	No negative environmental effects identified. The activities are expected to have a positive impact on drinking water sources by removing the source of arsenic contamination to Long Lake, thereby allowing drinking water quality to meet the ODWS.
Air quality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>Normal activities at the mine, access road route and surrounding area do not currently contribute to increased air quality emissions in the atmosphere.</p> <p>Although considered low risk, there is the potential for the excavation of the tailings and movement of construction vehicles overland at the mine to result in the generation of dust contaminated with arsenic.</p> <p>Standard construction equipment will be utilized to complete the work,</p>	<p>The project specifications will include the requirement of a Dust Best Management Plan to ensure best management practises are implemented to minimize fugitive dust along the mine access road and at the mine site.</p> <p>Speed limits will be contractually enforced along the access roads and at the mine site to minimize dust emissions.</p>

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	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes			No
									and the emissions of diesel fumes associated with this equipment is expected to be minimal.	Water or a dust suppressant will be utilized, as needed. Air quality for dust will be compliant with the standards for suspended particulate matter at off-site receptors identified in O.Reg 419/05.
Other (specify) Waste	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	No soil or contaminated material will be removed from the site. All tailings and contaminated material will be consolidated within the impoundment area. Limited excess soil will be generated as part of the road improvements will be retained and used as part of the road construction activities. The generation of waste will be limited to increased domestic garbage and litter from on-site workers.	The handling, management, and disposal of waste will be completed in accordance with applicable health and safety and environmental legislation. The work are will remain free of litter and all waste disposed of at a licensed facility in accordance with O.Reg 347.
Additional Information / comments:										
<ul style="list-style-type: none"> All negative environmental effects can be readily mitigated. No unknown environmental effects identified. 										
Built / Structural Environment										
Infrastructure (roads,	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No new utility services or facilities are proposed as part of the project. The project includes upgrades to the	The upgrades are expected to have a positive impact by improving sight line distances

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	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes			No
powerlines, pipelines, etc.)									<p>existing network of public roads located along the southeast side of Long Lake.</p> <p>There is the potential for increased hauling and traffic volume to result in damage to local road infrastructure.</p> <p>and making the road safer for both local and construction traffic.</p> <p>The haulage of materials on public roads will be avoided during extreme weather conditions, including periods with poor visibility.</p> <p>The scheduling of trucks along the public roads will preferentially be completed during a time when traffic is expected to be lowest. No truck traffic will be permitted during school bus loading and unloading periods.</p> <p>A road maintenance agreement will be prepared between the Ministry, City of Greater Sudbury, Ministry of Transportation, and the Local Roads Board to ensure the roadways are actively maintained.</p> <p>Truck loads will follow the load limits and restriction set out by the City of Greater Sudbury</p>	

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	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes			No
									under the Ontario Highway Traffic Act (HTA)	
Navigation routes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>The proposed access road routes will occur on public roads and will result in interruption to local traffic.</p> <p>There is a snowmobile trail that joins the site access road that continues south across the tailings area, maintained by the Broder Dill Snowmobile Association. The existing section of trail that extends across the tailings will be permanently closed and re-routed.</p>	<p>Any disruption to local traffic will be temporary. Flagging, signage, and road construction safety measures will be utilized in accordance with the Ontario Traffic Manual.</p> <p>The trail will be rerouted to allow continued use of the route. The location of the new trail will be determined through consultation with the Broder Dill Snowmobile Association.</p>
Seasonal or permanent residences	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>Increased vehicular and construction traffic on public roads may increase the probability of collisions with other vehicles, school buses, cyclist, and pedestrians.</p> <p>Potential impacts to residences due to increased noise, vibration and fugitive dust has been detailed above <i>Air Quality, Noise and Vibrations</i>.</p> <p>The construction phase of the project will result in the temporary disruption to Crown land access,</p>	<p>Mitigation measures for increased vehicular traffic is provided above for <i>Infrastructure</i>.</p> <p>Protective fencing and signage will be utilized to secure the work site from public access. Access to the site will be controlled to ensure no risk to the public, including hunters, recreational users, and the private landowner.</p>

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	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes			No
									<p>which may have a short-term negative effect to recreational users.</p> <p>The surface rights owner that owns the southern portion of TA-02 and the glory hole and the claim holder will have limited access to their property during the construction work.</p>	The project will benefit the surface rights owner and claim holder by improving access to their property.
Natural or human-made hazards	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	The proposed activities will remove uncontained tailings from the surrounding environment.	No negative environmental effects identified.
Other projects or activities (adjacent)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<p>There is a snowmobile trail that joins the site access road that continues south across the tailings area, maintained by the Broder Dill Snowmobile Association. The existing section of trail that extends across the tailings will be permanently closed and re-routed.</p> <p>The work may temporarily disrupt access to the Killarney area while the trail is being re-routed.</p>	<p>Protective fencing and signage will be utilized to secure the work site from public access.</p> <p>Access to the site will be controlled to ensure no risk to the public, including users of the snowmobile trail.</p> <p>The trail will be rerouted to allow continued use of the route. The location of the new trail will be determined through consultation with the Broder Dill Snowmobile Association</p>
Additional Information / comments: <ul style="list-style-type: none"> All negative environmental effects can be readily mitigated. No unknown environmental effects identified. 										

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	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes	No		
Social / Economic / Cultural Environment¹										
Archaeological resources	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Although considered low risk, there is the potential to encountered previously unidentified archaeological resources during the excavation activities.	If any previously unidentified archaeological features are identified during construction activities, work will immediately stop and MCM Heritage Planning Unit contacted to determine the appropriate next steps.
Built heritage resources / cultural heritage landscapes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	A Cultural Heritage Evaluation Report was completed that concluded that the property meets the criteria for cultural heritage value or interest prescribed in O.Reg 9/06 for historical/associative and contextual reasons and should be considered as a potential Provincial Heritage Property (PHP).	A Heritage Impact Assessment will be completed, and all mitigation measures outlined in the Heritage Impact Assessment will be adhered to during the completion of the work.
Agricultural or forestry uses	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	N/A	N/A	N/A	The mine and surrounding areas have no known agricultural or forestry uses.	No environmental effects identified.
Site(s) of Aboriginal cultural significance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The construction phase of the project will result in the temporary disruption to land access, which may have a short-term negative impact to	Communication with the community will be maintained throughout the construction activities

¹ Completed in accordance with the screening checklists provided in Schedule A (Screening for Built Heritage resources and Cultural heritage Landscapes) and Schedule B (Screening for Archaeological Resources) in the document *A Class Environmental Assessment for Activities of the Ministry of Northern Development of Mines under the Mining Act*.

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	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes			No
									users that may access the area for hunting, fishing, harvesting or other traditional activities	
Recreational uses	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The construction phase of the project will result in the temporary disruption to Crown land access, which may have a short-term negative effect to recreational users. Additional impacts to recreational users are detailed above in <i>Seasonal or Permanent Residences</i>	Mitigation measures are detailed above in <i>Seasonal or Permanent Residences</i> .
Tourism uses	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	The Broder Dill Snowmobile Association has a trail that transects the tailings area. The proposed work will have temporary impacts on the trail.	The trail will be rerouted to allow continued use of the route. The location of the new trail will be determined through consultation with the Broder Dill Snowmobile Association.
Industrial uses	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	N/A	N/A	N/A	The site has no known industrial uses.	No environmental effects identified.
Local / regional economies or businesses	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	The rehabilitation and road improvements will provide economic opportunities to local businesses.	No negative environmental effects identified.
Public health and safety	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Increased vehicular and construction traffic on public roads may increase the probability of collisions with other vehicles, school buses, cyclist, and pedestrians.	Mitigation measures for public safety during the road improvement work is provided above in <i>Seasonal or Permanent Residences</i> .

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	Yes	No	Unk.	Pos.	Neg.	Unk.	Yes	No		
First Nation land claims	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	Completing the project and removing the sources of arsenic contamination will improve water quality in the receiving environment, including within Round Lake on AAFN land, and possibly reduce fish consumption advisory limits for sought after species.	No negative environmental effects identified.
Additional Information / comments: <ul style="list-style-type: none"> All negative environmental effects can be readily mitigated. No unknown environmental effects identified. 										

Schedule B – Screening Checklist for Archaeological Resources

Project Name: Long Lake Gold Mine Rehabilitation Project

Project Location: Eden Township, Sudbury District

The following questions apply to the entire project area including temporary storage or work areas as well as temporary roads/detours. See Section 5.0 to define the boundary.

Answer each question in succession and follow the instructions. Continue until all questions are answered or a definitive conclusion is reached.

Screening Question	Response
<p>1. Has an archaeological assessment been prepared for this proposed project area that recommends that there are no further concerns about impacts to archaeological sites and that has been entered into the Ontario Public Register of Archaeological Reports (Register) maintained by MTCS¹?</p> <p>Where information can be obtained: MNDM files, third-party applicant, and/or MTCS.</p> <p>The following archaeological assessments have been completed for the mine and access road route:</p> <ol style="list-style-type: none"> 1. URS Canada Inc. 2014. Stage 1-2 Archaeological Assessment, Ministry of Northern Development and Mines, Long Lake Gold Mine, Eden Township, District of Sudbury, Ontario. Dated: December 1, 2014 2. Aecom Canada Ltd. 2018. Long Lake Gold Mine – Archaeological Potential for Wetland Located on Atikameksheng Anishnawbek, Ontario. Dated: December 21, 2018 <p>The previous archaeological assessments completed have concluded that the site and proposed access road route has low archaeological potential.</p>	<p>Yes</p>

¹ If an archaeological assessment report complies with MTCS' requirements and makes recommendations that there are no further concerns about impacts to archaeological sites a letter is sent to the *consultant archaeologist* and copied to MNDM, and to the third party or partner if applicable, confirming that MTCS has entered the report into the Register.

Screening Question	Response
<p>If you answered YES, an archaeological assessment is NOT required. Proponents should follow the recommendations from the report(s). It is not necessary to complete the remaining questions in the checklist. MNDM will summarize this conclusion and add this checklist to the project file, with the appropriate documentation (e.g., MTCS acceptance of archaeological assessment report). The summary and appropriate documentation will be maintained by the project proponent.</p>	
<p>If you answered NO, continue to question 2. Documentation to support an answer of YES is not required.</p>	
<p>2. Are there known archaeological sites within 300m of the proposed project?</p> <p>Where information can be obtained: The Ministry of Tourism, Culture and Sport maintains a database of known archaeological sites in Ontario. Contact the Archaeological Data Coordinator for information about archaeological sites at archaeology@ontario.ca</p> <p>When requesting information regarding archaeological sites included in records by MTCS, both large scale mapping showing the project area boundaries and small scale mapping showing nearby township names for context purposes should accompany the request.</p>	<p>Yes / No</p>
<p>If you answered YES, an archaeological assessment is required (follow process outlined in Section 10.0); it is not necessary to complete the remaining questions in the checklist.</p>	
<p>If you answered NO, continue to question 3. MTCS' response to Question 2 should be used as documentation.</p>	
<p>3. Will the proposed project, decision or activity result in significant ground disturbance?</p> <p>Significant ground disturbance means to interfere with or alter the existing condition of the ground, whether is above or below water, through human actions that have potential to affect cultural heritage resources, and includes, but not limited to, altering the existing grade of land, compacting, excavating, or removing topsoil, power spraying, dredging, placing or dumping fill, removing vegetation, allowing heavy vehicle traffic, trenching (e.g. for services, etc.), drainage ditch construction, trail construction, scarification and soil mechanics studies, but does not include normal, regular farming practices such as ploughing and tilling.</p>	<p>Yes / No</p>
<p>If you answered YES, continue to question 4. Documentation to support an answer of YES is not required.</p>	

Screening Question	Response
<p>If you answered NO, an archaeological assessment is NOT required and it is not necessary to fill out the remainder of the checklist. The proponent will summarize this conclusion and document as part of the EA process. Appropriate documentation demonstrating that no ground disturbance will take place. The summary and all documentation will be added to the project file.</p>	
<p>4. Have all areas to be impacted by ground disturbing activities been subjected to recent (i.e. post 1960) extensive and intensive disturbances and to depths greater than the depths of the proposed activities?</p> <p>(For example, all areas have been subject to post-1960 construction, road construction, shoreline stabilization/channelization)?</p>	<p>Yes / No</p>
<p>If you answered YES to the preceding question, an archaeological assessment is NOT required. The checklist and any supporting documentation demonstrating that no activities will go deeper than past ground disturbances or will occur in previously undisturbed lands is to be included in the summary.</p>	
<p>If you answered NO, there is potential for archaeological resources in the project area and an archaeological assessment is required.</p>	

Schedule A: Screening Checklist for Built Heritage and Cultural Heritage Landscapes

Project Name: Long Lake Gold Mine Rehabilitation Project

Project Location: Eden Township, Sudbury District

Have the following information ready when making requests for information on recognized *cultural heritage resources*:

- a map showing the location and boundary (see Section 5.0) of the project area, and other relevant details, including existing *mine hazards*, nearby communities, structures, natural features (e.g., water bodies), sensitive features, etc.;
- the municipal addresses of all properties within the project area when contacting the Ontario Heritage Trust or a municipal clerk; and/or
- the lot(s), concession(s), and parcel number(s) of all properties within the project area when contacting the local land registry office.

The following questions apply to the entire project area.

Answer each question in succession and follow the instructions. Continue until all questions are answered or a definitive conclusion is reached.

Screening Questions	Response
Part A: Screening for Potential Impacts	
<p>1. Is the proposed undertaking consistent with an approved conservation plan, if one exists?</p> <p>Check with MNDM, MNR, Infrastructure Ontario and/or MTCS staff.</p> <p>According to the Ministry of Citizenship and Multiculturalism (MCM), there are no conservation plans for the site/area.</p>	No
<p>If you answered YES, it is not necessary to complete the remaining questions in the checklist. MNDM will include this information in the project file and follow the recommendations of the conservation plan during project planning and implementation.</p> <p>If you answered NO continue to question 2.</p>	
<p>2. Will the proposed project result in any of the following potential direct or indirect impacts to the project area or an adjacent property:</p>	

Screening Questions	Response
<p>a) Alteration (which means a change in any manner and includes destruction, removal, relocation, restoration, renovation, repair, or isolation) of a feature or an adjacent resource, i.e., a building or structure, or a feature of a structure, landscape or setting?</p> <p>The project will result in the alteration of the landscapes on the property.</p>	<p>Yes</p>
<p>b) New direct or indirect obstruction of views or vistas from, within, or to a built or natural feature?</p> <p>For example: the introduction of new elements such as a building or addition, a noise wall, a fence or a parking lot. The project includes the construction of an impoundment that will result in new obstructions of views to natural features.</p> <p>Depending on the answers to Part B, the answer to this question may need to be revisited.</p>	<p>Yes</p>
<p>If you answered YES to any of the above questions, continue to Part B: Screening for Recognized Cultural Heritage Value.</p> <p>If you answered NO to all of the above questions:</p> <ul style="list-style-type: none"> ○ There is low potential for impacts to built heritage or cultural heritage landscapes. ○ For discretionary rehabilitation activities and permissions to test mineral content (<i>bulk samples</i>): it is not necessary to complete the remaining questions in the checklist. MNDM will summarize this conclusion and add this checklist to the project file, with appropriate documentation demonstrating that no impacts will occur. ○ For discretionary tenure decisions other than <i>bulk samples</i>: MNDM will update the project file as described above. In addition, MNDM will determine whether conditions regarding future activities will be included in the approval instrument by continuing to Part B: Screening for Recognized Cultural Heritage Value. 	
<p>Part B: Screening for Recognized Cultural Heritage Value</p>	
<p>3. Does the project area contain a parcel of land that has been evaluated before and found not to be of cultural heritage value?</p> <p>Check with MNDM, MNRF, Infrastructure Ontario and/or MTCS staff.</p>	<p>No</p>

Screening Questions	Response
<p>If you answered YES, it is not necessary to complete the remaining questions in the checklist. MNDM will summarize this conclusion and add this checklist to the project file, with appropriate documentation demonstrating that a cultural heritage evaluation was undertaken.</p> <p>If you answered NO, continue to Question 4.</p>	
<p>4. Does the project area contain a parcel of land that:</p>	
<p>a) is subject of a covenant or agreement (under Parts II or IV of the <i>Ontario Heritage Act</i>) between the owner of the property and a conservation body or level of government registered on title and executed with the primary purpose of preserving, conserving, and maintaining a cultural heritage resource, or preventing its destruction, demolition or loss?</p> <p>Where information can be obtained: Municipal Clerk and Ontario Heritage Trust (http://www.heritagetrust.on.ca/Home.aspx). Additional information may be found at the local land registry office (title search).</p>	<p>No</p>
<p>b) is listed on a register or inventory of heritage properties maintained by the municipality?</p> <p>Check with the Municipal Clerk, Municipal Heritage Planning staff, or the Municipal Heritage Committee to determine if the bridge or a parcel of land within the project area is listed on a municipal register.</p>	<p>No</p>
<p>c) is designated under Part IV of the Ontario Heritage Act?</p> <p>Where information can be obtained: Municipal Clerk and Ontario Heritage Trust (http://www.heritagetrust.on.ca/Home.aspx). Additional information may be found at the local land registry office (title search).</p>	<p>No</p>
<p>d) is subject to a notice of intention to designate (under Part IV of the <i>Ontario Heritage Act</i>) issued by a municipality?</p> <p>Where information can be obtained: Municipal Clerk.</p>	<p>No</p>
<p>e) is located within a designated Heritage Conservation District?</p> <p>Where information can be obtained: Municipal Clerk.</p>	<p>No</p>

Screening Questions	Response
<p>f) is an area designated by a municipal by-law made under section 40.1 of the <i>Ontario Heritage Act</i> as a heritage conservation district study area?</p> <p>Where information can be obtained: Municipal Clerk.</p>	No
<p>g) is included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties?</p> <p>Where information can be obtained: Heritage Advisor, Ministry of Tourism, Culture and Sport.</p>	No
<p>h) is part of a National Historic Site?</p> <p>For more information on National Historic Sites: http://www.pc.gc.ca/progs/lhn-nhs/index.aspx</p>	No
<p>i) is part of a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?</p> <p>A UNESCO World Heritage Site is a place listed by UNESCO as having outstanding universal value to humanity. In order to retain the status of World Heritage Site, each site must maintain its character defining features. For more information on World Heritage Sites in Canada: http://www.pc.gc.ca/eng/progs/spm-whs/index.aspx</p> <p>Currently, the Rideau Canal is the only World Heritage Site in Ontario.</p>	No
<p>j) is designated under the Heritage Railway Station Protection Act?</p> <p>For a directory of designated heritage railway stations: http://www.pc.gc.ca/eng/clmhc-hsmbc/pat-her/gar-sta.aspx</p>	No
<p>k) is identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office?</p> <p>For more information: http://www.pc.gc.ca/progs/beefp-fhbro/index_e.asp</p>	No
<p>l) is designated under the <i>Heritage Lighthouse Protection Act</i>?</p> <p>For more information: http://www.pc.gc.ca/eng/progs/lhn-nhs/pp-hl/page01.aspx</p>	No

Screening Questions	Response
<p>m) is the subject of a municipal, provincial or federal commemorative or interpretive plaque?</p> <p>Heritage resources are often recognized with formal plaques or markers. Plaques are erected by municipalities, provincial or federal ministries or agencies, or by local non-government or non-profit organizations through commemorative and interpretive plaque programs.</p> <p>Information can be found at the following sources:</p> <ul style="list-style-type: none"> • municipal heritage committees or local heritage organizations, for the locations of plaques in their community: http://www.mtc.gov.on.ca/en/heritage/lacac.shtml • Ontario Historical Society’s Heritage Directory, for a list of historical societies and heritage organizations: https://www.ontariohistoricalsociety.ca/index.php/services/heritage-directory-map • Ontario Heritage Trust, for a list of plaques commemorating Ontario’s history: http://www.heritagetrust.on.ca/Resources-and-Learning/Online-Plaque-Guide.aspx • Historic Sites and Monuments Board of Canada, for a list of plaques commemorating Canada’s history: http://www.pc.gc.ca/apps/dfhd/default_eng.aspx 	No
<p>If you answered YES to any of the above questions:</p> <ul style="list-style-type: none"> ○ If a Statement of Cultural Heritage Value has previously been prepared, a Heritage Impact Assessment report is required (see Section 8.0 Heritage Impact Assessment). ○ If a Statement of Cultural Heritage Value has not previously been prepared, a Cultural Heritage Evaluation Report is required (see Section 7.0 Cultural Heritage Resource Evaluation). ○ For discretionary tenure decisions other than <i>bulk samples</i> that may have future direct or indirect impacts (i.e., you answered NO in question 2), MNDM will include this information in the project file, continue with project screening and planning, and will include the appropriate conditions in the approval instrument. <p>If you answered NO to all of the above questions continue to Part C: Screening for Potential Cultural Heritage Value.</p>	

Screening Questions	Response
Part C: Screening for Potential Cultural Heritage Value 5. Does the project area contains a parcel of land that:	
<p>a) is on or adjacent to a known burial site and/or cemetery?</p> <p>The presence of a cemetery can be confirmed through a site visit. Additionally, information on registered cemeteries may be obtained from: the Registrar of Cemeteries, Ministry of Consumer Services' database of registered cemeteries: http://www.consumerbeware.mqs.gov.on.ca/eseach/cemeterySearch.do?eformsId=0</p> <ul style="list-style-type: none"> • the Ontario Genealogical Society (OGS) records of Ontario cemeteries (both currently and no longer in existence), cairns, family plots and burial registers: http://www.ogs.on.ca/indexes.php • the Canadian County Atlas Digital Project which lists early cemeteries in Southern Ontario: http://web.library.mcgill.ca/countyatlas/searchmapframes.php 	<p>No</p>
<p>b) is in a Canadian Heritage River watershed?</p> <p>The Canadian Heritage River System is a national river conservation program. It promotes, protects and enhances the best examples of Canada's river heritage. Canadian Heritage Rivers must have, and maintain, outstanding natural, cultural, and/or recreational values, and a high level of public support. For more information: www.chrs.ca/Main_e.htm</p> <p>Questions regarding the boundaries of a watershed should be directed to the applicable Conservation Authority and/or municipal staff.</p>	<p>No</p>
<p>c) contains structures over forty years old?</p> <p>(e.g., residential structures, farm buildings and outbuildings, industrial, commercial, or institutional buildings, and/or engineering works).</p> <p>The land registry office can provide information on the recent history of a property. Historical source materials can also be helpful in determining the age of structures; these include: directories, photographs, historical atlases, fire insurance maps, and business records.</p>	<p>Yes</p>

