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4.0 ALTERNATIVES ASSESSMENT

The main objective of conducting an alternatives assessment is to consider a reasonable range of feasible options before determining the final Springpole Gold Project (Project) design. This ensures that a variety of options were identified, considered and compared in order to determine the best way to meet the needs of the Project while being protective of the environment. An alternatives assessment is required for the Project per the *Canadian Environmental Assessment Act, 2012* (SC 2012, c. 19, s. 52) and the Ontario *Environmental Assessment Act* (RSO 1990, c. E.18). This section also meets the requirements of the Environmental Impact Statement (EIS) Guidelines (Appendix B-1) and provincially approved Terms of Reference (ToR; Appendix B-3) for the Project.

4.1 Alternatives Assessment Approach

4.1.1 Identification of Alternatives

As a matter of general policy and practice, alternatives are only considered feasible and are appropriate to be assessed in the Environmental Impact Statement / Environmental Assessment (EIS/EA) if they are likely to satisfy the following questions (adapted from MOE 2014):

- Do they provide a viable solution to the problem or opportunity to be addressed?
- Are they proven technologies and are they technically feasible at the scale required?
- Are they consistent with other relevant planning objectives, policies and decisions?
- Are they consistent with government priority initiatives, for example, waste diversion, energy efficiency, source water protection or reducing greenhouse gas (GHG) emissions?
- Could potential effects on any sensitive environmental features, such as wetlands, species at risk (SAR), archaeological resources or built heritage, be mitigated?
- Are they practical, financially realistic and economically viable?
- Are they able to be implemented and at the defined location?

These questions were used to identify a reasonable range of alternatives for assessment.

The identification of alternatives for assessment and the assessment method used for evaluating alternatives has also been guided by the results of ongoing engagement and consultation with Indigenous communities, government agencies, and the public (Section 2 and Appendix D).

4.1.1.1 Alternatives to the Project

The *Canadian Environmental Assessment Act, 2012* and Ontario *Environmental Assessment Act* require consideration for both alternatives to a proposed project and alternate methods of carrying out a proposed project. The following alternatives to the Project were identified and are assessed in Section 4.:

- Proceed with the Project in the near term as planned.
- Delay the Project until circumstances are more favourable.
- Abandon the Project (i.e., do nothing).

These alternatives were identified to be assessed in the final EIS/EA within the provincially approved ToR. No other Project alternatives were identified through a review of the questions in Section 4.1.1 during internal FMG meetings, or through consultation and engagement activities with Indigenous communities, government agencies and the public, including on the draft EIS/EA.

The alternative of not proceeding and abandoning the Project (i.e., do nothing) does not meet the purpose of the Project or the questions in Section 4.1.1, but has been included as required by the Ontario Code of Practice (MOE 2014). The do nothing alternative maintains the existing, baseline environmental conditions and is used for comparison during the assessment of the alternative methods for the Project.

4.1.1.2 Alternative Means

Both the EIS Guidelines and ToR for the Project (Appendices B-1 and B-3) indicate that an assessment of alternative means (i.e., alternatives of carrying out the Project) should consider a number of Project components, including those identified at a preliminary level based on information available at that time:

- Dikes;
- Mine rock storage;
- Tailings storage;
- Ore processing;
- Ore storage;
- Overburden / surficial materials storage;
- Buildings, facilities and general infrastructure;
- Effluent treatment;
- Water supply;
- Site water management;
- Treated effluent discharge;
- Internal site access roads;
- Mine access road route;
- Workforce accommodations;
- Workforce transportation;
- Domestic sewage;
- Solid waste;
- Power supply;
- Transmission line;
- Explosives;
- Aggregates; and
- Mine closure.

Each of these Project components is needed to support Project construction, operation or decommissioning and closure, and the Project cannot feasibly be implemented without consideration of these components. For each of the required Project components, a range of potentially viable alternatives were identified for assessment against the criteria provided in Section 4.1.2, including using information from the following sources:

- Engineering investigations and engineering studies, including trade-off studies;
- Consultation with interested persons and comments received during consultation and engagement activities, including on the draft EIS/EA (summarized in Section 2 and detailed in Appendices C and D); and
- Professional experience and expertise listed in Section 14, including from preparation or reviewing other Ontario mining EIS/EAs.

The alternatives means of carrying out the Project were considered with the application of standard, reasonable mitigation for potential environmental effects, including:

- **Air:** dust management, controlled blasting, reduced vehicle speeds, preventative maintenance of equipment, no idling policy;
- **Water:** collecting, managing and treating contact waters; designing for prevention of acid rock drainage; avoiding waterbodies and/or compensating for effects on fish habitat; and implementing erosion and sediment control measures;
- **Land:** minimizing clearing of natural vegetation, designing a compact site, using reduced vehicle speeds, minimizing potential for wildlife interactions, utilizing or paralleling existing infrastructure corridors and reclaiming the site after operations; and
- **People:** avoiding or minimizing adverse effects on local residences or camps, implementing a procurement approach to support local employment and contracts, and engaging communities on reclamation strategies.

Table 4.1-1 provides an assessment of the Project components against the questions outlined in Section 4.1.1. Table 4.1-2 outlines the progression over the EA process, the rationale for the alternatives identified for each Project component, as well as the primary sources of information. The methods for completing the alternatives assessment are provided in Section 4.1.2.

A number of Project components were initially identified and/or required to be included in the alternatives assessment based on the EIS Guidelines and/or provincially approved ToR (Appendices B-1 and B-3); however, viable alternatives were not identified for all components. For these Project components, information is provided regarding the lack of viable alternatives in the relevant subsection in the final EIS/EA relative to the questions presented in Section 4.1.1.

Table 4.1-1: Identification of Alternatives Methods that Satisfy Initial Questions

Potential Alternative Methods	Are There Alternatives That (Are):							Potentially Viable Alternatives Identified
	Provide a Viable Solution	Proven Technically Feasible Technologies	Consistent with Planning Requirements	Consistent with Government Priority Initiatives	Support Mitigation for Sensitive Environmental Aspects	Practical, Financially Realistic and Economically Viable	Able to be Implemented and at the Location	
Dike	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Location
Mine rock storage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Location, Method
Tailings storage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Location, Method
Ore processing	No	NA	NA	NA	NA	NA	NA	NA
Ore storage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Location
Overburden / surficial materials storage	No	NA	NA	NA	NA	NA	NA	NA
Buildings, facilities and general infrastructure	No	NA	NA	NA	NA	NA	NA	NA
Effluent treatment	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Method
Water supply	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Location
Site water management	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Location
Treated effluent discharge	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Location
Internal site access roads	No	NA	NA	NA	NA	NA	NA	NA
Mine access road route	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Location
Workforce accommodations	No	NA	NA	NA	NA	NA	NA	NA

Table 4.1-1: Identification of Alternatives Methods that Satisfy Initial Questions

Potential Alternative Methods	Are There Alternatives That (Are):							Potentially Viable Alternatives Identified
	Provide a Viable Solution	Proven Technically Feasible Technologies	Consistent with Planning Requirements	Consistent with Government Priority Initiatives	Support Mitigation for Sensitive Environmental Aspects	Practical, Financially Realistic and Economically Viable	Able to be Implemented and at the Location	
Workforce transportation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Method
Domestic sewage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Method
Solid waste	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Location
Power supply	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Method
Transmission line route	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Location
Explosives	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Location
Aggregates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Location
Mine closure	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Method

Source: adapted from MOE 2014.
NA = not assessed further, as the Project component does not have a viable alternative.

Table 4.1-2: Progression and Rationale for Alternative Methods Assessed in the Final Environmental Impact Statement / Environmental Assessment

Project Component	Rationale for Initial Selection		Methods Consulted Upon in the Draft EIS/EA	Methods Identified for Assessment in Final EIS/EA	Range of Alternatives Considered in Final EIS/EA	Primary Means of Identifying Individual Alternative Methods Assessed
	Federal EIS Guidelines Methods	Provincial Final Amended ToR Methods				
Dikes	Location of key Project components	Not included	locations	Dike locations (terminology change)	Six alternative locations in total	• Engineering trade-off studies
Ore processing	Ore processing methods / technologies	Ore processing	Ore processing location, methods and technologies	No new technically feasible alternatives were identified through engineering or consultation for the final EIS/EA		
Mine rock storage	Mine waste disposal, methods, conveyance and sites considered	Mine rock (and overburden management)	Mine rock storage locations	Mine rock storage locations	Two potential locations	• Prefeasibility study • Engineering trade-off studies • Mine Waste Management Alternatives Assessment (Appendix E) completed in accordance with MDMER requirements
Tailings storage	Mine waste disposal, methods, conveyance and sites considered	(Process effluent and) tailings management	Tailings storage locations	Tailings storage locations	Eight potential locations	
			Mine rock and tailings storage methods	Mine rock and tailings storage methods	Two potential methods	
			Tailings storage technologies	Tailings storage technologies	Three technologies	
			Mine rock and tailings storage strategy	Mine rock and tailings storage strategy	Four alternative methods	

Table 4.1-2: Progression and Rationale for Alternative Methods Assessed in the Final Environmental Impact Statement / Environmental Assessment

Project Component	Rationale for Initial Selection		Methods Consulted Upon in the Draft EIS/EA	Methods Identified for Assessment in Final EIS/EA	Range of Alternatives Considered in Final EIS/EA	Primary Means of Identifying Individual Alternative Methods Assessed
	Federal EIS Guidelines Methods	Provincial Final Amended ToR Methods				
Buildings, facilities and general infrastructure	Location of key Project components, process plant	Process plant (and related site infrastructure)	Process plant location	No new technically feasible alternatives were identified through engineering or consultation for the final EIS/EA		
Ore storage	Location of key Project components, ore, low grade ore	Not included	Ore storage locations	Ore storage locations	Two potential locations	• Engineering study • Prefeasibility study
Overburden / surficial materials storage	Location of key Project components, overburden, top soil stockpiles/storage areas	(Mine rock and) overburden management	Overburden, surficial soil and lake bed sediment storage	No new technically feasible alternatives were identified through engineering or consultation for the final EIS/EA		
Buildings, facilities and general infrastructure	Location of key Project components, pipelines, fuel storage and distribution	(Process plant and) related site infrastructure	Other site buildings, facilities and general infrastructure	No new technically feasible alternatives were identified through engineering or consultation for the final EIS/EA		
Effluent treatment methods	Management of water supply (mine and potable) and waste water)	Not included	Process plant effluent treatment	Process plant effluent treatment	Three alternative effluent treatment methods assessed	• Engineering study

Table 4.1-2: Progression and Rationale for Alternative Methods Assessed in the Final Environmental Impact Statement / Environmental Assessment

Project Component	Rationale for Initial Selection		Methods Consulted Upon in the Draft EIS/EA	Methods Identified for Assessment in Final EIS/EA	Range of Alternatives Considered in Final EIS/EA	Primary Means of Identifying Individual Alternative Methods Assessed
	Federal EIS Guidelines Methods	Provincial Final Amended ToR Methods				
Fresh water supply	Management of water supply (mine and potable)	Water supply	Water supply	Fresh water supply (terminology revised for precision)	Three alternative locations	• Engineering study
Site water management		Minewater management	Site water management	Central water storage pond (CWSP) (new to be consistent with Appendix E)	Four alternative locations	• Engineering trade-off study • Consultation • Mine Waste Management Alternatives Assessment (Appendix E)
Treated effluent discharge locations	(Water management and) location of the final effluent discharge points	Water discharge	Treated effluent discharge location	Treated effluent discharge location	Three alternative locations	• Engineering study • Consultation
Mine access road	Access to the Project site, all-season access road	Site access (and access road routing)	Site access	No new technically feasible alternatives were identified through engineering or consultation for the final EIS/EA		
		(Site access and) access road routing	Mine site access road routing	Mine site access road routing	Four alternative locations (routes)	• Engineering trade-off study
Workforce Accommodations	Workforce accommodations	Not included	Workforce accommodations	No new technically feasible alternatives were identified through engineering or consultation for the final EIS/EA		

Table 4.1-2: Progression and Rationale for Alternative Methods Assessed in the Final Environmental Impact Statement / Environmental Assessment

Project Component	Rationale for Initial Selection		Methods Consulted Upon in the Draft EIS/EA	Methods Identified for Assessment in Final EIS/EA	Range of Alternatives Considered in Final EIS/EA	Primary Means of Identifying Individual Alternative Methods Assessed
	Federal EIS Guidelines Methods	Provincial Final Amended ToR Methods				
	(and transportation)					
Workforce transportation to site	Workforce (accommodations and) transportation	Not included	Workforce transportation	Workforce / contractor transportation to site (terminology revised for precision)	Two alternative methods	• Engineering trade-off study
Domestic sewage	Not included	(Solid waste management and) domestic sewage treatment	Domestic sewage management	Domestic sewage management	Three alternative methods	• Engineering study
Solid waste	Not included	Solid waste management (and domestic sewage treatment)	Solid waste management	Domestic solid waste management (terminology revised for precision)	Two alternative locations	• FMG discussions with approved waste management locations
Power supply	Power supply	Power supply (and routing)	Power supply	Power supply	Four alternative technologies	• Engineering study • Renewables study • Consultation
Transmission line route		Power (supply and) routing	Transmission line routing	Transmission line routing	Four alternative	• Power supply study • Engineering study • Consultation

Table 4.1-2: Progression and Rationale for Alternative Methods Assessed in the Final Environmental Impact Statement / Environmental Assessment

Project Component	Rationale for Initial Selection		Methods Consulted Upon in the Draft EIS/EA	Methods Identified for Assessment in Final EIS/EA	Range of Alternatives Considered in Final EIS/EA	Primary Means of Identifying Individual Alternative Methods Assessed
	Federal EIS Guidelines Methods	Provincial Final Amended ToR Methods				
					locations (routes)	
Explosives	Not included	Explosive siting and storage	Explosive supply and handling	Explosives manufacturing location (terminology revised for precision)	Two alternative locations	• Engineering study
Aggregates	Source of construction aggregate	Aggregate supply	Aggregate sources	All technically feasible alternatives identified through FMG aggregate investigation study have been carried forward to the Project Description (Section 5); rationale provided		
Fish Habitat Offsetting Measures	Not included	Fish habitat loss and offsetting / compensation	Fish habitat offsetting / compensation	Alternatives that meet Fisheries and Oceans Canada policy and guiding principles are considered and consulted up through a complementary regulatory process (Appendix F)		
Mine closure	Not included	Mine closure	Mine closure, open pit basin	Mine closure, dewatered open pit basin	Two alternative methods	• Professional experience and judgment
			Mine closure, co-disposal facility (CDF)	Mine closure, CDF	Three alternative methods	• Engineering study
			Mine closure, demolition waste	Mine closure, demolition waste	Two alternative methods	• Professional experience and judgment • FMG discussions with approved waste management locations

4.1.2 Assessment of Alternatives Methods

The assessment of viable alternatives was carried out to distinguish the relative merits of the different alternatives and provide transparency regarding the Project design choices described in Section 5. Qualitative and quantitative measures were used to evaluate the potential effects of each alternative for each performance objective and associated criteria and indicators (Section 4.1.2.2). The detail required for the analysis of alternatives (including through provision of quantitative data) varies depending on the overall potential for effects. Closure-related alternatives were assessed for the decommissioning and closure phase, unless there was an interaction with the construction and operation phases.

4.1.2.1 Information Sources

As per the Ontario Code of Practice (MOE 2014), viable alternative methods are compared against the alternative of abandoning the Project (retaining existing baseline conditions; do nothing), so that the reader can more fully understand the advantages and disadvantages of proceeding with the preferred method. Project-specific baseline investigations and models have been completed for the Project that support that assessment of alternatives, and are appended to this final EIS/EA.

Other sources of information for the assessment of alternatives include the following:

- Traditional Knowledge and Land Use information shared by local Indigenous communities;
- Government-published data / maps / websites, regulatory instruments (such as acts and regulations), policies and plans (generally referenced within the Project-specific baseline and modelling reports included as appendices to the final EIS/EA);
- Categorized habitat delineations for Woodland Caribou used for differentiation amongst alternatives (only generalized habitat information is shown in figures as per the Ministry of the Environment, Conservation and Parks [MECP] request);
- Engineering investigations and engineering studies, including trade-off studies;
- Workshops, meetings and discussions;
- Consultation with interested persons and comments received during consultation and engagement activities, including on the draft EIS/EA (summarized in Section 2 and detailed in Appendices C and D); and
- Professional experience and expertise listed in Section 14, including from preparation or reviewing other Ontario mining EIS/EA submissions.

4.1.2.2 Performance Objectives, Criteria and Indicators Overview

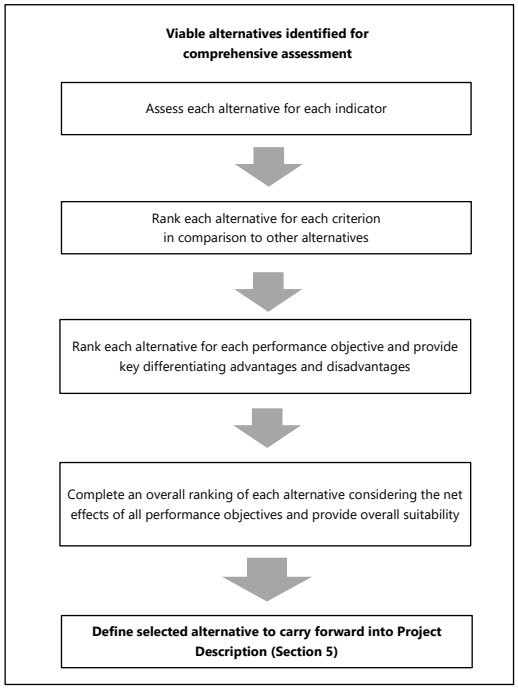
Performance objectives are meaningful attributes essential for the Project's environmental and technical success and provide a basis for distinguishing between individual alternatives. In the final EIS/EA, alternatives were assessed against four performance objectives:

- Potential effects on the natural environment;
- Potential effects on the social, economic, cultural and built environment;
- Technical performance; and
- Amenability to reclamation.

These performance objectives are also reflective of the requirements and guidance provided in the *Canadian Environmental Assessment Act, 2012* and Ontario *Environmental Assessment Act*. The performance objectives were consulted upon within the provincial ToR process, as well as the draft EIS/EA, and have been refined in the final EIS/EA to reflect the comments received (described in Section 4.2) during the draft EIS/EA review process (Table 4.1-3). The performance objectives also address the requirements of the federal EIS guidelines to assess the technical and economical feasibility of the alternatives.

Evaluation criteria and specific indicators for each performance objective were selected that could reasonably be applied to the assessment of alternatives to the Project and alternative means for the Project. The criteria and associated indicators were introduced and reviewed through the provincial ToR process, updated and presented in the draft EIS/EA, and refined based on the comments received during the review the draft EIS/EA to establish the final criteria and indicators for the final EIS/EA (Table 4.1-4).

Each viable alternative was evaluated against the four performance objectives using criteria and indicators specific to that objective. Rankings of preferred, partially preferred or not preferred were defined for each criteria, and the advantages and disadvantages that define the key differences / differentiating factors among the alternatives considered were tabulated for each indicator.



Some modifications to rank approach and descriptions were completed to provide an evaluation of each criterion, versus just at the performance level. These modifications were made to the natural environment and social, economic, cultural and built environment performance objectives (Section 4.1.2.3 and Section 4.1.2.4).

For each performance objective, the results are summarized, and an overall ranking was made for each alternative.

An overall assessment that was completed considered the results for all performance objectives. A comparative ranking and statement of suitability is provided for each alternative. Based on this overall assessment, one or more preferred alternative was identified. Where more than one alternative has an overall assessment of preferred, additional explanation is provided regarding which alternative has been selected to carry forward into the Project design (summarized in Section 5).

Table 4.1-3: Progression in Performance Objectives Used in Alternatives Assessment

Document	Performance Objectives for the Assessment of Alternatives	Primary Change
ToR	• Potential effects on the physical and biological environments (N) • Potential effects on the human environment, including Aboriginal and Treaty Rights, cultural heritage resources (including archaeological, built heritage and cultural heritage landscape resources) and traditional land use (SECB) • Technical applicability and/or system integrity and reliability (T) • Ability to service the site effectively (T) • Cost-effectiveness (T) • Amenability to reclamation (R)	• No change; initial listing
Draft EIS/EA	• Potential effects on the physical and biological environments (N) • Potential effects on the human environment (SECB) • Technical applicability and/or system integrity and reliability (T) • Ability to service the site effectively (T) • Cost-effectiveness (T) • Amenability to reclamation (R)	• Human environment objective name simplified (SECB)
Final EIS/EA	• Potential effects on the natural environment (N) • Potential effects on the social, economic, cultural and built environment (SECB) • Technical performance (T) • Amenability to reclamation (R)	• Physical and biological environment objective name simplified to natural environment (N) • Human environment objective name clarified further to social, economic, cultural and built environment (SECB) • Three technical objectives (T) are grouped into one to provide a greater focus on environment-related objectives

Note:
N = natural environment performance objective; R = amenability to reclamation performance objective; SECB = social, economic, cultural and built environment performance objective; T = technical performance objective.

Table 4.1-4: Progression in Criteria and Indicators Used in Alternatives Assessment and Rationale

Criteria Used in the Draft EIS/EA	Indicator Used in the Draft EIS/EA	Criteria Used in the Final EIS/EA	Indicator Used in the Final EIS/EA	Rationale for Inclusion
Performance Objective: Potential Effects on the Physical and Biological Environments		**Performance Objective: Potential Effects on the Natural Environment**		
Air quality and climate	• Attainment or maintenance of air quality point of impingement standards, or scientifically defensible alternatives • Emission rates or GHGs	Potential effect on air quality and climate	Change in level and quality of air emissions	Natural environment component
			Change in level of GHG emissions generated	Regulatory interest
Effect on fish and aquatic habitat	• Attainment or maintenance of surface water quality guidelines for the protection of aquatic life, or where pre-Project water quality does not meet Provincial Water Quality Objectives for protection of aquatic life, not further degraded • Maintenance or provision of fish habitat • Maintenance of fish population • Maintenance of water flows or conditions suitable for fish passage • Maintenance of groundwater flows, levels or quality	Potential effect on water quality, fish and aquatic habitat	Change in level and quality of surface water from effluent discharges	Natural environment component
			Area of fish habitat affected	Natural environment component
			Ability to maintain fish populations	Natural environment component
			Ability to maintain conditions for fish passage	Natural environment component
			Ability to maintain groundwater flow direction, level and quality	Natural environment component
Effect on wetlands	• Area, type and quality (functionality) of wetlands that would be displaced or altered • Maintenance of wetland connectivity	Potential effect on wetlands	Area of wetlands affected	Natural environment component
			Ability to maintain wetland connectivity	Natural environment component
Effect on terrestrial species and habitat	• Area, type and quality (functionality) of terrestrial		Area of terrestrial habitat displaced	Natural environment component

Table 4.1-4: Progression in Criteria and Indicators Used in Alternatives Assessment and Rationale

Criteria Used in the Draft EIS/EA	Indicator Used in the Draft EIS/EA	Criteria Used in the Final EIS/EA	Indicator Used in the Final EIS/EA	Rationale for Inclusion
	habitat that would be displaced or altered • Potential for noise (or other harm and harassment) related disturbance • Maintenance or provision of plant dispersion and wildlife movement corridors • Maintenance of wildlife population	Potential effect on terrestrial species and habitat	Change in the level of noise and presence of other harm and harassment to wildlife	Natural environment component
			Ability to maintain plant dispersion and wildlife movement corridors	Natural environment component
			Ability to maintain wildlife populations	Natural environment component
Effect on species at risk (SAR)	• Sensitivity level (Endangered, Threatened, Special Concern) of involved species • Area, type and quality of SAR territories or habitat that would be displaced • Potential for noise (or other harm and harassment) related disturbance • Maintenance or provision of wildlife movement corridors	Potential effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per the *Endangered Species Act, 2007* (SO 2007, c. 6) and *Species at Risk Act* (SC 2002, c. 29)	Natural environment component
			Area and type of SAR habitat displaced	Natural environment component
			Change in the level of noise and presence of other harm and harassment to SAR	Natural environment component
			Ability to maintain SAR wildlife movement corridors	Natural environment component
Performance Objective: Potential Effects on the Human Environment		**Performance Objective: Potential Effects on the Social, Economic, Cultural and Built Environment**		
Effect on local residents and recreational users	• Maintenance of property values • Maintenance or improvement of income opportunities • Maintenance or provision of local access • Attainment of provincial noise guidelines, and/or background	Potential effect on local residents and recreational users	Relative potential change to property value	Economic environment component
			Ability to maintain or improve income opportunities	Economic environment component
			Ability to maintain or improve local access	Built environment component
			Ability to attain or maintain provincial noise guidelines	Built environment component

Table 4.1-4: Progression in Criteria and Indicators Used in Alternatives Assessment and Rationale

Criteria Used in the Draft EIS/EA	Indicator Used in the Draft EIS/EA	Criteria Used in the Final EIS/EA	Indicator Used in the Final EIS/EA	Rationale for Inclusion
	sound levels if already above the guidelines • Non-interference with water well supply systems • Non-interference with surface water drinking supply • Potential for general disturbance and adverse effects on aesthetics • Potential for adverse health and safety effects		Distance from known water well sources	Built environment component
			Distance from known surface water drinking sources	Built environment component
			Change in visual aesthetics or level of general disturbance	Built environment component
			Potential for adverse health and safety effects	Social environment component
Effect on infrastructure	• Maintenance or provision of local and regional access • Maintenance and reliability of power supply systems • Maintenance and reliability of pipeline systems	Potential effect on infrastructure	Ability to maintain or provide local and regional access	Built environment component
			Ability to maintain or provide reliable power supply	Built environment component
			Ability to maintain or provide reliable pipeline systems	Built environment component
Public health and safety	• Attainment or maintenance of air quality point of impingement standards, or scientifically defensible alternatives • Maintenance or attainment of the quality of drinking water supply systems • Managing the potential for adverse electromagnetic exposure • Maintaining safe road traffic conditions that are within the domain of FMG control	Potential effect on public health and safety	Change in the level and quality of air emissions	Built environment component
			Potential for effects on quality of drinking water supplies	Built environment component
			Potential for adverse electromagnetic exposure	Built environment component
			Ability to maintain safe road traffic within FMG's control	Built environment component
			Change in provision of health services	Social environment component

Table 4.1-4: Progression in Criteria and Indicators Used in Alternatives Assessment and Rationale

Criteria Used in the Draft EIS/EA	Indicator Used in the Draft EIS/EA	Criteria Used in the Final EIS/EA	Indicator Used in the Final EIS/EA	Rationale for Inclusion
	• Maintenance or provision of health services			
Effect on local businesses and economy	• Maintenance or improvement of local business and economic opportunities (including commercial bait harvesters and trappers) • Continued access to areas used for natural resource harvesting by tourism operators	Potential effect on local businesses and economy	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	Economic environment component
			Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	Economic environment component
Effect on tourism and recreation	Maintenance or improvement of tourism and recreational opportunities	Potential effect on tourism and recreation	Change to tourism and recreational opportunities	Economic environment component
Effect on regional economy	Maintenance or improvement of the regional economy	Potential effect on regional economy	Change to the regional economy	Economic environment component
Effect on government services	Maintenance or improvement on the capacity of existing health, education and family support services	Potential effect on government services	Change to the capacity of existing health, education and family support services	Social environment component
Effect on resource management objectives	Consistency with established and planned resource management objectives such as Bear Management Areas and Sustainable Forest Management Units	Potential effect on resource management	Degree of consistency with existing land use and resource management plans	Social environment component
Excessive waste materials	• Limiting the generation of unnecessary waste materials • Potential for material to be recycled / re-used	Waste materials	Ability to limit the generation of unnecessary waste materials	Built environment component
			Potential for material to be recycled or re-used	Built environment component
Effect on heritage resources including	Alteration that is not sympathetic or is incompatible with the historical fabric	Potential effect on heritage resources	Alteration that is not sympathetic or is incompatible with the historical fabric	Cultural environment component

Table 4.1-4: Progression in Criteria and Indicators Used in Alternatives Assessment and Rationale

Criteria Used in the Draft EIS/EA	Indicator Used in the Draft EIS/EA	Criteria Used in the Final EIS/EA	Indicator Used in the Final EIS/EA	Rationale for Inclusion
archaeology, built heritage and cultural heritage landscapes	and appearance of cultural heritage resources		and appearance of cultural heritage resources	
	• Isolation of a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship • Direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource • Avoidance or damage to known archaeological resources • Land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)		Isolation of a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	Cultural environment component
			Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	Cultural environment component
			Avoids damage or disturbance to known archaeological resources	Cultural environment component
			Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	Cultural environment component
Effect on First Nation reserves and communities	Maintenance or improvement of First Nation reserve and community conditions (subject to the limitations of Company capacity and community members' personal choice)	Potential effect on Indigenous communities	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	Cultural environment component
Effect on spiritual, ceremonial, and cultural heritage, and archaeological sites	Avoidance of damage or disturbance to known spiritual, ceremonial, cultural heritage and archaeological sites; or implement other forms protection / preservation supported by local First Nations and Métis	Potential effect on spiritual and ceremonial sites	Avoids damage or disturbance to known spiritual, ceremonial, cultural heritage and archaeological sites; or implements other forms protection / preservation supported by local Indigenous communities	Cultural environment component

Table 4.1-4: Progression in Criteria and Indicators Used in Alternatives Assessment and Rationale

Criteria Used in the Draft EIS/EA	Indicator Used in the Draft EIS/EA	Criteria Used in the Final EIS/EA	Indicator Used in the Final EIS/EA	Rationale for Inclusion
Effect on traditional land use	Maintain access to traditional lands for current traditional land uses, except as otherwise agreed to with local First Nations and Métis	Potential effect on traditional land use	Maintains access to traditional lands for current traditional land uses, except as otherwise agreed to with local Indigenous communities. The assessment of Aboriginal and Treaty rights is addressed through the analysis of traditional land use.	Cultural environment component
Effect on Aboriginal and Treaty Rights	Avoid infringement of Aboriginal and Treaty Rights, except as otherwise agreed to with local First Nations and Métis			
Performance Objective: Technical Applicability and/or System Integrity and Reliability		**Performance Objective: Technical Performance**		
Available technology	• Used elsewhere in similar circumstances, and is predictably effective with contingencies if and as required • New technology supported by pilot plant or strong theoretical investigations or testing, with contingencies if and as required	Ability to service the site	Prevalence and effectiveness of technology for use in similar circumstances	Technical feasibility per EIS Guidelines [1] and ToR[2]
			Degree to which new technology is supported by investigations or testing	Technical feasibility per EIS Guidelines [1] and ToR[2]
Performance Objective: Ability to Service the Site Effectively		[Performance objective combined in Technical Performance in the final EIS/EA]		
Service	Provides a guaranteed supply to the site with manageable potential for supply disruption, and/or contingencies available	Ability to service the site	Ability to consistently meet Project needs	Technical feasibility per EIS Guidelines [1] and ToR[2]
Accessibility	Accessible land base or infrastructure needed to support component development and operation		Availability of necessary infrastructure for component	Technical feasibility per EIS Guidelines [1] and ToR[2]
Performance Objective: Cost-Effectiveness		[Performance objective combined in Technical Performance in the final EIS/EA]		
Project financing	Investor attractiveness or risk	Cost effectiveness	Potential effect on Project financing resulting from investor attractiveness or risk	Economic feasibility per EIS Guidelines [1] and ToR[2]

Table 4.1-4: Progression in Criteria and Indicators Used in Alternatives Assessment and Rationale

Criteria Used in the Draft EIS/EA	Indicator Used in the Draft EIS/EA	Criteria Used in the Final EIS/EA	Indicator Used in the Final EIS/EA	Rationale for Inclusion
Return on investment	Provides a competitive or acceptable return on investment		Degree to which alternative provides a competitive or acceptable return on investment	Economic feasibility per EIS Guidelines [1] and ToR[2]
Financial risk	Provides, or is associated with, a preferred, manageable or acceptable financial risk		Degree to which alternative provides financial risk	Economic feasibility per EIS Guidelines [1] and ToR[2]
Performance Objective: Amenability to Reclamation		**Performance Objective: Amenability to Reclamation**		
Effect on public safety and security	Avoidance of safety and security risks to the general public	Potential effect on future public safety and security	Ability to avoid safety and security risks to the general public	Technical feasibility per EIS Guidelines [1] and ToR[2]
Effect on environmental health and sustainability	• Attainment or maintenance of air quality point of impingement standards, or scientifically defensible alternatives • Attainment or maintenance of water quality guidelines for the protection of aquatic life, or where pre-Project water quality does not meet the Provincial Water Quality Objectives for protection of aquatic life, not further degraded • Restoration of passive drainage systems • Provision of habitats for vegetation and wildlife species, including SAR	Potential effect on future environmental health and sustainability	Not considered in the final EIS/EA for this performance objective, as reclamation and closure is considered in the natural environment objective	
			Not considered in the final EIS/EA for this performance objective, as reclamation and closure is considered in the natural environment objective	
			Degree to which pre-development passive drainage systems will be restored	Technical feasibility per EIS Guidelines [1] and ToR[2]
			Ability to provide habitats for vegetation and wildlife species, including SAR	Technical feasibility per EIS Guidelines [1] and ToR[2]
Effect on land use	• Provides opportunities for productive land uses		Ability to provide productive land uses consistent with existing land use and resource management plans	Technical feasibility per EIS Guidelines [1] and ToR[2]

Table 4.1-4: Progression in Criteria and Indicators Used in Alternatives Assessment and Rationale

Criteria Used in the Draft EIS/EA	Indicator Used in the Draft EIS/EA	Criteria Used in the Final EIS/EA	Indicator Used in the Final EIS/EA	Rationale for Inclusion
	• Provide for an aesthetically pleasing site		Provides for an aesthetically pleasing site	Technical feasibility per EIS Guidelines (1) and ToR(2)

Note:
(1) The EIS Guidelines (Appendix B-1) require that "*The EIS will identify and consider the environmental effects of alternative means of carrying out the project that are technically and economically feasible.*" For that reason, technical and economic criteria and indicators were used, as well as environmental criteria and indicators.
(2) The Terms of Reference (Appendix B-1) requires that a comparative evaluation will be completed per the methodology described in the ToR.