Screening Questions	Response
<p>d) the Ministry of Tourism, Culture and Sport has identified as a property with potential cultural heritage value?</p> <p>Contact the Heritage Advisor, MTCS.</p>	
<p>Part D: Other Considerations</p>	
<p>6. Is there local knowledge or accessible documentation suggesting that the project area is situated on a parcel of land that:</p>	
<p>a) is considered a landmark in the local community or contains any structures or sites that are important to defining the character of the area?</p> <p>For instance: buildings or landscape features that are accessible to the public or readily noticeable and widely known, complexes or buildings, monuments, or ruins.</p> <p>For more information (on Part D questions) contact: Elders in Aboriginal communities, community researchers, municipal heritage committees, or local heritage organizations (see Ontario Heritage Society’s Heritage Directory: https://www.ontariohistoricalsociety.ca/index.php/services/heritage-directory-map).</p>	<p>No</p>
<p>b) has special association with a community, person, or historical event?</p> <p>For example: Aboriginal sacred site, traditional-use areas, battlefield, or the birthplace of an individual of importance to the community.</p>	<p>Yes</p>
<p>c) contains or is part of a cultural heritage landscape?</p> <p>For example: Aboriginal trail, park, designed garden, historic road or rail corridor that may have been established as a key transportation or trade route, or unique landforms such as waterfalls, rock faces, caverns or mounds that may have have connections to a particular event, group or belief.</p>	<p>No</p>

Screening Questions	Response
<p>If you answered YES to one or more of the above questions (parts C and D):</p> <ul style="list-style-type: none"> ○ There is potential for <i>cultural heritage resources</i>. ○ A Cultural Heritage Evaluation Report is required. MNDM will include this information in the project file and continue with project screening and/or planning as required. ○ For discretionary tenure decisions other than <i>bulk samples</i> that may have future direct or indirect impacts (i.e., answered NO in question 2), a Cultural Heritage Evaluation Report is not required at this time. MNDM will include this information in the project file, continue with project screening and planning, and will include the appropriate conditions in the approval instrument. <p>If you answered NO to all of the above questions, there is low potential for impacts to <i>cultural heritage resources</i>. MNDM will summarize this conclusion and add it and all related documentation to the project file and will proceed with project screening and/or planning as required.</p>	

Appendix C

MECP Memorandum of Understanding

APPENDIX F

Memorandum of Understanding between MECP and MNDM re: Upgrade to an Existing Road through Eden Township Forest Conservation Reserve

Purpose of Memorandum of Understanding

The purpose of the Memorandum of Understanding between MECP and MNDM is to:

- (a) Define the expected outcomes regarding the use and upgrade of an existing road through the Eden Township Forest Conservation Reserve (CR) to the Long Lake Gold Mine site (Schedule A),
- (b) Provide documentation to demonstrate that the requirements of the Class EA for the Activities of the Ministry of Northern Development and Mines under the Mining Act (ENDM's Class EA) will be met, and
- (c) Clearly outline the roles and responsibilities of each Ministry in meeting requirements of the project.

1. Environmental Assessment Requirements

MECP will participate in ENDM's Class EA process to ensure that the Eden Township Forest CR values are identified and considered. The Class Environmental Assessment for Provincial Parks and Conservation Reserves (Class EA-PPCR) and the conditions of Section 21 under the *Provincial Parks and Conservation Reserves Act* (PPCRA) do not apply to this project; however, both may be used as a best management practice, to consider CR values and inform the ENDM's Class EA.

Project Description

ENDM will prepare a project description as per the requirements of the ENDM's Class EA. MECP will work with ENDM to ensure additional information regarding the road through the CR is incorporated into the project description. At a minimum, this will include:

- Purpose and rationale of the CR road upgrade.
- Details on the road including location, extent of upgrade, frequency and extent of use, duration of use, access control, and final standard or condition of the road.

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- Identify other access alternatives to the Long Lake mine site to be considered and the rationale (preliminary evaluation) for selecting the preferred alternative.
- Identification of applicable policies, procedures, manuals, etc. required to upgrade, operate and decommission the road.
- Identification of existing CR values that may be impacted by the upgrade of the road.
- Identification of any appropriate mitigation required to minimize impacts to values within the CR.

Project Screening

ENDM will:

- Screen the proposed project, including the upgrade to the road, under the ENDM's Class EA.
- Incorporate any additional screening criteria from Table 4.1 of Class EA-PPCR identified by MECP into the project screening.

MECP will:

- Provide ENDM with an outline of known values that occur within the study area (i.e., the Long Lake mine site and the CR).
- Assist ENDM with the screening by evaluating and documenting potential impacts of the proposed project on the CR.
- Perform and document the Test of Compatibility, as per Appendix D of the Statement of Conservation Interest, for the CR.

Notification and Consultation

ENDM will:

- Prepare project notices (e.g., Notice of Opportunity to Provide Input, Notice of Completion, and Statement of Completion) and other project documentation as required by the ENDM's Class EA.
- Send draft consultation packages, including a contact list, to MNRF for review and input.
- Incorporate comments from ENDM into notices, etc.
- Distribute project notices and project documentation to stakeholders (via mail, email, Environmental Registry of Ontario posting and ENDM's Class EA web site).
- Receive and compile input from interested persons.
- Prepare Record of Consultation and provide to MECP for review and input.

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MECP will:

- Review consultation packages and provide ENDM with comments on notices, project documentation, etc.
- Review the contact list to identify additional stakeholders and distribute ENDM notices and other documents to stakeholders if contact information cannot be shared with ENDM (due to *Freedom of Information and Protection of Privacy Act* requirements).
- Address inquiries and any comments received through ENDM, during the consultation period(s) regarding potential impacts to the CR.

Project Review and Evaluation

ENDM will complete the project evaluation as per the requirements of the ENDM's Class EA. MECP will work with ENDM to ensure that the road is appropriately addressed in the project evaluation, including the following information:

- A summary of decision-making and rationale for why the use and upgrade of the road through the CR is the preferred option.
- Identification of any policies, procedures and manuals that were considered for the upgrade, operation and final standard or condition of the road.
- An assessment on whether the proposed upgrading and final standard or condition of the road will meet its intended purpose.
- A description of the permanent access restrictions or measures required within the CR that are necessary to protect rehabilitated works and ensure ongoing monitoring of the Long Lake mine site by ENDM.
- A statement regarding the need for monitoring within the CR (see below) and a description of any monitoring requirements and commitments.

Monitoring

MECP will work with ENDM to develop and implement a monitoring plan to assess impacts to the CR during upgrading and use of the road, and after the work on road has been completed. The monitoring plan will include the following information:

- The components, features and or values of the CR being monitored and the rationale for monitoring.
- The objectives and acceptable outcomes of project activities within the CR.
- The methods of monitoring that will be used.
- How the results of monitoring will be documented including details on how and when reporting will be completed.
- Any additional remedial actions that will be required in order to meet an objective(s).
- The responsible party for each of the monitoring program components.

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2. Operations (during Mine Site Rehabilitation)

ENDM will:

- Oversee road upgrades,
- Implement any access controls that are identified during the Class EA review,
- Oversee placement and maintenance of temporary signage, if required,
- Fulfill any monitoring and reporting obligations, and
- Include operational conditions as per Schedule B.

MECP will:

- Conduct inspections during road upgrade and operational use, and
- Review and provide technical input into monitoring reports as required.

3. Final Standard or Condition of Access Road

ENDM will:

- Oversee the work on the road,
- Fulfill any monitoring and reporting obligations,
- Carry out any additional remedial actions if objectives and acceptable outcomes are not being met, and
- Include operational conditions as per Schedule B.

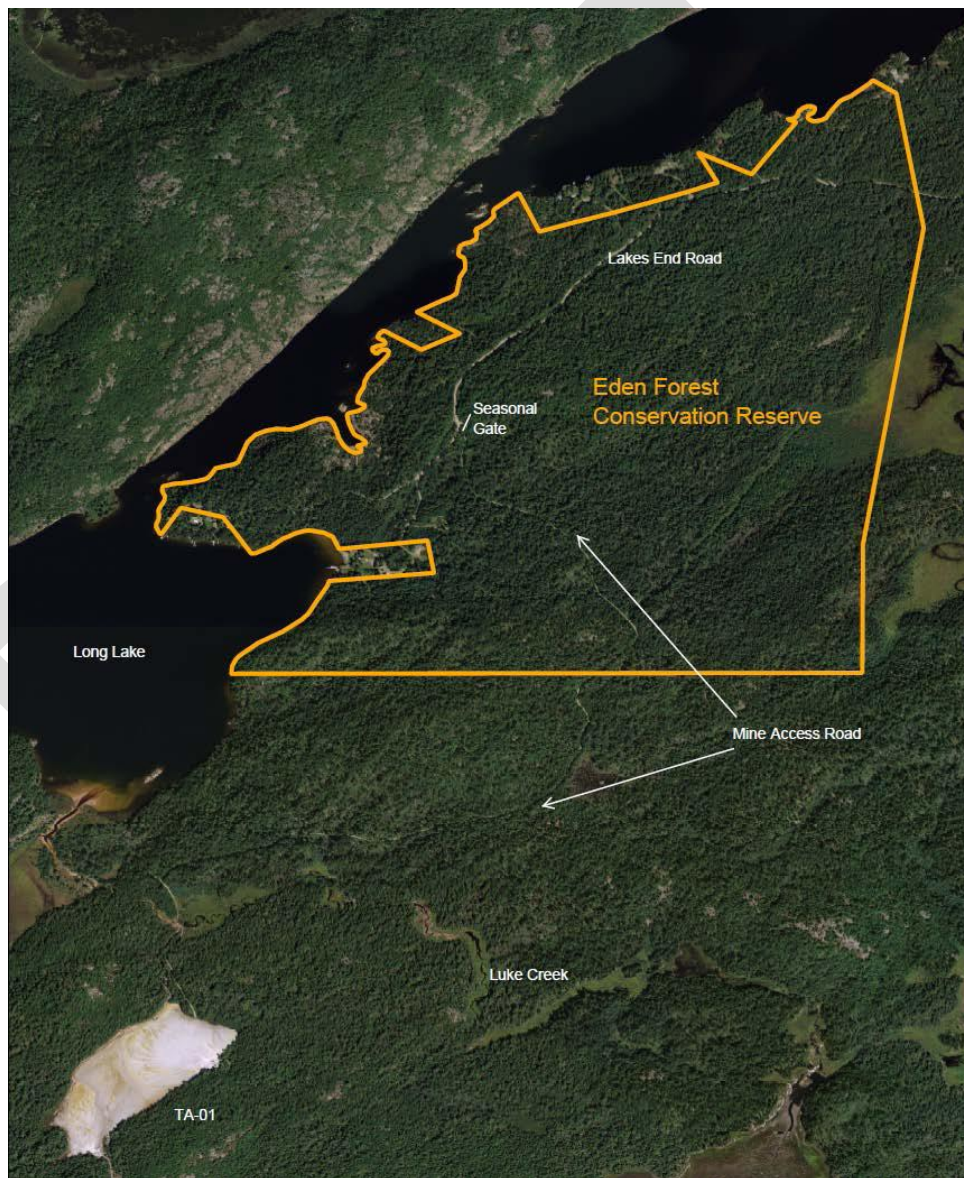
MECP will:

- Define final standard or condition of the road,
- Inspect the road upon completion of work to confirm that objectives for final standard or condition of the road were met,
- Monitor the use of the road in the CR after the work has been completed.

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Schedule A – Project Scope and Location

Lakes End Road and the Mine Access Road will require upgrading to permit efficient and safe haulage of materials and equipment to the Long Lake Gold Mine Site. Upgrading may include widening, straightening of sharp curves and the placement of additional fill. The road will also need to be maintained for the duration of the reclamation work. The existing service level will be maintained for Lakes End Road, to allow for the continued access by property owners during the project. Maintenance will include grading and dust control at a minimum. Maintenance for winter access will include snow removal and sanding.



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Schedule B – Operational Conditions

- A1. All contractors and equipment operators will be provided with a copy of this MOU and Schedules prior to proceeding with any work.
- A2. All work shall be completed in accordance with these operational conditions. Any changes to the proposed work will be discussed with the Ministry of the Environment, Conservation and Parks (MECP) prior to their implementation.
- A3. All work will comply with the terms and conditions described in permit SU-A-001-17 issued under clause 17(2)(a) of *Endangered Species Act*, 2007.
- A4. Vehicles and machinery will be cleaned prior to entering the Conservation Reserve following the Clean Equipment for Industry Protocol (http://www.ontarioinvasiveplants.ca/wp-content/uploads/2016/07/Clean-Equipment-Protocol_June2016_D3_WEB-1.pdf).
- A5. ENDM will ensure that the Mine Access Road within the Conservation Reserve will be closed to the public while operations are in progress.
- A6. The following conditions apply to the management of Crown timber within the Conservation Reserve:
- i) All cutting of Crown timber must be authorized under a Forest Resource License.
 - ii) The maximum allowable right of way clearance is 15 m unless otherwise approved by MECP for safety reasons. The road width is to be kept as narrow as is safely possible to minimize the loss of Conservation Reserve values (i.e. red pine and cedar trees).
 - iii) Red pine and cedar marked for removal must be authorized by MECP and MNRF. The road corridor is to be flagged and confirmed by MECP and MNRF before clearing.
 - iv) The number of red pine/cedar trees, and volume of merchantable timber is to be estimated before cutting. MNRF will assess if the quantity of merchantable timber is sufficient for haulage to a sawmill.

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- v) Where red pine is on both sides of road, larger/older trees are to be retained over younger/smaller trees.
 - vi) In general, red pines on the south side of the road form part of contiguous stand and therefore should be retained over red pines on the north side of the road that are already fragmented by the road.
 - vii) Non-merchantable timber can be chipped or stacked and left for local use as firewood.
- A7. Upon completion of the work, Lakes End Road will be re-instated to a condition at least equal to its existing condition. This will include replacing a short section of asphalt should it be damaged during the construction period.
- A8. Upon completion of the work, the Mine Access Road will be returned to a minimal standard or serviceable condition that will provide access for long-term mine site inspection, care and maintenance.

Appendix D

Record of Consultation

The content of this appendix has intentionally been omitted. Please contact MineRehab@ontario.ca.

Appendix E

Indigenous Consultation

The content of this appendix has intentionally been omitted. Please contact MineRehab@ontario.ca.

Appendix F

Technical Studies

Long Lake Gold Mine

Summary of Technical Studies

An overview of technical studies completed to inform the Long Lake Gold Mine Rehabilitation Project is summarized in Table 1 below. Technical reports and supporting material that have been finalized and available to the public can be downloaded using the following weblink:

www.geologyontario.mndm.gov.on.ca/mines/documents/client/LLGM_EA_Documents\2024_LLGM_Class_EA_Technical_Studies.zip

Table 1 – Summary of Technical Reports

Date	Author	Report Title	Type of Study
1984	Ministry of Natural Resources and Forestry	File Notes – Long Lake Gold Mine	Site Inspection Report
1988	Ministry of the Environment	Technical Memorandum: Impacts of Luke Creek on Long Lake	Surface Water Technical Report
1990	Ministry of the Environment	Technical Memorandum: Effects of Tailings Drainage on Water Quality of Luke Creek	Surface Water Technical Report
1999	Ministry of Northern Development and Mines	A Site Assessment of the Long Lake Gold Mine and Associated Hazards	Site Inspection Report
2000	DST Consulting Engineers Inc.	Site Assessment Report	Site Inspection Report
2007	AMEC Foster Wheeler	Site Condition Summary – Long Lake	Contaminant Characterization Assessment
2013	Ministry of Environment and Climate Change	Memorandum: Long Lake (Sudbury) – arsenic and other metals in 2013 fish samples	Fisheries Assessment
2013	CH2M Hill	Long Lake Gold Mine – Assessment of Contaminant Loading from Various Sources to Long Lake Using GoldSIM Model	Contaminant Characterization Assessment
2014	CH2M Hill	Site Characterization Report and Data Analysis – Long Lake Gold Mine Tailings Areas, Eden Township, Ontario	Contaminant Characterization Assessment
2014	CH2M Hill	Remediation Options Report – Long Lake Gold Mine Tailings, Eden Township, Ontario	Contaminant Characterization Assessment
2014	URS Canada Inc.	Stage 1-2 Archaeological Assessment, Ministry of Northern Development and Mines, Long Lake Gold Mine, Eden Township, District of Sudbury, Ontario	Archaeological Assessment
2015	SNC Lavalin	Bathymetric Survey of the Tailings in Long Lake, Technical Memorandum	Surface Water Technical Report

2015	SNC Lavalin	2015 Geotechnical Investigation, Detailed Design of the Long Lake Gold Mine Rehabilitation	Geotechnical Investigation
2016	SNC Lavalin	Flow Estimate in Luke Creek, Greater Sudbury, Ontario, Technical Memorandum	Surface Water Technical Report
2016	SNC Lavalin	2015 Species at Risk Surveys	Species at Risk Survey
2017	SNC Lavalin	Characterization of Contaminated Materials, Detailed Design and Constriction Management for Remediation of the Long Lake Gold Mine Tailings	Contaminant Characterization Assessment
2018	Aecom Canada Ltd.	Long Lake Gold Mine – Archaeological Potential for Wetland Located on Atikameksheng Anishnawbek, Ontario	Archaeological Assessment
2019	Conservation Sudbury	Wavy creek Wetland Turtle Survey Report	Species at Risk Survey
2021	Ecometrix Incorporated	Third- Party Review of Remediation Options for the Long Lake Gold Mine Tailings	Contaminant Characterization Assessment
2021	Wood Environment & Infrastructure Solutions	Long Lake Mine Aquatic Assessment (2020) Existing Conditions Report	Fisheries Assessment
2021	Wood Environment & Infrastructure Solutions	Long Lake Gold Mine Spring and Summer Aquatic Assessment (2021) Existing Conditions Report	Fisheries Assessment
2021	DM Wills	Detailed Engineering of Long Lake Gold Mine, Access Road Improvements – Culvert Inspection Memo	Road Design
2021	DM Wills	Long Lake Gold Mine Access Road, Wavy Trail Culvert – Estimated Material Service Life.	Road Design
2021	DM Wills	Traffic Study Memorandum – Detailed Engineering of Long Lake Gold Mine Access Road Improvements	Road Design
2021	DM Wills	Roadside Safety Review Memorandum.	Road Design
2022	DM Wills	Survey Memorandum	Road Design
2022	DM Wills	Field Investigation Memorandum	Road Design
2022	Redstone Engineering Inc.	Geotechnical Investigation, Long Lake Gold Mine Road Network Upgrades	Geotechnical Investigation
2022	GHD	Summary of Preliminary Investigation Results, Draft Report ⁽¹⁾	Rehabilitation Design
2022	GHD	Evaluation of SNC- proposed underdrains, TA-01 Containment Cells. Draft Report ⁽¹⁾	Rehabilitation Design
2023	GHD	Crown pit – Aggregate and Groundwater Field investigation and review ⁽¹⁾	Rehabilitation Design
2023	GHD	Evaluation of Low Permeability Cover Options, Draft Report ⁽¹⁾	Rehabilitation Design
2023	GHD	Waste Rock Management Conceptual Plan, Draft Report ⁽¹⁾	Rehabilitation Design
2023	WSP Canada Ltd.	Cultural Heritage Evaluation Report, Long Lake Gold Mine, Eden Township, District of Sudbury, Ontario	Cultural Heritage Evaluation

Notes: (1) Deliverable has not yet been provided as final.

Appendix G

Alternative Analysis Supporting Reports



LONG LAKE GOLD MINE TAILINGS REHABILITATION PROJECT

Response to Stakeholder Concerns



March 2021

Ministry of Energy, Northern Development and Mines
Mines and Minerals Division
Mineral Development Branch

EXECUTIVE SUMMARY

Safe rehabilitation of the Long Lake Gold Mine (LLGM), located in Eden Township south of the municipality of Greater Sudbury, is a priority for the Ministry of Energy, Northern Development and Mines (ENDM). ENDM is working diligently towards finalizing a rehabilitation strategy and submitting applications for regulatory permits that are required prior to tendering construction activities.

As part of the public consultation process associated with ENDM's Class Environmental Assessment (EA), ENDM presented their preferred alternative, referred to as Alternative #4, on October 8 and December 16, 2019. ENDM received eighteen (18) Part II Order requests from the public during the public consultation period, which ended on January 17, 2020. The Part II Order requests can generally be summarized as follows:

1. The current conditions of Long Lake Road, Tilton Lake Road, Wavy Trail and Lakes End Road are not acceptable for construction traffic. Incremental construction traffic on inadequate roads presents a risk to public safety.
2. The incremental volume, frequency and duration of traffic on Long Lake, Tilton Lake, Wavy Trail and Lakes End Roads as a result of construction present a risk to public safety.
3. Consideration of access alternatives, particularly Alternative #5, access via Halifax Road, was not thoroughly evaluated.

To help address concerns raised, ENDM contracted SNC Lavalin to investigate traffic safety hazards and develop a conceptual plan for mitigation. ENDM reviewed the construction plan and material requirements to estimate a daily traffic base load as well as incremental heavy haulage volume, frequency and duration. This provided a basis to develop opportunities to reduce material quantities and manage construction traffic. ENDM also conducted an evaluation to compare Alternative #4, site access via the existing public road network, with Alternative #5(A), site access via Halifax Road off Highway 637, as well as a new alternative, Alternative (#5B), a hybrid between Alternative #4 and Alternative #5A. The evaluation approach applied a technical component (constraint and weighted criteria) and economic component. Public safety was identified as a constraint while impact to implementation, environmental

impact, impact to accessibility, and impact to natural resources were all identified as appropriate criteria to compare each alternative. Costs were broken down into engineering, permitting, capital (construction), quality assurance, decommissioning, maintenance and incremental costs to construction.

This review and evaluation has resulted in the following key conclusions:

1. An investigation into traffic safety hazards did not reveal conditions that could not reasonably be mitigated.
2. ENDM has estimated that the incremental base volume of traffic will be minimal in comparison to current Annual Average Daily Traffic (AADT) count data and that there are opportunities to further reduce this.
3. ENDM has demonstrated that there are opportunities to reduce the volume of material (topsoil) hauled to site as part of the refine/optimize process planned for 2021.
4. ENDM has calculated the duration and volume of haulage traffic to be significantly less than perceived by some stakeholders and has identified opportunities to manage the rate of transport.
5. ENDM will impose enforceable conditions on the contractor through the tendering process, as appropriate.
6. Based on the criteria assessed, Alternative #4 has the highest technical score of the three alternatives evaluated.
7. Based on the costs considered, Alternative #4 is the least expensive of the three alternatives evaluated.

As a result of this evaluation, ENDM recommends proceeding with Alternative #4 by conducting detailed engineering design of the proposed traffic safety improvements identified by SNC Lavalin. As committed in a January 25, 2021 newsletter, ENDM will continue to consider comments from stakeholders and the public about the remediation strategy and work with them to address and mitigate concerns to the extent possible. The intent of the project is to address environmental and human health concerns. The inconveniences that may result from the project will be short lived in comparison to its environmental and human health benefits.

This report has been prepared to address the concerns raised through the Class EA process, clarify inaccurate information and take steps to proceed to project implementation.

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Appendix D: Crown Land Use Policy Atlas, Policy Report E211a Killarney East Area (Ministry of Natural Resources and Forestry, 2006)

Appendix E: Alternative #5B Class Environmental Assessment Screening (ENDM, 2021)

Appendix F: Mineral Potential South of Long Lake Gold Mine (Resident Geologist Program, 2019)

Appendix G: Sudbury Forest Management Plan Basemaps 4805120 and 4905120 (Vermillion Forest Management Company Ltd., 2020)

Appendix H: Best Practices for Building and Working Safely on Ice Covers in Ontario (Infrastructure Health and Safety, 2014)

List of References:

- Ministry of Energy Northern Development and Mines, Long Lake Gold Mine Rehabilitation Project – Public Notice, January 2021.
- Ministry of Energy, Northern Development and Mines, A Class Environmental Assessment for the Activities of the Ministry of Northern Development and Mines under the Mining Act, February 2018.
- SNC Lavalin, Detailed Design and Construction Management for Remediation of the Long Lake Gold Mine Tailings, January 2017.
- CH2M Hill, Site Characterization Report and Data Analysis, January 2014.

1.0 INTRODUCTION

Safe rehabilitation of the Long Lake Gold Mine (LLGM), located in Eden Township south of the municipality of Greater Sudbury, remains a priority for the Ministry of Energy, Northern Development and Mines (ENDM). ENDM is working diligently towards finalizing a rehabilitation strategy and submitting applications for regulatory permits that are required prior to tendering construction activities.

Prior to implementing the rehabilitation strategy, the Class Environment Assessment (EA) process for discretionary rehabilitation activities must be completed. ENDM is committed to open and consistent communication with the public and, as committed in a January 25, 2021 newsletter, will continue to consider comments from stakeholders and the public about the remediation strategy and work with them to address and mitigate concerns where possible.

As part of the public consultation process associated with ENDM's Class Environmental Assessment (EA), ENDM presented their preferred alternative, referred to as Alternative #4 on October 8 and December 16, 2019. ENDM received eighteen (18) Part II Order requests from the public during the public consultation period, which ended on January 17, 2020. The Part II Order requests can generally be summarized as follows:

1. The current conditions of Long Lake Road, Tilton Lake Road, Wavy Trail and Lakes End Road are not acceptable for construction traffic. Incremental construction traffic on inadequate roads presents a risk to public safety.
 - o This is discussed in Section 3.0.
2. The incremental volume, frequency and duration of traffic as a result of construction on Long Lake, Tilton Lake, Wavy Trail and Lakes End Roads presents a risk to public safety.
 - o This is discussed in Section 4.0.
3. Consideration of access alternatives, particularly Alternative #5, access via Halifax Road, was not thoroughly evaluated.
 - o This is discussed in Section 5.0.

It is important to recognize that public safety is of utmost importance. No alternative will be considered that presents unacceptable risks to public safety. ENDM will take the necessary steps and time to implement the project successfully while making every effort to minimize impacts on local residents. The intent of the project is to address environmental and human health concerns. The inconveniences that may result from the project will be short lived in comparison to its environmental and human health benefits.

This report has been prepared to address the concerns raised through the Class EA process, clarify inaccurate information and take steps to proceed to project implementation.

2.0 BACKGROUND

The LLGM is located in Eden Township, south of the City of Greater Sudbury, adjacent to the south end of Long Lake and the eastern boundary of the Atikameksheng Anishnawbek First Nation (AAFN) reserve. The LLGM was a small producer and operated intermittently between 1909 and 1939 producing approximately 57,000 ounces of gold via underground mining methods. Some minor mitigation work has taken place over the years as a preventative measure.

During operation, the mill discharged tailings to low lying areas where they would be naturally contained by the surrounding topography. Three deposits are located on site and identified as TA-01, TA-02 and TA-03. TA-01 is the largest of the three by area and volume and closest to the receiving environment. Through investigation, the tailings were found to generate acidity in significant concentrations as well as leach metals/metalloids of potential concern, particularly arsenic.

The receiving environment consists predominantly of three immediate water bodies; Luke Creek, Long Lake and Round Lake. Surface runoff from the tailings discharges directly to Luke Creek which flows into the south bay of Long Lake and then to Round Lake. Over time, the tailings have eroded into the receiving environment, including AAFN reserve lands, which has impacted downstream soil, sediment and water quality.

Long Lake is part of Sudbury's southern cottage country, is a densely populated lake, and contains approximately 1,000 permanent and seasonal residents. There are several adjacent lakes to Long Lake (Lohi, Clearwater, Tilton and Wavy) which also attract cottagers. Long Lake is the source of drinking water for most residents on the lake. In 2012, Ministry of Environment staff collected samples of the south bay of Long Lake. Arsenic concentrations were found to exceed the Ontario Drinking Water Standard of 10 µg/L. The Sudbury and District Health Unit issued a letter to five seasonal residents who may be drawing their water from that part of the lake. ENDM has been providing bottled water to residents who may be affected since the advisory was issued on November 13, 2012.

Following several investigations, a conceptual mitigation option was selected by ENDM to rehabilitate the tailings and contaminated soils and prevent discharge of contaminated waters into Long Lake (CH2M Hill, 2014). Subsequently, the conceptual design was developed to a detailed design stage by SNC Lavalin (2017). The rehabilitation strategy generally consists of the following activities:

- Construct an engineered impoundment within the footprint of TA-01 to accommodate all tailings and contaminated soils. Construct perimeter channels to divert site runoff around the impoundment. Construct sump or berm to prevent runoff from discharging offsite.
- Excavate and place tailings (fugitive and in place) and contaminated soils from TA-02, TA-03 and channels in between into the new impoundment at TA-01.
- Construct a temporary diversion channel to re-route Luke Creek upstream of the confluence with site runoff and allow excavation of tailings/contaminated soil in dry conditions.
- Excavate and transfer tailings and contaminated soil present in Luke Creek and the adjacent wetland into the constructed impoundment at TA-01.
- Install a barrier across the south bay of Long Lake to prevent mixing of work area water with clean Long Lake water.
- Excavate or dredge tailings in the south bay of Long Lake and place/pump into the constructed impoundment at TA-01.
- Reconstruct Luke Creek, the wetland area and the south bay of Long Lake.
- Install an impermeable liner over the impoundment to prevent infiltration/oxidation.
- Place a vegetative medium over the protective cover layer and seed. Backfill, vegetate and seed other disturbed areas.
- Manage on site water through treatment before discharge to the receiving environment.

Historically, the LLGM was accessed through AAFN reserve. The two water crossings, one at Whitefish River and the second at Luke Creek, have since been removed and most of the road is no longer navigable. There is only one current means of accessing the LLGM, via Long Lake Road, Tilton Lake Road, Wavy Trail, Lakes End Road and a narrow gravel trail. Part of Lakes End Road and the gravel trail are within the Eden Township Conservation Reserve. In 2017, ENDM proposed hauling all materials

required for construction from offsite sources (geotextiles/synthetics, engineered aggregates, clean fill and topsoil). This was presented at a public open house on September 13, 2017 as part of ENDM's Class EA process. After receiving significant concerns regarding the volume of haul traffic on Long Lake Road, Tilton Lake Road, Wavy Trail and Lakes End Road, ENDM voluntarily withdrew the Notice of Completion to review alternative access routes and aggregate sources. Following two years of investigation and evaluation, five alternatives were developed as summarized in Table 1.

Each alternative was scored based on three weighted criteria; environmental impact, rehabilitation costs and Indigenous participation. Alternative #4 was selected as the preferred option because it:

1. Provides the most certainty in ensuring that aggregate requirements will be met in an economical manner for both short-term construction project activities and for the long-term care and maintenance of the site.
2. Reduces haul distances, fuel consumption & road maintenance costs.
3. Reduces risk/delays in acquiring aggregate by providing two sources of material.
4. Provides potential opportunity for an earlier project start-up.
5. Provides significant economic benefits to an Indigenous community.
6. Balances natural and social environmental impacts.
7. Reduces haul traffic along Long Lake Road, Tilton Lake Road, Wavy Trail and Lakes End Road compared with Alternative #1 (base case) by approximately 89%¹.

On October 7, 2019, a public information session was held to present the alternatives evaluated and the proposed Alternative #4 route. A second open house was also held on December 16, 2019. The public consultation comment period was extended to January 17, 2020. On the closing date of the consultation period, eighteen (18) Part II Order requests had been received.

¹ This estimate has since been revised based on updated aggregate quantities.

On July 22, 2020, following the enactment of the COVID-19 Economic Recovery Act, the Part II Order under the EA process was cancelled, except in respect of impacts to Aboriginal and treaty rights. At the time of cancellation, 18 submissions had been received on the project. In September 2020, the Ministry of Environment, Conservation and Parks (MECP) contacted these 18 individuals/groups to notify them of the change in the EA process and redirect any concerns and/or questions related to LLGM to ENDM.

On January 25, 2021, ENDM distributed a newsletter to update stakeholders on the LLGM rehabilitation project and re-assure stakeholders who submitted Part II Order requests that ENDM will continue to consider comments from stakeholders and the public about the remediation and work with them to address and mitigate various concerns to the extent possible.

3.0 PUBLIC SAFETY – ROAD CONDITIONS

3.1 Investigation into Traffic Safety Concerns

The Alternative #4 route has a significant amount of interaction with public traffic. Long Lake Road, Tilton Lake Road, Wavy Trail and Lakes End Road are roads constructed predominantly for cottagers to access their property. The City of Greater Sudbury has jurisdiction over Long Lake Road and part of Tilton Lake Road. Past this point, a Local Roads Board maintains the remainder of Tilton Lake Road and Wavy Trail. Lakes End Road is maintained by the Lakes End Camper's Association.

In 2020, ENDM contracted SNC Lavalin to identify road hazards on Long Lake Road, Tilton Lake Road, Wavy Trail and Lakes End Road as well as conceptual mitigative options. SNC Lavalin compiled an inventory of existing roadway features which included the following:

- The roadway surface including type and visual condition;
- Roadside elements such as guide rails and other hazards;
- Coarse observation of geometrics including sightlines;
- Visual review of all visible drainage features including roadside ditches and culverts;
- Private driveways and entrances;
- Visible roadside utilities (e.g. hydro poles); and
- Signage.

A hazard is generally defined as a feature which is deficient when compared to an appropriate standard. The City of Greater Sudbury Engineering Design Manual (2012) was referenced for guidance on appropriate road standards and guidelines. Where a standard or criteria was not clearly defined, other appropriate standards and guidelines were adopted from the Ministry of Transportation (MTO). Traffic safety hazards identified by SNC Lavalin generally included many tight corners with reduced line of sight based on the posted speed limit, rock out crops close to the shoulder of the road, narrowing of the road, a hydro pole near the edge of the road, steep gradients and poor signage.

Measures to mitigate traffic safety can be divided between engineered controls (e.g. widening of the road) or administrative controls (e.g. signage). Generally, SNC Lavalin recommended the following road improvements (engineered controls) to improve traffic safety:

- Localized rock outcrop removal and tree / brush trimming to improve sight lines;
- Utility pole relocation adjacent to Tilton Lake;
- Localized grading to correct shoulder erosion, soft shoulders, potholing and wash-boarding; and
- Guide rail improvements.

At the intersection of Wavy Trail and Lakes End Road as well as the steep hairpin turn approximately 1.0 km down Lakes End Road will require significant improvements to accommodate construction traffic.

In addition, SNC Lavalin recommended signage improvements (administrative controls) to enhance wayfinding and route guidance as well as to reinforce speed limits as a further means to improve public safety.

3.2 Summary of Road Conditions

Overall, there were no hazards identified that could not reasonably be mitigated to reduce traffic safety risks associated with incremental construction traffic. The presence of significant road hazards confirms that road improvements are required in advance of rehabilitation. ENDM is proposing to advance the conceptual design prepared by SNC Lavalin to a detailed design stage. The following investigations, as identified by SNC Lavalin, will be conducted to support engineering design:

- A detailed topographic survey for areas subject to widening and/or realignment and areas subject to rock cuts;
- A traffic study to confirm existing and proposed volumes to support the pavement structure design and identify deficient pavement structures;
- A geotechnical investigation to:
 - Document existing roadway conditions;

- Recommend an appropriate pavement structure for widened/realigned roads; and
- Recommend surface improvements that may be required on existing roadways prior to haulage of materials.

The final report prepared by SNC Lavalin is presented in Appendix A. The report has been reviewed by the City of Greater Sudbury, the Local Roads Board and the Lakes End Campers Association and comments have been incorporated into the document.

4.0 PUBLIC SAFETY - CONSTRUCTION TRAFFIC

4.1 Estimated Construction Schedule

It is important to recognize that the detailed rehabilitation design prepared by SNC Lavalin in 2017 is not construction-ready. Though much detail has been incorporated into the design, there are uncertainties identified by both SNC Lavalin and ENDM that present a significant risk to construction that may result in delays or cost implications and therefore warrant further consideration. Reducing as much uncertainty as possible in advance of construction, commonly referred to as front-end loading, is critical to successful implementation and meeting project objectives. This can be referred to as the refining/optimizing stage of the design process and is not anticipated to result in significant changes to the approach so much as to provide further guidance and direction to the contractor as well as include additional engineered controls where necessary.

That said, the current approximate schedule is provided below² and is also presented in Table 2:

Stage 1 (Approximately 11 months):

- Year 1 May:
 - Mobilization of equipment to site and site preparation.
- Year 1 June to December:
 - Construction of water management controls on site consisting of diversion ditches to direct site runoff and sumps/berms to prevent discharge of site runoff.
 - Set up of water treatment system.
 - Construction of engineered impoundment at TA-01.
 - Excavation of tailings in TA-02 and TA-03 and placement in TA-01 impoundment.
 - Backfill of TA-02 and TA-03 with clean material.
 - Construction of Luke Creek diversion channel and other water management controls required for excavation within Luke Creek and the adjacent wetland.

² This schedule is an update of the schedule presented by SNC Lavalin in their 2017 report.

- Year 2 January to March:
 - Excavation of tailings and contaminated soils in Luke Creek and the adjacent wetland and transport for placement within the TA-01 impoundment.
 - Reconstruction of Luke Creek and the adjacent wetland.

Stage 2 (Approximately 4 months):

- Year 2 June to September:
 - Excavation/dredging of tailings and contaminated soils in Long Lake at the outlet of Luke Creek for placement within the TA-01 impoundment.
 - Reconstruction of the shoreline of Long Lake at the outlet of Luke Creek.
 - Begin site revegetation.

Stage 3 (Approximately 3 months):

- Year 3 June to August:
 - Installation of engineered cover over TA-01 impoundment.
 - Vegetation of remaining disturbed areas.

This represents approximately eighteen (18) months of construction over a three-year period. As shown above, this does not mean that construction will occur continuously over a period of three years, or eighteen months, but rather in stages. For example, the engineered cover cannot be installed in Year 2 of construction due to the material impounded. The material excavated or dredged will be soft and saturated and will likely require a period of settlement to consolidate and drain water. Installing a cover over unconsolidated material can lead to tears in the liner. That said, placement methodology and liner type are important considerations. Both are to be considered further in 2021 as part of the project refining/optimizing process. ENDM will look at opportunities to reduce overall duration of construction.

Through the Class EA process, concerns were raised regarding the volume, frequency and duration of traffic. During construction, traffic can generally be divided between daily construction traffic and material haulage traffic. There is a distinct difference between daily construction traffic (base volume) and material haulage. The following sections further explain daily construction traffic and material haulage traffic.

4.2 Estimated Daily Construction Traffic

On a daily basis, residents of Long Lake Road, Tilton Lake Road, Wavy Trail and Lakes End Road can expect a 'base' volume of traffic during construction. This base volume is anticipated to consist of, but not limited to, the following types of vehicles:

- Light vehicles (pick-ups) for:
 - Site supervisor;
 - Site safety coordinator;
 - Quality control inspector;
 - Quality assurance inspector;
 - Site surveyor; and
 - Supply runner.
- Transport bus for workers;
- Fuel truck for equipment;
- Mobile maintenance for equipment; and
- Periodic inspections by ENDM, MOL, City of Greater Sudbury, etc.

The Annual Average Daily Traffic (AADT) count is a common metric used to assess the volume of traffic. The number is reflective of the number of traffic movements i.e., one vehicle making an in-out return trip would represent two movements. It is reasonable to assume that all vehicles travelling to site daily will also be returning from site at the end of each day. Based on the anticipated construction activities on site, ENDM has estimated a base volume AADT count of 30.

For comparison, ENDM looked at AADT count data available for the area. Traffic data provided by the City of Greater Sudbury for the year 2015 indicated an AADT count of 3,300 for Long Lake Road between McFarlane Lake Road and Tilton Lake Road. The estimated base volume of construction traffic would represent a less than 1% increase in traffic at this location.

Similarly, traffic data provided by the City of Greater Sudbury for the year 2019 indicated an AADT count of 1,500 on Tilton Lake Road between Dew Drop Road and Southshore Road. The estimated base volume of construction traffic would represent approximately 2% increase in traffic at this location.

The intent of this section is to shed light on the relative increase in base volume traffic that is anticipated with construction. The actual base volume of construction traffic will be determined by the selected contractor however is not expected to differ significantly from the estimates herein.

4.3 Opportunities to Reduce Material Hauled

The concerns raised through the Class EA process regarding public safety as a result of construction traffic were generally not directed towards light vehicle traffic, rather they were directed at heavy equipment traffic, specifically, hauling of construction materials to site. Currently, ENDM estimates approximately 81,000 m³ of backfill, 47,000 m³ of engineered aggregate and 30,000 m³ of a vegetative medium (topsoil) will be required, in addition to other construction materials (geotextiles and geosynthetics), for site rehabilitation³⁴.

As described in Table 1, it is anticipated that all aggregate will be supplied from either the Round Lake pit or ENDM's pit south of the Conservation Reserve. At this time, the only material of significant quantity⁵ anticipated to be hauled from off-site is topsoil.

There are essentially three areas where topsoil is currently specified in the rehabilitation design:

- To establish a vegetative cover over backfilled TA-02 and TA-03 (approximately 3,300 m³);
- To establish a vegetative cover over the liner of TA-01 impoundment (approximately 7,200 m³); and
- To re-construct Luke Creek and the wetland area (approximately 19,500 m³).

The tailings and contaminated soils underlying the tailings present in TA-02 and TA-03 will be excavated down to bedrock and backfilled with clean fill. Establishing a strong vegetative cover quickly is not critical because erosion of the underlying

³ Note that these volumes are revised estimates since the 2017 SNC Lavalin design report was completed.

⁴ These estimates are for site rehabilitation only and do not include material for road improvements.

⁵ Hauling of geotextiles and geosynthetics are expected to be a relatively small volume of traffic in comparison to topsoil.

material is not a significant risk. To reduce the amount of topsoil specified, other alternatives can be considered such as hydroseeding with periodic touch up as required. In the event vegetation does not establish itself on the fill material, an application of an organic material such as biotic earth or biosolids in smaller quantities could be applied. There will also be a substantial amount of clearing/brushing required. This coarse woody debris can also be used as a supplement. These options dramatically reduce the materials required for import.

All tailings and contaminated soils will be stored within an engineered containment constructed within the footprint of TA-01. Once filled, the impoundment will be covered with an impermeable liner and a layer of protective material placed on top. The purpose of a vegetative medium in this case is to prevent erosion of the underlying material and exposing the impermeable liner. Though the importance of a vegetative cover over the liner is higher than it is for TA-02 and TA-03, there are other options that can be considered that would result in a strong vegetative cover. From test pit logs investigating the ENDM pit (Appendix B), there is evidence of silts and clays which could also be used as an excellent medium to support vegetation. Similar to the above, an application of an organic material such as biotic earth or biosolids in smaller quantities could be applied as added assurance. Routine inspection to monitor presence of erosion and occasional maintenance of vegetation as required following construction may be sufficient and could result in a dramatic decrease of materials hauled to site.