During preparation of the draft EIS/EA, the MECP recommended FMG consider additional criteria and indicators for the assessment and evaluation of alternatives for SAR) and its habitat, focusing on the assessment of linear Project components (MECP 2021). Appendix T-1 provides a focused assessment of the transmission line and mine access road alternatives using these additional criteria and indicators.

4.1.2.3 Natural Environment Performance Objective

The evaluation criteria and indicators used in the assessment of the alternatives for the natural environment performance objective are provided in Table 4.1-5, as well as the primary information sources.

Table 4.1-5: Natural Environment Performance Objective Evaluation Criteria and Indictors

Criteria	Indicators	Primary Information Sources
Potential effect on air quality and climate	• Change in level and quality of air emissions • Change in level of GHG emissions generated	• Appendix G-1: Air Quality Baseline Report • Appendix G-2: Air Quality Modelling Report • Appendix I-1: Greenhouse Gas Assessment
Potential effect on water quality, fish and aquatic habitat	• Change in level and quality of surface water from effluent discharge • Area of fish habitat affected • Ability to maintain fish populations • Ability to maintain conditions for fish passage • Ability to maintain groundwater flow direction, level and quality	• Appendix K2: Mine Site Water Quality Estimate for Mine Operations and Closure • Appendix L-2: Hydrogeological Modelling Report • Appendix N-1: Surface Water Quality Baseline Report • Appendix N-2: Surface Water Quality Modelling Report • Appendix N-3: Predictive Modelling of Pit Lake Water Quality • Appendix O-1: 2022/2023 Aquatics Baseline • Appendix O-2: 2021 Aquatics Baseline • Appendix O-3: 2020 Aquatics Baseline
Potential effect on wetlands	• Area of wetlands affected • Ability to maintain wetland connectivity	• Appendix P-1: Updated Baseline Terrestrial Report
Potential effect on terrestrial species and habitat	• Area of terrestrial habitat displaced • Change in the level of noise and presence of other harm and harassment to wildlife • Ability to maintain plant dispersion and wildlife movement corridors • Ability to maintain wildlife populations	• Appendix H-3: Noise Assessment Report • Appendix H-4: Blasting Assessment Report • Appendix P-1: Updated Baseline Terrestrial Report
Potential effect on SAR	• Status of species present (Endangered, Threatened or Special Concern) per *Endangered Species Act, 2007* and *Species at Risk Act* • Area and type of SAR habitat displaced • Change in the level of noise and presence of other harm and harassment to SAR • Ability to maintain SAR wildlife movement corridors	• Appendix H-3: Updated Noise Modelling Report • Appendix H-4: Updated Blasting Assessment Report • Appendix P-1: Updated Baseline Terrestrial Report • Appendix T: SAR Detailed Assessment

Performance is determined in a comparative manner according to the following:

- **Preferred:** provides less negative effects or greater positive effects on the natural environment criterion;
- **Partially preferred:** offers limited to no measurable difference in positive or negative effects; or
- **Not preferred:** provides greater negative effects or less positive effects on the natural environment criterion.

If the alternatives are considered equivalent, the performance objective is rated as partially preferred.

4.1.2.4 Social, Economic, Cultural and Built Environment Performance Objective

The evaluation criteria and indicators used in the assessment of the alternatives for the social, economic, cultural and built environment performance objective are provided in Table 4.1-6, as well as the primary information sources.

Table 4.1-6: Social, Economic, Cultural and Built Environment Performance Objective Evaluation Criteria and Indicators

Criteria	Indicators	Primary Information Sources
Potential effect on local residents and recreational users	• Relative potential change to property value • Ability to maintain or improve income opportunities • Ability to maintain or improve local access • Ability to attain or maintain provincial noise guidelines • Distance from known water well sources • Distance from known surface water drinking sources • Change in visual aesthetics or level of general disturbance • Potential for adverse health and safety effects	• Appendix H-3: Updated Noise Impact Modelling Report • Appendix L-1: Hydrogeology Baseline Report • Appendix Q-1: Socioeconomic Baseline Report • Appendix Q-2: Economic Modelling Results • Appendix R: Draft Human and Ecological Health Risk Assessment • Appendix U: Visual Aesthetics Desktop Baseline Study and Assessment
Potential effect on infrastructure	• Ability to maintain or provide local and regional access • Ability to maintain or provide reliable power supply • Ability to maintain or provide reliable pipeline systems	• Engineering studies, including engineering scoping study, prefeasibility study, topic-specific investigation reports, topic-specific trade-off studies, engineering team information • Team experience with other mining projects
Potential effect on public health and safety	• Change in the level and quality of air emissions • Potential for effects on quality of drinking water sources • Potential for adverse electromagnetic exposure • Ability to maintain safe road traffic conditions that are within FMG's control	• Appendix G-2: Air Quality Modelling Report • Appendix L-1: Hydrogeology Baseline Report • Appendix Q-1: Socioeconomic Baseline Report • Appendix Q-2: Economic Modelling Results • Appendix R: Draft Human and Ecological Health Risk Assessment

Table 4.1-6: Social, Economic, Cultural and Built Environment Performance Objective Evaluation Criteria and Indicators

Criteria	Indicators	Primary Information Sources
	• Change in provision of health services	
Potential effect on local businesses and economy	• Change to local business and economic opportunities (including commercial bait harvesters and trappers) • Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• Appendix Q-1: Socioeconomic Baseline Report • Appendix Q-2: Economic Modelling Results
Potential effect on tourism and recreation	• Change to tourism and recreational opportunities	• Appendix Q-1: Socioeconomic Baseline Report • Appendix Q-2: Economic Modelling Results
Potential effect on regional economy	• Change to the regional economy	• Appendix Q-1: Socioeconomic Baseline Report • Appendix Q-2: Economic Modelling Results
Potential effect on government services	• Change to the capacity of existing health, education and family support services	• Appendix Q-1: Socioeconomic Baseline Report
Potential effect on resource management objectives	• Degree of consistency with existing land use and resource management plans	• Appendix O-4: Updated Baseline Fisheries Report • Appendix P-3: Updated Baseline Terrestrial Report • Appendix Q-1: Socioeconomic Baseline Report
Waste materials	• Ability to limit the generation of unnecessary waste materials • Potential for material to be recycled or re-used	• Team experience with other mining projects
Potential effect on heritage resources	• Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources • Isolation of a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship • Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource • Avoids damage or disturbance to known archaeological resources • Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that	• Appendix S-1: Stage 1 Archaeological Assessment • Appendix S-2: Stage 2 Archaeological Assessment of the Project Development Area • Appendix S-3: Stage 1 Archaeological Assessment and Cultural Heritage Resource Evaluation, Four Alternate Transmission Line Corridors and Parts of the Proposed Mine Access Road • Appendix S-4: Stage 2 Archaeological Assessment and Cultural Heritage Resource Evaluation, Four Alternate Transmission Line Corridors and Parts of the Proposed Mine Access Road • Appendix S-5: Cultural Heritage Research Report: Built Heritage and Cultural Heritage Landscapes • Appendix S-6: Cultural Heritage: Existing Conditions and Preliminary Impact Assessment

Table 4.1-6: Social, Economic, Cultural and Built Environment Performance Objective Evaluation Criteria and Indicators

Criteria	Indicators	Primary Information Sources
	adversely affect an archaeological resource)	• Appendix S-7: Cultural Heritage Evaluation Report - Springpole / Birch Lake Portage / Travel Route • Appendix S-8: Cultural Heritage Evaluation Report - Cabin • Appendix S-9: Cultural Heritage Evaluation Report - Cabin Longitude: -92.295699) • Appendix S-10: Cultural Heritage Evaluation Report - Cabin • Appendix S-11: Cultural Heritage Evaluation Provisional Report - Exploration Camp
Potential effect on First Nation Reserves and Communities	• Maintains or improves Indigenous communities conditions (subject to the limitations of Company capacity and community members' personal choice)	• Appendix Q-1: Socioeconomic Baseline Report • Appendix Q-2: Economic Modelling Results • Cat Lake First Nation (2024a,b) • Lac Seul First Nation (2024a,b) • NWOMC (2022, 2023) • Slate Falls Nation (2024)
Potential effect on spiritual, ceremonial, and cultural heritage, and archaeological sites	• Avoids damage or disturbance to known spiritual, ceremonial, cultural heritage and archaeological sites; or implement other forms protection / preservation supported by local Indigenous communities	• Cat Lake First Nation (2024a,b) • Lac Seul First Nation (2024a,b) • NWOMC (2022, 2023) • Slate Falls Nation (2024)
Potential effect on traditional land use	• Maintains access to traditional lands for current traditional land uses, except as otherwise agreed to with local Indigenous communities	• Cat Lake First Nation (2024a,b) • Lac Seul First Nation (2024a,b) • NWOMC (2022, 2023) • Slate Falls Nation (2024)
Potential effect on Aboriginal and Treaty Rights	• Avoids infringement of Aboriginal and Treaty Rights, except as otherwise agreed to with local Indigenous communities	• Cat Lake First Nation (2024a,b) • Lac Seul First Nation (2024a,b) • NWOMC (2022, 2023) • Slate Falls Nation (2024)

Performance is determined in a comparative manner according to the following:

- **Preferred:** offers less negative effects or greater positive effects on the social, economic, cultural and built environment criterion;
- **Partially preferred:** provides limited to no measurable difference in positive or negative effects; or
- **Not preferred:** offers greater negative effects or less positive effects on social, economic, cultural and built environment effects criterion.

These performance rankings were clarified further for the final EIS/EA in response to comments received on the draft EIS/EA, particularly for the assessment of social, economic, cultural and built criteria. If the alternatives are considered equivalent, the performance objective is rated as partially preferred.

4.1.2.5 Technical Performance Objective

The three initial technical-related performance objectives (technical applicability and/or system integrity and reliability, ability to service the site effectively and cost effectiveness) were combined into a single technical performance objective for the final EIS/EA in response to comments received on the draft EIS/EA.

The evaluation criteria and indicators used in the assessment of the alternatives for the technical performance objective are provided in Table 4.1-7, as well as the primary information sources.

Table 4.1-7: Technical Performance Objective Evaluation Criteria and Indictors

Criteria	Indicators	Primary Information Sources
Ability to service the site	• Prevalence and effectiveness of technology for use in similar circumstances • Degree to which new technology is supported by investigations or testing • Ability to consistently meet Project needs • Availability of necessary infrastructure for component	• Engineering studies, including engineering scoping study, prefeasibility study, topic-specific investigation reports, topic-specific trade-off studies, engineering team information
Cost effectiveness	• Potential effect on Project financing resulting from investor attractiveness or risk • Degree to which alternative provides a competitive or acceptable return on investment • Degree to which alternative provides financial risk	• Team experience with financing mining projects • Engineering studies, including engineering scoping study, prefeasibility study, topic-specific investigation reports, topic-specific trade-off studies, engineering team information

Performance related to the ability to service the site criterion is determined as follows:

- **Preferred:** predictably effective with contingencies if the alternative does not perform as expected;
- **Partially preferred:** provides the required access / supply to the site and appears effective with contingencies in the event of disruptions; or
- **Not preferred:** cannot reliably provide sufficient access / supply or involves an unacceptable level of risk without contingencies or relies on unproven technologies.

Performance related to the cost-effectiveness criterion is determined as follows:

- **Preferred:** facilitates a competitive return on investment and presents manageable or acceptable financial risk;
- **Partially preferred:** facilitates an acceptable return on investment and presents manageable or acceptable financial risk; or
- **Not preferred:** cannot be financially supported by the Project as it does not facilitate an acceptable return on investment and does not present manageable or acceptable financial risk to the Project.

If the alternatives are considered equivalent, the performance objective is rated as partially preferred.

4.1.2.6 Amenability to Reclamation Performance Objective

Amenability to reclamation was also considered an important performance objective, recognizing that the primary goal of decommissioning and closure of the Project is to establish a site that is physically, chemically and biologically stable. The evaluation criteria and indicators used in the assessment of the alternatives for the amenability to reclamation performance objective are provided in Table 4.1-8, as well as the primary information sources.

Table 4.1-8: Amenability to Reclamation Performance Objective Evaluation Criteria and Indictors

Criteria	Indicators	Primary Information Sources
Potential effect on future public safety and security	• Ability to avoid safety and security risks to the general public	• Conceptual closure plan (Section 5.18) • Team experience with mining project closure planning
Potential effect on future environmental health and sustainability	• Degree to which pre-development passive drainage systems will be restored • Ability to provide habitats for vegetation and wildlife species, including SAR • Ability to provide productive land uses consistent with existing land use and resource management plans • Provides for an aesthetically pleasing site	• Conceptual closure plan (Section 5.18) • Team experience with mining project closure planning

Performance is determined in a comparative manner according to the following:

- **Preferred:** causes disturbance to the natural and social, economic, cultural and built environments that requires limited reclamation;
- **Partially preferred:** causes disturbance to the natural and social, economic, cultural and built environments that requires moderate to extensive reclamation; or
- **Not preferred:** mitigation of disturbance to the natural and social, economic, cultural and built environments is not practical or feasible.

If the alternatives are considered equivalent, the performance objective is rated as partially preferred.

4.1.2.7 Effects Assessment and Identification of the Selected Alternative

The alternatives assessment approach relies on a comparison of the advantages and disadvantages of each alternative, based on the criteria and indicators for all the performance objectives (i.e., natural environment, social, economic, cultural and built environment, technical performance and amenability to reclamation). The assessment of the identified alternatives was completed in consideration of the results of consultation and engagement with Indigenous communities, government agencies and other interested parties. The findings of the alternatives assessment are summarized in the text, and tables are provided at the end of individual subsections documenting this process in detail.

The selection of the preferred alternative is based on a comparison of the balance of advantages to disadvantages for each alternative, demonstrating which alternative is the most advantageous overall. The alternative that receives the greatest number of preferred ratings for individual criteria or individual performance objectives is not necessarily the best or most preferred alternative, as the assessment considers all criteria and performance objectives combined.

For the final EIS/EA, a single preferred alternative was selected for a Project component, which was carried forward into Section 5 (Project Description). Rationale is provided for the selected alternative where more than one preferred alternative is identified in the summary.

4.1.3 Other Regulatory Processes

An alternatives assessment is a common planning approach used in various regulatory processes that apply to the Project, not just in the EA process. These assessments are complementary and support the assessment provided in this section of the final EIS/EA, although the approaches differ.

The Metal and Diamond Mining Effluent Regulations (MDMER; SOR/2002-222) requires that an assessment of selected mineral waste-related alternatives be completed using the required federal approach (ECCC 2021) under certain circumstances. An updated draft of the Mine Waste Management Alternatives Assessment is provided as Appendix E. The approach required by the MDMER is different than that presented in this section; however, both approaches identified the same preferred alternatives for mineral waste management.

Under the federal *Fisheries Act* (RSC 1985, c. F-14), measures will be required to be implemented to offset habitat losses to avoid adverse effects on fish and fish habitat. Preliminary alternatives related to fish habitat offsetting to meet the regulatory needs were presented in the draft fish habitat offsetting plan provided in Appendix F of the draft EIS/EA. The fish habitat offsetting plan has been updated for the final EIS/EA based on the results of consultation and engagement and is provided in Appendix F of this document. The fish habitat offsetting plan will continue to be advanced in consultation with Fisheries and Oceans Canada, Environment and Climate Change Canada and Indigenous communities in parallel with the EA process.

As noted in Section 4.1.2, the MECP provided suggestions on additional indicators and criteria that could be used to assess the potential effects of the Project on Boreal Caribou. These are in addition to the indicators and criteria described in Section 4.1.2. An assessment is provided in Appendix T of the alternative routes for the Project's linear corridors on SAR species, including Boreal Caribou, using these additional indicators and criteria. The assessment information provided in that appendix has been fully considered in the assessment of alternative methods with respect to SAR provided in Section 4.0. In addition, an Overall Benefit Permit is anticipated to be required, which requires that reasonable alternatives have been considered, including alternatives that would not adversely affect the relevant SAR species, and the best alternative has been chosen. The Overall Benefit Permit process will continue after the EA process has concluded.

4.2 Influence of Consultation with Indigenous Communities, Government and the Public

Consultation has been ongoing for several years prior to and throughout the environmental assessment process, and will continue with government agencies, Indigenous communities, and the public through the life of the Project. Section 2 provides more detail on the extensive consultation process. The Record of Consultation (Appendix D) includes detailed comments received during the development of the final EIS/EA.

Feedback received through consultation has been addressed through direct responses (in writing and follow up meetings) and incorporated into the final EIS/EA, as appropriate. The key comments that influenced the effects assessment for groundwater between the draft and final EIS/EA is provided below:

Alternatives Assessed

The MECP, the Ministry of Natural Resources (MNR), the Ministry of Citzenship and Multiculturism, CLFN and SFN provided comments during consultation and engagement that resulted in the following alternatives that were considered in the draft EIS/EA and the final EIS/EA:

Renewable Power Sources

MECP requested a description of the reasonable range of alternatives considered for renewable power sources. Table 4.1-2 includes a summary of components assessed and a description of the reasonable range of alternatives for renewable power sources.

Dike Locations

MNR requested clarification on the types of dikes considered for dewatering, and whether this would change area affected. Alternative dikes types were not considered feasible, given the underlying foundation conditions and the requirements of the Project to withhold water from an operational area. Alternative locations for the dikes are discussed in Section 4.4, however the amount of lake area requiring dewatering would not change as a result of the dike type.

Treated Effluent Discharge Location

MECP requested clarification on the location of the treated effluent discharge, and whether an assimilative capacity study was conducted for alternatives.

The alternatives assessment considers potential impacts based on the proposed location of infrastructure. Three locations were assessed, Birch Lake, Springpole Lake North Basin and Southeast Arm of Springpole Lake. The effluent discharge into the Southeast Arm of Springpole Lake will provide the best potential mixing. An effluent discharge location would have different impacts at each proposed location depending on the installed infrastructure (e.g., multiport diffuser versus shoreline pipe discharge versus submerged pipe). Potential impacts predicted through an assimilative capacity assessment and mixing zone study would change depending on the installed diffuser structure. As a result, the evaluation of the effluent discharge locations is focused on the location, as described in Section 4.17.

Mine Access Road

IAAC requested explanation for why limited twinning of the transmission line and access road was considered in the route. Roads and transmission lines have different subsurface and routing requirements. For example, the road has been preferentially located on higher lands to minimize direct effects to waterbodies and crossing wetlands where practical. Transmission lines cannot curve and turning points need to be minimized. However, opportunities to aligning the two corridors has been reevaluated, and the transmission line and mine access road have been co-located within a single corridor.

Transmission Line

Traditional Land Use information shared by MON noted several land use values located along the southern end of Alternative 3 transmission line route. During discussions and follow-up communications, SFN also requested that the transmission line routing (Alternative 3) selected in the draft EIS/EA be replaced with Alternative 1 to follow the existing E1C transmission line corridor through the northern portion of the SFN Reserve lands. Alternative 1 and Alternative 3 were both identified as the preferred alignment routes in the draft EIS/EA with an understanding that further engagement and discussion with SFN and others could result in optimizing the alignment. SFN shared land use value locations along the southern end of Alternative 3, and noted that following the existing E1C corridor was preferred over making a new corridor around the community. The MECP Species at Risk Branch (SARB) also provided comments on the draft EIS/EA and in follow up meetings that an emphasis should be placed on minimizing new linear corridors. Accordingly, Alternative 1 has been selected as the updated preferred alignment. In addition to selecting Alternative 1, the transmission line has been optimized to follow the mine access road more closely, thereby

reducing the overall corridor width through this segment. Details on the transmission line are provided in Section 5.18.

Co-disposal Facility

MINES provided comments regarding the use of dry filtered tailings in a CDF being a potentially new design concept with potential challenges to being able to co-deposit dry tailings and mine rock. IAAC also commented regarding the design of the CDF and encapsulating the PAG rock with NAG tailings and how the material would be co-disposed. In consideration of the comments received, additional engineering trade-off assessments were carried out, resulting in the optimization of the CDF. Optimizations include the production of a thickened pumpable NAG tailings (instead of the filtered tailings) that can be hydraulically transported and placed in a manner that improves operational and environmental performance of the CDF. Thickened tailings provide a more robust operation for co-mingling with mine rock, reduced energy consumption and reduced air emissions, including GHGs. The optimized CDF designs were subsequently presented and discussed during follow-up meetings with reviewers and the Independent Geotechnical and Tailings Review Board (IGTRB). An IGTRB has pro-actively been established for the Project and is composed of three external experts. The purpose of the IGTRB is to provide independent oversight on the design, construction, operation, performance and closure planning for the CDF, with the objective of long-term safety and environmental protection. Additional details on the optimized design of the CDF are summarized in Section 5.10.3 and provided in Appendix V.

MINES commented that other acceptable alternatives to the design and placement of the CDF should be presented. A detailed and comprehensive assessment of tailings alternatives following ECCC guidelines for the assessment of alternatives for mine waste disposal was completed for the draft EIS/EA and has been updated in Appendix E. The assessment used a stepwise approach and multiple accounts analysis to demonstrate that the preferred location and technologies proposed for tailings and mine rock are defensible according to environmental, social, technical and financial considerations. ECCC determined that the central water storage pond (CWSP) would also be subject to Schedule 2 of the Metal and Diamond Mine Effluent Regulations (MDMER; SOR/2022-222) and require assessment following the ECCC guidelines. Accordingly, a comprehensive assessment and analysis of water storage alternatives has also been included in the updated assessment in Appendix E.

Central water storage pond

ECCC requested further assessment of the use of unnamed lake L-2 to manage contact water. One new alternative method was identified after the submission of the draft EIS/EA to be assessed in the final EIS/EA:

- **Central water storage pond (CWSP) location:** identified to be assessed as a site water management alternative, after a revised understanding of the MDMER requirements.

Ongoing engineering determined that an airstrip may be needed for the Project; however, no feasible alternative locations were identified (see Section 4.13).

Assessment Approach

Input on the alternatives assessment approach received during consultation on the draft EIS/EA from the MECP is detailed in Appendix D and was incorporated into the final EIS/EA. Key revisions to the assessment approach resulting from these comments include:

- Additional text is provided in the final EIS/EA to clarify how a reasonable range of viable alternatives have been identified consistent with the EA Code of Practice (MOE 2014).

- Rationale was provided for which alternatives were carried forward for assessment.
- Sources of information that supported the alternatives assessment and information sources for individual indicators have been provided.
- Two of the performance objectives were renamed to natural environment and social, economic, cultural and built environment.
- Some modifications to rank approach and descriptions were completed to provide an evaluation of each criterion, verse just at the performance level. These modifications were made to the natural environment and social, economic, cultural and built environment performance objectives.
- The three initial technical performance objectives were combined to provide greater focus on environmental performance objectives.
- Alternative assessment tables were moved into the main body of the EIS/EA from the appendices.
- Alternative assessment tables were provided for identified viable alternatives, including for tailings and mine rock.
- A description of the baseline conditions was added to the alternative assessment tables to allow the reader to compare the no Project alternative (i.e. do nothing) against the changes resulting from the alternative means being assessed.
- Indicator descriptions were revised to be measurable and quantifiable as reasonable, noting that quantifiable information is not reasonably available for many indicators, nor is it necessary to allow for a reasoned comparison of alternatives; there is no requirement for a quantitative assessment of alternatives under the *Canadian Environmental Assessment Act, 2012* or the Ontario *Environmental Assessment Act*.
- Phases of the proposed Project (i.e., construction, operations and decommissioning and closure) were characterized within the alternative assessment tables and assessed for each indicator where applicable.
- Rankings of preferred, partially preferred or not preferred are defined for each criterion for each alternative, requiring an alteration of the ranking descriptions for the natural environment and social, economic, cultural and built environment performance objectives.
- Ranking for each alternative for each performance objective is provided in the alternative assessment tables, including key differentiating advantages and disadvantages.
- Additional quantitative information is provided in the alternative assessment tables, where helpful to the comparison and reasonably available.
- An assessment of alternatives related to tailings and mine rock using the approach described in Section 4.1 was completed and is presented in this section (Section 4.7), and in Appendix E following the required approach per federal regulations (MDMER).

Where there is a material difference between the assessment of an alternative in the draft EIS/EA and final EIS/EA, additional explanation has been provided in the final EIS/EA text or related alternative assessment table.

The Ministry of Citizenship and Multiculturism requested clarification on the description of indicators used for maintenance or provision of local access, maintenance or improvement of tourism and recreational opportunities, financial risk and land use conflicts. Clarification was provided in the response to the comment and this information has been incorporated into the chapter where relevant.

The MECP requested clarification for how groundwater quality and quantity, surface water quality and quantity and long-term effects to surface water were evaluated in the assessment of alternatives. The assessment of alternatives for the final EIS/EA now includes surface and groundwater indicators under the potential effect on fish and aquatic habitat criteria and under the potential effect on public health and safety criteria.

The Northwestern Ontario Métis Community requested clarification on how potential effects on Métis rights were considered. This topic is evaluated in the assessment of alternatives in the final EIS/EA with an indicator under the potential effect on Aboriginal and Treaty Rights in the alternatives assessment.

The Ministry of Natural Resources and Forestry requested clarification on how the removal of terrestrial habitat, mortality, invasive species and habitat for bat prey were evaluated in the assessment of alternatives and noted an interest in evaluating negative effects from removing habitat, where there are marked differences. The Ministry of Natural Resources and Forestry also requested clarification on the analysis of changes in wildlife movement and the attraction of nuisance wildlife resulting in mortality. The response provided indicated that these items are addressed with indicators in the assessment of alternatives in the final EIS/EA under the potential effect on terrestrial species and habitat criteria. Where these specific items are material to the evaluation of these indicators, additional explanation is provided in the assessment of the specific alternative in the alternative assessment tables.

Other Comments Related to Alternatives Assessment

Natural Resources Canada requested that the economic aspects of backfilling tailings and mine rock be expanded upon in the final EIS/EA. The economic aspects that makes this potential alternative not feasible for this Project are expanded upon in the discussion of alternatives for closure of the open pit (Section 4.28).

4.3 Alternatives to the Project

The *Canadian Environmental Assessment Act, 2012* and Ontario *Environmental Assessment Act* require consideration of alternatives to a proposed project.

4.3.1 Identified Alternatives to the Project

The following alternatives to the Project were considered in the final EIS/EA:

- **Alternative 1:** Proceed with the Project as planned.
- **Alternative 2:** Delay the Project until circumstances are more favourable.

These alternatives were identified based on professional judgment, as well as consideration of EAs approved for Ontario mining projects. There are no other viable alternatives identified; therefore, the assessment was completed for proceeding with the Project as planned and delaying the Project until circumstances are more favourable.

Abandoning the Project is not a viable alternative as it does not fulfill the Project purpose, including to provide a competitive or acceptable return on investment. It represents a lost opportunity for shareholders and for economic benefits and employment to the region. With the Project abandonment scenario, environmental conditions remain unchanged and are retained in the baseline (current) condition. The scenario of abandoning the Project therefore provides a baseline against which the other viable alternatives can be considered.

Alternative 1: Proceed with the Project as planned

This considers proceeding with the Project as currently planned assuming regulatory approvals are obtained and a positive commercial decision.

Alternative 2: Delay the Project until circumstance are more favourable

The alternative of delaying to an unspecified time is also considered, on the assumption that the delay is material and beyond the period of time typical for commercial and regulatory decision making.

4.3.2 Assessment of Alternatives

Current commodity pricing is highly favourable to support development of a gold mining project in Ontario. The primary advantages of proceeding with the Project as planned are that it will provide a return on the investment made to date to advance the Project while delivering positive effects to the local and regional economies, support skills development, and provide direct and indirect employment and business opportunities. Project designs and mitigation measures will minimize direct and indirect disturbance of terrestrial and aquatic habitat and species and will be monitored through life of mine.

Intentionally delaying the Project would not alter the level of disturbance or the disadvantages of other negative effects associated with the Project. It would, however, delay the anticipated positive effects of the development, and has the potential to reduce investor confidence and the ability to finance the Project.

The results of the assessment of alternatives to the Project are detailed in Table 4.3-1. All performance objectives were considered in the comparative analysis of the two viable alternatives; however, the following performance objectives and criteria were identified as key differentiators for the comparative assessment:

- Technical performance:
- Cost effectiveness.

4.3.2.1 Alternative 1: Proceed with the Project as Planned

Advantages: This alternative best fulfills the Project purpose. Proceeding with the Project as planned would result in both positive and negative changes from the baseline condition (the do nothing alternative). It has the advantage of providing considerable regional and local employment and business opportunities, including to local Indigenous communities, and improvements to the regional economy in the near term. Development of the Project as planned takes advantage of the current value for gold, which is very favourable, and provides increased attractiveness due to the greater certainty on potential timing for a return on investment. Investors are reactive to current and anticipated near-term market conditions and are schedule conscious and will therefore react favourably to proceeding with the Project. There is a lower risk of unforeseen events occurring in either the marketplace or the regulatory climate with the Project proceeding as planned. Proceeding as planned allows investments made to date (e.g., exploration, lands, engineering) by FMG to be recouped sooner, which improves the potential for a return to investment to shareholders in the nearer term.

Disadvantages: Although regulatory requirements and commitments made during the EA will be met, this alternative will also result in changes to the natural environment during construction, operation and closure of the Project, consistent in scale and effect with other Ontario mining projects.

4.3.2.2 Alternative 2: Delay the Project until Circumstances Are More Favourable

Advantages: There are no advantages offered by this alternative that are not equivalent to or poorer than the alternative of proceeding as planned.

Disadvantages: Given the current high gold prices, there is no expectation that the investment climate for gold will improve substantively in the future. The primary differentiating disadvantages for this alternative are related to the cost effectiveness performance objective. Delaying the Project would result in decreased attractiveness to investors due to an increase in speculative risk and potentially an inability to raise funds for detailed engineering and other functions on a delayed or uncertain timeline. It will also delay the return on the substantial investment to date for shareholders, which could affect the overall viability of the Project due to additional carrying costs. The disadvantages of this alternative are equivalent to or worse than proceeding with the Project as planned in comparison to the current baseline condition (do nothing alternative).

4.3.3 Results Summary and Selected Alternative

Alternative 1, proceeding with the Project in the near term as planned, is the preferred and selected alternative carried forward into Section 5 (Project Description) based on the assessment of net effects (Table 4.3-1). It fulfills the Project purpose, including to provide a competitive or acceptable return on investment within a reasonable timeframe.