The largest quantity of topsoil required is reserved to reconstruct Luke Creek and the wetland area. A draft conceptual design was prepared by SNC Lavalin however was never finalized. As described above, the rehabilitation design will be refined/optimized in 2021. As part of the process, optimizing material quantities will occur to ensure a proper balance of meeting the objectives of wetland restoration and material quantities. This highlights that there are additional opportunities to reduce material requirements on site and therefore reduce heavy traffic on Long Lake Road, Tilton Lake Road, Wavy Trail and Lakes End Road.

4.4 Contractual Opportunities to Manage Haulage Traffic

4.4.1 Baseline Conditions

As described above, the concerns raised through the Class EA process regarding public safety as a result of hauling materials include volume (AADT), frequency and duration. It is important to emphasize the following conditions:

1. Hauling of topsoil will not occur on a daily basis for the full duration of construction (18 months).
2. Hauling of topsoil will not occur during the winter months.
3. Hauling of topsoil will not occur during half-load restrictions or during other periods which may result in significant deterioration of roads.

Harvesting of topsoil during the winter months presents issues at both the source (supplier) and destination (site) that would increase project cost. Similarly, the City of Greater Sudbury imposes half-load restrictions during springtime because there are sections of the road that would rapidly deteriorate under full load hauling conditions. Material haulage is typically the greatest cost versus the cost of the material. Hauling half-loads would be a significant increase to cost that is not warranted given available alternatives. With reasonable planning in advance, there is no reason to haul on Long Lake Road, Tilton Lake Road, Wavy Trail or Lakes End Road daily, during winter or during half-load restrictions.

4.4.2 Managing Haulage Traffic Volume

As described in Section 4.3, topsoil (or some other vegetative medium) is only required towards the end of rehabilitation i.e., after TA-02/TA-03 are backfilled, the liner is placed on the impoundment, and Luke Creek and the wetland are prepped for restoration. Because the material is not necessarily considered to be essential for day-to-day production, there is greater flexibility on timing to haul to site. This can also be enforced contractually.

Suppose that through refinement and optimization of the design, topsoil material quantities are eliminated for covering TA-01, TA-02 and TA-03 however 19,500 m³ is still required to restore Luke Creek and the wetland. Based on current understanding of how construction will be sequenced, it is likely that topsoil will not be required until the second year of construction. This allows ENDM to consider several options on

how to transport the volume required. The following assumptions are used in the examples below:

- Only triaxle trucks are used to haul material;
- A conservative payload of 10 m³ of topsoil per load;
- Hauling only occurs between June (after half-load restriction is lifted) and November (prior to snow accumulation);
- A typical 12-hour construction day, Monday to Friday, during daylight hours only;
- TA-02 and TA-03 are a suitable stockpile location; and
- Topsoil is supplied by Hollandia Land and Environmental.

Hauling All Topsoil in Year One (Approximately 3 Months):

Hauling all topsoil in the first year of construction can only occur once tailings and contaminated soils from TA-02 and TA-03 have been excavated and replaced with clean fill to provide a suitable stockpile location. This is estimated to occur by mid-summer which would allow approximately three months to haul topsoil in the first year of construction. To haul all topsoil to site in three months would require approximately 9 trucks hauling consistently, or approximately 3-loads delivered to site per hour. This amounts to an AADT count of 72.

The advantage of this approach is that all material would be hauled to site by the end of the first year of construction limiting the inconvenience to residents in subsequent years. However, this may be perceived as too aggressive and too great of an inconvenience for residents.

Hauling All Topsoil in Two Years (Approximately 7 Months):

Similar to the example above, hauling topsoil in the first year of construction can only occur once tailings and contaminated soils from TA-02 and TA-03 have been excavated and replaced with clean fill to provide a suitable stockpile location. This is estimated to occur by mid-summer which would allow approximately three months to haul topsoil in the first year of construction. As listed in the assumptions, hauling of topsoil in year two of construction would not begin until after the half-load restriction is lifted and would be finished by September, as per the schedule, approximately four months. To haul all topsoil to site in seven months would require approximately 4

trucks hauling consistently, or approximately 1.5 loads delivered to site per hour. This amounts to an AADT count of 32.

The advantage of this approach is that all material would be hauled to site within two seasons reducing the daily inconvenience to residents. However, this may be perceived as unnecessarily extending the inconvenience to some residents.

SNC Lavalin provided a similar example in their report (Appendix A). These examples are not meant to be taken as commitments on what *will* happen so much as provide awareness of the options available to manage traffic on residential roads. Scheduling when the material is required and at what rate needs to balance the productivity of the project with the inconvenience to residents.

4.5 Contractual Opportunities

ENDM is responsible for preparing the construction tendering package for open competition. As part of the tender, ENDM has full legal right to instate conditions on the contractor with penalties for failure to comply. In addition, construction quality assurance (CQA) is an integral part of construction to ensure that the contractor is meeting the intent of the design. CQA can also be the mechanism used to monitor conditions in the contract, such as traffic. A preliminary list of opportunities is as follows:

- Request contractor to transport workers to site with a bus.
- Request contractor to set up bulk fuel tank on site.
- Impose limits on daily haul traffic volume.
 - For example, maximum number of trucks per hour.
- Impose time-of-day limits on haul traffic.
 - For example, no hauling before 9:00 am or after 5:00 pm.
- Restrict hauling during large events.
 - No hauling during public events such as at Kivi Park.
- Require escorts when floating equipment on or off site.
- Incorporate random speed checks into quality assurance program.
- Impose GPS tracking of vehicles to monitor speed limits.
- Impose contractual penalties for failure to comply.

This is not meant to be taken as an exhaustive list so much as demonstrate the opportunities to impose restrictions on the contractor where appropriate. Similar to the above, these restrictions need to balance the productivity of the project with the inconvenience to residents.

4.6 Summary of Construction Traffic

The following bullets summarize Section 4:

- Rehabilitation is expected to take approximately 18 months over a 2 to 3-year period.
- ENDM has estimated that the incremental base volume of traffic will be minimal in comparison to current AADT count data and that there are opportunities to further reduce this.
- ENDM has demonstrated that there are opportunities to reduce the volume of material (topsoil) hauled to site as part of the refine/optimize process in 2021.
- ENDM has calculated the duration and volume of haulage traffic to be significantly less than perceived by some stakeholders and that there are opportunities to manage the rate of transport.
- ENDM will impose enforceable conditions on the contractor through the tendering process, as appropriate.

5.0 EVALUATION OF THE HALIFAX ROAD ALTERNATIVE

As described in Section 2.0, at the last public information session in 2019, ENDM presented five (5) alternatives to access the site including sources of aggregate, the comparative analysis applied, and ENDM's rationale for selecting Alternative #4. Subsequently, ENDM was criticized for inadequate due diligence in their evaluation of Alternative #5, access via Halifax Road. The following section outlines a thorough evaluation of the currently proposed alternative (#4) in comparison to Alternative #5(A) as well as consideration of a new alternative (#5B). Note that the mine rehabilitation strategy is consistent for each alternative as described in Section 2.0. Only the differences between each alternative will be considered in this section.

5.1 Description of Alternatives Evaluated

5.1.1 Alternative #4 (Base Case) Description

The Alternative #4 route is shown in Figure 1 with the route beginning at Long Lake Road, proceeding south to Tilton Lake Road, Wavy Trail and Lakes End Road before entering the gravel trail to the mine. This scenario is for year-round access⁶ and has the following assumptions:

- a. All aggregates for site rehabilitation will come from the Round Lake and/or ENDM aggregate pit.
- b. All mobilization/demobilization of equipment, off-site materials such as topsoil and rolls of geotextile/geomembrane, daily construction crews, survey people, quality control and quality assurance people, fuel truck and maintenance crews would use this route year-round.
- c. Heavy haulage traffic would generally be restricted to the snow-free season and after the half-load restriction is lifted.
- d. Traffic safety improvements, as described in Section 3.0, would be implemented.

5.1.2 Alternative #5A Description

The Alternative #5A route is shown in Figure 2 with routes starting from the southeast via the Killarney Highway, along the primary forestry road known as Halifax Road, and

⁶ Year-round access does not include travel during half-load restrictions or other similar restrictions.

a new 8.6 km road extension from the end of Halifax Road, referred to as the Halifax Road Extension (HRX), before reaching the mine site. This scenario is for year-round site access during construction and has the following assumptions:

- a. All aggregates for site rehabilitation will come from the Round Lake and/or ENDM aggregate pit.
- b. All mobilization/demobilization of equipment, off-site materials such as topsoil and rolls of geotextile/geomembrane, daily construction crews, survey people, quality control and quality assurance people, fuel truck and maintenance crews would use this route year-round.

5.1.3 Alternative #5B Description

The Alternative #5B route is a combination of Alternatives #4 and #5A. This scenario is for both year-round site access for day-to-day traffic (Alternative #4 route) and winter only access for hauling topsoil (Alternative #5A route). This scenario has the following assumptions:

- a. All aggregates for site rehabilitation will come from the Round Lake and/or ENDM aggregate pit.
- b. All mobilization/demobilization of equipment, rolls of geotextile/geomembrane, daily construction crews, survey people, quality control and quality assurance people, fuel truck and maintenance crews would use Alternative #4 Route year-round.
- c. Traffic safety improvements, as described in Section 3.0, would be implemented.
- d. All topsoil would be hauled to site using a winter-only Alternative #5A Route.

The methodology utilized to conduct the evaluation follows a weighted criteria approach, similar to the previous evaluation, and is described further in the following sections. A key difference in the approach is the division between a 'technical' score and a 'commercial' or cost score. By separating cost from the technical score, the technical evaluation focuses on feasibility of an alternative only. The two are then combined for an overall score.

5.2 Technical Constraints and Criteria

The technical constraints and criteria have been expanded and revised to reflect the complexity of the evaluation and are listed below for reference:

- Constraints:
 - Public safety – no alternative that presents unacceptable risks to public safety will be considered.
- Criteria:
 - Impact to implementation;
 - Environmental impacts;
 - Impacts to accessibility; and
 - Impacts to natural resources.

Each criterion was prioritized and then weighted between 1 and 10. Table 3 provides a detailed description of each criterion along with the respective weighting assigned. The following sections elaborate on the rationale used to assign each weighting.

5.2.1 Omitted Criteria

In previous evaluations, ENDM included a criterion “Impact to Land Users”. There are a significant number of land users in the area each of whom may be positively or negatively impacted by the project. The term ‘impact’, in this context, is subjective as one stakeholder may view a condition positively while another may view the same condition negatively. Also, an impact is not binary but rather represents a spectrum of preference, acceptability or tolerance. For example, a perceived negative impact manifested as a moderate inconvenience may be mitigated through positive stakeholder communication. Lastly, there are stakeholders to the south that have yet to be identified (Halifax Road alternative). It is unreasonable to assume an impact to these unidentified stakeholders, one way or another.

With the exception of specific impacts espoused from select groups and individuals, ENDM is not in a position to broadly qualify impacts to stakeholders. Upon consideration, and to ensure an open and transparent process, this criterion has been removed from the evaluation as it is highly subjective and difficult to qualify. As stated in the newsletter distributed on January 25, 2021, the inconveniences that may result from the project will be short lived in comparison to its long-term environmental and

human health benefits. ENDM will make every effort to minimize the inconveniences that may result from the project.

5.2.2 Criteria - Impact to Implementation (Weight = 9)

This criterion looks at the following sub-components:

- Class EA process;
- Regulatory permitting process;
- Legal requirements; and
- Timeline to begin rehabilitation

As described in Section 2.0, the Long Lake Gold Mine site has been abandoned for many decades and continues to discharge contaminated water to the receiving environment. The result has directly impacted the livelihood of residents who rely on Long Lake for drinking water and has degraded the natural environment. Additionally, the contamination is impacting the community of AAFN who are a downstream receiver of contaminated water.

The rehabilitation of large, complex, contaminated sites can be a lengthy process that involves an environmental assessment process, stakeholder consultation, regulatory permitting and possible legal agreements. These factors all play into the studies required and timeline for regulatory review, in other words, how quickly a project will commence.

Rehabilitation of the Long Lake Gold Mine is of utmost importance to the province and is ranked #2 in the portfolio of ENDM priority contaminated sites. As such, implementation of rehabilitation is weighted the highest at nine (9) out of ten (10).

5.2.3 Criteria - Environmental Impact (Weight = 7)

This criterion looks at the following sub-components:

- Overall footprint;
- Protected areas; and
- Climate change.

The fundamental reason to rehabilitate abandoned mine sites is to protect public health and safety and the environment by mitigating hazards and supporting ecological recovery. The Environmental Assessment Act sets out a planning and decision-making process with the purpose of providing for protection, conservation and wise management of the environment in Ontario. Rehabilitation of hazards often results in unavoidable, temporary land disturbance. The process recognizes that environmental impacts are justifiable when controls can be applied to minimize the extent of the impact.

ENDM strives to limit environmental impact by reducing the project footprint and avoiding sensitive areas where possible. Unnecessary disturbance or expansion of the project footprint results in increased cost and time for ecological recovery. Consideration is also given to available materials on site to reduce the volume imported, saving cost and reducing greenhouse gas emissions.

Evaluation of rehabilitation alternatives is a calculated decision to balance timely implementation, stakeholder concerns and environmental impact. As such, environmental impact is weighted second highest at seven (7) out of ten (10).

5.2.4 Criteria - Impact to Accessibility (Weight = 4)

This criterion looks at the following sub-components:

- Short term access; and
- Long term access.

The ability to access the abandoned mine to facilitate rehabilitation activities is an important consideration as the rehabilitation process often requires heavy equipment and materials. During construction, it is critical that the contractor has a very clear understanding of the conditions associated with site access in order to plan accordingly. Short term access is largely a function of stakeholder engagement to resolve concerns related to accessibility in advance of construction. Long term access for the purpose of monitoring and maintenance is less critical when the rehabilitation strategy employed has taken into account minimal maintenance as a criterion. That said and given the hazards on site, it is likely that some maintenance work will be required. Similarly, long term monitoring does not necessarily require

vehicle access so much as a trail for an all-terrain-vehicle or similar mode of transportation. As such, impact to accessibility is weighted four (4) out of ten (10).

5.2.5 Criteria - Impact to Natural Resources (Weight = 2)

This criterion looks at the following sub-components:

- Mineral development; and
- Forestry.

As described above, the fundamental reason to rehabilitate mine hazards is to protect health and safety and the environment. Through stakeholder consultation, rehabilitation projects may provide opportunities for resource development however this is not considered to be a critical factor in the design process and selection of a preferred strategy. Resource development in itself is a separate process and can lead to complicating the rehabilitation project if the two are merged. As such, impact to natural resources is weighted two (2) out of ten (10).

5.3 Alternative Rating System

Each alternative is rated against the criteria using a score from 0 to 10. The rating system requires 'end points' to define and calibrate the score and better qualify the evaluation. An example is given below for reference.

- Environmental impact:
 - Score of 0 is representative of an alternative with significant environmental disturbance (clearing, brushing, etc.), greatest impact to fish and wildlife (multiple water crossings, development of virgin ground), impacts to protected areas (conservation reserves) and distance to site (greenhouse gas emissions).
 - Score of 10 is representative of an alternative with little to no disturbance or footprint, little to no impacts to fish and wildlife (no crossings or development of virgin ground), little to no impacts to protected areas and shortest haul distances.

Table 4 provides a definition of the criteria end points.

5.4 Alternatives Carried Forward

As noted in Section 2.0, Alternative #1 was considered the original base case presented in 2017. Following further consideration, four additional alternatives were developed and evaluated with Alternative #4 selected as the preferred alternative, as presented in 2019.

For this evaluation, Alternatives #1 to #3 are considered eliminated. Only Alternatives #4 and #5(A) have been carried forward. An additional alternative #5B has been included in this assessment. All alternatives are summarized in Table 5 and shown in Figure 1 and Figure 2 for reference.

The following sections go through the evaluation of each constraint and criteria in detail. Note that only incremental impacts are being evaluated. Impacts that are common across all alternatives are not considered in the process. Some examples of activities that are common amongst each alternative include:

- Luke Creek water crossing (north of site);
- Development of Crown aggregate pit;
- Development of access road to Round Lake pit;
- On site clearing / brushing for the purpose of access and removal of tailings and contaminated soils; and
- Construction of on-site roads for the purpose of access and removal of tailings and contaminated soils.

Regulatory permitting, stakeholder engagement and Indigenous consultation associated with common activities are also not considered in this evaluation.

5.5 Constraint Evaluation

5.5.1 Public Safety - Alternative #4

As described in Section 3.0, there were no hazards identified that could not reasonably be mitigated to reduce traffic safety risks associated with construction traffic. As a result, Alternative #4 is carried forward in the evaluation process.

5.5.2 Public Safety - Alternative #5A and #5B

The Alternative #5A and #5B route uses an existing forest access road, Halifax Road. Halifax Road is the primary artery to access harvesting by the Sustainable Forest License holder and operator, Vermillion Forest Management Company Limited (VFM). The road was not built to support residential traffic and there are no known residents that use Halifax Road to access a camp or cottage. Public traffic is limited to low volume recreational traffic or remote access and tourism.

As such, traffic safety improvements for Halifax Road were not considered and both alternatives (#5A and #5B) are carried forward in the evaluation process.

5.6 Criteria Evaluation

5.6.1 Impact to Implementation

5.6.1.1 *Alternative #4 (score of 7 x weight of 9 = 63 points):*

Class Environmental Assessment

The original screening assessment undertaken during the Class EA process considered the use of the existing access road, Alternative #4 route, and was screened as a Category C.

Other Permitting

There is only one regulatory permit or approval required associated with the Alternative #4 route. The Ministry of Energy, Conservation and Parks (MECP) has jurisdiction over the Conservation Reserve. Any improvements to the access route that travels through the Conservation Reserve will require MECP consultation and approval in advance of construction.

Agreements

It is anticipated that agreements or memorandums of understanding (MOUs) will be required prior to implementing road improvements with each of the road jurisdictions. These are not anticipated to be complicated endeavours.

At this time, ENDM is not aware of situations that would require agreements or MOU's with private land owners.

Timeline:

As a Category C with relatively straightforward regulatory permitting, it is anticipated that rehabilitation will commence earlier than other alternatives.

*5.6.1.2 Alternative #5A (score of 3 = 27 points):*Class Environmental Assessment

To better understand the incremental EA requirements, a formal screening exercise was conducted (Appendix C). The result of revising site access to Halifax Road and construction of the HRX was that the category would increase from Category C to a Category D EA. This would result in new consultation efforts including stakeholders and Indigenous communities to the south not previously identified. Additional studies (environmental characterization, species at risk and cultural heritage values) would be required as well as a formal update to the Environmental Study Report.

Under the Crown Land Use Policy Atlas (CLUPA), part of Halifax Road and the HRX is identified as an Enhanced Management Area (EMA) under Policy E211a: Killarney East Area (Appendix B). Policy E211a states that new road development is acceptable however "must be planned through comprehensive long-term access planning that considers the values of the area." Guidelines include:

- Roads should be constructed to the lowest standard possible;
- New roads/trails should be directed to existing corridors where possible;
- Layout should consider aesthetics; and
- Design and construction should facilitate access controls and closure/rehabilitation.

Construction of a new temporary year-round access road through an EMA would also require a separate EA through the Ministry of Natural Resources and Forestry (MNR). Preliminary discussions with MNR suggest that ENDM's own Class EA for rehabilitation projects may capture many of MNR's requirements.

Note that through the Class EA process and public consultation in 2019, ENDM received correspondence [REDACTED] potential consideration of an access route to site via Halifax Road.

Other Permitting

During field investigations, wildlife exclusion fencing was identified on Halifax Road therefore it is likely that species at risk are present on Halifax Road and the HRX. This would require a permit through the Endangered Species Act.

MNRF Work Permits for the four water crossings identified would be required to install water crossings.

A Forest Resource License for clearing trees, brush and vegetation along the new road alignment would also be required.

Agreements

A shared use agreement or MOU would likely be required with VFM, the current active forest management operator, due to the increase in construction traffic. This is not anticipated to be a complicated endeavour.

Timeline:

Considerable work would be required to fulfil ENDM's Category D Class EA, MNRF's EA and the regulatory permits required. It is estimated that this would extend the timeline to begin rehabilitation up to two (2) years relative to Alternative #4.

5.6.1.3 Alternative #5B (score of 3 x weight of 9 = 27 points):

Class Environmental Assessment

To better understand the incremental EA requirements, a formal screening exercise was conducted (Appendix E). The result of expanding the project boundary to capture access to site via Halifax Road and construction of a new temporary winter road was that the category would increase from Category C to a Category D EA. This would result in new consultation efforts including stakeholders and Indigenous communities to the south not previously identified. Additional studies (environmental characterization, species at risk and cultural heritage values) would be required as well as a formal update to the Environmental Study Report. However, it is anticipated that a winter road alternative would be easier to justify compared to Alternative #5A.

As described in Section 5.6.1.2, construction of an access road, including a winter road, through an EMA will require a separate EA through the MNRF. Preliminary discussions

with MNRF suggest that ENDM's own Class EA for rehabilitation projects may capture many of MNRF's requirements.

Note that through the Class EA process and public consultation in 2019, ENDM received correspondence from stakeholders expressing concerns over the potential consideration of an access route to site via Halifax Road.

Other Permitting

Wildlife exclusion fencing was identified on Halifax Road therefore it is likely that species at risk are present on Halifax Road and the HRX. This will require a permit through the Endangered Species Act however it is anticipated that this would be relatively straightforward for a winter road.

Permits for the four water crossings will be required through the MNRF to install culverts or bridges. Similarly, winter road crossings are anticipated to be easier to approve as they do not interfere with fish passage or sensitive timing windows such as spawning.

A Forest Resource License for clearing/brushing vegetation along the new road alignment will also be required.

Agreements

It is anticipated that agreements or MOU's will be required prior to implementing road improvements with each of the road jurisdictions and potentially private surface rights holders which have not been identified. Though agreements or MOU's with the road jurisdictions are not anticipated to be a complicated endeavour, there is uncertainty regarding private landowners.

A shared use agreement or MOU will likely be required with VFM, the current active forest management operator, due to the increase in construction traffic. This is not anticipated to be a complicated endeavour.