Table 4.3-1: Assessment of Alternatives to the Project

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Proceed with Project as Planned	Alternative 2: Delay the Project until Circumstances Are More Favourable
Natural Environment				
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Air emissions will result from explosive use, overburden and rock movement, travel on roads, fuel combustion and ore processing primarily during construction and operations phases, but also during decommissioning and closure; however, they will not affect attainment of air quality standards	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Level of additional emissions or GHGs generated	• No additional emissions or GHGs generated	• GHGs will result from fuel combustion primarily during construction and operations, but also during closure • Generation of GHGs will be minimized by connecting the site to the regional electrical grid to meet the majority of the power requirements during the construction, operations and early closure phases	• There is no difference between Alternative 1 and Alternative 2 for this indicator the effect will just be delayed
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO, except for a few occasions which were irregular, generally associated with elevated suspended solids	• Effluent will be treated by an effluent treatment plant to meet regulatory requirements prior to discharge to the environment during the operations phase (and construction and closure phases as needed)	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Area of fish habitat affected	• Abundant and varied fish habitat is present	• Fish habitat will be lost during construction as a result of Project facilities that cannot reasonably be placed to avoid waterbodies / watercourse such as the open pit; fish habitat may also be affected by flow reductions resulting from the need to collect contact water within the Project Development Area (PDA) primarily during operations, but also during the construction and closure phases • Mitigation will be provided for impacts to fish habitat through design and implementation of the Fish Habitat Offsetting / Compensation Plan to achieve a greater amount of fish habitat after closure	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores • Coolwater or coldwater communities are present in local waterbodies	• Fish populations may be affected by the loss of fish habitat, although fish will be relocated in advance from the affected waterbodies / watercourses • X	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• Contact water will be collected and treated to avoid environmental effects which will result in flow reductions to watercourses that have reduced watershed areas • Loss of water flows resulting in a loss of fish habitat / fish passage will be mitigated through flow supplementation or through implementation of the Fish Habitat Offsetting / Compensation Plan	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Dewatering of the open pit mine during the construction and operations phase has the potential to reduce groundwater reporting as base flow to Springpole Lake, Birch Lake and small inland area lakes • Development and operation of the CDF has the potential to alter groundwater quality and seepage quality to Birch Lake and Springpole Lake	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed

Table 4.3-1: Assessment of Alternatives to the Project

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Proceed with Project as Planned	Alternative 2: Delay the Project until Circumstances Are More Favourable
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• Development of the Project during the construction phase will result in the permanent displacement of 133 hectares (ha) of wetlands • Approximately 4.6 kilometres (km) of the mine access road will cross through wetlands which will be permanently altered	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• Where the mine access road will cross through wetlands, connectivity will be maintained as practicable, such as by installation of cross drainage during the construction phase	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• Development of the Project during the construction phase is conservatively assumed to displace 573 ha of local terrestrial habitat and associated plant species (Note: this area includes a buffer area to allow for Project refining and therefore is an overestimation of habitat disturbance)	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Potential for general disturbance of wildlife caused by sensory disturbances (such as light, sound and vibration emissions) during the construction, operations and closure phases of the Project	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• May cause a disruption to existing wildlife movement	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• Increased potential for wildlife - vehicular interactions associated with the Project development which is expected to be highest during the construction phase when there is the greatest individual vehicular traffic, and reduced during the operations and closure phases	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Little Brown Myotis were detected in the PDA and maternity and foraging habitat is present, although it may not be present within the area of anticipated disturbance • The majority of the main site footprint is located in Category 2 (seasonal range) habitat for Caribou • A portion of the main site footprint is located in Category 1 high use habitat for Caribou (Boreal population) • Mine access road and transmission line crosses 9.5 km of	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed

Table 4.3-1: Assessment of Alternatives to the Project

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Proceed with Project as Planned	Alternative 2: Delay the Project until Circumstances Are More Favourable
			Category 1 high use habitat for Caribou (Boreal population) • Lesser Yellowlegs were detected within the PDA and intersects habitat • Wolverine tracks were recorded along the edges of lakes and streams in multiple locations, but no dens or individuals were observed • Eastern Whip-poor-will were not detected in the PDA, but a portion of the transmission will overprint suitable habitat • Active Barn Swallow nest (at current exploration camp) to be displaced by open pit • Canada Warbler were detected within the PDA and suitable habitat intersects the PDA • Common Nighthawk were detected within the PDA and suitable habitat intersects the PDA	
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• There is the potential for general disturbance of SAR caused by sound and vibration emissions during all Project phases, including SAR listed as present within the PDA	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• With respect to the mine access road, discharge pipeline, transmission line, additional new movement corridors will be established which could support increased predation of Caribou (Boreal population); by co-locating the transmission line with the mine access road, and other existing linear features, as reasonable, these will be more limited	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Summary		**Partially preferred**	**Partially preferred**
	Natural Environment Performance Objectives Assessment		**Partially preferred**	**Partially preferred**
			• Adv: there are no advantages to the natural environment with proceeding with the Project as planned • Disadv: Baseline conditions will be altered by the development however regulatory requirements will be met • Disadv: Aquatic and terrestrial habitat, and species including SAR, may be affected and mitigation measures will be employed as part of the Project design to minimize the potential effects	• Adv: there are no advantages to the natural environment with proceeding with the Project as planned • Disadv: Baseline conditions will be altered by the development however regulatory requirements will be met (for this alternative the effect is delayed to the future) • Disadv: Aquatic and terrestrial habitat, and species including SAR, may be affected and mitigation measures will be employed as part of the Project design to minimize the potential effects (for this alternative the effect is delayed to the future)
Social, Economic, Cultural and Built Environment				
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The mine site area is remote with no full-time residences nearby	• Sound and visual disturbances associated with mine development (construction phase) and operations (operations phase) could detract from local property values	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Development of the Project as planned will generate considerable regional and local, employment and business opportunities	• The same regional and local, employment and business opportunities will be provided as Alternative 1 however the opportunities will be delayed
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Additional access will be provided beyond the Birch River crossing	• There is no difference between Alternative 1 and Alternative 2 for this indicator however the enhancement

Table 4.3-1: Assessment of Alternatives to the Project

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Proceed with Project as Planned	Alternative 2: Delay the Project until Circumstances Are More Favourable
				will be delayed
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Mine development will generate noise emissions that will meet regulatory requirements	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Distance from known water well supplies	• No water well supply systems are present	• No effects anticipated; no known water supply wells present in the Project area	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Distance from known surface water drinking supplies	• No surface water drinking sources are present	• No effects anticipated; no known surface water drinking source present in the Project area	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• The Project will cause disturbance during the construction, operations and decommissioning and closure phases; however, in the longer term after revegetation and pit filling, effects on aesthetics will be reduced	• There is no difference between Alternative 1 and Alternative 2 for this indicator however the effect will be delayed
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• All discharges and emissions will meeting regulatory requirements and no adverse health effects are predicted • Potential for safety risks will be minimized through regulatory requirements and site-specific safety measures established for the Project	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the mine site • The nearest all-season road provides access to the regional road network is located 17 km away	• Will extend the existing Wenasaga Road further north, aligning well with proposed permanent access under consideration for development by the Cat Lake First Nation and supports enhancement of the regional road network	• There is no difference between Alternative 1 and Alternative 2 for this indicator however the enhancement will be delayed
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Will reinforce the local power grid if transmission line is transferred to a third party after closure	• There is no difference between Alternative 1 and Alternative 2 for this indicator however the enhancement will be delayed
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines	• No effects anticipated from baseline condition	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• No adverse effect to health and safety; emissions will be generated during construction, operations and closure phases; however, will not affect attainment of air quality standards which are protective of health	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• No effects anticipated; no drinking water sources are currently identified in the Project area	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• No material effects anticipated from baseline condition	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the mine site	• No material effects anticipated from baseline condition as safe road traffic conditions will be maintained •	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Change in provision of health services	• Health infrastructure is present in the municipalities of Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Increased access to some health services by employees as there will services provided on site	• There is no difference between Alternative 1 and Alternative 2 for this indicator

Table 4.3-1: Assessment of Alternatives to the Project

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Proceed with Project as Planned	Alternative 2: Delay the Project until Circumstances Are More Favourable
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• There are local businesses • Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds and outfitters, in the region	• The economic benefits resulting from employment related to the Project are significant (approximately 600 positions during construction and 450 positions for operations) and have been estimated by means of a model detailed in Appendix Q-2	• There is no difference between Alternative 1 and Alternative 2 for this indicator however the enhancement will be delayed
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the mine site • Large lakes are present that allow for float plane access	• The mine site area will be inaccessible until after the mine is closed; however, the mine access road will increase access to new areas which could support tourism and recreational opportunities after the mine closes	• There is no difference between Alternative 1 and Alternative 2 for this indicator however the enhancement will be delayed
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Tourism and recreational opportunities may be affected by the mine development and the change in local land use from remote to industrial • The mine access road may improve opportunities in the longer term	• There is no difference between Alternative 1 and Alternative 2 for this indicator however the enhancement will be delayed
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Will provide local and regional employment and business opportunities	• There is no difference between Alternative 1 and Alternative 2 for this indicator however the enhancement will be delayed
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout as well as local Indigenous communities	• Will provide direct and indirect revenues and demands that will help to support government services • May increase demands on local government services	• There is no difference between Alternative 1 and Alternative 2 for this indicator however the enhancement and potential increase in demands will be delayed
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• There are no known conflicts with resource management objectives that cannot be mitigated through approvals that will be obtained	• There is no difference between Alternative 1 and Alternative 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Waste materials will result from any industrial development, but will be managed according to all regulatory requirements during all Project phases	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Opportunities will be sought to re-use or recycle waste materials as reasonable during the construction, operations and closure phases	• There is no difference between Alternative 1 and Alternative 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**

Table 4.3-1: Assessment of Alternatives to the Project

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Proceed with Project as Planned	Alternative 2: Delay the Project until Circumstances Are More Favourable
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• No effect anticipated from baseline condition, as the portage route currently maintained by FMG will be relocated during operations	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole / Birch Lake Portage / Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• None of the resources are within the PDA, and therefore cannot be isolated; No effect anticipated from baseline condition	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole / Birch Lake Portage / Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• None of the resources are within the PDA, and therefore cannot be affected; No effect anticipated from baseline condition	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no known areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• None of the resources are within the PDA, and therefore cannot be affected; No effect anticipated from baseline condition	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• None of the resources are within the PDA, and therefore cannot be affected; No effect anticipated from baseline condition	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Provision of employment, training and business opportunities for Indigenous community members	• There is no difference between Alternative 1 and Alternative 2 for this indicator however the enhancement will be delayed
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• No known disturbance pending receiving additional Traditional Knowledge	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Disruption to habitat that may affect traditional land use (i.e., hunting, trapping and fishing) will occur due the development of the Project, which will continue during operation and into decommissioning until the site is fully rehabilitated	• There is no difference between Alternative 1 and Alternative 2 for this indicator; the effect will just be delayed
	Summary		**Partially preferred**	**Partially preferred**

Table 4.3-1: Assessment of Alternatives to the Project

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Proceed with Project as Planned	Alternative 2: Delay the Project until Circumstances Are More Favourable
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially preferred**	**Partially preferred**
			• Adv: Development of the Project will result in increased opportunities for employment and businesses, as well as a substantial benefit to local and regional economies compared to current conditions • Disadv: The alternative will result in a change to the local land use from the current natural condition which will be mitigated by reclamation at closure	• Adv: Development of the Project will result in increased opportunities for employment and businesses, as well as a substantial benefit to local and regional economies compared to current conditions, however the effect or enhancement will be delayed • Disadv: The alternative will result in a change to the local land use from the current natural condition to industrialized site. to be mitigated by reclamation after the Project ends
Technical Objectives				
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Indicator is not applicable to this alternative	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Indicator is not applicable to this alternative	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Indicator is not applicable to this alternative	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Indicator is not applicable to this alternative	• There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Development of the Project as planned takes advantage of the current value for gold which and provides increased attractiveness due to the certainty • Investors react to the current and anticipated near term market, and are schedule conscious; there is a lower risk of unforeseen events in either the marketplace or the regulatory climate with proceeding as planned	• There is the potential that the investment climate for gold could be better in the future, however the current value for gold is very high as compared to over the last fifty years (with a comparable value only present in 2011/2012) which presents the risk of future value for gold decreasing and consequentially the attractiveness could decrease if the Project is delayed
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• The Project will only proceed on regulatory approval and if there is a competitive or acceptable return on investment • Proceeding as plans allows investments made to date (e.g., exploration, lands, engineering) to be recouped sooner	• There would be additional carrying costs on the current investments which would increase the financial burden and reduce the return on investment on the Project
	Degree to which alternative provides financial risk	• There are no facilities present	• Project economics are defined in the context of the current market and associated conditions and therefore a known risk if development occurs as planned	• Financial risks associated with a Project delay are highly uncertain, and not reasonably foreseeable
	Summary		**Preferred**	**Not preferred**
Technical Performance Objective Assessment			**Preferred**	**Not preferred**
			• Adv: Investors react to current and anticipated near-term market conditions, and are schedule conscious and will react favourably to proceeding as planned • Adv: Proceeding with the Project in the near term provides FMG with the best opportunity to realize returns on investments to date	• Disadv: Investor risk becomes more speculative if the Project timeline is pushed out by a substantial amount (years), and capital for detailed engineering and other functions would be extremely difficult to obtain with a substantively delayed, or uncertain timeline • Disadv: Given high gold prices, the investment climate for gold is not anticipated to improve substantively in the future

Table 4.3-1: Assessment of Alternatives to the Project

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Proceed with Project as Planned	Alternative 2: Delay the Project until Circumstances Are More Favourable
Amenability to Reclamation (Closure Phase)				
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• The Project site will be closed out in accordance with Ontario regulations and industry best practices, so as to avoid adverse safety and security risks to the general public in the near and long term	• There is no difference between Alternative 1 and Alternative 2 for this indicator although the timing will be delayed
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• Drainage will be returned to passive flow after closure; however, patterns will remain altered as a result of development in the PDA	• There is no difference between Alternative 1 and Alternative 2 for this indicator although the timing will be delayed
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Project development will generate habitat alterations compared with the baseline condition however active habitat restoration will occur at closure	• There is no difference between Alternative 1 and Alternative 2 for this indicator although the timing will be delayed
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• Restored lands are anticipated to be suitable for recreational uses such as boating and hunting, and traditional uses although some uses will be diminished due to site topographical changes	• There is no difference between Alternative 1 and Alternative 2 for this indicator although the timing will be delayed
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• The site will be returned to an aesthetically pleasing although altered landscape	• There is no difference between Alternative 1 and Alternative 2 for this indicator although the timing will be delayed
	Summary		**Partially preferred**	**Partially preferred**
	Summary		**Partially preferred**	**Partially preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially preferred**	**Partially preferred**
			• Adv: The site will be rehabilitated to Ministry of Mines requirements under the *Mining Act* which will mitigate effects of the Project • Disadv: the site will be altered from the baseline environmental condition	• Adv: The site will be rehabilitated to Ministry of Mines requirements under the *Mining Act* which will mitigate effects of the Project • Disadv: the site will be altered from the baseline environmental condition; as the Project will be delayed the timing of completion of reclamation will be similarly delayed
OVERALL ASSESSMENT OF ALTERNATIVE			**PREFERRED (SELECTED ALTERNATIVE)**	**NOT PREFERRED**
			This alternative best fulfills the Project purpose. Although regulatory requirements will be met, this alternative will result in negative changes to the existing environment during construction, operation and closure of the Project, consistent in scale and effect with other Ontario mining projects.	The alternative of delaying the Project until circumstances are more favourable is not preferred, as a material delay may result in the inability to raise funds to proceed with development. Given the current high gold prices, there is no expectation that the investment climate for gold will improve substantively in the future.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
(2) For ease of referencing, Caribou refers to Woodland Caribou (Boreal population).
Adv = advantage; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; RSA = Regional Study Area; SARA = *Species at Risk Act*.

4.4 Dike Locations

Dikes are required to separate a portion of the north basin from the remainder of Springpole Lake so that the water from the isolated portion of the lake can be removed and mining of the ore body can occur. No other technically feasible means for isolating this portion of the lake have been identified.

Dikes are commonly used and predictably effective for mining applications. The following are a few examples of Canadian mines that required dikes to access ore bodies located under portions of large lakes:

- Meadowbank Mine, Nunavut;
- Gahcho Kué Mine, Northwest Territories; and
- Diavik Mine, Northwest Territories.

4.4.1 Identified Alternatives

If a west dike and east dike are not established (the do nothing alternative), the Project cannot proceed as the ore is located below Springpole Lake and cannot be accessed without the containment of a portion of the lake. The environmental conditions at Alternatives W1 and E2 (the west and east dike locations) would be unchanged if the dikes were not constructed; however, the socioeconomic benefits of the Project cannot occur without dikes to allow dewatering of a portion of the lake basin (Figure 4.4-1).

Two dikes are required to isolate the portion of the north basin of Springpole Lake where dewatering is required to fully isolate the proposed mining area. Based on the natural topography and bedrock conditions, two potential locations were identified for the west dike:

- **Alternative W1:** south and closest to the open pit; and
- **Alternative W2:** southwest and downstream of W1.

Four alternative potential locations were identified for the east dike, listed in increasing distance from the open pit:

- **Alternative E1:** immediately east and closest to the open pit;
- **Alternative E2:** east and farther downstream of E1;
- **Alternative E3:** east and farther downstream of E1 and E2; and
- **Alternative E4:** south and farthest downstream of E1, E2 and E3.

The alternative dike locations are shown in Figure 4.4-1.

The potential dike alternatives are situated in locations where there is a narrowing of the natural bays combined with favourable lakebed topography. This minimizes the length of the dikes and associated fill requirements, reduces effects on the lakebed and improves overall stability aspects. The following dike design was assumed for all locations:

- Dike crest elevation of 396 metres above sea level (masl) providing 5 metres (m) of freeboard above the current average lake level (391 masl);
- Constructed of a core and shell of rock, with additional coarse riprap stone at the upstream wave interface;
- Upstream and downstream slopes of 1.3 horizontal to 1 vertical (1.3H:1V); and

- A slurry wall installed to the base of embankment fill and a grout curtain installed into the foundation.

Primary considerations for the dike locations from a technical perspective were distance from the open pit, dike height and natural foundation conditions:

- Dike locations closer to the open pit will be more susceptible to blast-induced vibrations as reflected by the peak particle velocity.
- Higher dike crests will increase the geotechnical complexity for maintaining long-term stability.
- Higher proportions of native sediments on the lakebed increase the geotechnical design complexity and may require removal prior to construction of the dike (resulting in additional construction complexity, including the control of sediment releases at depth).

All six potential dike alternatives were modelled using the three-dimensional (3D) modelling software package Muk3D and developed to an equivalent level of detail to support accurate comparison (Knight Piésold 2021). A comparison of the six dike alternatives from a technical perspective is provided in .

4.4.2 Assessment of Alternatives

The alternatives for the west and east dikes were assessed for all performance objectives, criteria and indicators (Table 4.4-1 and Table 4.4-2, respectively). The alternative locations for both the west and east dikes are similar with respect to the performance objectives except for natural environment and technical performance, for which there are the following differentiating criteria:

- Natural environment performance:
- Potential effect on air quality and climate (West Dike only); and
- Potential effect on water quality, fish and aquatic habitat.
- Technical performance:
- Cost effectiveness; and
- Ability to service site (East Dike only).

The key mitigation measures that would minimize the potential environmental effects from the dikes are as follows:

- Minimize the distance from rock supply to reduce air emissions including GHGs.
- Minimize the length of the dikes to reduce the length of time to construct and construction-related disruptions such as noise.
- Limit the size of the open pit basin to reduce effects on aquatic habitat as practicable.
- Use standard mitigation measures during construction, including to complete construction outside of sensitive wildlife and fish periods, and employ effective erosion and sediment control measures to separate the construction area from the open water / remainder of the lake.
- Refill the open pit basin after Project operations cease and lower the dike to provide for reconnection to Springpole Lake once all regulatory requirements are met.

4.4.2.1 West Dike

Both W1 and W2 locations are far enough away from the open pit blasting areas for stability purposes. The primary advantage of W1 over W2 is that it would result in a substantially smaller dewatered open pit basin, and as a result, reduced effects on fish habitat and fish spawning areas, as well as and air emissions during construction. The W1 location would also result in reduced GHG emissions compared to the W2 location due to a shorter overall haul distance to construct the dikes, as well as reduced indirect GHG emissions from the power required for controlled dewatering. In addition, the W1 location would result in the lowest potential loss of fish habitat and lower effect on spawning areas due to the smaller potential open pit basin compared to the W2 location. The W2 location does not present any advantages over W1 and has the disadvantage of substantially increased costs resulting from the greater haul distance and increased controlled dewatering / pumping costs, as well as increased fisheries compensation measures. The increased cost for W2 cannot be supported by the Project.

4.4.2.2 East Dike

The E1 alternative is closest to the open pit (less than 250 m), therefore having the lowest potential for emissions during construction due to the lowest haul distance. The E1 alternative would also have the lowest potential impact on fish habitat and spawning areas due to having the smallest potential open pit basin. The disadvantage of the E1 location is that it could require additional design measures to provide effective mitigation of blast-induced vibration

Alternative location E2 has the second shortest distance for hauling, and also has the second least potential effect on fish habitat and fish spawning areas due to the potential size of the open pit basin. The advantage of this location over the E1 alternative is the distance from the open pit not causing stability concerns resulting from blast-induced vibrations.

Although E3 has the advantage of a shorter length, it would be five or more metres higher than the other east dike alternatives, resulting in additional footprint and cost. Dike locations E3 and E4 unnecessarily expand the isolated area that would require dewatering and increase the potential effect on fish habitat and fish spawning areas. The E4 alternative has higher capital (construction phase) and operating (operations phase) costs that cannot be supported by the Project.

4.4.3 Results Summary and Selected Alternatives

Dike location W1 is the preferred alternative for the western dike as W2 would unnecessarily expand the dewatering area and be much more costly. The W2 alternative would result in direct effects (dewatering) of an additional area of deep basin habitat not affected by use of W1.

Alternatives E2 and E3 are both preferred for the eastern dike, providing a balance of distance from the open pit for stability and reduced environment effects from construction emissions and size of the basin requiring dewatering. Alternative E2 is the selected alternative for the east dike, as it has the advantage of dewatering a smaller portion of the lake and will have reduced effects on fish and fish habitat.

Alternative W1 and alternative E2 are the selected alternatives carried forward into Section 5 (Project Description), based on the assessment of key advantages and disadvantages per Table 4.4-1 and Table 4.4-2 and with the implementation of the key mitigation measures summarized in Section 4.4.2.

Table 4.4-1: Assessment of West Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative W1: Closest to Open Pit	Alternative W2: Farther from Open Pit
Natural Environment				
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting [1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con: Reduced emissions from the shorter overall haul distance; 470 metres (m) to open pit to construct the dams • Op: No effects anticipated • Cl: No material effects anticipated	• Con: Substantially longer haul distance from the open pit (1,760 m) resulting in increased emissions • Op: No effects anticipated • Cl: No material effects anticipated
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con: GHG emissions will result from construction of the dike (primarily from fuel combustion in heavy equipment), but all regulatory requirements will be met • Con: Reduced GHG emissions generated from shorter overall haul distance (470 m) to construct the dams, as well as reduced indirect GHG emissions from power needed for controlled dewatering • Op: No effects anticipated • Cl: No material effects anticipated	• Con: GHG emissions will result from construction of the dike (primarily from fuel combustion in heavy equipment), but all regulatory requirements will be met • Con: Substantially longer haul distance from the open pit (1,760 m) resulting in increased emissions • Op: No effects anticipated • Cl: No material effects anticipated
	Summary		**Preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Cl: All regulatory requirements will be met during all Project phases, with mitigation measures employed during the construction and closure phase as needed to control sediment loading and potential releases to Springpole Lake • Op: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Area of fish habitat affected	• Representative of both a coolwater and a coldwater fish community. • Provides habitat for a diverse fish community, including eight sportfish species (Burbot, Cisco, Lake Trout, Lake Whitefish, Northern Pike, Rock Bass, Walleye and Yellow Perch) and 18 forage and baitfish species (including Shorthead Redhorse and White Sucker). • The north basin includes three deep basins that are considered important habitat for coldwater fish (Lake Trout and Lake whitefish).	• Con/Op/Cl: Provides for the smallest potential open pit basin (135 ha) [2], thereby having the lowest potential loss of fish habitat • Con/Op/Cl: Has the lowest effect on spawning areas (Appendix F, Figure 4-1)	• Con/Op/Cl: Results in the largest open pit basin (346 ha) [2] including directly affecting another lake basin • Con/Op/Cl: Affects a substantially larger number of spawning areas including for Lake Trout (Appendix F, Figure 4-1) • Con/Op: Results in the removal of an additional area of deep basin habitat not affected by the other alternative
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores Springpole Lake species density estimates based on one provincial protocol broadscale monitoring cycle indicate a population density of 0.3 Lake Trout per hectare and 2.5 Walleye per hectare	• Con/Op/Cl: Fish populations may be affected by the loss of fish habitat, however this will be compensated and offset by the FHOCP and restored at closure	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to maintain conditions for fish passage	• Fish passage is unimpeded	• Con/Op/Cl: By their nature, dike(s) will impede fish passage and the potential effects are comparable for both dike locations	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• No wetlands are present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to maintain wetland connectivity	• No wetlands are present; no effect to connectivity	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator

Table 4.4-1: Assessment of West Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative W1: Closest to Open Pit	Alternative W2: Farther from Open Pit
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• No terrestrial habitat is present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con: Construction of the dike(s) as well as partial removal during the decommissioning and closure phase will result in localized noise which may disturb wildlife • Op: No effects anticipated • Cl: Very limited noise will result from related reclamation activities	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to maintain plant dispersion and wildlife movement corridors	• No terrestrial habitat is present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to maintain wildlife populations	• No terrestrial habitat is present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• No terrestrial SAR habitat is present • No aquatic SAR have been identified	• Con/Op/Cl: No effects anticipated; no SAR aquatic species identified as present	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Area and type of SAR habitat displaced	• No terrestrial SAR habitat is present • No aquatic SAR have been identified	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Construction of the dike(s) as well as partial removal during the closure phase will result in localized noise which may disturb wildlife, including terrestrial SAR if present • Op: No effects anticipated • Cl: Partial removal during the closure phase will result in localized noise which may disturb wildlife, including terrestrial SAR if present	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to maintain SAR wildlife movement corridors	• No terrestrial SAR habitat is present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
		Natural Environment Performance Objectives Assessment	**Preferred**	**Partially preferred**
			• Adv: Reduced GHG emissions due to shorter overall haul distance to construct the dams • Adv: Provides for the smallest potential open pit basin (less than half the size of Alternative 2; using E1 to allow for calculation), thereby having the lowest potential loss of fish habitat from controlled dewatering and reduced impact on spawning areas	• Disadv: Further distance from source of aggregate, resulting in greater GHG emissions during construction as well as greater indirect GHG emissions associated with increased controlled dewatering requirements during construction and operations phases • Disadv: Establishes a much larger isolated lake area / volume, resulting in additional loss of fish habitat
Social, Economic, Cultural and Built Environment				
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities •	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator

Table 4.4-1: Assessment of West Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative W1: Closest to Open Pit	Alternative W2: Farther from Open Pit
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Construction of the dike(s) will generate noise emissions that will meet regulatory requirements • Op: No effects anticipated • Cl: Partial removal during the closure phase will result in localized noise that will meet regulatory requirements	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects anticipated; no water wells present in Project area	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects anticipated; no known surface water supplies present in the Project area	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con: Dike construction / reclamation will cause disturbance during the construction and closure phases • Op: The dike will be a rock dike above the water level that will affect aesthetics locally during construction and operations phases • Cl: The potential effect on aesthetics will be reduced after closure, when the dike is lowered below the lake surface	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: No adverse effect to health and safety; emissions will be generated during construction, operations and decommissioning and closure phases; however, will not affect attainment of air quality standards which are protective of health • Op: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects anticipated; no drinking water systems are present	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: There are no material electromagnetic emissions associated with this alternative	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect road traffic	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**

Table 4.4-1: Assessment of West Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative W1: Closest to Open Pit	Alternative W2: Farther from Open Pit
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities however; no material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: Dike(s) support the development of an open pit basin which will not be available for harvesting of fish or access until the filled basin is reconnected to Springpole Lake (post closure)	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Cl: Dike construction / reclamation will cause disturbance during the construction and closure phases which may result in disturbance to recreational users • Con/Op/Cl: The PDA will not be available for tourism and recreational opportunities during the construction, operations and closure phases	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: Project development, including of the dike(s), will generate considerable regional and local, employment and business opportunities • Op/Cl: No effects associated with the alternative anticipated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative W1	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator

Table 4.4-1: Assessment of West Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative W1: Closest to Open Pit	Alternative W2: Farther from Open Pit
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole / Birch Lake Portage / Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative W1	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole / Birch Lake Portage / Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative W1	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near Alternative W1	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near Alternative W1 •	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the nearest Reserve is distant from the mine site	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No effects; there are no known spiritual, ceremonial, cultural heritage and archaeological sites at or near Alternative W1	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: Disruption to habitat will occur due the development of the dikes that may affect traditional fishing, which will continue during operation and into decommissioning until the site is fully rehabilitated	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially preferred** • Adv: Together with a required east dam, will allow for mining to occur which provides economic benefits to the region and Province • Adv: Will create a much smaller open pit basin and reduced disruption of aquatic habitat, therefore potentially resulting in less potential effects on other lake users, including tourism and recreational operators, traditional land users and others	**Partially preferred** • Adv: Together with a required east dam, will allow for mining to occur which provides economic benefits to the region and Province • Disadv: Together with a required east dam, will create a larger open pit basin (than W1), which could increase the disruption for aquatic harvesters (recognizing that the size of the basin is not the only potential disruptor)

Table 4.4-1: Assessment of West Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative W1: Closest to Open Pit	Alternative W2: Farther from Open Pit
Technical Objectives				
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Dikes are commonly used and predictably effective even for larger scale applications. Examples of Canadian mines which required temporary or permanent dewatering of portions of lakes to provide access to ore bodies include: Meadowbank Mine, Nunavut; Gahcho Kué Mine, Northwest Territories; and Diavik Mine, Northwest Territories • Con/Op/Cl: Both dams are of comparable length (W1: 640 m; W2: 750 m) and height (approximately 17 m), and anticipated substrate conditions	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; dikes are commonly used	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: A dike located at Alternative W1 will be able to consistently meet Project needs	• Con/Op/Cl: A dike located at Alternative W2 will be able to consistently meet Project needs
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: A west dike is a required infrastructure in order for open pit mining occur	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Although there is precedent in Canada, there is a potential risk to being able to obtain approval to section off a portion of a lake in support of open pit mining, which could be perceived as less attractive	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Costs for dike and associated fisheries compensation measures can be supported by the Project, providing an acceptable return on investment	• Con/Op/Cl: Substantially increased costs for W2 and compared to W1, resulting from the greater haul distance, increased controlled dewatering / pumping costs, as well as increased fisheries compensation measures • Con/Op/Cl: The increased cost cannot be supported by the Project
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No effect anticipated as dikes will be constructed using rock extracted at site (rather than external supplier)	• Con/Op/Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
		Summary	**Partially preferred**	**Not preferred**
		Technical Performance Objective Assessment	**Partially preferred**	**Not preferred**
			• Adv: Capital and operating costs can be supported by the Project and provide a competitive return on investment	• Disadv: Higher capital (construction phase) and operating (operations phase) costs cannot be supported by the Project
Amenability to Reclamation (Closure Phase)				
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• Con/Op Indicator is only related to closure • Cl: The dikes will create an open pit basin during the construction phase, which will be managed to provide the safety and security of the general public, including up to the filling of the basin during the late operations / closure phases	• Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• The open pit basin is part of a natural lake	• Cl: Indicator is not applicable to this alternative (note that the dikes are proposed to be altered to allow natural water movement between the filled basin and Springpole Lake once water quality in the filled basin meets all regulatory requirements)	• Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator

Table 4.4-1: Assessment of West Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative W1: Closest to Open Pit	Alternative W2: Farther from Open Pit
	Ability to provide habitats for vegetation and wildlife species, including SAR	• There is no terrestrial habitat present	• Cl: No material effects anticipated	• Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• Cl: The restored filled basin is anticipated to be suitable for recreational uses such as boating and traditional uses • Area will provide increase in fish habitat compared to baseline conditions which will be suitable for fishing	• Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: The site will be returned to an aesthetically pleasing although altered landscape	• Cl: There is no difference between Alternative W1 and Alternative W2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially preferred**	**Partially preferred**
			• Adv: The dike will be lowered in order that the open pit basin can be reconnected to Springpole Lake for future use, once the water in the filled basin meets all regulatory requirements	• Adv: The dike will be lowered in order that the open pit basin can be reconnected to Springpole Lake for future use, once the water in the filled basin meets all regulatory requirements
OVERALL ASSESSMENT OF ALTERNATIVE			**PREFERRED (SELECTED ALTERNATIVE)**	**NOT PREFERRED**
			The primary reason for selecting this alternative is that it allows for a reduced size dewatered open pit basin that results in less direct effects on aquatic habitat.	This alternative has an increased surface area (over twice the area of Alternative 1) and greater direct effects on aquatic habitat. It also has substantially higher costs, resulting from the greater haul distance, increased dewatering / pumping costs, as well as increased fisheries compensation measures that cannot be supported by the Project.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
(2) To allow for comparison across all dike alternatives, listed areas / volumes assumes E1 (for west alternatives) to fully isolate the basin.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; Aeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured. ; Op: operations phase; SARA = *Species at Risk Act*.

Table 4.4-2: Assessment of East Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative E1: Closest to Open Pit	Alternative E2: Closer to Open Pit	Alternative E3: Farther from Open Pit	Alternative E4: Farthest from Open Pit
Natural Environment						
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting [1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con: Reduced emissions are generated for E1 from the shorter overall haul distance (235 m to open pit) to construct the dams • Op: No effects anticipated • Cl: No material effects anticipated	• Con: Emissions will be higher compared to E1 (590 m distance from open pit) • Op: No effects anticipated • Cl: No material effects anticipated	• Con: Emissions will be higher (900 m from open pit) compared to E1 and E2 • Op: No effects anticipated • Cl: No material effects anticipated	• Con: Greatest air emissions from construction due to rock hauling distance (over twice the distance of E3, approximately 2 km) and excessive controlled dewatering requirements • Con: Establishes a much larger open pit basin, resulting in greater power use and indirect emissions • Op: No effects anticipated • Cl: No material effects anticipated
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Cons: Reduced GHG emissions generated from shorter overall haul distance to construct the dams, as well as reduced indirect GHG emissions from power needed for controlled dewatering • Op: No effects anticipated • Cl: No material effects anticipated	• Con: Emissions will be higher compared to E1 (590 m distance from open pit) • Op: No effects anticipated • Cl: No material effects anticipated	• Con: Emissions will be higher (900 m from open pit) compared to E1 and E2 • Op: No effects anticipated • Cl: No material effects anticipated	• Con: Greatest GHG emissions from construction due to hauling distance for heavy equipment (longer drive time) • Con: Establishes a much larger open pit basin, resulting in greater power use and indirect emissions • Op: No effects anticipated • Cl: No material effects anticipated
		Summary	**Preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Cl: All regulatory requirements will be met during all Project phases, with mitigation measures employed during the construction and closure phase as needed to control sediment loading and potential releases to Springpole Lake • Op: effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Area of fish habitat affected	• Representative of both a coolwater and a coldwater fish community. • Provides habitat for a diverse fish community, including eight sportfish species (Burbot, Cisco, Lake Trout, Lake Whitefish, Northern Pike, Rock Bass, Walleye and Yellow Perch) and 18 forage and baitfish species (including Shorthead Redhorse and White Sucker). • The north basin includes three deep basins that are considered important habitat for coldwater fish (Lake Trout and Lake whitefish).	• Con/Op/Cl: Provides for the smallest potential open pit basin (135 ha) [2], thereby having the lowest potential loss of fish habitat • Con/Op/Cl: As there are spawning areas locally, it also has the lowest effect on spawning areas (Appendix F, Figure 4-1)	• Con/Op/Cl: Would result in a larger open pit basin (156 ha) [2], and would affect a larger area of spawning, including for Lake Trout (Appendix F, Figure 4-1)	• Con/Op/Cl: Would result in a larger open pit basin (167 ha) [2], and would affect a larger area of spawning including for Lake Trout as compared to E1 and E2 (Appendix F, Figure 4-1)	• Con/Op/Cl: Provides for the largest potential open pit basin (307 ha), thereby having the greatest potential loss of fish habitat • Con/Op/Cl: It also has the greatest potential effect on spawning areas including for Lake Trout and Whitefish (Appendix F, Figure 4-1) • Con/Op: Would result in the removal of an additional area of deep basin habitat not affected by the other alternatives
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores Springpole Lake species density estimates based on one provincial protocol broadscale monitoring cycle indicate a population density of 0.3 Lake Trout per hectare	• Con/Op/Cl: Dike(s) support the development of an open pit basin in order that mining can occur • Con/Op/Cl: Fish populations may be affected by the loss of fish habitat, although fish will be relocated from the basin as	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator

Table 4.4-2: Assessment of East Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative E1: Closest to Open Pit	Alternative E2: Closer to Open Pit	Alternative E3: Farther from Open Pit	Alternative E4: Farthest from Open Pit
		and 2.5 Walleye per hectare	practicable; however, some loss of fish life is expected			
	Ability to maintain conditions for fish passage	• Fish passage is unimpeded	• Con/Op/Cl: By their nature, dike(s) will impede fish passage. This is expected to be restored on filling of the basin with water and reconnection to Springpole Lake after closure of the mine • Con/Op/Cl: Loss of water flows resulting in a loss of fish habitat / fish passage will be mitigated through implementation of a fish habitat offsetting / compensation plan	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Summary		**Preferred**	**Partially preferred**	**Partially preferred**	**Not preferred**
Potential Effect on Wetlands	Area of wetlands affected	• No wetlands are present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Ability to maintain wetland connectivity	• No wetlands are present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• No terrestrial habitat is present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Construction of the dike(s) as well as partial removal during the closure phase will result in localized noise which may disturb wildlife	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Ability to maintain plant dispersion and wildlife movement corridors	• No terrestrial habitat is present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Ability to maintain wildlife populations	• No terrestrial habitat is present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• No terrestrial SAR habitat is present • No aquatic SAR have been identified	• Con/Op/Cl: No SAR aquatic species identified as present	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Area and type of SAR habitat displaced	• No terrestrial SAR habitat is present • No aquatic SAR have been identified	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this	• Con/Op/Cl: There is no difference amongst the alternatives for this	• Con/Op/Cl: There is no difference amongst the alternatives for this

Table 4.4-2: Assessment of East Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative E1: Closest to Open Pit	Alternative E2: Closer to Open Pit	Alternative E3: Farther from Open Pit	Alternative E4: Farthest from Open Pit
				indicator	indicator	indicator
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Construction of the dike(s) as well as partial removal during the closure phase will result in localized noise which may disturb wildlife, including terrestrial SAR if present	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Ability to maintain SAR wildlife movement corridors	• No terrestrial SAR habitat is present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Natural Environment Performance Objectives Assessment			**Preferred**	**Partially preferred**	**Partially preferred**	**Not preferred**
			• Adv: Reduced GHG emissions due to shorter overall haul distance to construct the dams • Adv: Provides for the smallest potential dewatered open pit basin, thereby having the lowest potential loss of fish habitat • Disadv: will result in the temporary lost of fish habitat until post closure	• Adv: Reduced GHG emissions due to shorter overall haul distance to construct the dams • Adv: Provides for a smaller potential dewatered open pit basin, thereby having a lower potential loss of fish habitat • Disadv: will result in the temporary lost of fish habitat until post closure	• Adv: Reduced GHG emissions due to shorter overall haul distance to construct the dams • Adv: Provides for a smaller potential dewatered open pit basin, thereby having a lower potential loss of fish habitat • Disadv: will result in the temporary lost of fish habitat until post closure	• Disadv: Greatest GHG emissions from construction due to distance and excessive dewatering requirements • Disadv: Establishes a much larger open pit basin, resulting in an unnecessarily greater loss of fish habitat that will continue until post closure
Social, Economic, Cultural and Built Environment						
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with this alternative; there are no camp / cabin facilities nearby • Con: Additional noise related to the dikes may affect wilderness perception for recreational users of nearby lakes	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Construction of the dike(s) will generate noise emissions that will meet regulatory requirements • Op: No effects anticipated • Cl: Partial removal during the closure phase will result in	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator

Table 4.4-2: Assessment of East Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative E1: Closest to Open Pit	Alternative E2: Closer to Open Pit	Alternative E3: Farther from Open Pit	Alternative E4: Farthest from Open Pit
			localized noise that will meet regulatory requirements			
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects anticipated; no water wells present in Project area	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects anticipated; no known surface water supplies present in the Project area	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con: Dike construction / reclamation will cause disturbance during the construction and closure phases • Op: The dike will be a rock dike above the water level that will affect aesthetics locally during construction and operations phases • Cl: The potential effect on aesthetics will be reduced after closure, when the dike is lowered below the lake surface	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: No adverse effect to health and safety; emissions will be generated during construction, operations and closure phases; however, will not affect attainment of air quality standards which are protective of health • Op: No effects anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Op/Cl: No effects anticipated; no drinking water supplies are located nearby	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator

Table 4.4-2: Assessment of East Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative E1: Closest to Open Pit	Alternative E2: Closer to Open Pit	Alternative E3: Farther from Open Pit	Alternative E4: Farthest from Open Pit
		• Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples				
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: No public access will be available on the dike(s) due to safety considerations • Con/Op/Cl: Protocols will be established for site traffic safety, including in relation to the dikes	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: Dike(s) support the development of an open pit basin in order that mining can occur; the open pit basin will not be available for harvesting of fish until the filled basin is reconnected to Springpole Lake (post closure)	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: This alternative results in a dewatering open pit basin that is twice the volume of the other basins, which could increase the disruption for aquatic harvesters (recognizing that the size of the basin is not the only potential disruptor)
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Not preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Cl: Dike construction / reclamation will cause disturbance during the construction and closure phases • Con/Op/Cl: The PDA will not be available for tourism and recreational opportunities during the construction, operations and closure phases	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: Project development, including of the dike(s), will generate considerable regional and local, employment and business opportunities • Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference from alternative E1 for this indicator	• Con/Op/Cl: There is no difference from alternative E1 for this indicator	• Con/Op/Cl: There is no difference from alternative E1 for this indicator

Table 4.4-2: Assessment of East Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative E1: Closest to Open Pit	Alternative E2: Closer to Open Pit	Alternative E3: Farther from Open Pit	Alternative E4: Farthest from Open Pit
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: No effects anticipated; Alternative E1 will not change services	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative E1	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative E1	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative E1	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator

Table 4.4-2: Assessment of East Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative E1: Closest to Open Pit	Alternative E2: Closer to Open Pit	Alternative E3: Farther from Open Pit	Alternative E4: Farthest from Open Pit
	resources or cultural heritage landscapes; shadows that materially alter the heritage resource	Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value				
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near Alternative E1	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near Alternative E1 • Con: Construction work will not alter water levels in the southeast arm of Springpole Lake	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Reserve is distant from Project	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No known disturbance	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: Disruption to habitat will occur due the development of the dikes, which will continue during operation and into decommissioning until the site is fully rehabilitated •	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**

Table 4.4-2: Assessment of East Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative E1: Closest to Open Pit	Alternative E2: Closer to Open Pit	Alternative E3: Farther from Open Pit	Alternative E4: Farthest from Open Pit
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially preferred**	**Partially preferred**	**Partially preferred**	**Not preferred**
			• Adv: Together with a west dam, will allow for mining to occur which provide economic benefits to the region and Province • Adv: Will create the smallest open pit basin and reduced disruption of aquatic habitat (135 ha utilizing Alternative W1 to allow for calculation), therefore resulting in lower potential effects on other lake users, including tourism and recreational operators, traditional land users and others	• Adv: Together with a west dam, will allow for mining to occur which provide economic benefits to the region and Province • Adv: Will create a smaller open pit basin and reduced disruption of aquatic habitat (156 ha utilizing Alternative W1 to allow for calculation), therefore resulting in lower potential effects on other lake users, including tourism and recreational operators, traditional land users and others	• Adv: Together with a west dam, will allow for mining to occur which provide economic benefits to the region and Province • Adv: Will create a smaller open pit basin and reduced disruption of aquatic habitat (167 ha utilizing Alternative W1 to allow for calculation), therefore resulting in lower potential effects on other lake users, including tourism and recreational operators, traditional land users and others	• Adv: Together with a west dam, will allow for mining to occur which provide economic benefits to the region and Province • Disadv: Will create a larger open pit basin of 307 ha, utilizing Alternative W1 to allow for calculation), which could increase the disruption for aquatic harvesters (recognizing that the size of the basin is not the only potential disruptor)
Technical Objectives						
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Dikes are commonly used and predictably effective even for larger scale applications, such as for other Canadian mines which required temporary or permanent isolation of portions of lakes to provide access to ore bodies • Con/Op/Cl: Length (235 m) and height (11 m) is not a stability concern • Con/Op/Cl: E1 is too close to open pit resulting in stability concerns related to blast-induced vibration	• Con/Op/Cl: Dikes are commonly used and predictably effective even for larger scale applications, such as for other Canadian mines which required temporary or permanent isolation of portions of lakes to provide access to ore bodies • Con/Op/Cl: Length (E2: 300 m) and height (E2: 11 m) are not a stability concern	• Con/Op/Cl: Dikes are commonly used and predictably effective even for larger scale applications, such as for other Canadian mines which required temporary or permanent isolation of portions of lakes to provide access to ore bodies • Con/Op/Cl: Length (E3: 250 m) and height (E3: 17 m) are not a stability concern	• Con/Op/Cl: Dikes are commonly used and predictably effective even for larger scale applications, such as for other Canadian mines which required temporary or permanent isolation of portions of lakes to provide access to ore bodies • Con/Op/Cl: Length (E4: 690 m) and height (E2: 12 m) are not a stability concern
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; dikes are commonly used	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: A dike located at Alternative E1 will be able to consistently meet Project needs	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: An east dike is a required infrastructure in order for open pit mining occur	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
		Summary	**Not preferred**	**Preferred**	**Preferred**	**Preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Although there is precedent in Canada, there is a potential risk to being able to obtain approval to section off a portion of a lake in support of open pit mining, which could be perceived as less attractive	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Degree to which alternative provides a competitive or	• There are no facilities present	• Con/Op/Cl: Costs for dike and associated fisheries compensation	• Costs for dike and associated fisheries compensation measures	• Costs for dike and associated fisheries compensation measures can be	• Con/Op/Cl: Substantially increased costs for E4 and compared to E1, E2

Table 4.4-2: Assessment of East Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative E1: Closest to Open Pit	Alternative E2: Closer to Open Pit	Alternative E3: Farther from Open Pit	Alternative E4: Farthest from Open Pit
	acceptable return on investment		measures can be supported by the Project, providing a competitive return on investment	can be supported by the Project, providing a competitive return on investment	supported by the Project, providing a competitive return on investment	and E3, resulting from the greater haul distance, increased controlled dewatering / pumping costs, as well as increased fisheries compensation measures • Con/Op/Cl: The increased cost cannot be supported by the Project
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No effect anticipated as dikes will be constructed using rock extracted at site (rather than external supplier)	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator	• Con/Op/Cl: There is no difference amongst the alternatives for this indicator
	Summary		**Preferred**	**Preferred**	**Preferred**	**Not preferred**
Technical Performance Objective Assessment			**Not preferred**	**Preferred**	**Preferred**	**Not preferred**
			• Adv: Capital and operating costs can be supported by the Project and provide a competitive return on investment • Disadv: E1 is close to the open pit (<250 m) and is less predictably effective, although additional design measures could potentially be used in order to provide effective mitigation of blast-induced vibrations	• Adv: A dike located at E2 is anticipated to meet Project needs and is not of stability or other technical concern • Disadv: Capital and operating costs can be supported by the Project and provide a competitive return on investment	• Adv: A dike located at E3 is anticipated to meet Project needs and is not of stability or other technical concern • Adv: Capital and operating costs can be supported by the Project and provide a competitive return on investment	• Adv: A dike located at E4 is anticipated to meet Project needs and is not of stability or other technical concern • Disadv: Higher capital (construction phase) and operating (operations phase) costs that cannot be supported by the Project
Amenability to Reclamation (Closure Phase)						
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• Cl: The dikes will create an open pit basin during the construction phase, which will be managed to provide the safety and security of the general public, including up to the filling of the basin during the late operations / closure phases	• Cl:: There is no difference amongst the alternatives for this indicator	• Cl:: There is no difference amongst the alternatives for this indicator	• Cl:: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• The open pit basin is part of a natural lake	• Cl: Indicator is not applicable to this alternative (note that the dikes are proposed to be altered to allow natural water movement between the filled basin and Springpole Lake once water quality in the filled basin meets all regulatory requirements)	• Cl:: There is no difference amongst the alternatives for this indicator	• Cl:: There is no difference amongst the alternatives for this indicator	• Cl:: There is no difference amongst the alternatives for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• There is no terrestrial habitat present	• Cl: No effects anticipated	• Cl:: There is no difference amongst the alternatives for this indicator	• Cl:: There is no difference amongst the alternatives for this indicator	• Cl:: There is no difference amongst the alternatives for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the	• Cl: The restored filled basin is anticipated to be suitable for recreational uses such as boating and traditional uses	• Cl:: There is no difference amongst the alternatives for this indicator	• Cl:: There is no difference amongst the alternatives for this indicator	• Cl:: There is no difference amongst the alternatives for this indicator

Table 4.4-2: Assessment of East Dike Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative E1: Closest to Open Pit	Alternative E2: Closer to Open Pit	Alternative E3: Farther from Open Pit	Alternative E4: Farthest from Open Pit
		Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes				
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: The site will be returned to an aesthetically pleasing although altered landscape	• Cl:: There is no difference amongst the alternatives for this indicator	• Cl:: There is no difference amongst the alternatives for this indicator	• Cl:: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
			• Adv: The dike will be lowered in order that the open pit basin can be reconnected to Springpole Lake for future use, once the water in the filled basin meets all regulatory requirements	• Adv: The dike will be lowered in order that the open pit basin can be reconnected to Springpole Lake for future use, once the water in the filled basin meets all regulatory requirements	• Adv: The dike will be lowered in order that the open pit basin can be reconnected to Springpole Lake for future use, once the water in the filled basin meets all regulatory requirements	• Adv: The dike will be lowered in order that the open pit basin can be reconnected to Springpole Lake for future use, once the water in the filled basin meets all regulatory requirements
OVERALL ASSESSMENT OF ALTERNATIVE			**NOT PREFERRED**	**PREFERRED (SELECTED ALTERNATIVE)**	**PREFERRED**	**NOT PREFERRED**
			While this alternative has the lowest potential direct effects on aquatic habitat (lowest surface area), there are technical concerns regarding the closeness of the dike to the open pit and blasting operations which poses a potential safety concern. This alternative was not selected because of this potential concern.	The primary reason for selecting this alternative is that it allows for a reduced size dewatered open pit basin that results in less direct effects on aquatic habitat, without the potential stability concern of Alternative E1.	This alternative was not selected because it has a larger dewatered open pit basin, and does not offer any additional advantage over Alternative E2.	This alternative has an increased surface area and direct effects on aquatic habitat. It also has substantially higher costs, resulting from the greater haul distance, increased dewatering / pumping costs, as well as increased fisheries compensation measures that cannot be supported by the Project.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
(2) To allow for comparison across all dike alternatives, listed areas / volumes assumes W1 for east alternatives to fully isolate the basin.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; Op: operations phase; SARA = *Species at Risk Act*.

Table 4.4-3: Comparison of Modelled Dike Alternatives

Dike	Height (m)	Length (m)	Distance to Open Pit[1] (m)	Dewatered Area[2] (Mm^2)	Dewatered Volume[2] (Mm^2)	Foundation Conditions
W1	17	640	470	1.2	17.5	10% very soft organic mud; 75% boulder, cobble, gravel and sand; and 15% bedrock
W2	17	750	1,760	3.2	46.3	10% very soft organic mud; 75% boulder, cobble, gravel and sand; and 15% bedrock (assumed)
E1	11	420	235	1.2	17.5	70% very soft organic mud; 10% silt, mud and soft clay; and 20% boulder and cobble
E2	11	300	590	1.4	18	50% very soft organic mud; 10% silt, mud and clay; and 40% boulder, cobble, gravel and sand
E3	17	250	900	1.5	18.6	50% very soft organic mud; 50% boulder, cobble, gravel and sand
E4	12	690	2,070	2.8	40.3	10% very soft organic mud; 75% boulder, cobble, gravel and sand; and 15% bedrock (assumed)

Source: adapted from Knight Piésold (2021).

(1) Alternatives closer to the open pit will be more susceptible to blast induced vibrations.

(2) To allow comparison across all dike alternatives, listed areas / volumes assume either W1 (for east alternatives) or E1 (for west alternatives) to fully isolate the basin.

Mm^2 = million square metres; % = percent.

549000
550000
551000
552000
5695000
5694000
5693000
5692000
5691000

Birch Lake
Birch Lake
L-1
L-19
L-2
L-5
Springpole Lake (North Basin)
Springpole Lake (North Basin)

Alternative E1
Alternative E2
Alternative E3
Alternative W1
Alternative E4
Alternative W2

X:\CA\CAOAK300-OAK\MIS-FS1-ProjectF\2021\Projects\ONS2104_FMG_Springpole_EIS\11_GIS\EISMXD\Dike_Alternatives_1.mxd

LEGEND

- Phase 1 and Main Open Pit
- Watercourse
- Waterbody
- Contours (5 m interval)

Dike Location Alternatives

- Alternative E1 (2.2 ha)
- Alternative E2 (1.4 ha)
- Alternative E3 (1.4 ha)
- Alternative E4 (2.8 ha)
- Alternative W1 (3.3 ha)
- Alternative W2 (3.6 ha)

NOTES:
- Contours extracted from 2020 LiDAR survey.
- Dike location alternatives provided by Knight Piésold Consulting, September 27, 2021.

Datum: NAD83
Projection: UTM Zone 15N

0 0.25 0.5 1 1.5 2 Kilometres

N W E S

First Mining Gold

wsp

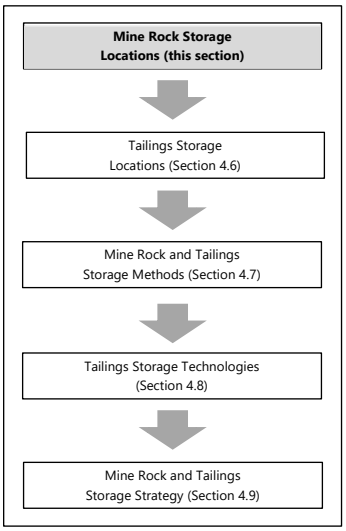
SPRINGPOLE GOLD PROJECT

Dike Location Alternatives

PROJECT N°: ONS2104 | **FIGURE: 4.4-1**

SCALE: 1:14,000 | DATE: July 2024

4.5 Mine Rock Storage Locations



Sections 4.5 to 4.9 provide a step-wise assessment of the mineral waste storage alternatives using the approach described in Section 4.1 that support the final mineral waste storage facility (the CDF) described in Section 5.8.

The MDMER require that an assessment of alternatives be completed using the prescribed approach (ECCC 2021) for mineral waste to be approved when over a natural, fish-bearing waterbody. A revised Mine Waste Management Alternatives Assessment for the Project is provided as Appendix E.

4.5.1 Identified Alternatives

Mine rock is the primary mineral waste that results from open pit mining at the Project. Overburden and lake sediments will also require removal from a portion of the dewatered basin to allow extraction of the ore and is considered in Section 4.12. If a mine rock storage area is not established (the do nothing alternative), the Project cannot proceed as the ore body is not accessible without removal of the mine rock. With the do nothing alternative, the Project does not proceed, and the environmental conditions at the site and surrounding area will not be changed from existing (baseline) conditions; however, the socio-economic benefits of the Project would also not occur.

There are two means of managing mine rock at single pit mining operations:

- Non-acid generating (NAG) mine rock is preferentially used as a construction material at most mine sites, to both minimize the volume of aggregate extracted from dedicated sources for construction purposes and to reduce the volume of mine rock requiring permanent storage. Mine rock is also a preferred construction material from an engineering perspective for overall long-term stability.
- Residual NAG mine rock not needed for construction and potentially acid generating (PAG) mine rock is commonly stockpiled using an on-surface facility designed to allow for the collection of contact waters (runoff and seepage) for subsequent management.

Storing all mine rock in the open pit (backfilling) is not operationally feasible during active mining of a single pit and is not considered further. As single open pit mines are developed by excavating deeper and wider over time, they do not typically have permanently inactive areas until near the end of mine life.

Apart from environmental siting constraints, the most critical aspect when selecting a suitable surface storage location for mine rock is haul distance from the open pit. Even small haulage distance differentials can amount to substantive cost differentials between alternatives for mine rock storage and result in an alternative that cannot be financially supported by the Project. The cost to transport mine rock is much higher than for the transportation of tailings for the Project, primarily due to the higher tonnage / volume of mine rock requiring management. For that reason, the siting of mine rock storage facility has taken precedence over siting of tailings storage and other facilities for the Project, as outlined in the stepwise alternatives assessment described in Sections 4.5 to 4.9.,

A workshop was held with a technical working group to identify potential locations for mine rock storage that identified six candidate locations (Appendix E). A 7 kilometre (km) radius from the proposed mine site was used as an initial maximum distance for mine rock haulage, although 7 km is in fact a very far distance for mine rock haulage. For mine rock storage, haulage costs are directly proportional to the haulage

distance. The economics of open pit mines are generally such that haul distances for mine rock must be kept to within approximately 4 to 5 km to maintain operating costs at a level that allows the project to remain viable. Locations greater than 7 km straight-line distance from the open pit (which would be longer in consideration of haul road routing to reflect topography and other aspects) were considered unfeasible for the Project.

Two potential locations (Figure 4.5-1) were identified for the storage of mine rock that met the requirement to be practical and potentially economically viable (Section 4.1.2): west of the open pit, or east of Springpole Lake.

4.5.1.1 Alternative 1: West of Open Pit

Alternative 1 is located immediately west of the open pit and is geographically constrained by Birch Lake, Springpole Lake, and the open pit. It overprints small ponds and streams. The location has sufficient space to hold all of the mine rock from the open pit at one location. As a result of the close proximity to the source of the rock requiring storage, limited additional infrastructure is required, and the location does not pose potential risks to Project financing.

4.5.1.2 Alternative 2: East of Springpole Lake and North of the Southeast Arm of Springpole Lake

Alternative 2 is located southeast of the open pit and would require approximately 5 km of additional dedicated haul road, which would require 10 km when accounting for round trips. It overprints small ponds and streams. The location has sufficient space to hold all the mine rock from the open pit at one location. As a result of the distance from open pit, which is the source of the rock requiring storage, the footprint and the indirect effects of the Project would be expanded. There is a significant increase in financial risk arising from increased costs associated with increased haul truck travel distances and time, and increased environmental effects and risk. The increased costs would make the Project more sensitive to fluctuations in commodity (gold, fuel) prices.

4.5.2 Assessment of Alternatives

The alternatives were assessed for all performance objectives, criteria and indicators (); however, the following performance objectives and criteria were identified as the key differentiators:

- Natural environment performance:
- Potential effect on air quality and climate; and,
- Potential effect on wetlands.
- Technical performance:
- Ability to service the site; and
- Cost effectiveness.

The two alternative locations are similar with respect to the majority of the other assessment criteria and indicators. Both locations will provide similar potential effects on the social, economic, cultural and built environment indicators.

The key mitigation measures that would minimize the potential environmental effects at both Alternatives 1 and 2 are as follows:

- Maintain equipment to manage and reduce air emissions and noise.
- Establish an appropriate lighting strategy to minimize offsite effects.

- Maintain a land buffer from the lake edge.
- Co-locate Project infrastructure to minimize footprint and creation of new infrastructure corridors as practicable.
- Reclaim the site after Project operations cease.
- Implement standard mitigation measures, including to complete infrastructure construction outside of sensitive wildlife and fish periods
- Reduce the length of the required infrastructure to the Project footprint (and use or parallel other site infrastructure) as practicable to limit the length of new infrastructure corridor created.
- Implement standard mitigation measures, including to complete infrastructure construction outside of sensitive wildlife and fish periods.

4.5.2.1 Alternative 1: West of Open Pit

Advantages: this alternative provides a more compact overall site footprint relative to Alternative 2. It will result in lower emission from mine rock hauling, as the total haulage distance is lower than that of Alternative 2. Alternative 1 is situated close to the site infrastructure, with limited new infrastructure required. It is also the most efficient due to its location being adjacent to the open pit. This efficiency results in an acceptable return on investment.

Disadvantages: no disadvantages apparent.

4.5.2.2 Alternative 2: East of Springpole Lake

Advantages: this alternative requires somewhat less overprinting of waterbodies and fish habitat than Alternative 1 but otherwise offers no advantages.

Disadvantages: this alternative would result in the expansion of the overall footprint, resulting in substantially greater GHG emissions due a greater haulage distance than Alternative 1. Alternative 2 is situated further away from other infrastructure, meaning that additional infrastructure, including a haul road, would need to be constructed. Additional equipment may also be required, making the return on investment for Alternative 2 less acceptable than Alternative 1. There is also a moderate increase in financial risk associated with the additional haul time, infrastructure, and equipment, which would cause the Project to be more sensitive to fluctuations in commodity prices.

4.5.3 Results Summary and Selected Alternative

The key differentiator is related to the technical performance objective and minimizing effects on the natural environment. As Alternative 1 provides a more compact overall site footprint, it also provides efficiency by requiring less infrastructure including haul road length and fewer haul trucks. It offers comparative environmental benefit by offering less disturbance, less dust and emissions, and cost savings for the operation. Alternative 2 would require the expansion of the overall footprint, infrastructure and travel distances and mine trucks resulting in substantially greater effects and costs.

Alternative 1 located immediately west of the open pit is the preferred alternative that is carried forward within the alternatives review process for mine waste, based on the assessment of net effects in and with the implementation of key measures summarized in Section 4.5.2. This alternative has the primary advantages of providing a more compact footprint, the greatest operational flexibility for the Project given the location relative to the open pit and considerably reduced costs.