Timeline

As discussed above in Section 5.6.1.25.6.2.25.6.1.3, considerable work will be required to fulfil ENDM's Category D Class EA, MNRF's EA and the regulatory permits required

to support a winter road. Though anticipated to be less onerous than Alternative #5A, it could still delay construction up to one (1) year relative to Alternative #4 (base case).

5.6.2 Environmental Impacts

5.6.2.1 *Alternative #4 (score of 8 x weight of 7 = 56 points)*

Fish and Wildlife

Use of the existing road corridor means that there will be very little clearing/brushing for site access. Clearing/brushing is generally limited to line of sight through the public road network (Tilton Lake Road, Wavy Trail, Lakes End Road) and possibly some widening of the gravel mine road off Lakes End Road. This is considered to have limited impact on fish and wildlife.

No additional water crossings are required for this route.

Protected Areas

There will likely be some minor impact to the Conservation Reserve by trimming/brushing vegetation that is close to the shoulder and widening the gravel road to accommodate single-lane traffic.

Based on guidance received from MECP, the contemplated road improvements are not anticipated to have a significant impact on the Conservation Reserve.

Climate Change

This route is the shortest of all alternatives and therefore will result in the lowest greenhouse gas emissions from traffic.

5.6.2.2 *Alternative #5A (score of 4 x weight of 7 = 28 points)*

Fish and Wildlife

Halifax Road is considered to be in reasonable shape and likely would not require significant improvement. Shared use of the road with forestry contractors may require some localized brushing/trimming to improve line of site due to the incremental traffic. This is considered to have limited impact on fish and wildlife.

To get to site from Halifax Road, an approximately 8.6 km new road through virgin forest would be constructed. This amounts to a significant footprint and disturbance to the environment. Policy E211a: Killarney East Area (Appendix D) states that "Fish and

wildlife management, in harmony with forest management, will dominate land use activities, in an attempt to ensure that fish and wildlife resources and associated recreation and remote tourism opportunities will be available in this area in the future. Any development which would reduce cover and browse will, therefore, not be encouraged on Crown land and not supported on private land." By constructing a new road, this will impact cover and browse and disrupt wildlife movement as well as diminish the protection given to fish and wildlife through remote access. MNRF has identified areas within the EMA as suitable moose wintering areas and has recommended that any potential impacts of a proposed access route through the EMA on moose wintering habitat be assessed in order to help with road corridor planning and/or determine effective mitigation measures, if required. It is unclear whether construction of a temporary access road will result in long term impacts to fish and wildlife.

Using aerial imagery and topographic mapping, four significant water crossings have been identified that will require a culvert or bridge (Appendix A) to ensure continued fish passage.

Protected Areas

It is not anticipated that any work would be required within the Conservation Reserve.

Impacts to the EMA are described in the previous Section.

Climate Change

The Halifax Road route is the longest route to access the site. Environmentally, this results in the most greenhouse gas emissions.

5.6.2.3 *Alternative #5B (score of 5 x weight of 7 = 35 points)*

Fish and Wildlife

Clearing/brushing is generally limited to line of sight through the public road network and possibly some widening of the gravel mine road. Halifax Road is considered to be in reasonable shape and likely will not require significant improvement. Shared use of the road with forestry contractors may require some brushing to improve line of sight due to the incremental traffic. An 8.6 km winter road will require a significant amount of brushing/clearing that will impact cover and browse and disrupt wildlife movement as well as diminish the protection given to fish and wildlife through remote

access. MNRF has identified areas within the EMA as suitable moose wintering areas and has recommended that any potential impacts of a proposed access route through the EMA on moose wintering habitat be assessed in order to help with road corridor planning and/or determine effective mitigation measures, if required. That said, the impact is considered less than Alternative #5A given that access will be limited to winter only.

Water crossings through the winter will be via ice bridges or temporary bridges and removed in the spring. Such crossings are considered less impactful than culverts (Alternative #5A).

Protected Areas

There will likely be some minor impact to the Conservation Reserve by trimming/brushing vegetation that is close to the shoulder and widening the gravel road to accommodate single-lane traffic.

Based on guidance received from MECP, the contemplated road improvements are not anticipated to have a significant impact on the Conservation Reserve.

Impacts to the EMA are described in the previous Section.

Climate Change

Day-to-day traffic following Alternative #4 route is the shortest of all routes and therefore results in the least greenhouse gas emissions from vehicle traffic. Hauling of material via Alternative #5A route however is the longest route resulting in the most greenhouse gas emissions for material hauling. Alternative #5B would result in less greenhouse gas emissions than Alternative #5A but more than Alternative #4.

5.6.3 Impact to Accessibility

5.6.3.1 Alternative #4 (score of 8 x weight of 4 = 32 points):

Short-Term Access

There will be year-round short-term access to the mine site for both light vehicles and heavy equipment during construction. However, this will require public road improvements to reduce traffic safety risks as recommended by SNC Lavalin (Appendix A).

Long-Term Access

There will be year-round long-term access to the mine site for both light vehicles and heavy equipment to facilitate post rehabilitation performance monitoring, maintenance and potential emergency response. Future site access may require road maintenance and advanced notification to residents and, depending on the nature of the work, administrative controls such as escorts when floating equipment to site.

5.6.3.2 *Alternative #5A (score of 5 x weight of = 20 points):*

Short Term Access

There will be year-round short-term access to the mine site for both light vehicles and heavy equipment during construction. However, this will require construction of a new road to access the mine site.

Long Term Access

There will not be year-round long-term access to the mine for either light vehicles or heavy equipment via Halifax Road and the HRX. Under Policy E211a (Appendix D), new road development is acceptable however comes with conditions. Roads constructed for projects would likely require decommissioning once the project is complete because permanent access contradicts the intent of the policy.

It is not anticipated that long term access will be required for heavy equipment however some maintenance will likely be required. Current access to the mine using the gravel trail off Lakes End Road is inadequate to facilitate long term maintenance. The trail is not maintained, is too narrow and not suitable for heavy equipment. This creates challenges in the event ENDM needs to address maintenance issues in a timely fashion. To access the mine site for monitoring via all-terrain-vehicle is adequate for monitoring purposes.

Note that amending or being granted an exemption under the policy was not considered as a reasonable option as this is an onerous, time consuming and resource-intensive exercise and, ultimately, may not be approved.

5.6.3.3 *Alternative #5B (score of 7 x weight of 4 = 28 points):*

Short Term Access

There will be year-round short-term access to the mine site for both light vehicles and heavy equipment during construction. However, this will require public road

improvements to reduce traffic safety risks as recommended by SNC Lavalin (Appendix A) and construction of a new winter road to access the mine site.

In the event of a warmer than average winter that results in a significantly shortened haulage period on the winter road, as experienced in 2021, it may result in substantial project delays and perhaps degradation of materials susceptible to erosion.

Long Term Access

There will be year-round long-term access to the mine site for both light vehicles and heavy equipment to facilitate post rehabilitation performance monitoring, maintenance and potential emergency response via Alternative #4 route. That said, future site access may require road maintenance and advanced notification to residents and, depending on the nature of the work, administrative controls such as escorts when floating equipment to site.

5.6.4 Impact to Natural Resources

5.6.4.1 Alternative #4 (score of 2 x weight of 2 = 4 points)

Mineral Development

The proposed road improvements will also improve access to the mine site for exploration activities. However, this may not be perceived as favourable to residents of Long Lake. Also, this route does not provide an opportunity to explore claims registered on the south side of Luke Creek.

Since the mine closed in 1939, exploration activities have been sporadic, none of which have resulted in any notable discoveries. The Ontario Resident Geologist Program was consulted regarding the mineral potential of the area. The only mineralization type showing a high potential is within an area where mining rights have been withdrawn (Appendix F). Though there will be improved access to the site for exploration activities, this is not considered to be of significant value given the relatively unattractive prospects.

Forestry

There are no active forestry operations that access harvest areas via the Alternative #4 route therefore no impact is anticipated. This also means that there are no opportunities available for potential forestry expansion.

5.6.4.2 *Alternative #5A (score of 8 x weight of 2 = 16 points)*

Mineral Development

The proposed new road accessing the mine from the south will open access to the mine site for exploration activities as well as areas to the south of the mine previously inaccessible. Providing an alternative access route for exploration will likely be more favourable to Long Lake residents. Mineral exploration is within the intent of Policy E211a (Appendix D).

Since the mine closed in 1939, exploration activities have been sporadic, none of which have resulted in any notable discoveries. The Ontario Resident Geologist Program was consulted regarding the mineral potential of the area. The only mineralization type showing a high potential is within an area where mining rights have been withdrawn (Appendix F). Though there will be improved access to the site for exploration activities, this is not considered to be of significant value given the relatively unattractive prospects.

Forestry

A review of the 2020 – 2030 Sudbury Forest Management Plan, submitted by VFM shows that the primary hauling corridor (Halifax road) will not be extended any further north (Appendix G). Future harvesting plots extend east towards Wavy Lake rather than north. In discussion with the MNRF, VFM is considering decommissioning the northern portion of Halifax road at the boundary of the EMA in favour of a more easterly access route.

Though an extension to Halifax Road may open opportunities for VFM, they will not be realized until after 2030 and would be subject to approval through forest management planning.

5.6.4.3 *Alternative #5B (score of 3 x weight of 2 = 6 points)*

Mineral Development

The proposed road improvements will also improve access to the mine site for exploration activities. However, this may not be perceived as favourable to residents of Long Lake.

The proposed winter road is unlikely to result in mineral exploration opportunities given the temporary and seasonal nature of the winter road. Mineral exploration is within the intent of Policy E211a (Appendix D).

Since the mine closed in 1939, exploration activities have been sporadic, none of which have resulted in any notable discoveries. The Ontario Resident Geologist Program was consulted regarding the mineral potential of the area. The only mineralization type showing a high potential is within an area where mining rights have been withdrawn (Appendix F). Though there will be improved access to the site for exploration activities, this is not considered to be of significant value given the relatively unattractive prospects.

Forestry

There are no active forestry operations that access harvest areas via the Alternative #4 route therefore no impact is anticipated.

A review of the 2020 – 2030 Sudbury Forest Management Plan, submitted by VFM shows that the primary hauling corridor (Halifax road) will not be extended any further north (Appendix G). Future harvesting plots extend east towards Wavy Lake rather than north. In discussion with the MNRF, VFM is considering decommissioning the northern portion of Halifax Road at the boundary of the EMA in favour of a more easterly access route.

Construction of a temporary winter road extension off Halifax road to site is unlikely to result in harvesting opportunities for VFM given the temporary and seasonal nature of the winter road.

5.6.5 Criteria Summary

Based on the scoring and rationale discussed above, the total points awarded for each alternative is as follows, in order of highest to lowest:

1. Alternative #4 = 155 points
2. Alternative #5B = 91 points
3. Alternative #5A = 96 points

Table 7, Table 8 and Table 8 summarize the criteria evaluation.

5.7 Costs

To accurately compare all three alternatives, it is important to understand the true, or all-in, costs of each alternative. The all-in costs go beyond the initial capital cost of road improvements or construction. The following costs were considered for each alternative:

- Engineering costs;
- Permitting costs;
- Capital (construction) costs;
- Quality assurance costs;
- Decommissioning costs;
- Maintenance costs; and
- Impact on construction costs.

The following sections summarize the costs of each alternative in detail.

5.7.1 Engineering Costs

5.7.1.1 *Alternative #4B*

The cost to develop an engineered construction plan to mitigate the hazards in accordance with City of Greater Sudbury and Local Roads Board standards, as recommended by SNC Lavalin, is approximately \$306,137. This includes:

- Traffic study;
- Detailed survey;
- Geotechnical investigation;
- Engineering design work; and
- Preparation of a construction tender.

5.7.1.2 *Alternative #5A*

The cost to develop an engineered construction plan to construct the HRX are not anticipated to be significant because the HRX does not need to meet a specific standard. The current estimate is approximately \$125,000 and includes:

- Detailed survey to optimize alignment and cut/fill volumes;
- Ground truthing of alignment;

- Hydrological assessment to correctly size culverts at each of the four crossings;
- Engineering design work; and
- Preparation of construction tender.

5.7.1.3 *Alternative #5B*

The cost to develop an engineered construction plan is the cost of Alternative #4 plus a winter road. With a winter road, a detailed survey will be required to optimize alignment. Hydrological assessments are not required and ground truthing is not anticipated to be as rigorous. A construction package for the winter road is more likely to consist of procedures and guidance documents, particularly for constructing ice bridges over water crossings.

The total estimated cost for Alternative #5B engineering is approximately \$356,137.

5.7.2 **Permitting Costs**

5.7.2.1 *Alternative #4*

The primary concern from MECP with any upgrades to the gravel trail to the mine through the Conservation Reserve is the cutting of mature red pine and white cedar. At this time, ENDM anticipates a nominal cost to flag stands of red pine and white cedar that are located along the edge of the current gravel trail.

The estimated cost of permitting Alternative #4 is \$5,000.

5.7.2.2 *Alternative #5A*

As discussed under Section 5.6.1.2, several studies are anticipated to be required under a Category D Class EA and to meet MNR's EA process. These studies include:

- Environmental characterization report;
- Species at Risk assessment; and
- Cultural heritage and archaeological evaluation report.

The total estimated cost of permitting Alternative #5A is approximately \$100,000 and includes ancillary support as required through the EA process.

5.7.2.3 *Alternative #5B*

Permitting Alternative #5B is anticipated to require the same studies as Alternative #5A therefore the cost is estimated at \$100,000.

5.7.3 Construction Costs

5.7.3.1 *Alternative #4*

The capital (construction) cost is estimated at \$1,260,675 and are based on the recommendations proposed by SNC Lavalin, summarized under Section 3.0. The breakdown of this cost is shown in the SNC Lavalin report (Appendix A) for reference.

5.7.3.2 *Alternative #5A*

Using existing topographic data, SNC Lavalin developed an alignment for the HRX. The alignment takes into consideration water bodies, creeks and gradients for optimization. A long section profile of the alignment was used to calculate approximate cut/fill volumes that would be required. Grading cut/fill as well as granular material constitutes the majority of costs to construct the HRX.

As discussed above, the Halifax Road area is under a Forest Management Plan. In the plan, several sources of aggregate are identified to construct forest access roads. These aggregate pits are designated for forestry operations only and are not available for commercial sale. The EMA is also off limits for developing commercial aggregate pits as stated under Policy E211a (Appendix D).

The MNRF's Natural Resource Information Portal for Pits and Quarries was used to identify sources of aggregate that could potentially be sourced for road construction (Figure 3). Along Highway 637, the MTO has several aggregate pits however these are designated for MTO projects only and aggregate from these pits are not available for commercial sale. The closest commercial aggregate pit that can accommodate the volume of material required is near Wanup, east of Sudbury or possibly French River.

For the purposes of this exercise, exploring areas that could be developed into a source of aggregate for road construction and maintenance was considered outside of scope. Such a task would also add cost and permitting requirements.

The capital (construction) cost is estimated at \$2,640,000. The breakdown of this cost is shown in the SNC Lavalin report (Appendix A) for reference.

5.7.3.3 *Alternative #5B*

The capital (construction) cost to develop an engineered plan for Alternative #5B is the cost of road improvements for Alternative #4 plus the cost of a winter road and is estimated at \$1,391,925.

To construct a winter road, clearing and brushing of the alignment is required followed by packing snow and ice to form a solid based. This is accomplished using a bulldozer to track-pack snow and drive the frost deeper into the soil. For the purposes of this exercise, it was assumed that ice bridges would be used at each of the four identified water crossings. To build a structurally competent ice bridge for heavy haulage typically requires surface flooding to increase ice thickness. The document Best Practices for Building and Working Safely on Ice Covers in Ontario published by Infrastructure Health and Safety Association was used for guidance. Refer to Appendix H for reference to this document.

5.7.4 **Construction Quality Assurance (CQA)**

5.7.4.1 *Alternative #4*

For the purposes of this exercise, it was assumed that CQA would be required to monitor construction and ensure work is completed in accordance with the design. This typically involves:

- Daily field observation reports;
- Confirmatory (Owner's) survey;
- Quality assurance sampling of materials;
- Engineering support (as required); and
- Construction as-builts.

It was also assumed that each road jurisdiction would require a separate report (as-built) to document the work done within each jurisdiction. The total estimated cost for Alternative #4 CQA is \$298,734..

5.7.4.2 *Alternative #5A*

CQA is not anticipated to be as necessary for Alternative #5A because the specifications for road construction are not expected to be as stringent as Alternative #4. As discussed above, there would likely be no formal standards applied for road construction so much as procedural guidelines. The exception to this may be areas of significant fill where compaction is required or at each of the four water crossings.

Given that the road will be decommissioned, a formal as-built is likely not necessary however a simple summary report is assumed to suffice. Similarly, a decommissioning report is assumed to be required to satisfy conditions through the MNRF EA process.

The estimated cost for CQA for Alternative #5A is \$75,000 and includes:

- Periodic field inspections;
- Monitoring of culvert installations;
- Engineering support (as required);
- Construction summary report; and
- Decommissioning summary report.

5.7.4.3 *Alternative #5B*

CQA costs for Alternative #5B includes the cost of CQA for Alternative #4 road improvements as well as for constructing a winter road. Only the ice bridge crossings are anticipated to require inspection during construction to confirm that there is adequate ice quality and thickness to cross with a loaded truck. It is assumed that several site inspections would be conducted to document progress.

Given that the ice road will melt away in the spring, no formal as-built is anticipated however a construction summary report to document conditions would be considered appropriate.

It is also assumed that a winter road will be required for two seasons therefore the construction quality assurance costs account for two winter road construction events.

The estimated cost for construction quality assurance for Alternative #5B is \$348,734 and includes similar tasks as identified for Alternative #4 and #5A.

5.7.5 Decommissioning Costs

5.7.5.1 Alternative #4

It is not anticipated that any decommissioning costs will be required.

5.7.5.2 Alternative #5A

As discussed above under Section 5.6.1.2, a permanent year-round access road is inconsistent with Policy E211a and therefore would require to be decommissioned at the end of use. Decommissioning of the 8.6 km HRX is anticipated to require:

- Removing culverts at all water crossings and re-instating the shoreline;
- Scarifying and seeding the access road to encourage vegetation growth to re-instate wildlife cover; and
- Building a berm at the entrance of the road to prevent vehicle access into the EMA.

The total estimated cost to decommission the HRX is approximately \$75,000.

5.7.5.3 Alternative #5B

It is not anticipated that any decommissioning costs will be required.

5.7.6 Maintenance Costs

At this time, maintenance costs are estimated based on a preliminary understanding of the expected construction traffic. Actual maintenance requirements will be based on formal agreements or MOU's with each of the respective road authorities. That said, for the purposes of this exercise, it is helpful to compare relative maintenance costs between each alternative.

5.7.6.1 Alternative #4

During rehabilitation, some routine maintenance work is anticipated as a result of degradation of the road (potholes and wash-boards) and dust. As construction is likely to occur throughout the winter, snow plowing Lakes End Road to site will be required. The following maintenance tasks are anticipated:

- Occasional grading of gravel roads as required to remove potholes and wash-boards;
- Occasional placement of granular material where grading alone is not adequate;
- Dust control (water truck or calcium); and
- Snow plowing and winter sand/salt placement.

The estimated cost for road maintenance during construction is approximately \$168,000.

5.7.6.2 *Alternative #5A*

Routine maintenance of Halifax Road during rehabilitation is not anticipated to be as onerous as *Alternative #4* because the contractor will not need to accommodate residential traffic. The road only needs to be maintained to facilitate construction traffic. Dust control is not anticipated to be a concern. However, Halifax road is constructed with run-of-pit sand gravel and is susceptible to wash outs therefore it is anticipated that additional grading would be required. Also, part of Halifax Road will be shared with VFM, it is likely that the contractor will be responsible for shared maintenance. The following maintenance tasks are anticipated:

- Occasional grading of gravel roads as required to remove potholes and wash-boards;
- Occasional placement of granular material where grading alone is not adequate; and
- Snow plowing and winter sand/salt placement.

The estimated cost for road maintenance during construction is approximately \$136,000.

5.7.6.3 *Alternative #5B*

Routine maintenance for *Alternative #5B* is anticipated to be less than *Alternative #4* with the majority of heavy equipment traffic directed towards the winter road. However, snow plowing will be required for both Halifax Road and Lakes End Road to site. Also, part of Halifax Road will be shared with VFM, it is likely that the contractor will be responsible for shared maintenance. The following maintenance tasks are anticipated:

- Occasional grading of gravel roads as required to remove potholes and washboards (both Alternative #4 and #5A routes);
- Occasional placement of granular material where grading alone is not adequate (both Alternative #4 and #5A routes);
- Dust control (water truck or calcium) (Alternative #4 route); and
- Snow plowing and winter sand/salt placement (both Alternative #4 and #5A routes).

The estimated cost for road maintenance during construction is approximately \$150,400.

5.7.7 Impact on Construction Costs

5.7.7.1 Alternative #4

The Alternative #4 access route will not have an impact on construction costs as it is the shortest route to site.

5.7.7.2 Alternative #5A

Use of Halifax Road to access the site for construction will result in lost productivity as well as increased costs to haul materials to site due to the substantial increase in travel distance. Some areas that would increase in cost include:

- Fuel;
- Survey support;
- Indirects such as site trailer, porta-potties, temporary power and administration;
- Quality control support;
- Construction quality assurance; and
- Material haulage.

Though difficult to quantify, this evaluation considers the cost implication of a longer travel time to site for haulage of materials only. This approach is considered to be underestimating the true cost of lost productivity. Note that ENDM did not consider a camp-style arrangement where temporary accommodations would be set up for workers on a rotation i.e., 2-weeks in and 2-weeks out. Though productivity would

increase during the day, it is unlikely that it would offset the overhead costs of food, potable water, accommodations and power.