Table 4.5-1: Assessment of Mine Rock Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative Site 1: West of the Open Pit	Alternative Site 2: East of Springpole Lake and North of the Southeast Arm of Springpole Lake
Natural Environment				
Potential Effect on Air Quality and Climate	Level of equipment activity affecting air quality	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Emissions will be generated during construction, stockpiling, and managing the stockpile at Alternative 1, but emissions will not affect attainment of air quality standards • Con/Op: Alternative 1 will result in lesser emissions from hauling mine rock, as the total haulage distance is approximately 2 km	• Con/Op/Cl: Emissions will be generated during construction, stockpiling, and managing the stockpile at Alternative 2, but emissions will not affect attainment of air quality standards • Con/Op: Alternative 2 will result in approximately three times the emissions from hauling mine rock, as the total haulage distance is approximately 6 km
	Level of additional emissions or GHGs generated	• No material GHG emissions are present	• Con/Op/Cl: Emissions will be generated during construction, stockpiling, and managing the stockpile at Alternative 1, but emissions will not affect attainment of air quality standards • Con/Op: Alternative 1 will result in lesser emissions from hauling mine rock, as the total haulage distance is approximately 2 km	• Con/Op/Cl: GHG emissions will be generated during stockpiling and managing the stockpile and extracting the stockpiled ore at Alternative 2, but emissions will not affect attainment of air quality standards • Con/Op: Alternative 2 will result in approximately three times the emissions from hauling ore, as the total haulage distance is approximately 6 km
		Summary	**Preferred**	**Partially Preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level of equipment activity affecting surface water quality objectives	• Surface water quality meets Provincial Water Quality Objectives for protection of aquatic life except for a few occasions that were irregular, generally associated with elevated suspended solids	• Con/Cl: Potential for short-term increases in suspended solids in adjacent waterbodies to be controlled using standard mitigation measures, such as silt fencing and turbidity curtains • Op: Surface water quality will not be altered during operations	• Con/Cl: Potential for short-term increases in suspended solids in adjacent waterbodies to be controlled using standard mitigation measures, such as silt fencing and turbidity curtains • Op: Surface water quality will not be altered during operations
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Op/Cl: Development of Alternative 1 will displace 29.2 ha of local aquatic habitat	• Con/Op/Cl: Development of Alternative 2 will displace 18.9 ha of local aquatic habitat
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: No effects anticipated, as habitat overprinted would be replaced as per offset and compensation plan	• Con/Op/Cl: No effects anticipated, as habitat overprinted would be replaced as per offset and compensation plan
	Ability to maintain conditions for fish passage	• There are no material constraints to fish passage in Birch Lake and Springpole Lake	• Con/Op/Cl: No effects anticipated, as habitat overprinted would be replaced as per offset and compensation plan	• Con/Op/Cl: No effects anticipated, as habitat overprinted would be replaced as per offset and compensation plan
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No material effects anticipated	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA • There are no wetlands present in Birch Lake and Springpole Lake	• Con/Op/Cl: Development of Alternative 1 will displace approximately 1.8 ha of local wetlands	• Con/Op/Cl: Development of Alternative 1 will displace approximately 2.3 ha of local wetlands
	Ability to maintain wetland connectivity	• Natural wetland connectivity is present, reflecting local topographic and subsurface conditions • There are no wetlands present in Birch Lake and Springpole Lake	• Con/Op/Cl: No effects anticipated, as Alternative 1 is largely surrounded by Birch Lake, Springpole Lake and the open pit	• Con/Op/Cl: Some loss of wetland connectivity could be expected
		Summary	**Preferred**	**Partially Preferred**

Table 4.5-1: Assessment of Mine Rock Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative Site 1: West of the Open Pit	Alternative Site 2: East of Springpole Lake and North of the Southeast Arm of Springpole Lake
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities • There is no terrestrial habitat present in Birch Lake and Springpole Lake	• Con/Op/Cl: Development of Alternative 1 will displace approximately 342 ha of local terrestrial habitat and associated plant species	• Con/Op/Cl: Development of Alternative 2 will displace approximately 450 ha of local terrestrial habitat and associated plant species
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op: Noise will be generated during stockpiling, managing the stockpile and extracting the stockpiled ore, including from heavy equipment, backup beepers and rock movement at Alternative 1 • Cl: Limited noise will result from related reclamation activities	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies • There is no terrestrial habitat present in Birch Lake and Springpole Lake	• Con/Op/Cl: Stockpile development may cause a disruption to existing wildlife movement, but as this location is close to the mine, avoidance of the area by wildlife is generally expected	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present, reflecting local habitat and natural species distributions	• Con/Op/Cl: No effects on wildlife populations; suitable alternate habitat available outside the PDA	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine.The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• Con/Op/Cl: The area for Alternative 1 is identified as Category 1 (high nursery use) Caribou habitat • Other SAR observations in this area include Little Brown Myotis (7 observations), Lesser Yellowlegs (2 observations) and other SAR (2 observations)	• Con/Op/Cl: The area for Alternative 1 is identified as Category 1 (high nursery use) Caribou habitat • Other SAR observations in this area include Little Brown Myotis (7 observations) and other SAR (1 observation)
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Con/Op/Cl: Category 1 (high nursery use) Caribou habitat will be displaced (anticipated area in the order of 371 ha) • Con/Op/Cl: The stockpile location will be within the PDA and the area may be avoided by Caribou and other SAR in general	• Con/Op/Cl: Category 1 (high nursery use) Caribou habitat will be displaced (anticipated area in the order of 5 ha) • Con/Op/Cl: The stockpile location will be within the PDA and the area may be avoided by Caribou and other SAR in general
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op: Noise will be generated during stockpiling, managing the stockpile and extracting the stockpiled ore, including from heavy equipment, backup beepers and rock movement at Alternative 1 • Cl: Limited noise will result from related reclamation activities	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative W2 for this indicator

Table 4.5-1: Assessment of Mine Rock Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative Site 1: West of the Open Pit	Alternative Site 2: East of Springpole Lake and North of the Southeast Arm of Springpole Lake
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies, including Springpole Lake and Birch Lake	• Con/Op/Cl: No material effects anticipated	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**
Natural Environment Performance Objectives Assessment			**Preferred**	**Partially Preferred**
			• Adv: Reduced overall Project footprint • Adv: Shorter travel distance provides for a much lower level of air, noise and GHG emissions	• Disadv: Travel distance approximately 3 times longer than Alternative 1, resulting in much greater air, noise and GHG emissions
Social, Economic, Cultural and Built Environment				
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effects anticipated, as there are no private residences near the required infrastructure	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: No effects anticipated, as the required infrastructure is remote from income opportunities	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: No effects anticipated, and local access will not be altered by the stockpile	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Construction and operation of stockpiles at Alternative 1 and closure of the stockpile area will generate noise emissions that will meet regulatory requirements	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects anticipated, as no water wells present in the PDA or local area	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects anticipated, as no surface water supplies present in the PDA or local area	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: Stockpiling of mine rock at Alternative 1 will result in a change to the natural landscape, which will affect local aesthetics	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: No adverse effect on health and safety; air emissions associated with ore stockpiling at Alternative 1 will meet air quality standards	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road providing access to the regional road network is located 18 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator

Table 4.5-1: Assessment of Mine Rock Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative Site 1: West of the Open Pit	Alternative Site 2: East of Springpole Lake and North of the Southeast Arm of Springpole Lake
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present—attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Emissions will be generated during construction, stockpiling, and managing the stockpile at Alternative 1, but emissions will not affect attainment of air quality standards • Con/Op: Alternative 1 will result in lesser emissions from hauling mine rock, as the total haulage distance is approximately 2 km	• Con/Op/Cl: Emissions will be generated during construction, stockpiling, and managing the stockpile at Alternative 2, but emissions will not affect attainment of air quality standards • Con/Op: Alternative 2 will result in approximately three times the emissions from hauling mine rock, as the total haulage distance is approximately 6 km
	Level of equipment activity affecting quality of drinking water supplies	• Surface water quality meets Provincial Water Quality Objectives for protection of aquatic life except for a few occasions that were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects; no drinking water supplies present in the Project area	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Cons/Op/Cl: Not applicable; there is no electromagnetic exposure associated with stockpiling	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: No effects are anticipated, as no public access will be available within the PDA and protocols will be established for site traffic safety, including in relation to hauling ore to Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout, providing a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative; it does not affect health services	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes such as Birch Lake and Springpole Lake allow float plane access	• Con/Op/Cl: Alternative 1 is located within the PDA, which will not be available for natural resource harvesting	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road-accessible main base lodges to remote camps	• Con/Op/Cl: The PDA, including Alternative 1, will not be available for tourism and recreational opportunities during the construction, operations and closure phases • Con/Op: Mine rock stockpiling at Alternative 1 will cause noise and require the use of lights during the construction and operations phases, which may result in disturbance to recreational users on nearby lakes	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator

Table 4.5-1: Assessment of Mine Rock Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative Site 1: West of the Open Pit	Alternative Site 2: East of Springpole Lake and North of the Southeast Arm of Springpole Lake
		Summary	**Partially Preferred**	**Partially Preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: Project development will generate considerable regional and local employment and business opportunities • Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514, which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• Con/Op/Cl: For Alternative 1, there are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Potential for material to be recycled or re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historical fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally • The local Springpole / Birch Lake Portage / Travel Route cultural heritage landscape, a trade route dating to the 1700s, has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator

Table 4.5-1: Assessment of Mine Rock Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative Site 1: West of the Open Pit	Alternative Site 2: East of Springpole Lake and North of the Southeast Arm of Springpole Lake
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally • The local Springpole / Birch Lake Portage / Travel Route cultural heritage landscape, a trade route dating to the 1700s, has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeology potential within the PDA • Two pictograph sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near Alternative 1 • Con: Archaeological sites could be discovered, but they will be managed and/or mitigated as needed	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeology potential within the PDA • Two pictograph sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near Alternative 1 • Con: Archaeological sites could be discovered, but they will be managed and/or mitigated as needed • Con: Construction work will not alter water levels in the southeast arm of Springpole Lake	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Reserve is distant from Project	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection/preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage or archaeological sites within the PDA	• Con/Op/Cl: No effects anticipated; there are no known spiritual, ceremonial, cultural heritage or archaeological sites near Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: Disruption to habitat will occur due to the development of Alternative 1, which may affect traditional hunting, trapping or harvesting; disruption will continue until the site is fully rehabilitated	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially Preferred** • Neutral: There are very limited anticipated effects on the human environment from the stockpile • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	**Partially Preferred** • Neutral: There are very limited anticipated effects on the human environment from the stockpile • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators

Table 4.5-1: Assessment of Mine Rock Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative Site 1: West of the Open Pit	Alternative Site 2: East of Springpole Lake and North of the Southeast Arm of Springpole Lake
Technical Objectives				
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Stockpiles are commonly used to provide storage for mine rock and are predictably effective even for larger scale applications	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Degree to which new technology supports investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; ore stockpiles are commonly used	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to consistently meet Project needs	• There are no facilities present	• Con/Op/Cl: A stockpile at Alternative 1 will be able to consistently meet Project needs	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Availability of necessary infrastructure for component	• There are no facilities, including supporting infrastructure, present	• Con/Op/Cl: Alternative 1 is well situated in relation to site infrastructure required for other reasons, and limited new infrastructure is not required	• Con/Op/Cl: Alternative 2 also well situated in relation to site infrastructure, however new infrastructure (haul road) will be required between this location and the process plant
		Summary	**Preferred**	**Partially Preferred**
Cost Effectiveness	Potential effect on Project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Stockpiles are commonly used to provide storage for mine rock and do not pose potential risks to Project financing	• Con/Op/Cl: There is no material difference between Alternative 1 and Alternative 2 for this indicator
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Alternative 1 is best situated for efficiency, as it is located adjacent to the open pit, providing an acceptable return on investment	• Con/Op/Cl: Alternative 2 is located more distant from the open pit, providing reduced efficiency and potentially requiring additional equipment • Con/Op/Cl: Will provide an acceptable return on investment, although less than Alternative 1
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No material effect anticipated	• Con/Op/Cl: There is a moderate increase in financial risk arising from higher costs associated with increased haul truck travel distances and time; these increased costs would make the Project more sensitive to fluctuations in commodity (gold, fuel) prices
		Summary	**Preferred**	**Not Preferred**
		Technical Performance Objective Assessments	**Preferred**	**Not Preferred**
			• Adv: Proximity to the open pit results in much lower haul costs	• Disadv: Greater distance from the open pit results in much greater operating costs for haulage of mine rock • Disadv: Increased operating costs would make the Project more sensitive to fluctuations in commodity prices and may affect economic viability
Amenability to Reclamation (Closure Phase)				
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities, including supporting infrastructure, present	• Cl: Facility will be closed out in accordance with regulatory requirements, including physical stability of slopes and mine waste piles	• Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography, which can be characterized as moderately rugged	• Cl: During decommissioning activities, infrastructure will be removed and affected area rehabilitated to promote natural drainage	• Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator

Table 4.5-1: Assessment of Mine Rock Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative Site 1: West of the Open Pit	Alternative Site 2: East of Springpole Lake and North of the Southeast Arm of Springpole Lake
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514, which allows mining-related land use activities • Located within the Trout Lake Forest Management Area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Provide for an aesthetically pleasing site	• The existing landscape at and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**
	Amenability to Reclamation Performance Objective Assessment		**Partially Preferred**	**Partially Preferred**
			• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed
	OVERALL ASSESSMENT OF ALTERNATIVE		**PREFERRED (SELECTED ALTERNATIVE)**	**PARTIALLY PREFERRED**
			• The primary reason for selecting this alternative is proximity to the main site and the open pit, resulting in lower infrastructure requirements and habitat disturbance	• Although this alternative is very similar to the preferred alternative, it was not selected because it will require crossing more sensitive SAR habitat and needs longer infrastructure, resulting in more habitat disturbance (although within the PDA) and increased costs, which could contribute to greater economic sensitivity for the Project

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present, including a small exploration camp, an office, storage facilities and yard areas.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LSA = Local Study Area; NA = not applicable; Op = operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*.

546000 548000 550000 552000 554000 556000

5694000

5692000

5690000

Birch Lake

Birch Lake

Birch Lake

L-18

L-17

L-1

L-2

L-19

Alternative1
West of Open Pit

L-3

L-4

L-5

L-6

L-16

Dole Lake

L-20

Springpole Lake
(North Basin)

Alternative 2
East of Springpole Lake

L-10

L-12

L-11

L-13

L-14

X:\CA\CAO\AK300-OAK\MIS-FS1-Project\P2021\Projects\ONS2104_FMG_Springpole_EIS\11_GIS\EIS\MXD\MineRock_Alternatives_4.mxd

LEGEND

- Open Pit Basin
- Watercourse
- Waterbody
- Contour (10 m intervals)

Mine Rock Storage Location Alternatives

- Alternative 1 West of Open Pit (371.0 ha)
- Alternative 2 East of Springpole Lake (470.0 ha)

0 0.5 1 2 3 4 5 Kilometres

NOTES:
- Topographic information extracted from LIO, MNRF.

Datum: NAD83
Projection: UTM Zone 15N

N W E S

First Mining Gold

wsp

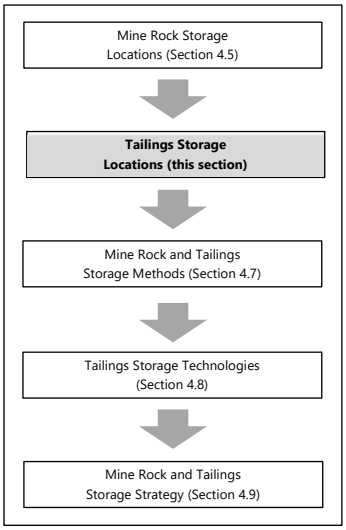
SPRINGPOLE GOLD PROJECT

Mine Rock Storage Location Alternatives

PROJECT N°: ONS2104 | **FIGURE: 4.5-1**

SCALE: 1:32,000 | DATE: July 2024

4.6 Tailings Storage Locations



Sections 4.5 to 4.9 provide a step-wise assessment of the mineral waste storage alternatives using the approach described in Section 4.1 that supports the final mineral waste storage facility (the CDF) described in Section 5.8.

The MDMER require that an assessment of alternatives be completed using the prescribed approach (ECCC 2021) for mineral waste to be approved when overprinting a natural, fish-bearing waterbody. An updated Mine Waste Management Alternatives Assessment for the Project is provided as Appendix E.

4.6.1 Identified Alternatives

Tailings produced from the processing of ore within the process plant are proposed to be stored in an on-surface containment facility. If a tailings storage area is not established (the do nothing alternative), the Project cannot proceed as the process plant will be unable to process the ore without a storage location for the resulting waste by-product. With the do nothing alternative, the Project does not proceed, and the environmental conditions at the site and surrounding area will not be changed from existing (baseline) conditions.

There is generally greater flexibility with siting of a tailings storage area than for a mine rock storage facility, as the transport of tailings is typically less cost prohibitive. As a result, a larger number of candidate locations were identified as potential storage areas for tailings than for mine rock (Figure 4.6-1). As noted in Section 4.5. for mine rock, tailings can similarly not be stored in the open pit during operations since active mining will be taking place.

The opportunity to use natural topography in addition to engineered containment is also an important consideration for tailings storage. Good natural topographic confinement reduces the requirements for embankments and minimizes the length and height of these containment structures. Natural containment is also preferred for long-term stability and to reduce costs.

Eight potential tailings storage locations were initially identified (Figure 4.6-1). The boundary for preliminary candidate locations was approximately 15 km southwest to east of the process plant, recognizing that required infrastructure components could be considerably longer due to the complex natural drainage network. Tailings can be transported a greater distance than mine rock and retain economic feasibility, and so all eight locations were considered further. Extending the distance from site farther than 15 km (on land distance) to identify additional potential alternative locations would not provide an additional range of candidate sites. Further, it would result in an incremental increase in disturbance associated with greater infrastructure length, as well as increased capital and operating costs and overall complexity.

The list below provides an overview of the eight locations shown in Figure 4.6-1:

- **Alternative 1:** tailings storage facility located adjacent to the west side of the open pit. Geographically constrained by Birch Lake, Springpole Lake and the open pit. This location overprints small ponds and streams.
- **Alternative 2:** tailings storage facility located to the southeast of the open pit, constrained to the west by Springpole Lake and south by the southeast arm of Springpole Lake. This location overprints a large pond, small ponds and streams.

- **Alternative 3:** tailings storage facility located to the southwest of the open pit. This location requires a road along the isthmus separating Birch Lake and Springpole Lake. It does not overprint waterbodies but has an irregular shape that could not reasonably be operated. It requires a dedicated infrastructure corridor.
- **Alternative 4:** tailings storage facility located near the mine access road and the north shore of the southeast arm of Springpole Lake. This location overprints a small ponds and streams.
- **Alternative 5:** tailings storage facility located near the mine access road to the west of Durkin Lake. This location overprints a large ponds and streams.
- **Alternative 6:** tailings storage facility located south of the southeast arm of Springpole Lake. This location overprints a large pond and streams. It requires a lengthy tailings pipeline due to the distance from the process plant, which is approximately 15 km straight-line, but a much greater length is required to avoid crossing the southeast arm of Springpole Lake.
- **Alternative 7:** tailings storage facility located south of the southeast arm of Springpole Lake. This location overprints several streams and large ponds. It requires a complex alignment of tailings pipeline and access road due to its distance from the process plant and numerous local drainage features, remote from other planned access.
- **Alternative 8:** tailings storage facility located northwest of Bertha Lake. This location overprints small ponds and streams. It requires a complex alignment of tailings pipeline and access road due to its distance from the process plant and numerous local drainage features.

4.6.2 Assessment of Alternatives

All of the locations have a similar footprint with respect to terrestrial habitat to maintain a similar and manageable facility height, with none of the alternatives anticipated to result in effects on wildlife population numbers despite routing through sensitive habitat for Caribou (Boreal population; Figure 4.6-1) and no material effects on other SAR are expected for any one of the Alternatives.

Approximate quantitative measures are provided within sufficient to allow comparison across the alternatives. The alternatives were assessed for all performance objectives, criteria and indicators; however, the following performance objectives and criteria were identified as the key differentiators:

- Natural environment performance:
- Potential effect on air quality and climate;
- Potential effect on water quality, fish and aquatic habitat; and
- Potential effects on wetlands.
- Technical performance:
- Ability to service site; and
- Cost effectiveness.

Alternative 3 has a facility geometry that would require excessive impoundment and management to avoid overprinting waters frequented by fish. It was included for completeness and for consistency with the MDMER requirements per Appendix E, although it is not a technically feasible alternative. The other tailings storage alternatives overprint between approximately 3 hectares (ha) and 59 ha of major waterbodies (plus smaller waterbodies / watercourses).

The differentiating advantages and disadvantages of each alternative are described briefly below:

- **Alternative 1:**
    - **Advantages:** This alternative minimizes the overall extent of the Project footprint and has the lowest GHG emissions and costs due to the short haulage distance for construction materials from site. This alternative also affects the least amount of wetland area out of all the alternatives and no loss of wetland connectivity is expected. This alternative also results in the most favourable costs.
    - **Disadvantages:** This alternative overprints a moderate area of waterbodies (approximately 23 ha) and is located within Category 1 (high nursery use) habitat for Woodland Caribou. In addition, surrounding water bodies preclude expansion of impoundment.
- **Alternative 2:**
    - **Advantages:** This alternative requires a moderate distance for haulage of construction materials (approximately 5 km) and is located near (less than 1 km) planned infrastructure, potentially minimizing new corridor creation. This alternative results in favourable costs and can be supported by the Project.
    - **Disadvantages:** This alternative overprints a moderate area of waterbodies (20.4 ha) and is located near a privately held cabin on Springpole Lake which may have increased noise levels during embankment construction. Increased emissions could be expected from this alternative due to the greater distance to project sites. This alternative could also be expected to result in some loss of wetland connectivity. In addition, it is located within Category 1 (high nursery use) habitat for Woodland Caribou. Increased costs associated with this alternative would make the Project more sensitive to fluctuations in commodity prices.
- **Alternative 3:**
    - **Advantages:** This alternative does not overprint large waterbodies / watercourses and does not overprint waters frequented by fish, resulting in no disturbance of fish habitat, compared to all other alternatives which would result in varying levels of disturbance.
    - **Disadvantages:** This alternative requires a dedicated infrastructure corridor (about 4.5 km length from the Project site), is highly technically challenging to construct and operate, cannot be financially supported by the Project, and is located within Category 1 (high nursery use) habitat for Woodland Caribou. This alternative could also be expected to result in some loss of wetland connectivity. It may also require an additional site to reasonably contain the volume of material required. This alternative is also not able to be financially supported by the Project.
- **Alternative 4:**
    - **Advantages:** This alternative is located near (less than 1 km) planned infrastructure, potentially minimizing new corridor creation, and overprints a smaller area (approximately 14 ha) of waterbodies.
    - **Disadvantages:** This alternative's increased distance from site results in more GHG emissions and considerably higher construction costs while providing no additional benefit, and it is located within Category 1 (high nursery use) habitat for Woodland Caribou. This alternative could also be expected to result in some loss of wetland connectivity Increased costs associated with this alternative would make the Project more sensitive to fluctuations in commodity prices.

- **Alternative 5:**
    - **Advantages:** This alternative is located near (less than 1 km) planned infrastructure, potentially minimizing new corridor creation.
    - **Disadvantages:** This alternative overprints the second largest area of waterbodies (approximately 44 ha), its increased distance from site results in more GHG emissions and considerably higher construction costs while providing no additional benefit, and it is located primarily within Category 1 (high nursery use) habitat for Woodland Caribou. This alternative could also be expected to result in some loss of wetland connectivity. Increased costs associated with this alternative would make the Project more sensitive to fluctuations in commodity prices.
- **Alternative 6:**
    - **Advantages:** This alternative is located near (less than 1 km) existing or planned infrastructure, potentially minimizing new corridor creation.
    - **Disadvantages:** This alternative overprints a moderate area of waterbodies (approximately 21 ha). Its increased distance from site results in more GHG emissions and considerably higher construction costs while providing no additional benefit, and it is located mainly within Category 1 (high nursery use) habitat with a lesser amount within Category 2 (seasonal range) habitat for Woodland Caribou. This alternative could also be expected to result in some loss of wetland connectivity. Increased costs associated with this alternative would make the Project more sensitive to fluctuations in commodity prices.
- **Alternative 7:**
    - **Advantages:** This alternative would result in relatively low level of wetlands would be overprinted. This alternative has no other apparent advantages.
    - **Disadvantages:** This alternative overprints the greatest area of waterbodies (approximately 59 ha), and a lengthy (minimum of approximately 9 km) new infrastructure corridor will be required that will be located entirely within the classified habitat for Woodland Caribou. It is located near a tourist outfitter on Seagrave Lake, the increased distance from site results in more GHG emissions and considerably higher construction costs, and it is located mainly within Category 1 (high nursery use) habitat with a lesser amount within Category 2 (seasonal range) habitat for Woodland Caribou. This alternative could also be expected to result in some loss of wetland connectivity. Increased costs associated with this alternative would make the Project more sensitive to fluctuations in commodity prices.
- **Alternative 8:**
    - **Advantages:** Based on current information, this alternative is located outside of the classified habitat for Woodland Caribou (Figure 4.6-1) and will require limited overprinting of waterbodies (approximately 3 ha).
    - **Disadvantages:** A lengthy (minimum of approximately 11 km) new infrastructure corridor will be required for this alternative that will be very near Category 1 (high nursery use) habitat for Woodland Caribou, and greater distance from site results in increased GHG emissions and considerably higher construction costs. This alternative could also be expected to result in some loss of wetland connectivity. Increased costs associated with this alternative would make the Project more sensitive to fluctuations in commodity prices.

All of the locations will require infrastructure routed through classified habitat for Woodland Caribou (Figure 4.6-2), although none are expected to affect population numbers for any wildlife species.

Key mitigation measures that would minimize potential environmental effects for all locations are as follows:

- Maintain equipment to manage air emissions and noise during initial construction and subsequent embankment raises.
- Reduce the length of the new infrastructure or parallel other site infrastructure to limit the length of new infrastructure corridor created as practicable.
- Implement standard construction mitigation measures, including to complete initial infrastructure construction and embankment construction outside of sensitive wildlife periods.
- Monitor and maintain associated infrastructure during operations.
- Reclaim the site after Project operations cease.

The results of the alternatives assessment for the tailings storage locations, listing differentiating aspects are summarized in Table 4.6-1.

4.6.3 Results Summary and Selected Alternatives

Two potential tailings storage locations were identified as preferred alternatives (Alternatives 1 and 2) as they provide operational flexibility with some expansion potential. Alternatives 1 and 2 are closer to the open pit for construction materials and the process plant for tailings transport (Figure 4.6-2). This also offers improved technical performance and reduces potential effects on the natural (Table 4.7-1). Based on the assessment of net effects and with implementation of the key measures summarized in Section 4.6.2, Alternative 1 was selected as the preferred alternative as it maintains a minimum setback of 120 m from Springpole Lake and Birch Lake.

Table 4.6-1: Assessment of Tailings Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing(1)	Alternative 1: West of the Open Pit	Alternative 2: Southeast of Open Pit, East of Springpole Lake and North of the Southeast Arm of Springpole Lake	Alternative 3: Southwest of the Open Pit	Alternative 4: Near the Mine Access Road and the North Shore of the Southeast Arm of Springpole Lake	Alternative 5: Near the Mine Access Road to the West of Durkin Lake	Alternative 6: South of the Southeast Arm of Springpole Lake	Alternative 7: South of the Southeast Arm of Springpole Lake	Alternative 8: Northwest of Bertha Lake
Natural Environment										
Potential Effect on Air Quality and Climate	Level of equipment activity affecting air quality	• Good air quality is present—attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Emissions will be generated during construction and operation of the facility at Alternative 1, but emissions will not affect attainment of air quality standards	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator • Emissions will be greater than Alternatives 1, 2 or 3 due to the greater distance from the Project site	• Con/Op/Cl: There is no difference between the alternatives for this indicator • Emissions will be greater than Alternatives 1, 2 or 3 due to the greater distance from the Project site	• Con/Op/Cl: There is no difference between the alternatives for this indicator • Emissions will be greater than Alternatives 1, 2 or 3 due to the greater distance from the Project site	• Con/Op/Cl: There is no difference between the alternatives for this indicator • Emissions will be greater than Alternatives 1, 2 or 3 due to the greater distance from the Project site	• Con/Op/Cl: There is no difference between the alternatives for this indicator • Emissions will be greater than Alternatives 1, 2 or 3 due to the greater distance from the Project site
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Op/Cl: GHG Emissions will be generated during construction and operation of the facility at Alternative 1; but emissions will not affect attainment of air quality standards	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator • Emissions will be greater than Alternatives 1, 2 or 3 due to the greater distance from the Project site	• Con/Op/Cl: There is no difference between the alternatives for this indicator • Emissions will be greater than Alternatives 1, 2 or 3 due to the greater distance from the Project site	• Con/Op/Cl: There is no difference between the alternatives for this indicator • Emissions will be greater than Alternatives 1, 2 or 3 due to the greater distance from the Project site	• Con/Op/Cl: There is no difference between the alternatives for this indicator • Emissions will be greater than Alternatives 1, 2 or 3 due to the greater distance from the Project site	• Con/Op/Cl: There is no difference between the alternatives for this indicator • Emissions will be greater than Alternatives 1, 2 or 3 due to the greater distance from the Project site
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level of equipment activity affecting surface water quality objectives	• Surface water quality meets Provincial Water Quality Objectives for protection of aquatic life except for a few occasions that were irregular, generally associated with elevated suspended solids	• Con/Cl: Potential for short-term increases in suspended solids in adjacent waterbodies to be controlled using standard mitigation measures, such as silt fencing and turbidity curtains • Op/Cl: Runoff and seepage to be collected for treatment	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator

Table 4.6-1: Assessment of Tailings Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: West of the Open Pit	Alternative 2: Southeast of Open Pit, East of Springpole Lake and North of the Southeast Arm of Springpole Lake	Alternative 3: Southwest of the Open Pit	Alternative 4: Near the Mine Access Road and the North Shore of the Southeast Arm of Springpole Lake	Alternative 5: Near the Mine Access Road to the West of Durkin Lake	Alternative 6: South of the Southeast Arm of Springpole Lake	Alternative 7: South of the Southeast Arm of Springpole Lake	Alternative 8: Northwest of Bertha Lake
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Op/Cl: The in water footprint of the facility is approximately 23.3 ha	• Con/Op/Cl: The in water footprint of the facility is approximately 20.4 ha	• Con/Op/Cl: The in water footprint of the facility is 0 ha	• Con/Op/Cl: The in water footprint of the facility is approximately 14.4 ha	• Con/Op/Cl: The in water footprint of the facility is approximately 44.4 ha	• Con/Op/Cl: The in water footprint of the facility is approximately 21.3 ha	• Con/Op/Cl: The in water footprint of the facility is approximately 58.6 ha	• Con/Op/Cl: The in water footprint of the facility is approximately 3.4 ha
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: No effects anticipated, as habitat overprinted would be replaced as per offset and compensation plan	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Ability to maintain conditions for fish passage	• There are no material constraints to fish passage in Birch Lake and Springpole Lake	• Con/Op/Cl: No effects anticipated, as habitat overprinted would be replaced as per offset and compensation plan	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No material effects anticipated	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA • There are no wetlands present in Birch Lake and Springpole Lake	• Con/Op/Cl: The alternative will affect approximately 87 ha of wetlands	• Con/Op/Cl: The alternative will affect approximately 131 ha of wetlands	• Con/Op/Cl: The alternative will affect approximately 122 ha of wetlands	• Con/Op/Cl: The alternative will affect approximately 130 ha of wetlands	• Con/Op/Cl: The alternative will affect approximately 128 ha of wetlands	• Con/Op/Cl: The alternative will affect approximately 171 ha of wetlands	• Con/Op/Cl: The alternative will affect approximately 88 ha of wetlands	• Con/Op/Cl: The alternative will affect approximately 138 ha of wetlands

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	Ability to maintain wetland connectivity	• Natural wetland connectivity is present, reflecting local topographic and subsurface conditions • There are no wetlands present in Birch Lake and Springpole Lake	• Con/Op/Cl: No effects anticipated, as Alternative 1 is largely surrounded by Birch Lake, Springpole Lake and the open pit	• Con/Op/Cl: Some loss of wetland connectivity could be expected	• Con/Op/Cl: Some loss of wetland connectivity could be expected	• Con/Op/Cl: Some loss of wetland connectivity could be expected	• Con/Op/Cl: Some loss of wetland connectivity could be expected	• Con/Op/Cl: Some loss of wetland connectivity could be expected	• Con/Op/Cl: Some loss of wetland connectivity could be expected	• Con/Op/Cl: Some loss of wetland connectivity could be expected
		Summary	**Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat are present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities • There are no terrestrial habitat present in Birch Lake and Springpole Lake	• Con: All alternatives have a similar footprint for terrestrial disturbance (approximately 350 to 400 ha) • Op/Cl: Habitat disruption will continue until infrastructure is removed and area is revegetated	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op: Noise will be generated during construction and operation of the facility, including from heavy equipment and backup beepers at Alternative 1, but it will meet regulatory requirements • Cl: Limited noise will result from related reclamation activities	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator

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	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies • There is no terrestrial habitat present in Birch Lake and Springpole Lake	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement, but as this location is close to the mine, avoidance of the area by wildlife is generally expected	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement, but as this location is close to the mine, avoidance of the area by wildlife is generally expected	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present, reflecting local habitat and natural species distributions	• Con/Op/Cl: No effects anticipated on wildlife populations	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine. The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern	• Con/Op/Cl: The area for Alternative 1 is identified as Category 1 (high nursery use) Caribou habitat • Other SAR observations in this area include Little Brown Myotis (7 observations), Lesser Yellowlegs (2 observations) and other SAR (2 observations)	• Con/Op/Cl: The area for Alternative 2 is identified as Category 1 (high nursery use) Caribou habitat • Other SAR observations in this area include Little Brown Myotis (7 observations), and other SAR (1 observations)	• Con/Op/Cl: The area for Alternative 3 is identified as Category 1 (high nursery use) Caribou habitat. • Other SAR have not been noted in this area	• Con/Op/Cl: The area for Alternative 4 is identified as Category 1 (high nursery use) Caribou habitat. • Other SAR observations in this area include Little Brown Myotis (18 observations)	• Con/Op/Cl: The area for Alternative 5 is identified as Category 1 (high nursery use) Caribou habitat • Other SAR have not been noted in this area	• Con/Op/Cl: The area for Alternative 6 is identified as Category 1 (high nursery use) Caribou habitat, with a lesser amount of Category 2 (Seasonal Range). • Other SAR observations in this area include Lesser Yellowlegs (1 observation)	• Con/Op/Cl: The area for Alternative 7 is identified as Category 1 (high nursery use) Caribou habitat, with a lesser amount of Category 2 (Seasonal Range) • Other SAR have not been noted in this area	• Con/Op/Cl: The area for Alternative 8 is identified as Category 1 (high nursery use) Caribou habitat • Other SAR have not been noted in this area

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		(ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.								
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Con/Op/Cl: Category 1 (high nursery use) Caribou habitat will be displaced (anticipated area in the order of 350 to 400 ha) • Con/Op/Cl: The stockpile location will be within the PDA and the area may be avoided by Caribou and other SAR in general	• Con/Op/Cl: Category 1 Caribou habitat will be displaced (anticipated area in the order of 350 to 400 ha) • Con/Op/Cl: The stockpile location will be within the PDA and the area may be avoided by Caribou and other SAR in general	• Con/Op/Cl: Category 1 Caribou habitat will be displaced (anticipated area in the order of 350 to 400 ha)	• Con/Op/Cl: Category 1 Caribou habitat will be displaced (anticipated area in the order of 350 to 400 ha)	• Con/Op/Cl: Category 1 Caribou habitat will be displaced (anticipated area in the order of 350 to 400 ha)	• Con/Op/Cl: Category 1 and some Category 2 Caribou habitat will be displaced (anticipated area in the order of 350 to 400 ha; approximately 95% Category 1, 5% Category 2)	• Con/Op/Cl: Category 1 and some Category 2 Caribou habitat will be displaced (anticipated area in the order of 350 to 400 ha; approximately 95% Category 1, 5% Category 2)	• Con/Op/Cl: Category 2 Caribou habitat will be displaced (anticipated area in the order of 350 to 400 ha)
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op: Noise will be generated during construction and operation of the facility, including from heavy equipment and backup beepers at Alternative 1, but will meet regulatory requirements • Cl: Limited noise will result from related reclamation activities	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies, including Springpole Lake and Birch Lake	• Con/Op/Cl: No material effects anticipated	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator

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	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Natural Environment Performance Objectives Assessment			**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**
			• Adv: Reduced air and GHG emissions due to proximity to process plant • Adv: Smallest overall Project footprint • Disadv: While still a relatively small number, this alternative has a greater number of SAR observations	• Adv: Relatively small overall Project footprint • Disadv: Increased air emissions and GHG emissions resulting from greater distance to Project site	• Adv: Does not overprint aquatic habitat • Disadv: Impracticality of this alternative would require an additional site to reasonably contain the required volume of material	• Adv: Relatively lower amount of aquatic habitat overprinted • Disadv: Increased air emissions and GHG emissions resulting from greater distance to Project site	• Adv: No SAR observations, aside from Caribou habitat • Disadv: Increased air emissions and GHG emissions resulting from greater distance to Project site • Disadv: Second largest area of aquatic habitat overprinting	• Adv: None apparent • Disadv: Increased air emissions and GHG emissions resulting from greater distance to Project site	• Adv: Second lowest level of wetlands overprinted • Adv: No SAR observations, aside from Caribou habitat • Disadv: Increased air emissions and GHG emissions resulting from greater distance to Project site • Disadv: Largest area of aquatic habitat overprinting	• Adv: No SAR observations, aside from Caribou habitat • Disadv: Increased air emissions and GHG emissions resulting from greater distance to Project site
Social, Economic, Cultural and Built Environment										
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effects are anticipated, as there are no private residences near the required infrastructure	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: No effects are anticipated, as the required infrastructure is remote from income opportunities	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: No effects are anticipated and local access will not be altered by the water supply or related infrastructure	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator

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	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Construction and operation of impoundment at Alternative 1 and closure of the area will generate noise emissions that will meet regulatory requirements	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects are anticipated, as no water wells are present in the PDA or local area	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects are anticipated, as no surface water supplies are present in the PDA or local area	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op: Development of a tailings impoundment of mine rock at Alternative 1 will result in a change to the natural landscape, which will affect local aesthetics • Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator

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	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: No adverse effect on health and safety; air emissions associated with ore stockpiling at Alternative 1 will meet air quality standards	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road providing access to the regional road network is located 18 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site PDA and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level of equipment activity affecting air quality	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Emissions will be generated during construction, tailings deposition and managing the facility at Alternative 1, but emissions will not affect attainment of air quality standards	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Level of equipment activity affecting quality of drinking water supplies	• Surface water quality meets Provincial Water Quality Objectives for	• Con/Op/Cl: No effects; no drinking water supplies present in Project	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for	• Cl: There is no difference between the alternatives for	• Cl: There is no difference between the alternatives for	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for	• Cl: There is no difference between the alternatives for this indicator

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		protection of aquatic life except for a few occasions that were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	area		this indicator	this indicator	this indicator		this indicator	
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Cons/Op/Cl: Not applicable; there is no electromagnetic exposure associated with tailings	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout, providing a range of services	• Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in	• Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator

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		the region and cabins targeted to hunters and anglers								
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes such as Birch Lake and Springpole Lake allow for float plane access	• Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road-accessible main base lodges to remote camps	• Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514, which allows mining-related land use activities • Located within the Trout Lake Forest Management Area and is subject to the Trout Lake Forest	• Con/Op/Cl: For Alternative 1, there are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator

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Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: West of the Open Pit	Alternative 2: Southeast of Open Pit, East of Springpole Lake and North of the Southeast Arm of Springpole Lake	Alternative 3: Southwest of the Open Pit	Alternative 4: Near the Mine Access Road and the North Shore of the Southeast Arm of Springpole Lake	Alternative 5: Near the Mine Access Road to the West of Durkin Lake	Alternative 6: South of the Southeast Arm of Springpole Lake	Alternative 7: South of the Southeast Arm of Springpole Lake	Alternative 8: Northwest of Bertha Lake
		Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor								
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Potential for material to be recycled or re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible with the historical fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative 1	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context	• Eight camps generally less than 50 years old are present locally • The local Springpole Lake to Birch Lake Travel Route cultural	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative 1	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator

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	or a significant relationship	heritage landscape, a trade route dating to the 1700s has cultural heritage value								
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative 1	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeology potential within the PDA • Two pictograph sites have been identified on the north side of the southeast arm of Springpole Lake	• Con: No effects anticipated; infrastructure will be sited to avoid known archaeology sites • Con: If there are new archaeological findings during construction, appropriate mitigation will be used (potentially avoidance) • Op/Cl: No effects anticipated, as no additional subsurface disturbance will be required after construction	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeology potential within the PDA • Two pictograph sites have been identified on the north side of the southeast arm of Springpole Lake	• Con: No effects are anticipated, as known archaeology sites will be avoided and if there are new archaeological findings during construction, appropriate mitigation will be	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator

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			used (potentially avoidance) • Op/Cl: No effects are anticipated, as no additional subsurface disturbance will be required after construction, and surface water levels and drainage patterns will not be altered							
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Indigenous community is distant from Project	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No effects anticipated; there are no known spiritual, ceremonial, cultural heritage or archaeological sites near Alternative 1	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest	• Con/Op/Cl: Disruption to habitat will occur due to the development of Alternative 1, which may affect traditional hunting, trapping or harvesting;	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator

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		• Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	disturbance will continue until the site is fully rehabilitated •							
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
			• Neutral: There are very limited anticipated effects on the human environment from the alternatives • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are very limited anticipated effects on the human environment from the alternatives • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are very limited anticipated effects on the human environment from the alternatives • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are very limited anticipated effects on the human environment from the alternatives • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are very limited anticipated effects on the human environment from the alternatives • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are very limited anticipated effects on the human environment from the alternatives • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are very limited anticipated effects on the human environment from the alternatives • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are very limited anticipated effects on the human environment from the alternatives • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators
Technical Objectives										
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Surface impoundment of tailings is an effective, commonly used technology in mining operations	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator
	Degree to which new technology supports investigations or testing	• There are no facilities present	• Con/Op/CI: Indicator is not applicable to this alternative; new technology not being used	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator
	Ability to consistently meet Project needs	• There are no facilities present	• Con/Op/CI: Tailings storage at Alternative 1 will be able to consistently meet Project needs	• Con/Op/CI: Tailings storage at Alternative 2 will be able to consistently meet Project needs	• Con/Op/CI: Irregular shape is not practical for construction or operation	• Con/Op/CI: Tailings storage at Alternative 4 will be able to consistently meet Project needs	• Con/Op/CI: Tailings storage at Alternative 5 will be able to consistently meet Project needs	• Con/Op/CI: Tailings storage at Alternative 6 will be able to consistently meet Project needs	• Con/Op/CI: Would require a dedicated infrastructure corridor for tailings transport, vehicle traffic and power	• Con/Op/CI: Would require a dedicated infrastructure corridor for tailings transport, vehicle traffic and power

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	Availability of necessary infrastructure for component	• There are no facilities, including supporting infrastructure, present	• Con/Op/Cl: Alternative 1 is well situated in relation to site infrastructure required for other reasons, and limited new infrastructure is required	• Con/Op/Cl: Alternative 2 is well situated in relation to site infrastructure required for other reasons, and limited new infrastructure is required	• Con/Op/Cl: Would require a dedicated infrastructure corridor for tailings transport, vehicle traffic and power	• Con/Op/Cl: Located near existing / planned infrastructure, potentially minimizing new corridor creation	• Con/Op/Cl: Would require a dedicated infrastructure corridor for tailings transport, vehicle traffic and power	• Con/Op/Cl: Located near existing / planned infrastructure, potentially minimizing new corridor creation	• Con/Op/Cl: Would require a dedicated infrastructure corridor for tailings transport, vehicle traffic and power	• Con/Op/Cl: Would require a dedicated infrastructure corridor for tailings transport, vehicle traffic and power
		Summary	**Partially Preferred**	**Partially Preferred**	**Not Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Not Preferred**	**Not Preferred**
Cost Effectiveness	Potential effect on Project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Tailings impoundments are commonly used to provide storage for tailings and do not pose potential risks to Project financing	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Alternative 1 is best situated for efficiency, as it is located close to the process plant, providing an acceptable return on investment	• Con/Op/Cl: Alternative 2 is reasonably situated for efficiency, as it is located close to the process plant, providing an acceptable return on investment	• Alternative 3 is impractical for construction and operation, and therefore does demonstrate a competitive return on investment	• Con/Op/Cl: Additional infrastructure and length of corridor increase capital and operating costs with no added benefit	• Con/Op/Cl: Additional infrastructure and length of corridor increase capital and operating costs with no added benefit	• Con/Op/Cl: Additional infrastructure and length of corridor increase capital and operating costs with no added benefit	• Con/Op/Cl: Additional infrastructure and length of corridor increase capital and operating costs with no added benefit	• Con/Op/Cl: Additional infrastructure and length of corridor increase capital and operating costs with no added benefit
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No material effect anticipated	• Con/Op/Cl: No material effect anticipated	• Alternative 3 presents the greatest risk, in that an additional site may be required at considerable extra cost and time	• Con/Op/Cl: Increased costs would make the Project more sensitive to fluctuations in commodity (gold, fuel) prices	• Con/Op/Cl: Increased costs would make the Project more sensitive to fluctuations in commodity (gold, fuel) prices	• Con/Op/Cl: Increased costs would make the Project more sensitive to fluctuations in commodity (gold, fuel) prices	• Con/Op/Cl: Increased costs would make the Project more sensitive to fluctuations in commodity (gold, fuel) prices	• Con/Op/Cl: Increased costs would make the Project more sensitive to fluctuations in commodity (gold, fuel) prices
		Summary	**Preferred**	**Partially Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**
Technical Performance Objective Assessment			**Preferred**	**Partially Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**	**Not Preferred**
			• Adv: Situated closest to process plant, resulting in most favourable costs • Disadv: Surrounding water bodies preclude expansion of impoundment	• Adv: Situated relatively close to process plant, resulting in favourable costs • Disadv: Slight increase in pipeline length without any technical advantage over	• Adv: None apparent • Disadv: Alternative cannot be economically supported by the Project	• Adv: None apparent • Disadv: Increased costs would make the Project more sensitive to fluctuations in commodity (gold,	• Adv: None apparent • Disadv: Increased costs would make the Project more sensitive to fluctuations in commodity (gold,	• Adv: None apparent • Disadv: Increased costs would make the Project more sensitive to fluctuations in commodity (gold, fuel) prices	• Adv: None apparent • Disadv: Increased costs would make the Project more sensitive to fluctuations in commodity (gold,	• Adv: None apparent • Disadv: Increased costs would make the Project more sensitive to fluctuations in commodity (gold, fuel) prices

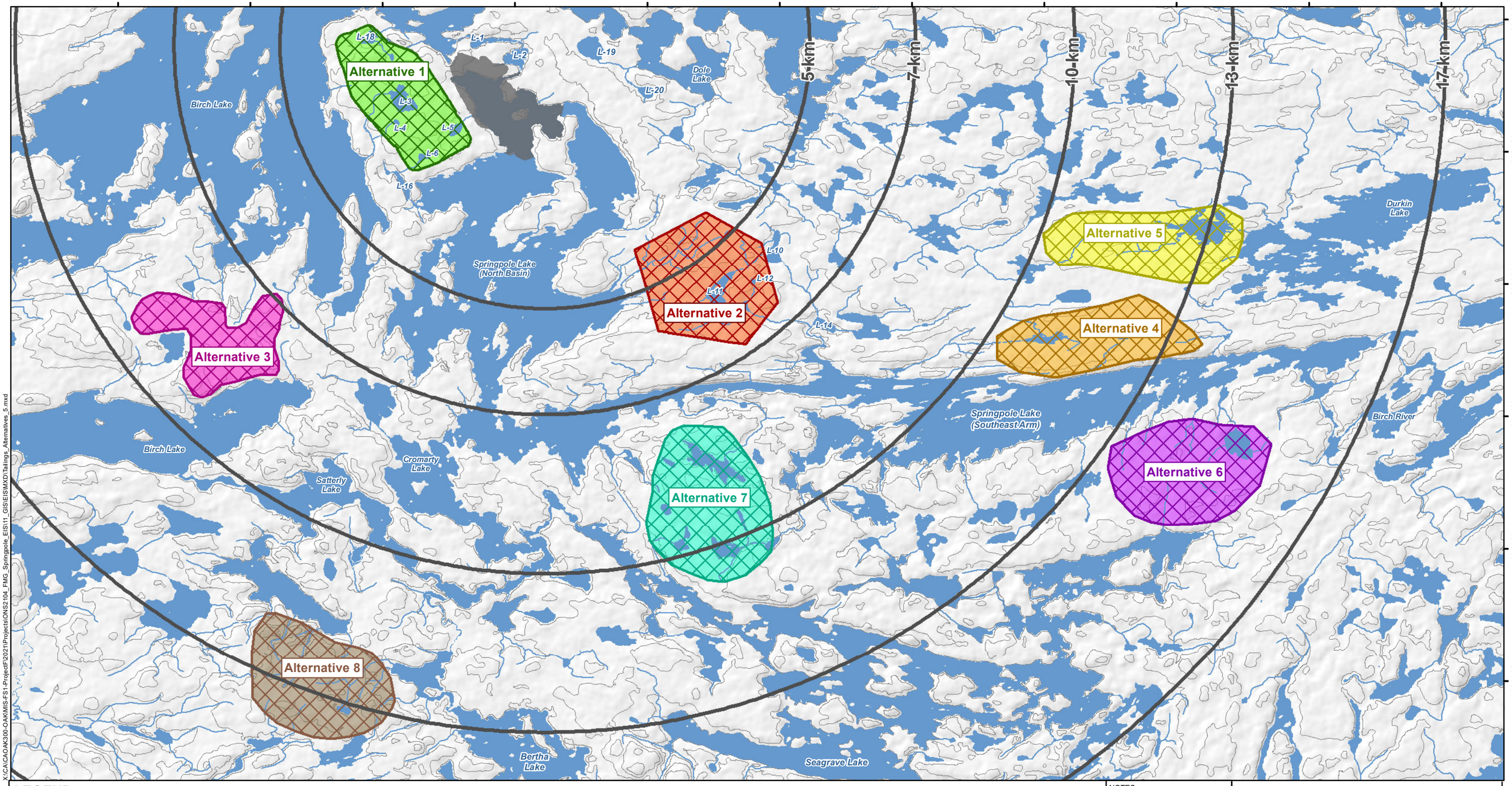
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				Alternative 1		fuel) prices	fuel) prices		fuel) prices	
Amenability to Reclamation (Closure Phase)										
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities, including supporting infrastructure, present	• CI: Facility will be closed out in accordance with regulatory requirements, including physical stability of slopes and mine waste piles	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography, which can be characterized as moderately rugged	• CI: During decommissioning activities, infrastructure will be removed and affected area rehabilitated to promote natural drainage	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514, which allows mining-related land use activities • Located within the Trout Lake Forest Management Area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• CI: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator

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	Provide for an aesthetically pleasing site	• The existing landscape at and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
			• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed
OVERALL ALTERNATIVE ASSESSMENT			**PARTIALLY PREFERRED (SELECTED ALTERNATIVE)**	**PARTIALLY PREFERRED**	**NOT PREFERRED**	**NOT PREFERRED**	**NOT PREFERRED**	**NOT PREFERRED**	**NOT PREFERRED**	**NOT PREFERRED**
			• The primary reason for selecting this alternative is proximity to the main site and the process plant, resulting in a smaller overall Project footprint and habitat disturbance, with lower overall costs	• Although this alternative is very similar to the preferred alternative, it was not selected because it will require crossing additional sensitive SAR habitat and needs longer infrastructure, resulting in more habitat disturbance (although within the PDA) and increased cost	• This alternative is highly technically challenging to construct and operate, and it cannot be financially supported by the Project	• This alternative is located at an increased distance from site, resulting in more GHG and air emissions and considerably higher construction costs while providing no additional benefit	• This alternative is located at an increased distance from site, resulting in more GHG and air emissions and considerably higher construction costs while providing no additional benefit	• This alternative is located at an increased distance from site, resulting in more GHG and air emissions and considerably higher construction costs while providing no additional benefit	• This alternative is located at an increased distance from site, resulting in more GHG and air emissions and considerably higher construction costs while providing no additional benefit	• This alternative is located at an increased distance from site, resulting in more GHG and air emissions and considerably higher construction costs while providing no additional benefit

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present, including a small exploration camp, office, storage facilities and yard areas.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op = operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*.



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LEGEND

- Open Pit Basin
- Distance Buffer from Project Location (labelled on map)
- Watercourse
- Waterbody
- Contour (10 m intervals)

Tailings Storage Location Alternatives

- Alternative 1 (371.0 ha)
- Alternative 2 (470.0 ha)
- Alternative 3 (312.1 ha)
- Alternative 4 (377.1 ha)
- Alternative 5 (413.6 ha)
- Alternative 6 (472.3 ha)
- Alternative 7 (542.4 ha)
- Alternative 8 (460.4 ha)

0 1 2 4 6 8 10 Kilometres

NOTES:
- Topographic information extracted from LIO, MNRF.

Datum: NAD83
Projection: UTM Zone 15N

First Mining Gold

wsp

SPRINGPOLE GOLD PROJECT

Tailings Storage Location Alternatives

PROJECT N°: ONS2104

FIGURE: 4.6-1

SCALE: 1:68,000

DATE: October 2024

542500 545000 547500 550000 552500 555000 557500 560000 562500 565000 567500

5695000 5692500 5690000 5687500 5685000 5682500

5 km 7 km 10 km 13 km 17 km

Alternative 1 Alternative 2 Alternative 3 Alternative 4 Alternative 5 Alternative 6 Alternative 7 Alternative 8

L-1 L-2 L-3 L-4 L-5 L-6 L-10 L-11 L-12 L-14 L-16 L-18 L-19 L-20

Birch Lake Dole Lake Springpole Lake (North Basin) Springpole Lake (Southeast Arm) Durkin Lake Birch River Cromarty Lake Satterly Lake Bertha Lake Seagrave Lake

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LEGEND

- Open Pit Basin
- Distance Buffer from Project Location (labelled on map)
- Classified Habitat*
- Watercourse
- Waterbody
- Contour (10 m intervals)
- Tailings Storage Location Alternatives

NOTES:
- Topographic information extracted from LIO, MNRF.
* Classified habitat represent simplified delineations of known category 1 caribou habitat regions (MECP GHD (2024), telemetry kernels, high density aerial survey observations, RSF predicted areas). The simplified delineations utilize the Natural Heritage Information Centre (NHIC, MNRF 2024) provincial tessellation boundaries and reflect broad areas of known high use caribou habitat.

Datum: NAD83
Projection: UTM Zone 15N

0 1 2 4 6 8 10 Kilometres

N W E S

First Mining Gold

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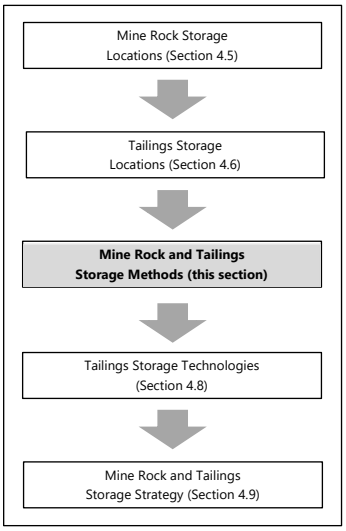
SPRINGPOLE GOLD PROJECT

Tailings Storage Location Alternatives and Classified Habitat

PROJECT N°: ONS2104 | **FIGURE: 4.6-2**

SCALE: 1:68,000 | DATE: October 2024

4.7 Mine Rock and Tailings Storage Methods



Sections 4.5 to 4.9 provide a step-wise assessment of the mineral waste storage alternatives using the approach described in Section 4.1 that support the final mineral waste storage facility (the CDF) described in Section 5.8.

The MDMER require that an assessment of alternatives be completed using the prescribed approach (ECCC 2021) in order for mineral waste to be approved when overprinting a natural, fish-bearing waterbody. An updated draft of the Mine Waste Management Alternatives Assessment for the Project is provided in Appendix E.

4.7.1 Identified Alternatives

There are a number of different methods of mine rock and tailings storage possible for a high tonnage open pit mine located in northern Ontario. Three alternative methods were initially identified:

- **Alternative 1:** in-pit disposal;
- **Alternative 2:** co-disposal of mine rock and tailings; and
- **Alternative 3:** separate facilities for mine rock and tailings

The Project cannot proceed without the selection of a storage method for mine rock and tailings. Mine rock from accessing ore in the open pit and tailings produced from the processing of ore within the process plant require effective management. If a storage method is not established (the do nothing alternative), the Project cannot proceed as the mine will be unable to produce ore and the process plant will be unable to process the ore without a storage location for the resulting mineral wastes. With the do nothing alternative, the Project does not proceed, and the environmental conditions at the site and surrounding area will not be changed from existing (baseline) conditions. Socioeconomic benefits of the Project would also not be accrued.

4.7.1.1 Alternative 1: In-Pit Disposal

The Project is a single open pit operation. An adjoining small, shallow Phase 1 pit is proposed to be developed at the start of construction, but it has very limited capacity for mineral waste storage. For the in-pit disposal alternative, the mineral waste (mine rock and/or tailings) would need to be stored in a surface facility during the operations phase and re-handled and placed in the open pit at or near the end of the mine life, prior to filling with water. The Project cannot financially support development of a temporary surface facility and double-handling the material after operations cease. In-pit disposal is therefore not a feasible option for the storage of the volume of mine rock and/or tailings required for the operations phase and is not assessed further.

Note that there is consideration for the potential placement of some mineral waste (overburden and/or mine rock) in the shallower, northern portion of the dewatered basin to support fish habitat creation. Although potentially offering benefits for fish habitat creation, this approach would not substantially reduce the overall volume of mine rock and tailings requiring storage on surface.

4.7.1.2 Alternative 2: Co-disposal of Mine Rock and Tailings

Co-disposal of mine rock and tailings entails storage of mine rock and tailings in the same facility, either mixed together for storage or placed independently within the same facility in layers or in different locations. A combination of co-disposal techniques may be used for the Project to allow the greatest use of the NAG mine rock as a construction material, pending further engineering design. Co-disposal is economically feasible for the Project. It has the advantages of more effectively managing PAG mineral wastes by minimizing the footprint of PAG wastes on the site and allowing management of surface water runoff and seepage from only one primary mineral waste facility. Strategic placement of tailings can help to effectively encapsulate PAG mine rock and reduce potential acid generation and metal leaching.

4.7.1.3 Alternative 3: Separate Facilities for Mine Rock and Tailings

As a result of their unique properties, mine rock and tailings are commonly stored in separate, discrete disposal areas, although mine rock is often used in the construction of tailings containment structures. As indicated in Sections 4.5 and 4.6, locations are available to discretely store the Project mine rock and tailings, although establishment of separate structures would result in a larger overall site footprint.

4.7.2 Assessment of Alternatives

The two feasible mine rock and tailings storage alternative methods were assessed:

- **Alternative 2:** co-disposal of mine rock and tailings; and
- **Alternative 3:** separate facilities for mine rock and tailings.

The results of the alternatives assessment for a mine rock and tailings storage methods listing differentiating aspects are summarized in Table 4.-1. The alternatives were assessed for all performance objectives, criteria and indicators; however, the following performance objectives and criteria were identified as the key differentiators:

- Natural environment performance:
- Potential effect on water quality, fish and aquatic habitat;
- Potential effect on wetlands;
- Potential effect on terrestrial species and habitat; and
- Potential effect on SAR.
- Technical performance:
- Ability to service the site; and
- Cost effectiveness.

4.7.2.1 Alternative 2: Co-disposal of Mine Rock and Tailings

Advantages: this alternative results in reduced surface area and the associated potential effects on terrestrial habitat including habitat for SAR, such as Woodland Caribou. It also involves mixing of mine rock and tailings increases the physical stability of the structure (high shear strength), and maximizes storage capacity, with tailings filling the large voids between rocks. There is a greater potential for in situ mitigation of metal leaching and acid rock drainage (ML/ARD), restricting atmospheric oxygen within the facility. In addition, it is the most cost-effective alternative with respect to reclamation requirements, long-term management and liability

Disadvantages: no apparent disadvantages.

For Alternative 2, the key mitigation measures that would minimize potential effects associated with this method isto use the inherent characteristics of the mineral wastes to minimize storage area and optimize environmental performance, such as by using NAG waste to encapsulate PAG waste. This could include re-use of NAG mine rock in construction to minimize additional disturbance from dedicated aggregate sources.

4.7.2.2 Alternative 3: Separate facilities for mine rock and tailings

Advantages: this alternative would increase operation ease as there is no need to manage two different materials within a single facility simultaneously.

Disadvantages: this alternative results in a larger overall Project footprint, with associated increased impacts of the terrestrial environment. This alternative also requires additional operational planning, as well as increased requirements for management of seepage and runoff.

There are no unique mitigation measures associated with Alternative 3 that would minimize potential effects, on the assumption that the same types of mine rock and tailings are produced as for the co-disposal option.

4.7.3 Results Summary and Selected Alternative

Two potential methods for mine rock and tailings storage were identified for the alternatives assessment. Alternative 2 (co-disposal) will provide the most compact Project footprint, while Alternative 3 (use of separate dedicated facilities) unnecessarily expands the Project footprint. Alternative 2 is the preferred alternative and is carried forward within the mine waste alternatives review process. It was selected based on the assessment of net effects in Table 4.6-1 with implementation of the key mitigation measures described briefly in Section 4.7.2.