Approximately 30,000 m³ of topsoil is currently required. There are few sources of OPSS 802 specification topsoil available in Sudbury. Hollandia Land and Environmental in Chelmsford is a common source of topsoil. There is approximately an \$8 per m³ of topsoil increase in cost by hauling via Halifax Road. This would result in an increase of \$240,000.

5.7.7.3 *Alternative #5B*

Similar to Alternative #5A, approximately 30,000 m³ of topsoil is required. There are few sources of OPSS 802 specification topsoil available in Sudbury. Hollandia Land and Environmental in Chelmsford is a common source of topsoil. There is approximately an \$8 per m³ of topsoil increase by hauling via Halifax road. The estimated cost of increasing haulage distance for the delivery of topsoil is \$240,000. Note that hauling in the winter may also require extra effort at the location of delivery.

5.7.8 **Cost Summary**

Based on the rationale discussed above, the total cost for each alternative is as follows, in order of least expensive to most expensive:

1. Alternative #4 = \$2,038,546
2. Alternative #5B = \$2,587,196
3. Alternative #5A = \$3,391,000

Table 9 summarizes the cost evaluation for reference.

5.8 **Summary of Evaluation**

This evaluation has resulted in the following key findings:

- Alternative #4 stands out as receiving the highest technical points.
- Alternative #4 is likely to be the least expensive of the three alternatives evaluated.

As a result of this evaluation, further consideration of Alternative #5 (A or B) is not proposed and ENDM recommends proceeding with Alternative #4, the current base case.

6.0 CONCLUSIONS AND RECOMMENDATIONS

A thorough review of the concerns received in the form of Part II Order requests has resulted in the following conclusions:

- An investigation into traffic safety hazards did not reveal conditions that could not reasonably be mitigated.
- ENDM has estimated that the incremental base volume of traffic will be minimal in comparison to current AADT count data and that there are opportunities to further reduce this.
- ENDM has demonstrated that there are opportunities to reduce the volume of material (topsoil) hauled to site as part of the refine/optimize process in 2021.
- ENDM has calculated the duration and volume of haulage traffic to be significantly less than perceived and that there are opportunities to manage the rate of transport.
- ENDM can request or impose enforceable conditions on the contractor through the tendering process.
- Based on the criteria assessed, Alternative #4 stands out as receiving the highest technical points.
- Based on the costs considered, Alternative #4 is likely to be the cheapest of the three alternatives evaluated.

As a result of this report, ENDM recommends proceeding with Alternative #4 to a detailed design stage.

TABLES

Table 1: Access Road Alternatives Presented in 2019

Alt	Description	Primary Access	Secondary Access	Aggregate (Off Site)	Aggregate (Round Lake)	Aggregate (Crown Pit)	Top Soil (Off Site)
1	All aggregate delivered to project site using existing access using roads along the south side of Long Lake.	Long Lake Road	None	Yes	No	No	Yes
2	Most of the aggregate produced by new ENDM pit located near the project site.	Long Lake Road	None	No	No	Yes	Yes
3	Most of the aggregate provided by Atikameksheng Anishnawbek and transported to the project site using the historical mine road.	AAFN	None	No	Yes	No	Yes
4	Majority of aggregate provided by Atikameksheng Anishnawbek and supplemented by aggregate produced by new ENDM pit.	Long Lake Road	AAFN	No	Yes	Yes	Yes
5	Access from the Killarney Highway using existing forestry road and new road. Majority of aggregate will still be provided by Atikameksheng Anishnawbek and supplemented by aggregate produced by new ENDM pit.	Halifax Road Extension	AAFN	No	Yes	Yes	Yes

Table 2: Current Approximate Construction Schedule

Year	YEAR 1												YEAR 2												YEAR 3											
Month	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Stage 1																																				
Stage 2																																				
Stage 3																																				

Table 3: Summary of Criteria

No.	EVALUATION CRITERIA	SUB COMPONENTS	CONSIDERATIONS FOR EVALUATION	WEIGHT
1	Impact to Implementation	Class Environmental Assessment process	Consider whether a change to the scope of the project would result in a revised screening i.e. Category which would result in additional requirements.	9
		Regulatory permitting process	Consider the regulatory permitting process and which permits are required. Additional permits would be considered more onerous to the project.	
		Legal requirements	Consider legal implications and potential challenge of arriving at agreements or MOUs.	
		Timeline to begin rehabilitation	Consider how each alternative could impact construction start-date.	
2	Environmental Impact	Overall footprint	Consider impacts to fish and wildlife (including potential impacts to the Fish Habitat Wetland, Species At Risk, and Migratory / Breeding Birds). Consider project footprints of alternatives (temporary loss of habitat; mortality risk associated with activities i.e. more trucks increases risk of collision; noise disturbances). For access routes, consider short-term and long-term potential impacts to fish habitat and water quality resulting from the additions of water crossings (e.g. number and size of crossings).	7
		Protected areas	Consider impacts to Values of Conservation Interest in the Eden Township Forest Conservation Reserve. Consider impacts to other protected areas (Enhanced Management Areas). Alternatives that do not require access upgrading through the Conservation Reserve were considered to have no impacts.	
		Climate change	Consider impacts of alternative on Climate Change (greenhouse gas emissions). Alternatives that reduce CO2 emissions by reducing haul distances will be considered less negative.	
3	Impact to Accessibility	Short term access	Consider ability to access the site during the short term. Alternatives that provide unrestricted access to the site would be considered positively.	4
		Long term access	Consider ability to access the site in the long term for the purposes of maintenance and monitoring. Alternatives that provide unrestricted long term site access would be considered positively.	
4	Impact to Natural Resources	Mineral Development	Consider ability of claim holder(s) to access claim to do assessment and/or exploration work.	2
		Forestry	Consider impact of alternatives on forestry operations.	

Table 4: Criteria Rating System

Criteria	Description	END POINTS	
		0	10
1	Impact to Implementation	<ul style="list-style-type: none"> - Significant changes to project as a result of revised screening of EA category (C to D for example). - Require additional studies to support EA. - Require expanding consultation to include new stakeholders to consult. - Require consultation with additional Indigenous communities who may be impacted. - Require many regulatory permits. - Difficult obtaining necessary legal agreements. - Likely to be the longest time and most complicated process to implement project. 	<ul style="list-style-type: none"> - Class EA process straightforward requiring little study or consultation. - No regulatory permits required. - No legal agreements required. - Time to implement considered to be short.
2	Environmental Impact	<ul style="list-style-type: none"> - Largest amount of disturbance. - Greatest impacts to fish and wildlife. - Permanent water crossings. - Impacts to protected areas (EMA or CRs). - Extended travel distances. 	<ul style="list-style-type: none"> - Little to no disturbance. - Little to no impacts to fish and wildlife. - Shortest travel distances.
3	Impact to Accessibility	<ul style="list-style-type: none"> - No short or long term access. 	<ul style="list-style-type: none"> - Permanent, year-round access. - No issues to bring in heavy equipment.
4	Impact on Natural Resources	<ul style="list-style-type: none"> - Inability for claim holders to exercise rights to explore. - Impacts to Sustainable Forest License holder and Forest Management Plan. 	<ul style="list-style-type: none"> - Positive impacts to claim holder to exercise rights. - Opportunities to expand forest operations.

Table 5: Alternatives Carried Forward

Alt	Description	Primary Access	Secondary Access	Aggregate (Off Site)	Aggregate (Round Lake)	Aggregate (Crown Pit)	Top Soil (Off Site)	STATUS
1	All aggregate delivered to project site using existing access using roads along the south side of Long Lake.	Long Lake Road	None	Yes	No	No	Yes	PREVIOUSLY ELIMINATED
2	Most of the aggregate produced by new ENDM pit located near the project site.	Long Lake Road	None	No	No	Yes	Yes	PREVIOUSLY ELIMINATED
3	Most of the aggregate provided by Atikameksheng Anishnawbek and transported to the project site using the historical mine road.	AAFN	None	No	Yes	No	Yes	PREVIOUSLY ELIMINATED
4	Majority of aggregate provided by Atikameksheng Anishnawbek and supplemented by aggregate produced by new ENDM pit. Road improvements will be implemented.	Long Lake Road	AAFN	No	Yes	Yes	Yes	CARRIED FORWARD
5A	Access from the Killarney Highway using existing forestry road and new road. Majority of aggregate will still be provided by Atikameksheng Anishnawbek and supplemented by aggregate produced by new ENDM pit.	Halifax Road Extension	AAFN	No	Yes	Yes	Yes	CARRIED FORWARD
5B	Day-to-day traffic access site from Long Lake road. Majority of aggregate will still be provided by Atikameksheng Anishnawbek and supplemented by aggregate produced by new ENDM pit. Top soil coming from off site would be hauled in the winter via a winter road extension off of Halifax road.	Long Lake Road	AAFN plus Halifax Road Extension	No	Yes	Yes	Yes	NEW ALTERNATIVE

Table 6: Alternative #4 Criteria Summary Evaluation

Criteria	ALTERNATIVE #4			
	Score	Rationale		Points
		Advantage	Disadvantage	
1	7	<p><i>Class EA Process:</i></p> <ul style="list-style-type: none"> - Class EA screening resulted in a category C which is the same as the current screening. <p><i>Regulatory Permitting:</i></p> <ul style="list-style-type: none"> - Minimal permitting required. <p><i>Legal Requirements:</i></p> <ul style="list-style-type: none"> - None. <p><i>Timeline:</i></p> <ul style="list-style-type: none"> - Anticipated that site rehabilitation will occur sooner than other alternatives. 	<p><i>Class EA Process:</i></p> <ul style="list-style-type: none"> - None. <p><i>Regulatory Permitting:</i></p> <ul style="list-style-type: none"> - Permitting will be required to upgrade road through Conservation Reserve. <p><i>Legal Requirements:</i></p> <ul style="list-style-type: none"> - Will require agreements with various road jurisdictions prior to improve access road. - Possibly require agreements with private residents. <p><i>Timeline:</i></p> <ul style="list-style-type: none"> - None.. 	63
2	8	<p><i>Fish and Wildlife:</i></p> <ul style="list-style-type: none"> - Limited clearing required (very small footprint). - No additional water crossings are required. <p><i>Protected Areas:</i></p> <ul style="list-style-type: none"> - None. <p><i>Climate Change:</i></p> <ul style="list-style-type: none"> - Shortest route to site (least GH gas emissions). 	<p><i>Fish and Wildlife:</i></p> <ul style="list-style-type: none"> - None. <p><i>Protected Areas:</i></p> <ul style="list-style-type: none"> - Some minor impacts as a result of the road upgrade through Conservation Reserve. <p><i>Climate Change:</i></p> <ul style="list-style-type: none"> - None. 	56
3	8	<p><i>Short Term:</i></p> <ul style="list-style-type: none"> - Permanent year-round access. <p><i>Long Term:</i></p> <ul style="list-style-type: none"> - Permanent year-round access. - Road upgrades will allow heavy equipment to be floated to site. 	<p><i>Short Term:</i></p> <ul style="list-style-type: none"> - None. <p><i>Long Term:</i></p> <ul style="list-style-type: none"> - Future access may require some administrative controls (escorts for example). 	32
4	2	<p><i>Mineral Development:</i></p> <ul style="list-style-type: none"> - Improved access for exploration. <p><i>Forestry:</i></p> <ul style="list-style-type: none"> - None. 	<p><i>Mineral Development:</i></p> <ul style="list-style-type: none"> - No access to claims on south side of Luke Creek. - Exploration may not be perceived favourably. <p><i>Forestry:</i></p> <ul style="list-style-type: none"> - No opportunities to expand forest operations. 	4
Total Score	155			

Table 7: Alternative #5A Criteria Summary Evaluation

Criteria	ALTERNATIVE #5A			
	Score	Rationale		Points
		Advantage	Disadvantage	
1	3	<p><i>Class EA: Process</i></p> <ul style="list-style-type: none"> - MNRF EA for temporary access road through EMA, ENDM Class EA process should capture many MNRF requirements. <p><i>Regulatory Permitting:</i></p> <ul style="list-style-type: none"> - None. <p><i>Legal Requirements:</i></p> <ul style="list-style-type: none"> - No agreements required with various road jurisdictions. <p><i>Timeline:</i></p> <ul style="list-style-type: none"> - None. 	<p><i>Class EA: Process</i></p> <ul style="list-style-type: none"> - Preliminary screening exercise indicates that this would require a Category D EA. - Will require studies (environmental characterization, SAR and cultural heritage). - Will require consultation with stakeholders to the south. - May require consultation with First Nations to the south. - ENDM has received letters of concern from stakeholders regarding the use of Halifax Road. - Will require MNRF EA to allow construction of a temporary road within EMA. <p><i>Regulatory Permitting:</i></p> <ul style="list-style-type: none"> - Will require SAR permit. - Will require water crossing permits for several crossings. - Will require FRL for clearing. <p><i>Legal Requirements:</i></p> <ul style="list-style-type: none"> - Will require a shared use agreement with VFM. <p><i>Timeline:</i></p> <ul style="list-style-type: none"> - Due to revisions to Class EA and other requirements, estimated to delay project up to 2-years. 	27
2	4	<p><i>Fish and Wildlife:</i></p> <ul style="list-style-type: none"> - None. <p><i>Protected Areas:</i></p> <ul style="list-style-type: none"> - Will not impact Conservation Reserve. <p><i>Climate Change:</i></p> <ul style="list-style-type: none"> - None. 	<p><i>Fish and Wildlife:</i></p> <ul style="list-style-type: none"> - Currently no road. Will require approximately 8.6km of new road clearing through virgin ground in EMA. - At least 4 significant crossings. - Potential to increase impact by creating new access to fish and wildlife. <p><i>Protected Areas:</i></p> <ul style="list-style-type: none"> - None. <p><i>Climate Change:</i></p> <ul style="list-style-type: none"> - Longest route to site (upwards of 3-hour return trip from south end of Sudbury). 	28
3	5	<p><i>Short Term:</i></p> <ul style="list-style-type: none"> - Permanent year-round access. <p><i>Long Term:</i></p> <ul style="list-style-type: none"> - None. 	<p><i>Short Term:</i></p> <ul style="list-style-type: none"> - None. <p><i>Long Term:</i></p> <ul style="list-style-type: none"> - Temporary nature of road does not allow long term access. - Long term access in general will be restricted (currently difficult to access site) and is season dependent. 	20
4	8	<p><i>Mineral Development:</i></p> <ul style="list-style-type: none"> - Improved access to claims. <p><i>Forestry:</i></p> <ul style="list-style-type: none"> - Possible that road allows expansion of harvesting. 	<p><i>Mineral Development:</i></p> <ul style="list-style-type: none"> - Mineral exploration potential not particularly attractive. - See RGO memo regarding mineral exploration potential. <p><i>Forestry:</i></p> <ul style="list-style-type: none"> - Current FMP between 2020 and 2030 does not expand towards mine at all. - Communication with MNRF that VFM may actually decommission primary road at EMA in favour of a different route. 	16
Total Score	91			

Table 8: Alternative #5B Criteria Summary Evaluation

Criteria	ALTERNATIVE #5B			Points
	Score	Rationale		
		Advantage	Disadvantage	
1	3	<p><i>Class EA: Process</i></p> <ul style="list-style-type: none"> - A winter road is anticipated to be easier to consult with stakeholders than Alt #5A. - MNRFA for winter road through EMA should be relatively straightforward (easier than Alt #5A). - ENDM Class EA process should capture many MNRFA requirements. <p><i>Regulatory Permitting:</i></p> <ul style="list-style-type: none"> - Anticipated to be easier than Alt #5A. <p><i>Legal Requirements:</i></p> <ul style="list-style-type: none"> - None. <p><i>Timeline:</i></p> <ul style="list-style-type: none"> - Expected to take less time than Alt #5A. 	<p><i>Class EA: Process</i></p> <ul style="list-style-type: none"> - Preliminary screening exercise indicates that this would require a Category D. - Will require additional studies (environmental characterization, SAR and cultural heritage). - Will require consultation with stakeholders to the south. - May require consultation with First Nations to the south. - ENDM has received letters of concern from stakeholders regarding the use of Halifax Road. - Will require MNRFA to allow construction of a winter within EMA. <p><i>Regulatory Permitting:</i></p> <ul style="list-style-type: none"> - Will require SAR permit. - Will require water crossing permits for several crossings. - Will require FRL for clearing. <p><i>Legal Requirements:</i></p> <ul style="list-style-type: none"> - Will require a shared use agreement with VFM. - Will require agreements with various road jurisdictions on Long Lake prior to improve access road. - Possibly require agreements with private residents. <p><i>Timeline:</i></p> <ul style="list-style-type: none"> - Due to revisions to Class EA and other requirements, estimated to delay project up to 1-year. 	27
2	5	<p><i>Fish and Wildlife:</i></p> <ul style="list-style-type: none"> - Day-to-day traffic follows shortest route to site which will require limited clearing to upgrade. - Temporary crossings in the winter not likely to have impact on aquatic ecosystem. <p><i>Protected Areas:</i></p> <ul style="list-style-type: none"> - None. <p><i>Climate Change:</i></p> <ul style="list-style-type: none"> - Day-to-day traffic will follow shortest route to site. 	<p><i>Fish and Wildlife:</i></p> <ul style="list-style-type: none"> - Access for Haul traffic will require clearing 8.6km of virgin ground. - Moderate impact expected given the cleared area will recover and is only used for a short duration. <p><i>Protected Areas:</i></p> <ul style="list-style-type: none"> - Some work required to upgrade road through Conservation Reserve. <p><i>Climate Change:</i></p> <ul style="list-style-type: none"> - Haul traffic will require upwards of 3-hr return trip. 	35
3	7	<p><i>Short Term:</i></p> <ul style="list-style-type: none"> - Permanent year-round access. <p><i>Long Term:</i></p> <ul style="list-style-type: none"> - Permanent year-round access. - Road upgrades will allow heavy equipment access in the event of future needs. 	<p><i>Short Term:</i></p> <ul style="list-style-type: none"> - None. <p><i>Long Term:</i></p> <ul style="list-style-type: none"> - Future access may require some administrative controls (escorts for example). 	28
4	3	<p><i>Mineral Development:</i></p> <ul style="list-style-type: none"> - Temporary access to claims south of Luke Creek. <p><i>Forestry:</i></p> <ul style="list-style-type: none"> - None. 	<p><i>Mineral Development:</i></p> <ul style="list-style-type: none"> - Mineral exploration potential not particularly attractive. - See RGO memo regarding mineral exploration potential. <p><i>Forestry:</i></p> <ul style="list-style-type: none"> - Current FMP between 2020 and 2030 does not expand towards mine at all. - Communication with MNRFA that VFM may actually decommission primary road at EMA in favour of a different route. 	6
Total Score	96			

Table 9: Summary of Costs

Category	ALTERNATIVE #4		ALTERNATIVE #5A		ALTERNATIVE #5B	
	Rationale	Estimate	Rationale	Estimate	Rationale	Estimate
Engineering Costs	<ul style="list-style-type: none"> - Detailed engineering required to meet City standards. - Includes detailed survey, traffic study and possible geotechnical investigation (drilling). - Engineering work not expected to be overly complicated. - 	\$306,137	<ul style="list-style-type: none"> - No engineering standards to follow. - Detailed survey required to determine best road alignment. - Ground truthing required to confirm conditions (not expected to be significant). - Not expecting geotechnical work. - Hydrology to appropriately size/design culverts at crossings. 	\$125,000	<ul style="list-style-type: none"> - Assume costs of Alt #4. - Detailed survey required for best road alignment. - Ground truthing to confirm conditions (not expected to be significant). - Assume ice bridges for winter crossings (no hydrological assessments required). 	\$356,137
Permitting Costs	<ul style="list-style-type: none"> - Costs of a forester to flag stands of red pine and white cedar along the current gravel trail. 	\$5,000	<ul style="list-style-type: none"> - General characterization of environment to support ESR (Class EA). ~\$25k. - SAR assessment. ~\$25k. - Archaeological/Cultural Heritage Assessment. ~\$50k. 	\$100,000	<ul style="list-style-type: none"> - General characterization of environment to support ESR (Class EA). ~\$25k. - SAR assessment. ~\$25k. - Archaeological/Cultural Heritage Assessment. ~\$50k. 	\$100,000
Construction Costs	<ul style="list-style-type: none"> - See SNC Report. - Includes 30% contingency. 	\$1,260,575	<ul style="list-style-type: none"> - See SNC Report. - Includes 30% contingency. 	\$2,640,000	<ul style="list-style-type: none"> - Assume same improvements as in Alt #4. - Only require tree/brushing for winter road. - Assume dozer operator to pack road and push down frost. - Ice bridges built using water from crossings, pump and labour as required (~\$10k per km) 	\$1,391,925
Quality Assurance	<ul style="list-style-type: none"> - Assume QA required in the field to document work. - Assume an as-built required for each road authority. - Estimated to be 3-4 months to complete. 	\$298,734	<ul style="list-style-type: none"> - QA only required for water crossings. - Simple as-built for records only. - Not likely to require engineering support. - No requirement for owner's survey or QC. 	\$75,000	<ul style="list-style-type: none"> - Assume QA for Alt#4. - QA may be required for winter road crossings to verify adequate for hauling. Not expected to be significant. 	\$348,734
Decommissioning Costs	<ul style="list-style-type: none"> - Work will be permanent. - No decommissioning costs required. 	\$0	<ul style="list-style-type: none"> - Will be a condition of temporary road through EMA. - Water crossings will need to be removed and waterways reinstated. - Road will be scarified and seeded to encourage recovery. - Entrance bermed and signage posted to prevent access while vegetation establishing. 	\$75,000	<ul style="list-style-type: none"> - Winter road only. - No water crossings to remove. 	\$0
Maintenance Costs	<ul style="list-style-type: none"> - Regular grading to remove ruts or washboards as required (60 hours per month). - Gran M for larger repairs (100mt or 5 trucks per month). - Water truck or application of calcium during dry season (Assume 200hours/year). - Snow plowing from Lakes End Road to site plus sanding during winter. 	\$168,000	<ul style="list-style-type: none"> - Anticipated to require regular grading due to material used to construct and extra activity (80 hours per month). - Shared maintenance with VFM. - No dust control required. - Snow plowing plus sanding during winter. Will likely need extra attention for hauling of materials. 	\$136,000	<ul style="list-style-type: none"> - With less traffic, specifically heavy traffic, road maintenance expected to be much less. - May require grading (20 hours per month). - May require some Gran A (40mt per month). - Assume water truck or application of calcium during dry season half of Alt #4. - Snow plowing generally required from both sides. - Shared maintenance with VFM. 	\$150,400
Impact on Construction	<ul style="list-style-type: none"> - No impact on rehabilitation. 	\$0	<ul style="list-style-type: none"> - Additional travel time will have a significant reduction on productivity that is difficult to quantify. - See Hollandia estimate for top soil comparing distances (~8m3 increase for the assumed 30,000m3 required). 	\$240,000	<ul style="list-style-type: none"> - Will likely pay more for topsoil due to increased haul distance. - Unlikely to find a location within a similar range. - Estimate for increased haul distance only. - See Hollandia estimate for top soil comparing distances (~8m3 increase for the assumed 30,000m3 required). 	\$240,000
TOTAL		\$2,038,546		\$3,391,000		\$2,587,196