Table 4.7-1: Assessment of Mine Rock and Tailings Storage Methods Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: In-Pit Disposal	Alternative 2: Co-disposal	Alternative 3: Discrete Facilities
Natural Environment					
Potential Effect on Air Quality and Climate	Level of equipment activity affecting air quality	• Good air quality is present—attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Some potential for dust generation from fine grained material and emissions arising from vehicle movement to / from the facility	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Op/Cl: Moderate GHG generation arising from transport of mine rock using mine fleet	• There is no material difference between Alternatives 1, 2 and 3 for this indicator	• There is no material difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level of equipment activity affecting surface water quality objectives	• Surface water quality meets Provincial Water Quality Objectives for protection of aquatic life except for a few occasions that were irregular, generally associated with elevated suspended solids	• Con/Op/Cl: No effects anticipated from baseline condition arising from choice of storage method	• Con/Op/Cl: Potential for effects on water quality due to seepage from storage facilities; facility will be designed to collect seepage and runoff for storage and treatment as needed	• Con/Op/Cl: Potential for effects on water quality due to seepage from storage facilities; facility will be designed to collect seepage and runoff for storage and treatment as needed
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Op/Cl: Depending on the choice of location for a temporary facility, some disturbance of waterbodies and watercourses could be expected	• Con/Op/Cl: Depending on the choice of location, some disturbance of waterbodies and watercourses could be expected	• Con/Op/Cl: Discrete facilities would have a greater likelihood of having a larger overall footprint, thereby potentially overprinting a greater area of potential fish habitat
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: No effects anticipated, as habitat overprinted would be replaced as per offset and compensation plan	• Con/Op/Cl: No effects anticipated, as habitat overprinted would be replaced as per offset and compensation plan	• Con/Op/Cl: No effects anticipated, as habitat overprinted would be replaced as per offset and compensation plan
	Ability to maintain conditions for fish passage	• There are no material constraints to fish passage in Birch Lake and Springpole Lake	• Con/Op/Cl: No effects anticipated from baseline condition arising from choice of storage method	• Con/Op/Cl: No effects anticipated, as habitat overprinted would be replaced as per offset and compensation plan	• Con/Op/Cl: No effects anticipated, as habitat overprinted would be replaced as per offset and compensation plan
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No direct effects anticipated to arise from choice of storage method, as the open pit is expected to be a groundwater discharge zone; no effects on groundwater levels arising from storage of mine waste materials within the open pit	• Con/Op/Cl: No effects are anticipated, as the facility will be designed to intercept and collect seepage for treatment if necessary	• Con/Op/Cl: No effects are anticipated, as the facility will be designed to intercept and collect seepage for treatment if necessary
		Summary	**Not Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA • There are no wetlands present in Birch Lake and Springpole Lake	• Con/Op/Cl: Depending on the choice of location for a temporary facility, some disturbance of wetlands could be expected	• Con/Op/Cl: Depending on the choice of location, some disturbance of wetlands could be expected	• Con/Op/Cl: Depending on the choice of location, some disturbance of wetlands could be expected
	Ability to maintain wetland connectivity	• Natural wetland connectivity is present, reflecting local topographic and subsurface conditions • There are no wetlands present in Birch Lake and Springpole Lake	• Con/Op/Cl: Depending on the choice of location for a temporary facility, some loss of wetland connectivity could be expected	• Con/Op/Cl: Depending on the choice of location, some loss of wetland connectivity could be expected	• Con/Op/Cl: Depending on the choice of location, some loss of wetland connectivity could be expected
		Summary	**Not Preferred**	**Partially Preferred**	**Partially Preferred**

Table 4.7-1: Assessment of Mine Rock and Tailings Storage Methods Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Pit Disposal	Alternative 2: Co-disposal	Alternative 3: Discrete Facilities
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities • There are no terrestrial habitat present in Birch Lake and Springpole Lake	• Con/Op/Cl: Some disturbance of terrestrial habitat to be expected, as mine waste materials would require surface storage until sufficient space is available in the open pit	• Con/Op/Cl: Some disturbance of terrestrial habitat would be expected for development of a co-disposal facility	• Con/Op/Cl: Discrete facilities would have a greater likelihood of having a larger overall footprint, thereby potentially overprinting a greater area of terrestrial habitat
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Moderately increased noise emissions from transport of mine waste materials to facility; limited increased potential for vehicle–wildlife interactions	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies • There is no terrestrial habitat present in Birch Lake and Springpole Lake	• Con/Op/Cl: Limited potential effect, as wildlife avoidance of PDA and transport corridor is generally expected; however, there could be a limited increased potential for vehicle–wildlife interactions	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present, reflecting local habitat and natural species distributions	• Con/Op/Cl: No effects anticipated from baseline condition arising from choice of storage method	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Not Preferred**	**Preferred**	**Partially Preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine, . The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• The PDA has been identified as Caribou habitat; other SAR could be present, depending on the location identified as appropriate for a temporary facility	• The PDA has been identified as Caribou habitat; other SAR could be present, depending on the location identified as appropriate for the facility	• The PDA has been identified as Caribou habitat; other SAR could be present, depending on the location identified as appropriate for the facility
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Con/Op/Cl: No additional effects anticipated arising from choice of storage method	• The PDA has been identified as Caribou habitat; other SAR could be present, depending on the location identified as appropriate for the facility	• The PDA has been identified as Caribou habitat; other SAR could be present, depending on the location identified as appropriate for the facility
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Moderately increased noise emissions from transport of mine waste materials to facility; limited increased potential for vehicle–wildlife interactions	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.7-1: Assessment of Mine Rock and Tailings Storage Methods Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Pit Disposal	Alternative 2: Co-disposal	Alternative 3: Discrete Facilities
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies, including Springpole Lake and Birch Lake	• Con/Op/Cl: Limited potential effect as wildlife avoidance of PDA is generally expected	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Not Preferred**	**Partially Preferred**	**Partially Preferred**
	Natural Environment Performance Objectives Assessment		**Not Preferred**	**Partially Preferred**	**Partially Preferred**
			• Adv: None apparent • Disadv: Surface storage required regardless until sufficient room is available within the open pit; double handling of material would be required, and surface impoundment would require reclamation	• Adv: Smaller facility and Project footprint • Disadv: None apparent	• Adv: None apparent • Disadv: Larger overall Project footprint
Social, Economic, Cultural and Built Environment					
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effects anticipated from baseline condition arising from choice of storage method	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: No effects anticipated from baseline condition arising from choice of storage method	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: No effects anticipated from baseline condition arising from choice of storage method	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No effects anticipated from baseline condition arising from choice of storage method, as project will be designed to meet regulatory guidelines	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects anticipated from baseline condition arising from choice of storage method	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects anticipated from baseline condition arising from choice of storage method	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: No effects anticipated from baseline condition arising from choice of storage method	• Con/Op/Cl: Stockpiling of mine waste materials will result in a change to the natural landscape, which will affect local aesthetics	• Con/Op/Cl: Stockpiling of mine waste materials will result in a change to the natural landscape, which will affect local aesthetics
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: No effects anticipated from baseline condition arising from choice of storage method	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**

Table 4.7-1: Assessment of Mine Rock and Tailings Storage Methods Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Pit Disposal	Alternative 2: Co-disposal	Alternative 3: Discrete Facilities
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road providing access to the regional road network is located 18 km away	• Con/Op/Cl: Indicator is not applicable to this alternative	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level of equipment activity affecting air quality	• Good air quality is present—attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Some potential for dust generation from fine grained material and emissions arising from vehicle movement to / from the facility	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Level of equipment activity affecting quality of drinking water supplies	• Surface water quality meets Provincial Water Quality Objectives for protection of aquatic life except for a few occasions that were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects; no drinking water supplies present in Project area	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Cons/Op/Cl: Not applicable; there is no electromagnetic exposure associated with mine waste storage	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Cons/Op/Cl: No effects are anticipated, as access will be restricted on the site during any Project phase	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout, providing a range of services	• Con/Op/Cl: No effects are anticipated, as there will be no change to health services	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: No effects are anticipated, as the Project site is not close to access locations	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes such as Birch Lake and Springpole Lake allow for float plane access	• Con/Op/Cl: No effects are anticipated, as the Project site is not close to access locations	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**

Table 4.7-1: Assessment of Mine Rock and Tailings Storage Methods Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Pit Disposal	Alternative 2: Co-disposal	Alternative 3: Discrete Facilities
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/Cl: No effects are anticipated, as the choice of storage method will not impact tourism and recreational opportunities	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: No effects are anticipated, as the choice of storage method will not provide a material change	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: No effects are anticipated, as the choice of storage method will not change government services	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514, which allows mining-related land use activities • Located within the Trout Lake Forest Management Area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing lake trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• Con/Cl: Applicable approvals will be obtained, including the Sustainable Forest Rights holder for pipeline corridor clearing and reclamation • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Potential for material to be recycled or re-used	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible with the historical fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects are anticipated, as the open pit does not overprint to cultural heritage resources	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects are anticipated, as the open pit does not overprint to cultural heritage resources	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.7-1: Assessment of Mine Rock and Tailings Storage Methods Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Pit Disposal	Alternative 2: Co-disposal	Alternative 3: Discrete Facilities
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects are anticipated, as storage of mine wastes within the open pit would be below existing ground level	• Con/Op/Cl: No potential for effects; no site located within the PDA	• Con/Op/Cl: No potential for effects; no site located within the PDA
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeology potential within the PDA • Two pictograph sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No potential for effects; no site located within the PDA	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeology potential within the PDA • Two pictograph sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No potential for effects; no site located within the PDA	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No effects are anticipated, as mine waste materials will be stored at the Project site and will not affect conditions distant from the PDA	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites, or implements other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No potential for effects; no site located within the PDA	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: This alternative provides the smallest overall Project footprint, and therefore the least potential to affect access to traditional lands, which will continue during operation and into decommissioning until the site is fully rehabilitated	• Con/Op/Cl: A co-disposal facility would result in a disruption to habitat, which will occur during construction; disruption will continue during operation and into decommissioning	• Con/Op/Cl: Discrete facilities would result in the largest total footprint, with disruption to habitat occurring during construction and continuing during operation and into decommissioning
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
			• Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators

Table 4.7-1: Assessment of Mine Rock and Tailings Storage Methods Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Pit Disposal	Alternative 2: Co-disposal	Alternative 3: Discrete Facilities
Technical Objectives					
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: In-pit storage is a viable and effective means of storing mine waste materials, with the assumption that there is available room to place the materials which would not interfere with active mine operations	• Con/Op/Cl: Development of a co-disposal facility for mine rock and tailings is a viable and effective means of storing mine waste materials.	• Con/Op/Cl: Development of discrete facilities for storage of mine rock and tailings is a viable and effective means of storing mine waste materials which is implemented at many sites across Canada
	Degree to which new technology supports investigations or testing	• There are no facilities present	• Con/Op/Cl: Not applicable, no new technology is proposed	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to consistently meet Project needs	• There are no facilities present	• Con/Op: During mining, tailings that are produced would have to be disposed of on the surface since the open pit will be actively mined • Cl: Material would require double-handling to relocate to the open pit at closure, incurring additional costs, and still resulting in surface impacts, which would require reclamation	• Con/Op/Cl: Development of a dedicated co-disposal facility would provide for sufficient storage for the anticipated volumes of mine waste materials; it would also allow for more effective management of PAG materials	• Con/Op/Cl: Development of discrete facilities would provide for sufficient storage for the anticipated volumes of mine waste materials
	Availability of necessary infrastructure for component	• There are no facilities, including supporting infrastructure, present	• Con/Op/Cl: The open pit would be developed on lands held by FMG, or are Crown lands expected to be accessible on completion of the environmental approvals process	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Not Preferred**	**Preferred**	**Partially Preferred**
Cost Effectiveness	Potential effect on Project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Proven and effective technology with no operational risks	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Surface storage is required until sufficient room is available within the open pit; Project economics cannot support double-handling of material, and surface impoundment would require reclamation	• Con/Op/Cl: Costs for mine waste deposition measures can be supported by the Project, providing a competitive return on investment	• Con/Op/Cl: Costs for mine waste deposition measures can be supported by the Project, providing a competitive return on investment
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: The Project economics cannot support double-handling of the materials	• Con/Op/Cl: No material effects anticipated on financial risk	• Con/Op/Cl: No material effects anticipated on financial risk
	Summary		**Not Preferred**	**Preferred**	**Partially Preferred**
Technical Performance Objective Assessment			**Not Preferred**	**Preferred**	**Partially Preferred**
			• Adv: Most favourable for management of seepage and runoff due to basin containment • Adv: Geotechnical stability; near elimination of stability / failure issues • Disadv: Surface storage is required until sufficient room is available within the open pit; double-handling of material would be required, which is not supported by the economics of the Project	• Adv: Greater effectiveness at management of PAG materials • Adv: Increased stability owing to placement of mine rock with tailings • Disadv: None apparent	• Adv: Commonly used / well-understood approach for management of both PAG and NAG mine waste materials • Disadv: Increased requirements for management of seepage and runoff

Table 4.7-1: Assessment of Mine Rock and Tailings Storage Methods Alternatives

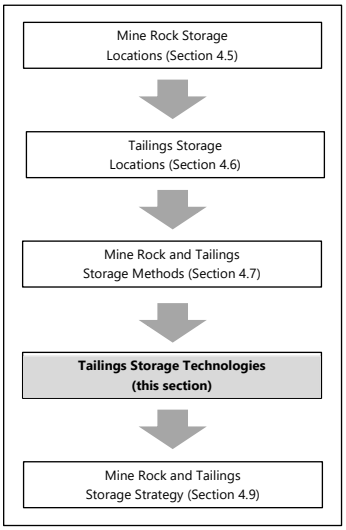
Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: In-Pit Disposal	Alternative 2: Co-disposal	Alternative 3: Discrete Facilities
Amenability to Reclamation (Closure Phase)					
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities, including supporting infrastructure, present	• Cl: The open pit will be allowed to flood at closure, forming a large lake basin that will blend the affected area into the surrounding landscape	• Cl: Facility will be closed out in accordance with regulatory requirements, including physical stability of slopes and mine waste piles	• Cl: Facility will be closed out in accordance with regulatory requirements, including physical stability of slopes and mine waste piles
	Summary		**Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography, which can be characterized as moderately rugged	• Cl: The open pit will be allowed to flood at closure, forming a large lake basin that will blend the affected area into the surrounding landscape	• Cl: Active and passive revegetation will re-establish habitat after decommissioning and natural regrowth over time will blend the affected area into the surrounding landscape	• Cl: Active and passive revegetation will re-establish habitat after decommissioning and natural regrowth over time will blend the affected area into the surrounding landscape
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Cl: The open pit will be allowed to flood at closure, forming a large lake basin that will blend the affected area into the surrounding landscape	• Cl: Active and passive revegetation will re-establish habitat after decommissioning and natural regrowth over time will blend the affected area into the surrounding landscape	• Cl: Active and passive revegetation will re-establish habitat after decommissioning and natural regrowth over time will blend the affected area into the surrounding landscape
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514, which allows mining-related land use activities • Located within the Trout Lake Forest Management Area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• Cl: The open pit will be allowed to flood at closure, forming a large lake basin that will blend the affected area into the surrounding landscape	• Cl: Active and passive revegetation will re-establish habitat after decommissioning and natural regrowth over time will blend the affected area into the surrounding landscape	• Cl: Active and passive revegetation will re-establish habitat after decommissioning and natural regrowth over time will blend the affected area into the surrounding landscape
	Provide for an aesthetically pleasing site	• The existing landscape at and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: The open pit will be allowed to flood at closure, forming a large lake basin that will blend the affected area into the surrounding landscape	• Cl: Active and passive revegetation will re-establish habitat after decommissioning and natural regrowth over time will blend the affected area into the surrounding landscape	• Cl: Active and passive revegetation will re-establish habitat after decommissioning and natural regrowth over time will blend the affected area into the surrounding landscape
	Summary		**Preferred**	**Partially Preferred**	**Partially Preferred**
Amenability to Reclamation Performance Objective Assessment			**Preferred**	**Partially Preferred**	**Partially Preferred**
			• Adv: Flooding at closure is a passive / semi-passive reclamation measure • Adv: Flooded lake basin will readily blend in with the surrounding landscape • Disadv: None apparent	• Adv: Efficiency realized through closure of a single facility • Disadv: None apparent	• Adv: None apparent • Disadv: Increased costs associated with closure of separate facilities
OVERALL ASSESSMENT OF ALTERNATIVE			**NOT PREFERRED**	**PREFERRED (SELECTED ALTERNATIVE)**	**PARTIALLY PREFERRED**
			• The primary reason for not selecting this alternative is the need for a surface impoundment for mine wastes until the open pit has suitable volume to store the materials, and storage won't interfere with active mining; this alternative cannot be supported by the economics of the Project	• This alternative is preferred for the reduced overall Project footprint as well as the improved ability to manage PAG materials and runoff from a single facility	• Although this alternative is very similar to the preferred alternative, it was not selected because it would require additional footprint, resulting in more habitat disturbance (although within the PDA) and increased costs associated with a second facility

Notes:

(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.

Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op = operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*.

4.8 Tailings Storage Technologies



Sections 4.5 to 4.9 provide a step-wise assessment of the mineral waste storage alternatives using the approach described in Section 4.1 that support the final mineral waste storage facility (the CDF) described in Section 5.8.

The MDMER require that an assessment of alternatives be completed using the prescribed approach (ECCC 2021) in order for mineral waste to be approved when overprinting a natural, fish-bearing waterbody. An updated draft of the Mine Waste Management Alternatives Assessment for the Project is provided in Appendix E.

4.8.1 Identified Alternatives

Four different potential technologies for tailings storage were identified for a single open pit operation in a northern location with the primary physical difference being the liquid content of the tailings:

- **Alternative 1:** conventional (slurry) tailings;
- **Alternative 2:** thickened tailings;
- **Alternative 3:** filtered tailings; and
- **Alternative 4:** paste tailings.

The Project cannot proceed without the selection of a storage method for tailings. Tailings produced from the processing of ore within the process plant require effective management. If a tailings storage method / area is not established (the do nothing alternative), the Project cannot proceed as the process plant will be unable to process the ore without a storage method / location for the resulting waste by-product. With the do nothing alternative, the Project does not proceed, and the environmental conditions at the site and surrounding area will not be changed from existing (baseline) conditions. Socioeconomic benefits of the Project would also not be accrued.

Alternative 4, paste tailings (another potential technology), has the lowest water content and is a technology generally used at mines with low production rates (such as underground mining operations) that have water constraints and few power (energy) constraints. Approximately the same general geographic locations and footprint areas would be required for a paste tailings disposal site as for the other tailings storage technologies, and this disposal technology offers limited environmental benefits over other tailings disposal technologies despite having higher capital and operating costs. Paste tailings disposal is not viable for the Project, so Alternative 4 was not considered during the alternatives assessment.

4.8.1.1 Alternative 1: Conventional Tailings

The conventional method of tailings storage at northern Ontario mining operations is within a permanent surface impoundment contained by natural topography and engineered embankments. Conventional tailings are characterized by having the highest water content. Tailings are transported by pipeline as a slurry having a density in the range of 30 percent (%) to 40% solids by weight. Conventional tailings storage is widely used in northern Canada and is one of the least expensive methods of disposal, available for any production rate.

4.8.1.2 Alternative 2: Thickened Tailings

The tailings can also be thickened to upwards of 65% by weight of solids, prior to placement into a tailings management area. Tailings thickeners are used effectively at mines at various production rates and are a proven technology for most applications. This alternative does not, however, provide a benefit for reducing or mitigating ML/ARD in PAG tailings, where relevant.

4.8.1.3 Alternative 3: Filtered Tailings

Filtered tailings have the lowest liquid content of these technologies. The tailings are passed through filter presses to produce a comparatively dry tailings that can be trucked or conveyed to the storage location. The development and management of filtered tailings has a high power requirement and additional operating costs but has advantages with respect to storage capacity needed for water management and containment infrastructure needs.

4.8.2 Assessment of Alternatives

Three tailings storage technologies were carried forward into the alternatives assessment:

- **Alternative 1:** conventional (slurry) tailings;
- **Alternative 2:** thickened tailings; and
- **Alternative 3:** filtered tailings.

The alternatives were assessed for all performance objectives, criteria and indicators; however, the following performance objectives and criteria were identified as the key differentiators:

- Natural environment performance:
- Potential effect on air quality and climate; and
- Potential effect on terrestrial species and habitat.
- Technical performance:
- Ability to service the site; and
- Cost effectiveness.

Each technology offers advantages and disadvantages as summarized below.

4.8.2.1 Alternative 1: Conventional Tailings

- **Advantages:** This alternative results in relatively low GHG emissions. It offers operational flexibility and certainty, as well as mitigation potential for PAG tailings management, as the tailings can be maintained in a saturated condition to help constrain acid generation.
- **Disadvantages:** has low strength and higher water content requirement management and generally requires a larger facility. There is the potential for increased overprinting effects on terrestrial and aquatic habitat and loss of land for traditional uses.

Key mitigation measures that would minimize potential effects associated with the conventional tailings method are as follows:

- Employ effective tailings deposition and water management practices to maintain pond(s) away from embankments.

- Establish equipment and procedures to confirm pipeline integrity when in use on a continual basis.
- Site pipelines to avoid unnecessary environmental disturbance and reduce potential for collisions.
- At critical locations, provide additional pipeline containment measures, such as use of double-walled pipes or placement in ditches.

4.8.2.2 Alternative 2: Thickened Tailings

- **Advantages:** This alternative results in relatively low GHG emissions. The main advantage over conventional tailings is the reduction in the amount of water contained in the tailings slurry being sent for storage resulting in reduced seepage and a somewhat reduced storage area
- **Disadvantages:** has a higher energy requirement from the dewatering thickening / dewatering process.

Key mitigation measures to minimize potential effects are the same as for conventional tailings.

4.8.2.3 Alternative 3: Filtered Tailings:

- **Advantages:** smaller capacity needed for water management and containment infrastructure needs.
- **Disadvantages:** development and management of filtered tailings has a high energy requirement resulting in greater GHG emissions than the other two alternatives, along with additional operating costs and additional dust management requirements as the tailings are drier. There is also the potential for additional disturbance of wildlife caused by sensory disturbances (such as light, sound and vibration emissions) during the operations phase of the Project due to movement of vehicles for tailings transport. This method is not commonly used at similar operations and may pose financial and technical risks

The key mitigation measures that would minimize potential effects associated with the filtered tailings method are as follows:

- Provide infrastructure for truck travel within the facility or armour the travelways to minimize dust creation during transport of tailings (or if conveyors are used, provide containment around the conveyors).
- Minimize drop height or use other means to minimize dust generation during placement.
- Maintain a wet surface or use other means, to reduce dust entrainment from the tailings surface.

The results of the alternatives assessment for tailings storage technologies listing differentiating aspects are summarized in .

4.8.3 Results Summary and Selected Alternatives

Alternatives 1 and 2 (conventional tailings and thickened tailings) were carried forward in the alternatives review process for mine waste based on the assessment of net effects in with implementation of key mitigation measures described in Section 4.8.2. Ultimately, Alternative 2 was selected due to the reduction in water management and treatment requirements for NPAG tailings. The primary reason is that Alternative 3 (filtered tailings) does not offer any benefit over conventional tailings disposal or thickened tailings disposal and has considerably higher power requirements, resulting in greater GHG emissions and costs.

Table 4.8-1: Assessment of Tailings Storage Technologies Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Conventional Tailings	Alternative 2: Thickened Tailings	Alternative 3: Filtered Tailings
Natural Environment					
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present—attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: The quantity of air emissions required for tailings deposition is low and associated with milling operations at the plant site	• There is no difference between Alternative 1 and Alternative 2 for this indicator	• Con/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator, for these project phases • Op: The quantity of air emissions from the mobile equipment required for tailings transportation is greater than Alternatives 1 and 2 for deposition using the mine fleet
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Cl/Op: The quantity of GHG emissions required for tailings deposition is low and associated with milling operations at the plant site	• There is no difference between Alternative 1 and Alternative 2 for this indicator	• Con/Cl: Con/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator, for these project phases • Op: The quantity of GHG emissions from the mobile equipment required for tailings transportation is greater than Alternatives 1 and 2 for deposition using the mine fleet
		Summary	**Partially Preferred**	**Partially Preferred**	**Not Preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets Provincial Water Quality Objectives for protection of aquatic life except for a few occasions that were irregular, generally associated with elevated suspended solids	• Con/Op/Cl: Water quality will be managed with control measures to meet regulatory requirements and there is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain conditions for fish passage	• There are no material constraints to fish passage in Birch Lake and Springpole Lake	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA • There are no wetlands present in Birch Lake and Springpole Lake	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.8-1: Assessment of Tailings Storage Technologies Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Conventional Tailings	Alternative 2: Thickened Tailings	Alternative 3: Filtered Tailings
	Ability to maintain wetland connectivity	• Natural wetland connectivity is present reflecting local topographic and subsurface conditions • There are no wetlands present in Birch Lake and Springpole Lake	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities • There are no terrestrial habitat present in Birch Lake and Springpole Lake	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Potential for general disturbance of wildlife caused by sensory disturbances (such as light, sound and vibration emissions) during the construction, operations and closure phases of the Project	• There is no difference between Alternative 1 and Alternative 2 for this indicator	• Potential for additional disturbance of wildlife caused by sensory disturbances (such as light, sound and vibration emissions) during the operations phase of the Project due to movement of vehicles for tailings transport
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies • There is no terrestrial habitat present in Birch Lake and Springpole Lake	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present, reflecting local habitat and natural species distributions	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Not Preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.8-1: Assessment of Tailings Storage Technologies Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Conventional Tailings	Alternative 2: Thickened Tailings	Alternative 3: Filtered Tailings
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No effect is anticipated, as there will be only limited (both sound level and duration) noise from the construction and infrastructure removal that will coincide with the Project, and related infrastructure will be within or very close to the PDA; additional disruption is not expected, as avoidance of the PDA by wildlife is generally expected	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies, including Springpole Lake and Birch Lake	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Natural Environment Performance Objectives Assessment			**Partially Preferred**	**Partially Preferred**	**Not Preferred**
			• Adv: Reduced emissions related to sound, air and GHGs • Disadv: None apparent	• Adv: Reduced emissions related to sound, air and GHGs • Disadv: None apparent	• Adv: None apparent • Disadv: Increase in emissions related to sound, air and GHGs
Social, Economic, Cultural and Built Environment					
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effects anticipated; the choice of tailings technology will not affect local property values	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: No effects anticipated; the choice of tailings technology will not affect opportunities for income	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: No effects anticipated; the choice of tailings technology will not affect local access	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Mine development will generate noise emissions that will meet regulatory requirements	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects anticipated; no known water well supply systems are present in the Project area	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects anticipated; no known surface water drinking supplies present in the Project area	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.8-1: Assessment of Tailings Storage Technologies Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Conventional Tailings	Alternative 2: Thickened Tailings	Alternative 3: Filtered Tailings
	Change in visual aesthetics or level of general disturbance	• The existing landscape at and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: While the facility will be visible from the water and may have an adverse impact on natural aesthetics, it will be a similar facility regardless of the chosen tailings technology—as such, the choice of tailings technology will not have an effect on visual aesthetics	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: No effects on local residents and recreational users anticipated associated with the choice of tailings technology, as access to the site will be restricted	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road providing access to the regional road network is located 18 km away	• Con/Op/Cl: No effects are anticipated, as the required infrastructure and activity are remote from the local and regional access	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Cons/Op/Cl: Not applicable; the choice of tailings technology does not affect the requirement for provision of power for the site	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Tailings pipelines are predictably reliable; the pipeline is relatively short and will be sited to help ensure accessibility for inspection and maintenance	• Con/Op/Cl: Tailings pipelines are predictably reliable; the pipeline is relatively short and will be sited to help ensure accessibility for inspection and maintenance	• ***
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level of equipment activity affecting air quality	• Good air quality is present—attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl/Op: The quantity of air emissions required for tailings deposition is low and associated with milling operations at the plant site	• There is no difference between Alternative 1 and Alternative 2 for this indicator	• Con/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator, for these project phases • Op: The quantity of air emissions from the mobile equipment required for tailings transportation is high for deposition using the mine fleet
	Level of equipment activity affecting quality of drinking water supplies	• Surface water quality meets Provincial Water Quality Objectives for protection of aquatic life except for a few occasions that were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Cons/Op/Cl: Not applicable; the choice of tailings technology will not influence the quality of drinking water supply to either the Project or other potential users	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Cons/Op/Cl: Not applicable, there is no electromagnetic exposure associated with the choice of tailings technology	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.8-1: Assessment of Tailings Storage Technologies Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Conventional Tailings	Alternative 2: Thickened Tailings	Alternative 3: Filtered Tailings
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: Safe road traffic conditions will be maintained • Con/Op/Cl: FMG will support maintaining safe road traffic conditions outside the domain of FMG control as practical	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout, providing a range of services	• Con/Op/Cl: No effects are anticipated, as there will be no change to health services	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: No effects are anticipated, as the water supply sources are not close to opportunities and the choice of technology will not have an effect	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes such as Birch Lake and Springpole Lake allow for float plane access	• Con/Op/Cl: No effects are anticipated, as the water supply sources are not close to opportunities and the choice of technology will not have an effect	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road-accessible main base lodges to remote camps	• Con/Op/Cl: No effects are anticipated, as the choice of tailings technology will not provide a material change	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: No effects are anticipated, as the choice of tailings technology will not provide a material change	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: No effects are anticipated, as the choice of tailings technology will not provide a material change	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514, which allows mining-related land use activities • Located within the Trout Lake Forest Management Area and is subject to the Trout Lake Forest Management Plan	• Con/Op/Cl: No effects are anticipated, as the choice of tailings technology will not provide a material change	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.8-1: Assessment of Tailings Storage Technologies Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Conventional Tailings	Alternative 2: Thickened Tailings	Alternative 3: Filtered Tailings
		• Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor			
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects are anticipated, as the choice of tailings technology will not affect the generation of waste material for the site	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Potential for material to be recycled or re-used	• There are no facilities present	• Con/Op/Cl: No effects are anticipated, as the choice of tailings technology will not affect the recycling material for the site; construction and decommissioning wastes will be recycled or re-used as practical	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible with the historical fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated to cultural heritage resources	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated to cultural heritage resources	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects are anticipated that would arise from the choice of tailings technology	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeology potential within the PDA • Two pictograph sites have been identified on the north side of the southeast arm of Springpole Lake	• Con: No effects are anticipated that would arise from the choice of tailings technology • Con: If there are new archaeological findings during construction, appropriate mitigation will be used (potentially avoidance) • Op/Cl: No effects are anticipated, as no additional subsurface disturbance will be required after construction	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.8-1: Assessment of Tailings Storage Technologies Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Conventional Tailings	Alternative 2: Thickened Tailings	Alternative 3: Filtered Tailings
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeology potential within the PDA • Two pictograph sites have been identified on the north side of the southeast arm of Springpole Lake	• Con: No effects anticipated which would arise from the choice of tailings technology • Con: If there are new archaeological findings during construction, appropriate mitigation will be used (potentially avoidance) • Op/Cl: No effects are anticipated, as no additional subsurface disturbance will be required after construction	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No effects are anticipated that would arise from the choice of tailings technology	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage or archaeological sites within the PDA	• Con/Op/Cl: No effects are anticipated that would arise from the choice of tailings technology	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: Some disruption of lands and waters potentially used for traditional purposes will occur during construction, which will continue during operation and into decommissioning •	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially Preferred** • Neutral: There are very limited anticipated effects on the human environment from the choice of tailings technology • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	**Partially Preferred** • Neutral: There are very limited anticipated effects on the human environment from the choice of tailings technology • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	**Partially Preferred** • Neutral: There are very limited anticipated effects on the human environment from the choice of tailings technology • Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators

Table 4.8-1: Assessment of Tailings Storage Technologies Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Conventional Tailings	Alternative 2: Thickened Tailings	Alternative 3: Filtered Tailings
Technical Objectives					
Ability to Service the Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Use of slurry tailings is commonplace at similar mining operations in similar environments; the greater water content within slurry tailings would allow for the development of a water cover over PAG tailings, inhibiting the onset of acid generation	• Con/Op/Cl: Use of thickened tailings is commonplace at similar mining operations in similar environments; thickened tailings result in a lower water content in the tailings storage area, providing for reduced seepage and water treatment requirements—this is advantageous for non-potentially acid generating tailings	• Con/Op/Cl: Filtered tailings are not typically used at similar mining operations in similar environments
	Degree to which new technology supports investigations or testing	• There are no facilities present	• Con/Op/Cl: Not applicable; no new technology is proposed	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to consistently meet Project needs	• There are no facilities present	• Con/Op/Cl: Use of slurry tailings is commonplace at similar mining operations in similar environments; the greater water content within slurry tailings would allow for the development of a water cover over PAG tailings, inhibiting the onset of acid generation	• Con/Op/Cl: Use of thickened tailings is commonplace at similar mining operations in similar environments; thickened tailings result in a lower water content in the tailings storage area, providing for reduced seepage and water treatment requirements—this is advantageous for non-potentially acid generating tailings	• Con/Op/Cl: Filtered tailings are not typically used at similar mining operations in similar environments
	Availability of necessary infrastructure for component	• There are no facilities, including supporting infrastructure, present	• Con/Op/Cl: Pipeline and access road route (and wells) would be placed on lands held by FMG, or are Crown lands expected to be accessible on completion of the environmental approvals process	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Preferred**	**Not Preferred**
Cost Effectiveness	Potential effect on Project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Costs for this technology are well understood and present low financial risk	• Con/Op/Cl: Costs for this technology are well understood and present low financial risk	• Con/Op/Cl: Project financing conditions may be less favourable due to perceived increased operational complications
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Costs for this technology are well understood and facilitate a competitive return on investment	• Con/Op/Cl: Costs for this technology are well understood and facilitate a competitive return on investment	• Con: Costs for supporting infrastructure development are greater than Alternatives 1 and 2 • Op: Increased processing and deposition costs may provide increased sensitivity to commodity price fluctuations • Cl: Cost differences for site reclamation are not material
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: Costs for this technology are well understood and facilitate a competitive return on investment	• Con/Op/Cl: Costs for this technology are well understood and facilitate a competitive return on investment	• Con: Costs for supporting infrastructure development are greater than Alternatives 1 and 2 • Op: Increased processing and deposition costs may provide increased sensitivity to commodity price fluctuations • Cl: Cost differences for site reclamation are not material
		Summary	**Partially Preferred**	**Partially Preferred**	**Not Preferred**

Table 4.8-1: Assessment of Tailings Storage Technologies Alternatives

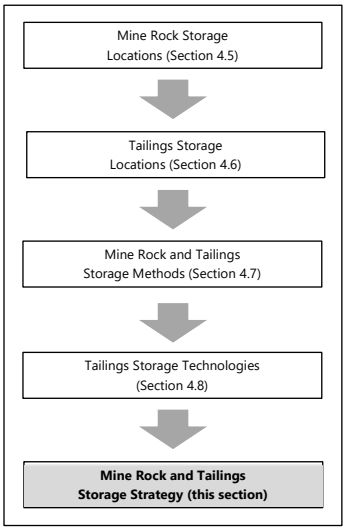
Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Conventional Tailings	Alternative 2: Thickened Tailings	Alternative 3: Filtered Tailings
		Technical Performance Objective Assessment	**Partially Preferred**	**Partially Preferred**	**Not Preferred**
			• Adv: Commonly used technology for which financial or technical risks are well understood • Adv: Allows for development of a water cover over PAG tailings • Disadv: Greater water content may result in increased treatment requirements and associated costs	• Adv: Commonly used technology for which financial or technical risks are well understood • Adv: Allows for reduced water management requirements for non-potentially acid generating tailings • Disadv: slight increase to costs for reducing water content	• Adv: None apparent • Disadv: A technology not commonly used at similar operations may pose financial and technical risks
Amenability to Reclamation (Closure Phase)					
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities, including supporting infrastructure, present	• CI: Regardless of the choice of tailings technology, the tailings facility will be closed out in a similar manner, consisting of revegetation, cover placement over PAG tailings and regrading to promote drainage	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography, which can be characterized as moderately rugged	• CI: During decommissioning activities, infrastructure will be removed and the affected area rehabilitated to promote natural drainage	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: Active and passive revegetation will re-establish habitat after decommissioning	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514, which allows mining-related land use activities • Located within the Trout Lake Forest Management Area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• CI: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan • CI: Active and passive revegetation will re-establish habitat after decommissioning	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
	Provide for an aesthetically pleasing site	• The existing landscape at and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• CI: Active and passive revegetation will re-establish habitat after decommissioning and natural regrowth over time will blend the affected area into the surrounding landscape	• There is no difference between Alternatives 1, 2 and 3 for this indicator	• There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**

Table 4.8-1: Assessment of Tailings Storage Technologies Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Conventional Tailings	Alternative 2: Thickened Tailings	Alternative 3: Filtered Tailings
Amenability to Reclamation Performance Objective Assessment			**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
			• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed
OVERALL ASSESSMENT OF ALTERNATIVE			**PREFERRED**	**PREFERRED (SELECTED ALTERNATIVE)**	**NOT PREFERRED**
			This alternative is partially preferred owing to the ability to use the increased water content for mitigation of acid onset for PAG tailings	The primary reasons for selection of this alternative are the reduction in water management and treatment requirements for non-potentially acid generating tailings	This alternative is not preferred owing to the increase in overall sound levels, air emissions and GHG emissions associated with a marked increase in mine fleet traffic to transport tailings, as well as the greater costs associated with dewatering tailings and the potential for associated financial risks to the Project

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op = operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*.