FIGURES

Figure 1: Alternative #4

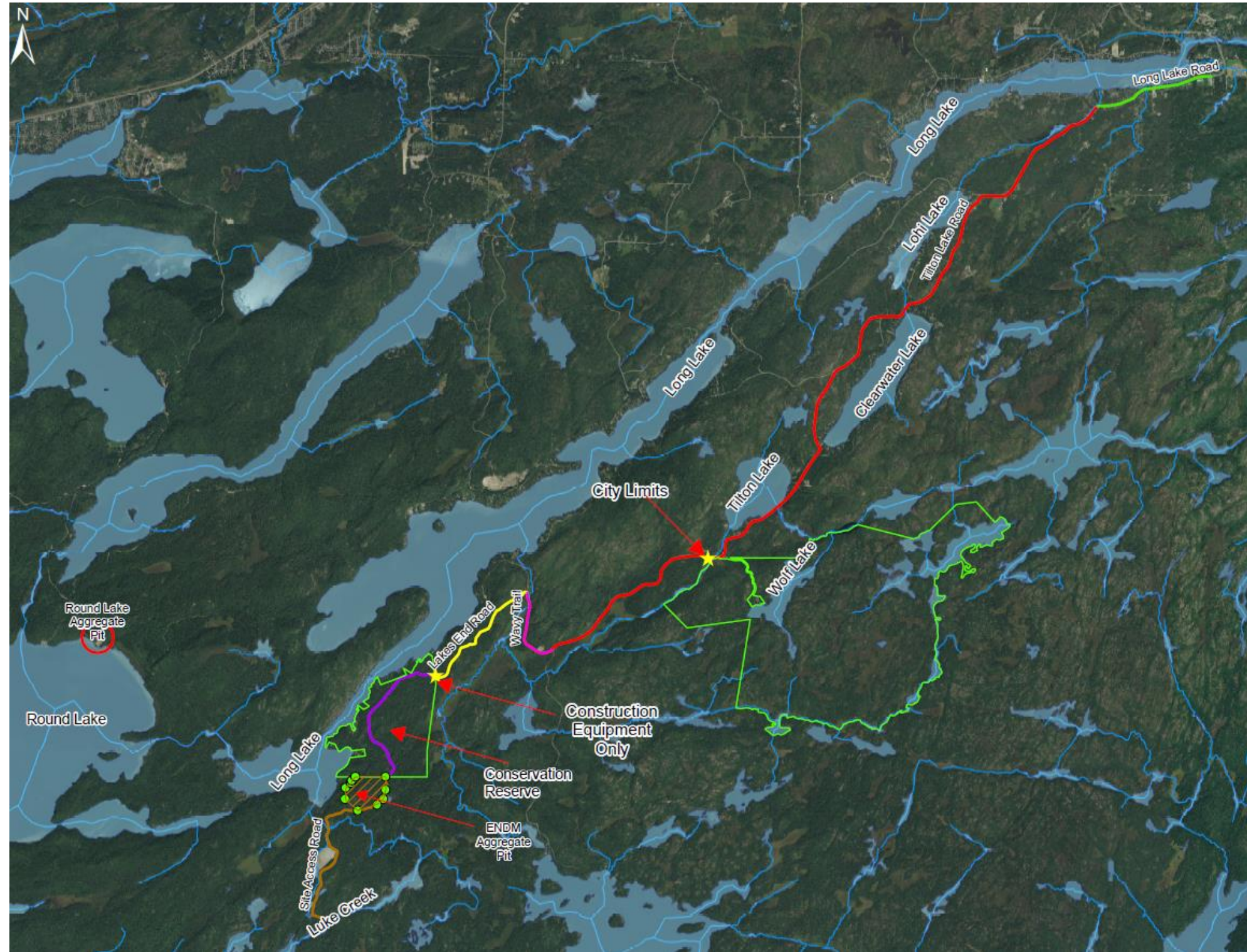


Figure 2: Alternative #5A and #5B Route

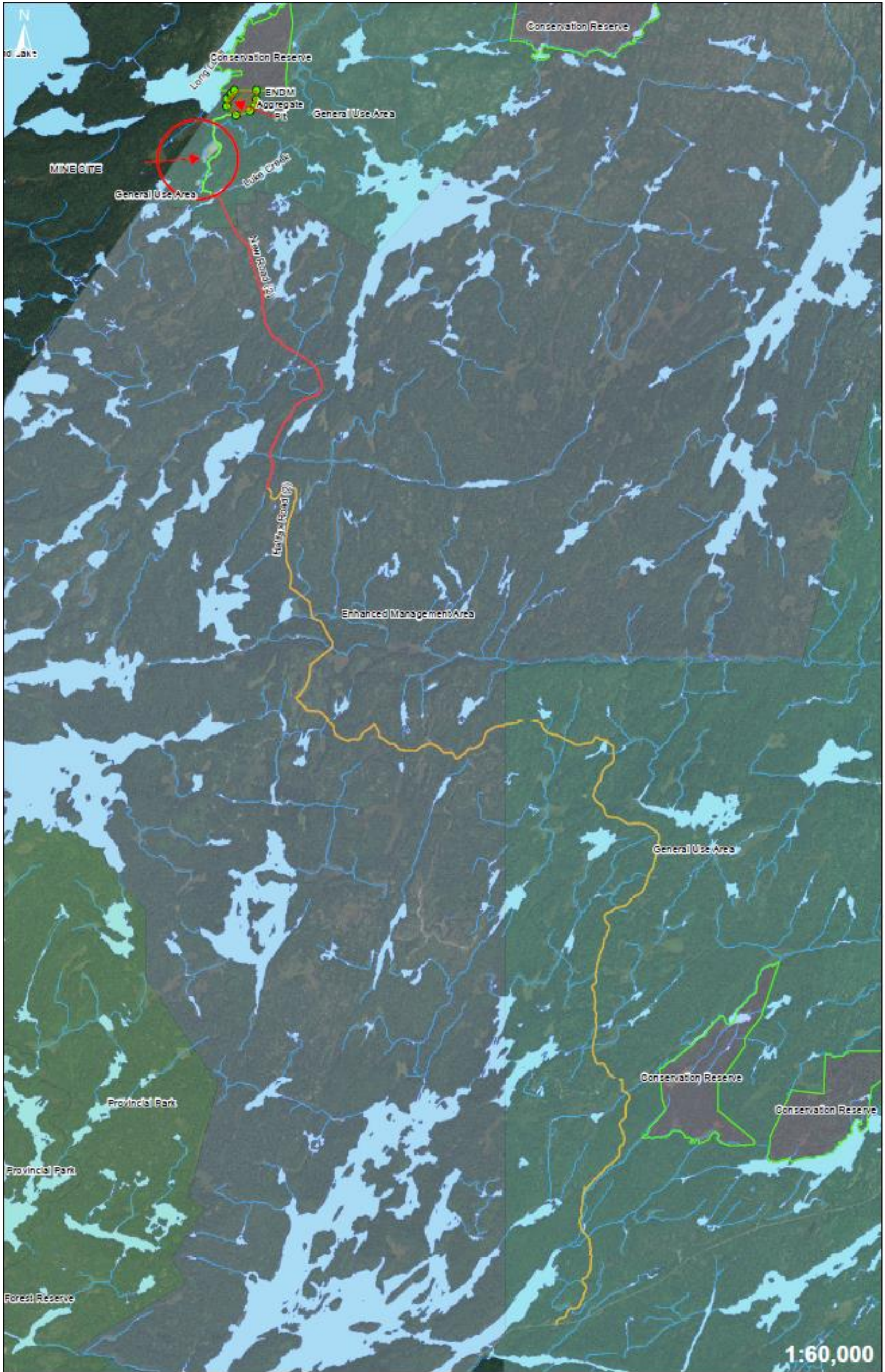
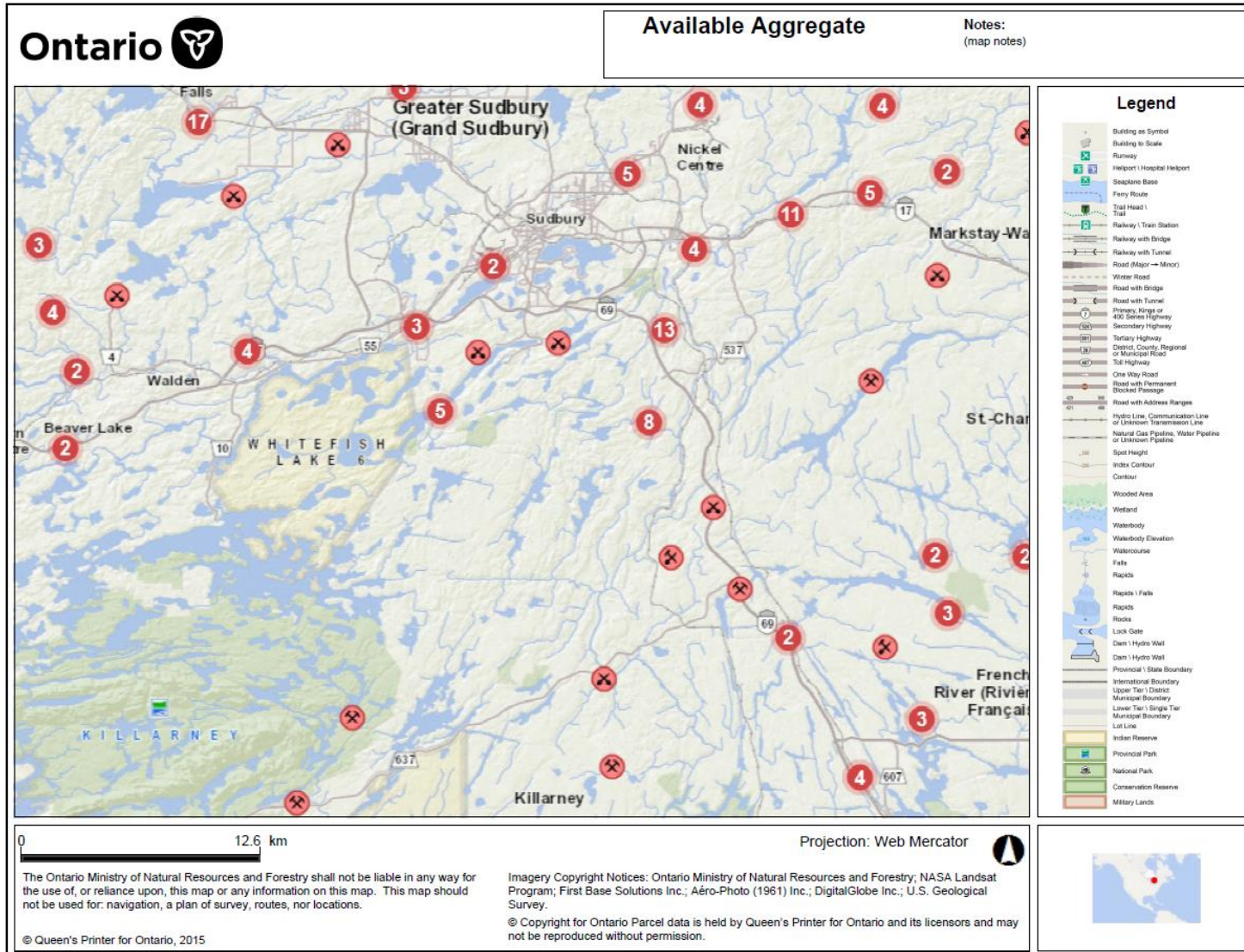


Figure 3: Natural Resource Information Portal Quarries and Pits



APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX E

APPENDIX F

APPENDIX G

APPENDIX H

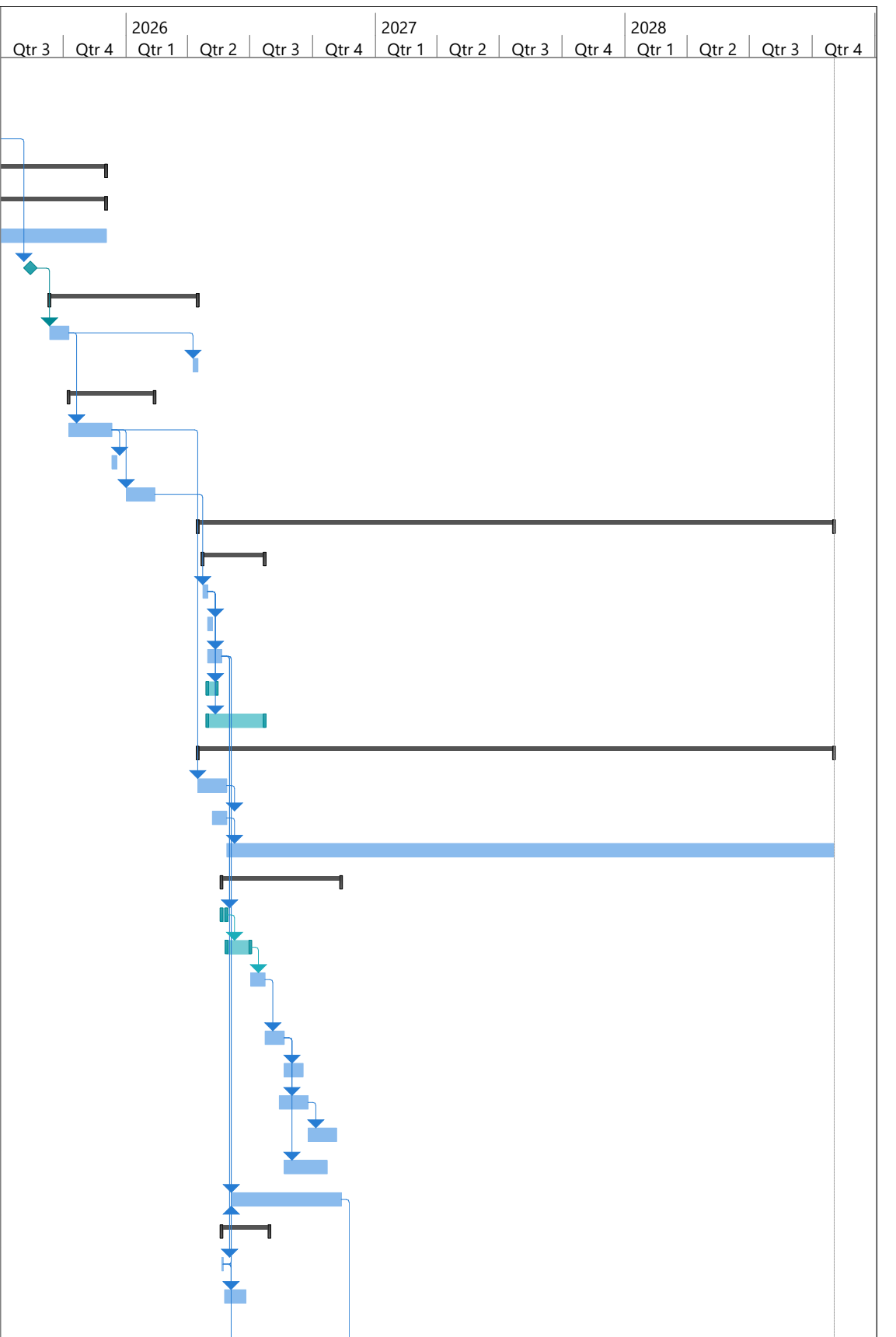
Appendix G

Project Schedule

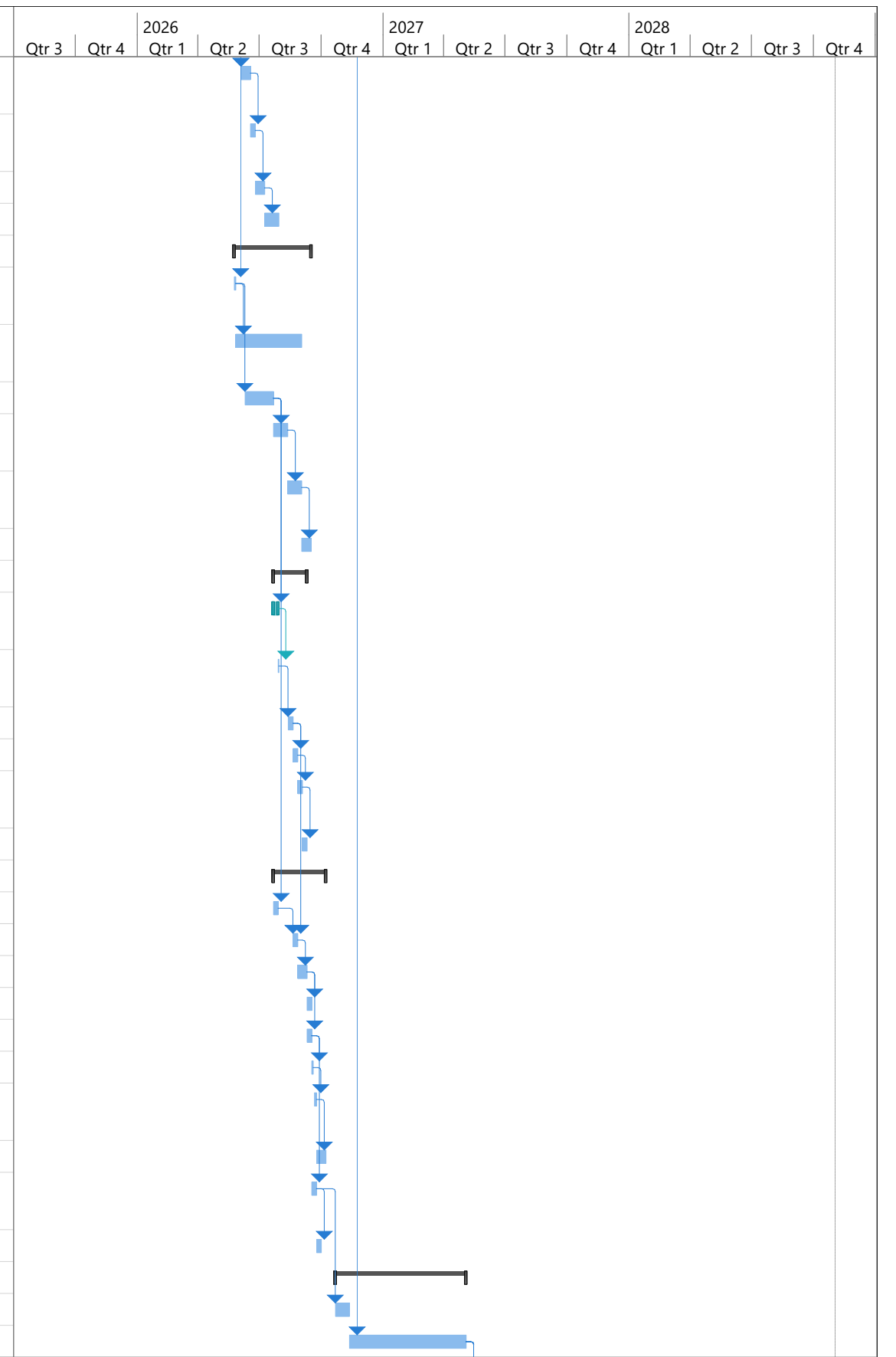
Long Lake Gold Mine - Road Improvements Construction Schedule

ID	Task Name	Notes	2024			2025			2026					
			Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	
0	Long Lake Gold Mine - Road Improvements	Quantity / Rate												
1	Wavy Trail Pit Operations													
2	Site Preparation (Clearing, Access Roads)													
3	Excavation / Blasting (Potential Timing)													
4	Crushing / Screening (Potential Timing)													
5	Utility Relocations													
6	Coordination with Utility Companies (6 months) (Potential Timing)													
7	Utility Relocations (1 month) (by Utility Companies) (Potential Timing)													
8	Mobilization / Demobilization													
9	Project Start-up Mobilization (10 days)													
10	2024 Seasonal Shutdown Demobilization (5 days)													
11	Winter Shutdown 2024-2025													
12	2025 Seasonal Start-up Mobilization (5 days)													
13	2025 Seasonal Shutdown Demobilization (5 days)													
14	Winter Shutdown 2025-2026													
15	2026 Seasonal Start-up Mobilization (5 days)													
16	Project Complete Demobilization (10 days)													
17	Road Improvements - Tilton Lake Road and Lakes End Road													
18	Clearing and Grubbing (10 days)	38,760 sq. m @ 4,000 sq. m per day												
19	Grading Operations													
20	Earth Excavation (31 days)	23,000 cu. m @ 750 cu. m per day												
21	Rock Excavation - New Rock Cut Locations (4 days)	5,980 cu. m @ 1,875 cu. m per day												
22	Rock Excavation - Widening Exist. Rock Cut Locations (16 days)	4,550 cu. m @ 300 cu. m per day												
23	Fill Placement (26 days)	19,030 cu. m @ 750 cu. m per day												
24	Granular Placement													
25	Granular 'A' (6 days)	5,680 t @ 1,030 t per day												
26	Granular 'B' (15 days)	38,050 t @ 2,700 t per day												
27	Guide Rail Operations (3 days)	380 m @ 150 m per day												
28	Miscellaneous Operations/Clean-up (10 days)													
29	Road Improvements - Site Access Road													
30	Clearing and Grubbing (12 days)	45,600 sq. m @ 4,000 sq. m per day												
31	Grading Operations													
32	Earth Excavation (23 days)	22,720 cu. m @ 1,000 cu. m per day												
33	Rock Excavation - New Rock Cut Locations (2 days)	2,820 cu. m @ 2,500 cu. m per day												
34	Rock Excavation - Widening Exist. Rock Cut Locations (6 days)	1,720 cu. m @ 600 cu. m per day												
35	Fill Placement (24 days)	23,800 cu. m @ 1,000 cu. m per day												
36	Granular Placement													
37	Granular 'A' (6 days)	5,280 t @ 1,030 t per day												
38	Granular 'B' (16 days)	41,600 t @ 2,700 t per day												
39	150mm Minus Crusher Run Shot Rock (4 days)	5,520 cu. m @ 1,500 cu. m per day												
40	Miscellaneous Operations/Clean-up (10 days)													

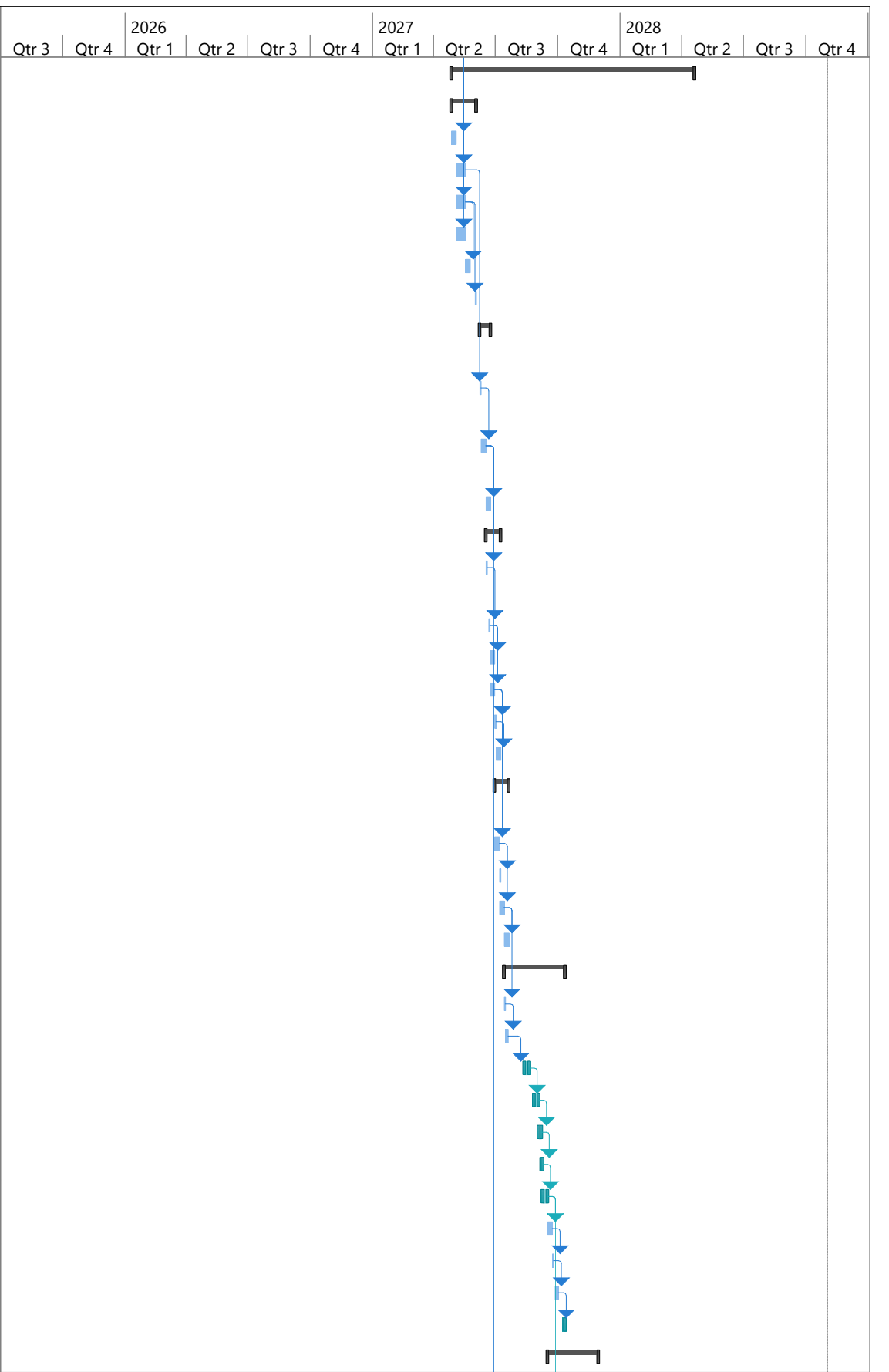
ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	2026				2027				2028				
							Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3
1	→	2024 Construction Season	574 days	Thu 9/22/22	Tue 12/3/24														
2	→	Access Road Construction	155 days	Thu 9/22/22	Wed 4/26/23														
3	→	Public Roads	155 days	Wed 5/1/24	Tue 12/3/24														
4	→	2025 Construction Season	155 days	Wed 4/30/25	Tue 12/2/25														
5	→	Access Road Construction	155 days	Wed 4/30/25	Tue 12/2/25														
6	→	Yellow Gate to Glory Hole	155 days	Wed 4/30/25	Tue 12/2/25	3FS+105 days													
7	→	Award Remediation Contract	1 day	Wed 8/13/25	Wed 8/13/25	3FS+180 days													
8	→	Remediation Contract	155 days	Thu 9/11/25	Wed 4/15/26														
9	→	Submittals (Task 1)	20 days	Thu 9/11/25	Wed 10/8/25	7FS+20 days													
10	→	Provision of Temporary Services	5 days	Thu 4/9/26	Wed 4/15/26	9FS+130 days													
11	→	Clear Crown Pit	90 days	Thu 10/9/25	Wed 2/11/26														
12	→	Initial Clearing for equipment lay down (Task 2)	45 days	Thu 10/9/25	Wed 12/10/25	9													
13	→	Create Mulching Area for brush/topsoil (Task 2)	5 days	Thu 12/11/25	Wed 12/17/25	12													
14	→	Remove saleable timber (Task 2)	30 days	Thu 1/1/26	Wed 2/11/26	12FS+15 days													
15	→	2026 Construction Season	665 days	Thu 4/16/26	Wed 11/1/28														
16	→	General	65 days	Thu 4/23/26	Wed 7/22/26														
17	→	Mobilization of Remediation Equipment (Task 1)	5 days	Thu 4/23/26	Wed 4/29/26	14FS+50 days													
18	→	Fence Exclusion zones near mine shaft pond (Task 1)	5 days	Thu 4/30/26	Wed 5/6/26	17													
19	→	Commission Temporary Water Treatment Plant (Task 1)	15 days	Thu 4/30/26	Wed 5/20/26	17													
20	→	Import gravel and develop support areas (Task 1)	10 days	Thu 4/30/26	Wed 5/13/26	17													
21	→	Install 2026 Reclamation Infrastructure (Task 3a)	60 days	Thu 4/30/26	Wed 7/22/26	17													
22	→	Develop Crown Pit (Task 2)	665 days	Thu 4/16/26	Wed 11/1/28														
23	→	Construct berms/ditches surrounding crown pit (Task 2)	30 days	Thu 4/16/26	Wed 5/27/26	12FS+90 days													
24	→	Develop staging Areas for borrow material (Task 2)	15 days	Thu 5/7/26	Wed 5/27/26	23FS-15 days													
25	→	Develop and screen material for use (Task 2)	635 days	Thu 5/28/26	Wed 11/1/28	24													
26	→	TA-01 Construction	125 days	Thu 5/21/26	Wed 11/11/26														
27	→	Grading of TA01 Ground surface (Task 3b)	5 days	Thu 5/21/26	Wed 5/27/26	19													
28	→	Ground stabilization beneath TA01 Berm (Task 4b)	25 days	Thu 5/28/26	Wed 7/1/26	27													
29	→	Remove Tailings within footprint of drainage ditch/berm/toe drain surrounding TA-01 (Task 12a)	15 days	Thu 7/2/26	Wed 7/22/26	28													
30	→	Construct TA-01 Perimeter Berm (Task 12b)	20 days	Thu 7/23/26	Wed 8/19/26	29													
31	→	Construct Perimeter Toe Drain (Task 12c)	20 days	Thu 8/20/26	Wed 9/16/26	30													
32	→	Liner Installation Perimeter Berm (Task 12d)	30 days	Thu 8/13/26	Wed 9/23/26	30FS-5 days													
33	→	Develop Grades of Drainage Ditches (Task 12e)	30 days	Thu 9/24/26	Wed 11/4/26	32													
34	→	Temporary erosion control and plantings (Task 12f)	45 days	Thu 8/20/26	Wed 10/21/26	30													
35	→	Place, shape and compact tailings in lifts from upstream of TA-01	115 days	Thu 6/4/26	Wed 11/11/26	37FS+8 days,19													
36	→	Waste Rock Area	50 days	Thu 5/21/26	Wed 7/29/26														
37	→	Deploy Mine Water Infrastructure (Task 3a)	2 days	Thu 5/21/26	Fri 5/22/26	19													
38	→	Treat mine shaft pond water/excavation water as necessary (Task 3a)	23 days	Mon 5/25/26	Wed 6/24/26	37													



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	2026				2027				2028				
							Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3
39	→	Waste Rock Excavation and Placement in TA-01 footprint (Task 4a)	10 days	Thu 6/4/26	Wed 6/17/26	37FS+8 days,19													
40	→	Import Clean Fill/top soil/crown pit compost to develop final grades (Task 5c)	5 days	Thu 6/18/26	Wed 6/24/26	39													
41	→	Temporary erosion control and plantings (Task 5c)	10 days	Thu 6/25/26	Wed 7/8/26	40													
42	→	Install Glory Hole Fencing	15 days	Thu 7/9/26	Wed 7/29/26	41													
43	→	TA-02 Tailings Area	82 days	Mon 5/25/26	Tue 9/15/26														
44	→	Deploy TA02 Mine Water Management Infrastructure (Task 3a)	2 days	Mon 5/25/26	Tue 5/26/26	37													
45	→	Treat TA02 pond water/excavation water as necessary (Task 5a)	70 days	Wed 5/27/26	Tue 9/1/26	44													
46	→	TA02 Tailings Excavation and Placement in TA-01 footprint (Task 5b)	30 days	Wed 6/10/26	Tue 7/21/26	44FS+10 days													
47	→	Develop sub-grades within TA-03/02 for treatment Wetland	15 days	Wed 7/22/26	Tue 8/11/26	46													
48	→	Import Clean Fill/top soil/crown pit compost to develop final grades	15 days	Wed 8/12/26	Tue 9/1/26	47													
49	→	Temporary erosion control and plantings	10 days	Wed 9/2/26	Tue 9/15/26	48													
50	→	TA-03 Tailings Area	36 days	Wed 7/22/26	Wed 9/9/26														
51	→	Complete Drainage Channel Reclamation from TA02 Outlet to TA03 (Task 6a)	5 days	Wed 7/22/26	Tue 7/28/26	46													
52	→	Deploy TA03 Mine Water Management Infrastructure (Task 3a)	1 day	Wed 7/29/26	Wed 7/29/26	51													
53	→	TA03 Tailings Excavation and Placement in TA-01 footprint (Task 6b)	5 days	Thu 8/13/26	Wed 8/19/26	52FS+10 days													
54	→	Develop sub-grades within TA-03 for treatment Wetland (Task 8a)	5 days	Thu 8/20/26	Wed 8/26/26	53													
55	→	Import Clean Fill/top soil/crown pit compost to develop final grades (Task 8b)	5 days	Thu 8/27/26	Wed 9/2/26	54													
56	→	Temporary erosion control and plantings (Task 8b)	5 days	Thu 9/3/26	Wed 9/9/26	55													
57	→	Rock Drain Area/Drainage channel to TA-01	56 days	Wed 7/22/26	Wed 10/7/26														
58	→	Construction access Rock Drain Area and Drainage Channel (Task 9a)	5 days	Wed 7/22/26	Tue 7/28/26	46													
59	→	Install drainage and erosion controls (Task 3a)	5 days	Thu 8/20/26	Wed 8/26/26	58,53													
60	→	Remove tailings from Drainage Channel TA03 to Rock Drain (Task 9b)	10 days	Thu 8/27/26	Wed 9/9/26	59													
61	→	Restore Drainage Channel (Task 9b)	5 days	Thu 9/10/26	Wed 9/16/26	60													
62	→	Remove Tailings in Rock Drain (Task 9a)	5 days	Thu 9/10/26	Wed 9/16/26	60													
63	→	Develop subgrades as wetland (Task 10b)	2 days	Thu 9/17/26	Fri 9/18/26	62													
64	→	Import Clean Fill/top soil/crown pit compost to develop final grades (Task 10b)	3 days	Mon 9/21/26	Wed 9/23/26	63													
65	→	Temporary erosion control and plantings (Task 10b)	10 days	Thu 9/24/26	Wed 10/7/26	64													
66	→	Remove Tailings from Drainage Channel Rock Drain to TA-01 (Task 10b)	5 days	Thu 9/17/26	Wed 9/23/26	62													
67	→	Restore Drainage Channel (Task 11)	5 days	Thu 9/24/26	Wed 9/30/26	66													
68	→	Secure Site for Winter	138 days	Thu 10/22/26	Mon 5/3/27														
69	→	Clearing and Grubbing for 2027 Construction access (Task 13)	15 days	Thu 10/22/26	Wed 11/11/26	66FS+20 days													
70	→	Monthly inspections	123 days	Thu 11/12/26	Mon 5/3/27	35													



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	2026				2027				2028				
							Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4			
71	→	2027 Construction Season	257 days	Tue 4/27/27	Wed 4/19/28														
72	→	General Site Work	27 days	Tue 4/27/27	Wed 6/2/27														
73	→	Re-mobilize Equipment to Site (Task 14a)	5 days	Tue 4/27/27	Mon 5/3/27	70FS-5 days													
74	→	Remedial Erosion Repair work following freshet (Task 14b)	10 days	Tue 5/4/27	Mon 5/17/27	70													
75	→	Develop Site Road to Delta (Task 14c)	10 days	Tue 5/4/27	Mon 5/17/27	70													
76	→	Re-Commission Water Treatment Plant (Task 14c)	10 days	Tue 5/4/27	Mon 5/17/27	70													
77	→	Install Silt Curtain in Long Lake (Task 14c)	5 days	Tue 5/18/27	Mon 5/24/27	75													
78	→	Install monitoring instrumentation (Task 14c)	2 days	Tue 6/1/27	Wed 6/2/27	75FS+10 days													
79	→	Removing Tailings from Drainage Channel to Luke Creek Confluence Excavation	12 days	Tue 6/8/27	Wed 6/23/27														
80	→	Install erosion controls from Drainage Channel to confluence with Luke Creek (Task 14c)	2 days	Tue 6/8/27	Wed 6/9/27	74FS+15 days													
81	→	Remove Tailings from Drainage Channel to Luke Creek Confluence Excavation and Place in TA-01 (Task 15)	5 days	Thu 6/10/27	Wed 6/16/27	80													
82	→	Restore Drainage Channel (Task 16b)	5 days	Thu 6/17/27	Wed 6/23/27	81													
83	→	Complete Luke Creek/Drainage Channel Confluence Excavation	16 days	Thu 6/17/27	Thu 7/8/27														
84	→	Install temp dam and pumps upstream of mine access road culvert and outlet of Drainage Channel to excavation (Task 16a)	2 days	Thu 6/17/27	Fri 6/18/27	81													
85	→	Pump residual water in excavation to Treatment system (Task 16)	2 days	Mon 6/21/27	Tue 6/22/27	84													
86	→	Excavate Tailings - Confluence excavation area (Task 16a)	5 days	Wed 6/23/27	Tue 6/29/27	85													
87	→	Prepare subgrades/sloping of banks in wetland area (Task 17)	5 days	Wed 6/23/27	Tue 6/29/27	85													
88	→	Restore Luke Creek (Task 17)	2 days	Wed 6/30/27	Thu 7/1/27	87													
89	→	Top soil, Temporary Erosion Controls and Plantings (Task 17)	5 days	Fri 7/2/27	Thu 7/8/27	88													
90	→	Luke Creek Tailings removal between Confluence and Wetland Area excavations	15 days	Wed 6/30/27	Tue 7/20/27														
91	→	Improve Access to Creek (Task 14c)	5 days	Wed 6/30/27	Tue 7/6/27	87													
92	→	Install upstream temporary dam and pumps (Task 18)	2 days	Wed 7/7/27	Thu 7/8/27	91													
93	→	Remove tailings from Creek Bed (Task 18)	5 days	Wed 7/7/27	Tue 7/13/27	91													
94	→	Restore Creek bed (Task 19b)	5 days	Wed 7/14/27	Tue 7/20/27	93													
95	→	Complete Luke Creek Wetland Area Excavation	64 days	Wed 7/14/27	Mon 10/11/27														
96	→	Deploy up and down stream temporary dams (Task 19a)	2 days	Wed 7/14/27	Thu 7/15/27	93													
97	→	Pump residual water in excavation to Treatment system (Task 19)	2 days	Fri 7/16/27	Mon 7/19/27	96													
98	→	Phase 1 Excavate Tailings - Wetland excavation area (Task 19a)	5 days	Fri 8/13/27	Thu 8/19/27	97													
99	→	Restore Phase 1 of Excavation (Task 19a)	5 days	Fri 8/27/27	Thu 9/2/27	98													
100	→	Relocate Dams and install western wetland dam (Task 19a)	2 days	Fri 9/3/27	Mon 9/6/27	99													
101	→	Pump residual water to temporary treatment system (Task 19a)	2 days	Tue 9/7/27	Wed 9/8/27	100													
102	→	Phase 2 Excavate Tailings - Wetland excavation area (Task 19a)	5 days	Thu 9/9/27	Wed 9/15/27	101													
103	→	Prepare subgrades/sloping of banks in wetland area (Task 19a)	5 days	Thu 9/16/27	Wed 9/22/27	102													
104	→	Restore Phase 2 of Wetland Area Excavation (Task 19a)	2 days	Thu 9/23/27	Fri 9/24/27	103													
105	→	Temporary Erosion Controls and Plantings (Task 19a)	5 days	Mon 9/27/27	Fri 10/1/27	104													
106	→	Remove temporary dams from Wetland Excavation Area (Task 19)	1 day	Mon 10/11/27	Mon 10/11/27	105													
107	→	Tailings Delta	53 days	Thu 9/16/27	Mon 11/29/27														



ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	2026				2027				2028				
							Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3
108	→	Phase 1 Aqua Dam Deployment (Task 20a)	5 days	Thu 9/16/27	Wed 9/22/27	102													
109	→	Phase 1 Excavate Tailings Delta to 2 meters below Seasonal Low Lake Level (Task 20a)	25 days	Thu 9/23/27	Wed 10/27/27	108													
110	→	Restore Phase 1 Tailings Delta Removal Area (Task 20a)	5 days	Thu 10/28/27	Wed 11/3/27	109													
111	→	Phase 2 Aqua Dam Deployment (Task 20a)	5 days	Thu 11/4/27	Wed 11/10/27	110													
112	→	Phase 2 Excavate Tailings Delta to 2 meters below Seasonal Low Lake Level (Task 20a)	15 days	Thu 10/7/27	Wed 10/27/27	111													
113	→	Restore Phase 2 Tailings Delta Removal area (Task 20a)	5 days	Thu 10/28/27	Wed 11/3/27	112													
114	→	Remove Dams (Task 20a)	5 days	Thu 11/4/27	Wed 11/10/27	113													
115	→	Remove Silt Curtain (Task 20a)	3 days	Thu 11/25/27	Mon 11/29/27	114FS+10 days													
116	→	TA-01 Construction - 2027	120 days	Thu 6/17/27	Wed 12/1/27														
117	→	Develop subgrades of TA-01/place, stabilize, compact, shape tailings (Task 21)	105 days	Thu 6/17/27	Wed 11/10/27	81													
118	→	Install end of season erosion control measures (Task 21)	15 days	Thu 11/11/27	Wed 12/1/27	117													
119	→	Monthly Inspections	100 days	Thu 12/2/27	Wed 4/19/28	118													
120	→	2027 Season demobilization	10 days	Tue 11/30/27	Mon 12/13/27	118													
121	→	2028 Construction Season	133 days	Mon 5/1/28	Wed 11/1/28														
122	→	Mobilize 2028 equipment (Task 22a)	5 days	Mon 5/1/28	Fri 5/5/28	119FS+7 days													
123	→	Erosion/Erosion Controls Repair following freshet Task 22a)	10 days	Mon 5/8/28	Fri 5/19/28	122													
124	→	Maintain Plantings and replant as necessary (Task 22b)	100 days	Mon 5/22/28	Fri 10/6/28	123													
125	→	TA01 Construction - 2028	118 days	Mon 5/22/28	Wed 11/1/28														
126	→	Cap Installation (Task 23)	35 days	Mon 5/22/28	Fri 7/7/28	123													
127	→	Final Grading/Top Soil (Task 23)	15 days	Mon 7/10/28	Fri 7/28/28	126													
128	→	Temporary Erosion Controls/seeding (Task 23)	5 days	Mon 7/31/28	Fri 8/4/28	127													
129	→	Restore Remaining Disturbed Areas (Task 24)	15 days	Thu 9/21/28	Wed 10/11/28	128													
130	→	Demobilization/remove temporary facilities (Task 25)	15 days	Thu 10/12/28	Wed 11/1/28	129													