4.9 Mine Rock and Tailings Storage Strategy



This section provides a summary of the step-wise approach taken to the assessment of mine waste alternatives, detailed in Sections 4.5 to 4.8. The assessments in Sections 4.5 through 4.8 along with the following factors were fully considered to develop the overall mine rock and tailings storage strategy used for the CDF described in Section 5.8:

- Geochemistry of the mine rock and tailings;
- Reduction of overall Project footprint as practicable; and
- Project economics.

The MDMER require that an assessment of alternatives be completed using the prescribed approach (ECCC 2021) in order for mineral waste to be approved for deposition in a natural, fish-bearing waterbody. An updated draft of the Mine Waste Management Alternatives Assessment for the Project is provided in Appendix E.

4.9.1 Identified Alternatives

Four alternative scenarios were identified for storage of mine rock and tailings following from the stepwise assessment provided in Sections 4.5 to 4.8:

- **Alternative 1:** CDF using a perimeter embankment constructed of NAG mine rock and aggregate to contain all thickened tailings (not geochemically segregated) and PAG mine rock;
- **Alternative 2:** CDF at the same location as Alternative 1 for co-disposal of PAG mine rock and NAG thickened tailings, but with an integrated tailings cell to store PAG conventional slurry tailings and an internal water management area;
- **Alternative 3:** CDF at the same location as Alternative 1 to store all mine rock and NAG tailings, but with a separate conventional slurry tailings management area located southeast of the process plant to contain PAG tailings including a water management component; and
- **Alternative 4:** CDF for all mine rock and tailings, with the tailings in a slurry form co-disposed with the PAG mine rock.

These combined alternatives are shown in Figure 4.9-1 to Figure 4.9-4 and described below. The scenarios assume that geotechnical foundations are supportive of the potential designs.

The Project cannot proceed without the selection of a storage strategy for mine rock and tailings. Mine rock from accessing ore in the open pit and tailings produced from the processing of ore within the process plant require effective management. If a storage strategy is not established (the do nothing alternative), the Project cannot proceed as the mine will be unable to produce ore and the process plant will be unable to process the ore without a storage solution for the resulting mineral wastes. With the do nothing alternative, the Project does not proceed, and the environmental conditions at the site and surrounding area will not be changed from existing (baseline) conditions. Socioeconomic benefits of the Project would also not be accrued.

4.9.1.1 Alternative 1

Alternative 1 uses a perimeter embankment constructed with NAG mine rock, supplemented by quarried rock, to contain unsegregated (i.e., PAG and NAG) thickened tailings and PAG mine rock. Perimeter embankments will be constructed using downstream raises with three horizontal to 1 vertical (3H:1V) upstream slopes and 2H:1V downstream slopes. The design includes foundation drains and a geomembrane liner for seepage management. The Alternative 1 CDF will have a maximum height of about 78 m with a total fill volume of approximately 57 million cubic metres (Mm^3). A geomembrane liner will be installed within the interior of the facility, as well as on the upstream face of the embankment for water management and collection. Collected water will be kept to a minimum and will be transferred by pumps in foundation drains to a dedicated contact water management pond and/or the CWSP (Figure 4.9-1).

4.9.1.2 Alternative 2

Alternative 2, as shown in Figure 4.9-2, consists of a north cell will that store all PAG mine rock and NAG thickened tailings and a south cell that will contain PAG conventional slurry tailings. A separator embankment will be constructed using centreline raises. The south cell will be expanded with downstream raises. The combined cells will have an embankment volume of approximately 76 Mm^3 and have a maximum final height of 77 m. A geosynthetic clay liner (GCL) will be installed into the upstream face of each cell embankment. Water reclaim from the south cell will be by means of a surface mounted system, while water will be managed in the north cell in the same manner as in Alternative 1. Excess water will be transferred by pipeline to the CWSP located east of the open pit.

4.9.1.3 Alternative 3

Alternative 3 is composed of a central facility for PAG mine rock and NAG thickened tailings, with a secondary PAG conventional slurry tailings facility location southeast of the main site (Figure 4.9-3). The embankment of the central facility will be constructed using centreline raises, while the embankment of the PAG conventional slurry tailings management facility will be expanded by downstream raises; requiring total embankment volumes of 47 and 12 Mm^3, respectively. By separating the mineral waste storage into two facilities, there is a larger overall footprint but somewhat reduced height relative to the other alternatives. The maximum heights of each facility are 73 m (central cell) and 46 m (conventional slurry tailings management facility). Both facilities will be lined with geomembrane, and water reclaim is similar to Alternative 2, although additional infrastructure will be required to the PAG conventional slurry tailings management facility (road, power distribution line and pipeline).

4.9.1.4 Alternative 4

Alternative 4 consists of a single geomembrane-lined facility containing all tailings in a slurry form (no thickened or segregated tailings), co-disposed with PAG mine rock (Figure 4.9-4). The embankments will be expanded with downstream raises to contain a total of 144 Mm^3 of combined PAG mine rock and tailings. The maximum final embankment height is 73 m. Water reclaim will be achieved with a surface mounted system on the embankment and/or pump barge, and the water could be transferred to a dedicated contact water pond or to the CWSP.

4.9.2 Assessment of Alternatives

Four overall mineral waste storage alternative strategies were carried forward into the alternatives assessment. The results of the alternatives assessment for a mine rock and tailings storage strategy listing differentiating aspects are summarized in Table 4.9-1.

The alternatives were assessed for all performance objectives, criteria and indicators; however, the following performance objectives and criteria were identified as the key differentiators:

- Natural environment performance:
- Potential effect on air quality and climate;
- Potential effect on water quality, fish and aquatic habitat;
- Potential effect on wetlands;
- Potential effect on terrestrial species and habitat; and
- Potential effect on SAR.
- Technical performance:
- Ability to service the site; and
- Cost effectiveness.

Table 4.9-1 summarizes the advantages and disadvantages of each alternative from a technical perspective, supporting the assessment of the technical performance objective in Table 4.9-2.

Table 4.9-1: Mine Rock and Tailings Storage Alternatives – Technical Advantages and Disadvantages

Characteristics	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Number of facilities	• One	• One	• Two • Will require additional operational support and equipment	• One
Total surface area	• 374 ha [(1)] • Smallest facility footprint and maintains a compact Project footprint	• 381 ha • Smaller facility footprint and maintains a compact Project footprint	• 458 ha[(1)] • Extends the overall Project footprint	• 404 ha • Smaller facility footprint and maintains a compact Project footprint
Maximum height	• 78 m • Greatest overall height, increasing viewshed effects	• 77 m • Lower facility height	• 73 m and 46 m • Lowest facility height	• 73 m • Lowest facility height

Table 4.9-1: Mine Rock and Tailings Storage Alternatives – Technical Advantages and Disadvantages

Characteristics	Alternative 1	Alternative 2	Alternative 3	Alternative 4
ML/ARD management potential	• Moderate potential • May require treatment of runoff and seepage needing onsite facilities and management in the long term	• High potential • Long-term runoff / seepage treatment not expected to be required	• High potential • Long-term runoff / seepage treatment not expected to be required	• High potential assuming a full water cover can be maintained in the long term including in consideration of climate change
Relative capital / operating costs	• Lower capital costs / highest operating costs	• Lowest capital costs / moderate operating costs	• Highest capital costs / moderate operating costs	• High capital costs / lowest operating costs (2)

Notes:
(1) Area is inclusive of an external contact water management pond to allow consistent comparison across alternatives.
(2) Costs would be higher if an engineered cover were required at closure to meet the same purpose.

4.9.2.1 Alternative 1:

Advantages: The footprint is compact and is in close proximity to the open pit and process plant. This alternative has simpler water management requirements due to a single facility.

Disadvantages: This alternative results in increased requirements for management of PAG material to avoid oxidation.

4.9.2.2 Alternative 2

Advantages: the footprint is compact and is in close proximity to the open pit and process plant. this alternative allows for easier segregation and management of PAG tailing and is expected to provide better management of ML/ARD for the closure phase.

Disadvantages:

4.9.2.3 Alternative 3

Advantages: this alternative allows for easier segregation and management of PAG tailing and is expected to provide better management of ML/ARD for the closure phase.

Disadvantages: this alternative involves in a larger footprint and longer pipeline corridor to the second cell, resulting in approximately three times the GHG emissions compared to the other alternatives as well as increases in other disturbances such as noise. This alternative also results in the greatest displacement of aquatic habitat and wetlands.

4.9.2.4 Alternative 4

Advantages: this alternative utilized widely used standard technology for NAG and PAG materials. The footprint is compact and is in close proximity to the open pit and process plant.

Disadvantages: this alternative involves increased water content, resulting in increased management requirements and treatment.

Key mitigation measures that would minimize potential environmental effects for all alternatives are as follows:

- Establish an appropriate mine rock management strategy to segregate PAG and NAG mine rock.
- Re-use mine rock in construction appropriately to minimize additional disturbance from dedicated aggregate sources.
- Utilize the inherent physical and geochemical characteristics of the mineral wastes to minimize storage area and optimize environmental performance, such as by using NAG waste to encapsulate PAG waste.
- Maximize re-use of the same infrastructure corridors to minimize the length of new infrastructure corridor created as practicable.
- Implement appropriate water management strategies to allow for the collection and monitoring contact waters, and send for additional treatment as applicable.
- Reclaim the site after Project operations cease.

4.9.3 Results Summary and Selected Alternative

Alternatives 1, 2 and 4 were assessed as partially preferred. Alternative 2 was the selected alternative as it allows the Project to maintain a compact overall footprint, provides the best mitigation for ML/ARD during operations and after closure, provides operational flexibility for tailings and water management, and has lowest overall capital costs. This selected alternative was further optimized with respect to the location of the internal pond as shown in the site plan, to improve water recycling ability (Figure 4.9-2).

Table 4.9-2: Assessment of Mine Rock and Tailings Storage Strategy Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: CDF to Contain All Thickened Tailings and PAG Mine Rock	Alternative 2: CDF for PAG Mine Rock and NAG Thickened Tailings, with an Integrated Cell for PAG Conventional Slurry Tailings	Alternative 3: CDF for All Mine Rock and NAG Tailings, with a Separate PAG Conventional Slurry Tailings Cell Located Southeast of the Process Plant	Alternative 4: CDF for All Mine Rock and Conventional Slurry Tailings
Natural Environment						
Potential Effect on Air Quality and Climate	Level of equipment activity affecting air quality	• Good air quality is present—attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Emissions will be generated during construction, stockpiling and managing of the stockpile, but emissions will not affect attainment of air quality standards • Con/Op: This alternative will result in lesser emissions from hauling mine rock, as the total haulage distance is approximately 2 km	• Con/Op/Cl: Emissions will be generated during construction, stockpiling and managing of the stockpile, but emissions will not affect attainment of air quality standards • Con/Op: This alternative will result in lesser emissions from hauling mine rock, as the total haulage distance is approximately 2 km	• Con/Op/Cl: Emissions will be generated during construction, stockpiling and managing of the stockpile, but emissions will not affect attainment of air quality standards • Con/Op: This alternative will result in approximately three times the emissions from hauling mine rock, as the total haulage distance is approximately 6 km	• Con/Op/Cl: Emissions will be generated during construction, stockpiling and managing of the stockpile, but emissions will not affect attainment of air quality standards • Con/Op: This alternative will result in lesser emissions from hauling mine rock, as the total haulage distance is approximately 2 km
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Op/Cl: GHG emissions will be generated during construction, stockpiling and managing of the stockpile, but emissions will not affect attainment of air quality standards • Con/Op: This alternative will result in lesser GHG emissions from hauling mine rock, as the total haulage distance is approximately 2 km	• Con/Op/Cl: GHG emissions will be generated during construction, stockpiling and managing of the stockpile, but emissions will not affect attainment of air quality standards • Con/Op: This alternative will result in lesser GHG emissions from hauling mine rock, as the total haulage distance is approximately 2 km	• Con/Op/Cl: Emissions will be generated during construction, stockpiling and managing of the stockpile, but emissions will not affect attainment of air quality standards • Con/Op: This alternative will result in approximately three times the GHG emissions from hauling mine rock, as the total haulage distance is approximately 6 km	• Con/Op/Cl: GHG emissions will be generated during construction, stockpiling and managing of the stockpile, but emissions will not affect attainment of air quality standards • Con/Op: This alternative will result in lesser GHG emissions from hauling mine rock, as the total haulage distance is approximately 2 km
		Summary	**Partially Preferred**	**Partially Preferred**	**Not Preferred**	**Partially Preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level of equipment activity affecting surface water quality objectives	• Surface water quality meets Provincial Water Quality Objectives for protection of aquatic life except for a few occasions that were irregular, generally associated with elevated suspended solids	• Con: Potential for short-term increases in suspended solids in adjacent waterbodies to be controlled using standard mitigation measures, such as silt fencing and turbidity curtains • Op: Surface water quality will not be altered during operation • Cl: Surface water quality not anticipated to be affected due to isolated PAG materials and drainage off facility surface	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Op/Cl: Development of this alternative will displace approximately 29 ha of local aquatic habitat	• Con/Op/Cl: Development of Alternative 2 will displace approximately 29 ha of local aquatic habitat	• Con/Op/Cl: Development of Alternative 3 will displace approximately 35 ha of local aquatic habitat	• Con/Op/Cl: Development of Alternative 4 will displace approximately 29 ha of local aquatic habitat
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: No effects are anticipated, as habitat overprinted would be replaced as per offset and compensation plan	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator

Table 4.9-2: Assessment of Mine Rock and Tailings Storage Strategy Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: CDF to Contain All Thickened Tailings and PAG Mine Rock	Alternative 2: CDF for PAG Mine Rock and NAG Thickened Tailings, with an Integrated Cell for PAG Conventional Slurry Tailings	Alternative 3: CDF for All Mine Rock and NAG Tailings, with a Separate PAG Conventional Slurry Tailings Cell Located Southeast of the Process Plant	Alternative 4: CDF for All Mine Rock and Conventional Slurry Tailings
	Ability to maintain conditions for fish passage	• There are no material constraints to fish passage in Birch Lake and Springpole Lake	• Con/Op/Cl: No effects are anticipated, as habitat overprinted would be replaced as per offset and compensation plan	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op: No material effects anticipated due to low permeability bedrock and collection of seepage • Cl: No material effects anticipated due to low permeability bedrock and cover promoting drainage away from facility	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Not Preferred**	**Partially Preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA • There are no wetlands present in Birch Lake and Springpole Lake	• Con/Op/Cl: Development of this alternative will displace approximately 87 ha of wetlands	• Con/Op/Cl: Development of this alternative will displace approximately 87 ha of wetlands	• Con/Op/Cl: Development of this alternative will displace approximately 100 ha of wetlands	• Con/Op/Cl: Development of this alternative will displace approximately 87 ha of wetlands
	Ability to maintain wetland connectivity	• Natural wetland connectivity is present, reflecting local topographic and subsurface conditions • There are no wetlands present in Birch Lake and Springpole Lake	• Con/Op/Cl: No effects are anticipated, as Alternative 1 is largely surrounded by Birch Lake, Springpole Lake and the open pit	• Con/Op/Cl: No effects are anticipated, as Alternative 2 is largely surrounded by Birch Lake, Springpole Lake and the open pit	• Con/Op/Cl: Some loss of wetland connectivity could be expected	• Con/Op/Cl: No effects are anticipated, as the Alternative is largely surrounded by Birch Lake, Springpole Lake and the open pit
		Summary	**Partially Preferred**	**Partially Preferred**	**Not Preferred**	**Partially Preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities • There are no terrestrial habitat present in Birch Lake and Springpole Lake	• Con/Op/Cl: Development of this alternative will displace approximately 350 to 400 ha of local terrestrial habitat and associated plant species	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator; however, the overall project footprint would be expanded with the development of a secondary facility	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op: Noise will be generated during construction and operation of the facility, including from heavy equipment, backup beepers and rock movement • Cl: Limited noise will result from related reclamation activities	• Con/Op: Noise will be generated during construction and operation of the facility, including from heavy equipment, backup beepers and rock movement • Cl: Limited noise will result from related reclamation activities	• Con/Op: Noise will be generated during construction and operation of the facility, including from heavy equipment, backup beepers and rock movement; this alternative would generate additional noise from vehicle movement to and from the secondary location • Cl: Limited noise will result from related reclamation activities	• Con/Op: Noise will be generated during construction and operation of the facility, including from heavy equipment, backup beepers and rock movement • Cl: Limited noise will result from related reclamation activities

Table 4.9-2: Assessment of Mine Rock and Tailings Storage Strategy Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: CDF to Contain All Thickened Tailings and PAG Mine Rock	Alternative 2: CDF for PAG Mine Rock and NAG Thickened Tailings, with an Integrated Cell for PAG Conventional Slurry Tailings	Alternative 3: CDF for All Mine Rock and NAG Tailings, with a Separate PAG Conventional Slurry Tailings Cell Located Southeast of the Process Plant	Alternative 4: CDF for All Mine Rock and Conventional Slurry Tailings
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies • There is no terrestrial habitat present in Birch Lake and Springpole Lake	• Con/Op/Cl: Stockpile development may cause a disruption to existing wildlife movement, but as this location is close to the mine, avoidance of the area by wildlife is generally expected	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present, reflecting local habitat and natural species distributions	• Con/Op/Cl: No material effects anticipated to wildlife populations; suitable alternative habitat available outside the PDA	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Not Preferred**	**Partially Preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine, . The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk. •	• Con/Op/Cl: The area for this alternative is identified as Category 1 (high nursery use) Caribou habitat • Other SAR observations in this area include Little Brown Myotis (7 observations), Lesser Yellowlegs (2 observations) and other SAR (2 observations)	• Con/Op/Cl: The area for Alternative 2 is identified as Category 1 (high nursery use) Caribou habitat • Other SAR observations in this area include Little Brown Myotis (7 observations), Lesser Yellowlegs (2 observations) and other SAR (2 observations)	• Con/Op/Cl: The area for Alternative 3 is identified as Category 1 (high nursery use) Caribou habitat • Other SAR observations in this area include Little Brown Myotis (9 observations combined) and other SAR (3 observations combined)	• Con/Op/Cl: The area for Alternative 4 is identified as Category 1 (high nursery use) Caribou habitat • Other SAR observations in this area include Little Brown Myotis (7 observations), Lesser Yellowlegs (2 observations) and other SAR (2 observations)
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Con/Op/Cl: Category 1 (high nursery use) Caribou habitat will be displaced (anticipated area in the order of 350-400 ha) • Con/Op/Cl: The stockpile location will be within the PDA and the area may be avoided by Caribou and other SAR in general	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator; however, the overall project footprint would be expanded with development of a secondary facility	• Con/Op/Cl: There is no difference between the alternatives for this indicator

Table 4.9-2: Assessment of Mine Rock and Tailings Storage Strategy Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: CDF to Contain All Thickened Tailings and PAG Mine Rock	Alternative 2: CDF for PAG Mine Rock and NAG Thickened Tailings, with an Integrated Cell for PAG Conventional Slurry Tailings	Alternative 3: CDF for All Mine Rock and NAG Tailings, with a Separate PAG Conventional Slurry Tailings Cell Located Southeast of the Process Plant	Alternative 4: CDF for All Mine Rock and Conventional Slurry Tailings
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op: Noise will be generated during construction and operation of the facility, including from heavy equipment, backup beepers and rock movement • Cl: Limited noise will result from related reclamation activities	• Con/Op: Noise will be generated during construction and operation of the facility, including from heavy equipment, backup beepers and rock movement • Cl: Limited noise will result from related reclamation activities	• Con/Op: Noise will be generated during construction and operation of the facility, including from heavy equipment, backup beepers and rock movement; this alternative would generate additional noise from vehicle movement to and from the secondary location • Cl: Limited noise will result from related reclamation activities	• Con/Op: Noise will be generated during construction and operation of the facility, including from heavy equipment, backup beepers and rock movement • Cl: Limited noise will result from related reclamation activities
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies, including Springpole Lake and Birch Lake	• Con/Op/Cl: No material effects anticipated	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Not Preferred**	**Partially Preferred**
Natural Environment Performance Objectives Assessment			**Partially Preferred**	**Partially Preferred**	**Not Preferred**	**Partially Preferred**
			• Adv: Proximity to open pit and process plant maintains compact site footprint • Disadv: None apparent	• Adv: Proximity to open pit and process plant maintains compact site footprint • Disadv: None apparent	• Adv: None apparent • Disadv: Expands the project footprint unnecessarily and adds to habitat fragmentation • Disadv: Additional noise generated from vehicle traffic to and from secondary site	• Adv: Proximity to open pit and process plant maintains compact site footprint • Disadv: None apparent
Social, Economic, Cultural and Built Environment						
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effects are anticipated, as there are no private residences near the required infrastructure	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: No effects are anticipated, as the required infrastructure is remote from income opportunities	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: No effects anticipated and local access will not be altered	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Construction and operation of the facility at this alternative and closure of the area will generate noise emissions that will meet regulatory requirements	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator

Table 4.9-2: Assessment of Mine Rock and Tailings Storage Strategy Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: CDF to Contain All Thickened Tailings and PAG Mine Rock	Alternative 2: CDF for PAG Mine Rock and NAG Thickened Tailings, with an Integrated Cell for PAG Conventional Slurry Tailings	Alternative 3: CDF for All Mine Rock and NAG Tailings, with a Separate PAG Conventional Slurry Tailings Cell Located Southeast of the Process Plant	Alternative 4: CDF for All Mine Rock and Conventional Slurry Tailings
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects are anticipated, as no water wells are present in the PDA or local area	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects are anticipated, as no surface water supplies present in the PDA or local area	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: Mine waste storage at this alternative will result in a change to the natural landscape that will affect local aesthetics	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: No adverse effect to health and safety; air emissions associated with this alternative will meet air quality standards	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road providing access to the regional road network is located 18 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level of equipment activity affecting air quality	• Good air quality is present—attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Emissions will be generated during construction, stockpiling and managing of the stockpile, but emissions will not affect attainment of air quality standards • Con/Op: This alternative will result in lesser emissions from hauling mine rock, as the total haulage distance is approximately 2 km	• Con/Op/Cl: Emissions will be generated during construction, stockpiling and managing of the stockpile, but emissions will not affect attainment of air quality standards • Con/Op: This alternative will result in lesser emissions from hauling mine rock, as the total haulage distance is approximately 2 km	• Con/Op/Cl: Emissions will be generated during construction, stockpiling and managing of the stockpile, but emissions will not affect attainment of air quality standards • Con/Op: This alternative will result in approximately three times the emissions from hauling mine rock, as the total haulage distance is approximately 6 km	• Con/Op/Cl: Emissions will be generated during construction, stockpiling and managing of the stockpile, but emissions will not affect attainment of air quality standards • Con/Op: This alternative will result in lesser emissions from hauling mine rock, as the total haulage distance is approximately 2 km

Table 4.9-2: Assessment of Mine Rock and Tailings Storage Strategy Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: CDF to Contain All Thickened Tailings and PAG Mine Rock	Alternative 2: CDF for PAG Mine Rock and NAG Thickened Tailings, with an Integrated Cell for PAG Conventional Slurry Tailings	Alternative 3: CDF for All Mine Rock and NAG Tailings, with a Separate PAG Conventional Slurry Tailings Cell Located Southeast of the Process Plant	Alternative 4: CDF for All Mine Rock and Conventional Slurry Tailings
	Level of equipment activity affecting quality of drinking water supplies	• Surface water quality meets Provincial Water Quality Objectives for protection of aquatic life except for a few occasions that were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects; no drinking water supplies present in Project area	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Cons/Op/Cl: Not applicable; there is no electromagnetic exposure associated with stockpiling	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: No effects are anticipated, as no public access will be available within the PDA and protocols will be established for site traffic safety, including in relation to hauling material to this alternative	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout, providing a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative; does not affect health services	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes such as Birch Lake and Springpole Lake allow for float plane access	• Con/Op/Cl: this alternative is located within the PDA, which will not be available for natural resource harvesting	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**

Table 4.9-2: Assessment of Mine Rock and Tailings Storage Strategy Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: CDF to Contain All Thickened Tailings and PAG Mine Rock	Alternative 2: CDF for PAG Mine Rock and NAG Thickened Tailings, with an Integrated Cell for PAG Conventional Slurry Tailings	Alternative 3: CDF for All Mine Rock and NAG Tailings, with a Separate PAG Conventional Slurry Tailings Cell Located Southeast of the Process Plant	Alternative 4: CDF for All Mine Rock and Conventional Slurry Tailings
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road-accessible main base lodges to remote camps	• Con/Op/Cl: The PDA for this alternative will not be available for tourism and recreational opportunities during the construction, operations and closure phases • Con/Op: Mine waste storage at this alternative will cause noise and use of lights during the construction and operations phases, which may result in disturbance to recreational users on nearby lakes	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: Project development will generate considerable regional and local employment and business opportunities • Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514, which allows mining-related land use activities • Located within the Trout Lake Forest Management Area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• Con/Op/Cl: There are no known conflicts with resource management objectives with this alternative that cannot be mitigated through approvals	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
		Summary	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator

Table 4.9-2: Assessment of Mine Rock and Tailings Storage Strategy Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: CDF to Contain All Thickened Tailings and PAG Mine Rock	Alternative 2: CDF for PAG Mine Rock and NAG Thickened Tailings, with an Integrated Cell for PAG Conventional Slurry Tailings	Alternative 3: CDF for All Mine Rock and NAG Tailings, with a Separate PAG Conventional Slurry Tailings Cell Located Southeast of the Process Plant	Alternative 4: CDF for All Mine Rock and Conventional Slurry Tailings
	Potential for material to be recycled or re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible with the historical fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally • The local Springpole / Birch Lake Portage / Travel Route cultural heritage landscape, a trade route dating to the 1700s, has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from this alternative	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally • The local Springpole / Birch Lake Portage / Travel Route cultural heritage landscape, a trade route dating to the 1700s, has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from this alternative	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally • The local Springpole / Birch Lake Portage / Travel Route cultural heritage landscape, a trade route dating to the 1700s, has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from this alternative	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeology potential within the PDA • Two pictograph sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near this alternative • Con: Archaeological sites could be discovered, but will be managed and / or mitigated as needed	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeology potential within the PDA • Two pictograph sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near this alternative • Con: Archaeological sites could be discovered, but will be managed and / or mitigated as needed • Con: Construction work will not alter water levels in the southeast arm of Springpole Lake	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**

Table 4.9-2: Assessment of Mine Rock and Tailings Storage Strategy Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: CDF to Contain All Thickened Tailings and PAG Mine Rock	Alternative 2: CDF for PAG Mine Rock and NAG Thickened Tailings, with an Integrated Cell for PAG Conventional Slurry Tailings	Alternative 3: CDF for All Mine Rock and NAG Tailings, with a Separate PAG Conventional Slurry Tailings Cell Located Southeast of the Process Plant	Alternative 4: CDF for All Mine Rock and Conventional Slurry Tailings
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Indigenous community is distant from Project	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No effects anticipated; there are no known spiritual, ceremonial, cultural heritage and archaeological sites near this alternative	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	Con/Op/Cl: Disruption to habitat will occur due the development of this alternative that may affect traditional hunting, trapping or harvesting; disruption will continue until the site is fully rehabilitated	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Aboriginal and Treaty Rights (Cultural Environment)	Avoids infringement of Aboriginal and Treaty Rights, except as otherwise agreed to with local Indigenous communities	• Information is available from separate Traditional Knowledge and Land Use Studies from NWOMC, CLFN, SFN LSFN, WFN and MON,	• Con/Op/Cl: Changes to the exercise of Aboriginal and Treaty Rights is contingent on the effects to traditional land use activities.	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
			• Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are no differentiating advantages or disadvantages for the criteria and indicators

Table 4.9-2: Assessment of Mine Rock and Tailings Storage Strategy Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: CDF to Contain All Thickened Tailings and PAG Mine Rock	Alternative 2: CDF for PAG Mine Rock and NAG Thickened Tailings, with an Integrated Cell for PAG Conventional Slurry Tailings	Alternative 3: CDF for All Mine Rock and NAG Tailings, with a Separate PAG Conventional Slurry Tailings Cell Located Southeast of the Process Plant	Alternative 4: CDF for All Mine Rock and Conventional Slurry Tailings
Technical Objectives						
Ability to Service the Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: This technology is commonly used to provide storage for mine rock and tailings and is predictably effective even for larger scale applications	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Degree to which new technology supports investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; ore stockpiles are commonly used	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator	• Con/Op/Cl: There is no difference between the alternatives for this indicator
	Ability to consistently meet Project needs	• There are no facilities present	• Con/Op/Cl: This alternative will be able to consistently meet Project needs, with the advantage of reducing water management requirements, though material placement must be carefully managed for PAG material	• Con/Op/Cl: This alternative will be able to consistently meet Project needs, with the advantage of reducing overall water management requirements while maintaining a water cover for lesser amounts of PAG tailings	• Con/Op/Cl: This alternative will be able to consistently meet Project needs, with the advantage of reducing overall water management requirements while maintaining a water cover for lesser amounts of PAG material	• Con/Op/Cl: This alternative will be able to consistently meet Project needs
	Availability of necessary infrastructure for component	• There are no facilities, including supporting infrastructure, present	• Con/Op/Cl: This alternative is well situated in relation to site infrastructure required for other reasons, and limited new infrastructure is required	• Con/Op/Cl: This alternative is well situated in relation to site infrastructure required for other reasons, and limited new infrastructure is required	• Con/Op/Cl: This alternative is well situated in relation to site infrastructure required for other reasons, and limited new infrastructure is required	• Con/Op/Cl: This alternative is well situated in relation to site infrastructure required for other reasons, and limited new infrastructure is required
		Summary	**Partially Preferred**	**Preferred**	**Partially Preferred**	**Partially Preferred**
Cost Effectiveness	Potential effect on Project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Co-disposal is commonly used to provide storage for tailings and mine rock and does not pose potential risks to Project financing	• Con/Op/Cl: Co-disposal is commonly used to provide storage for tailings and mine rock and does not pose potential risks to Project financing	• Con/Op/Cl: Co-disposal and slurry tailings are commonly used to provide storage for tailings and mine rock and does not pose potential risks to Project financing	• Con/Op/Cl: Co-disposal is commonly used to provide storage for tailings and mine rock and does not pose potential risks to Project financing
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: This alternative is best situated for efficiency, as it is located adjacent to the open pit, providing an acceptable return on investment	• Con/Op/Cl: This alternative is best situated for efficiency, as it is located adjacent to the open pit, providing an acceptable return on investment	• Con/Op/Cl: This alternative is located, in part, more distant from the open pit, providing reduced efficiency and potentially requiring additional equipment • Con/Op/Cl: Will provide an acceptable return on investment although less than other alternatives	• Con/Op/Cl: This alternative is best situated for efficiency, as it is located adjacent to the open pit, providing an acceptable return on investment
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No material effect anticipated	• Con/Op/Cl: No material effect anticipated	• Con/Op/Cl: There is a moderate increase in financial risk arising from higher costs associated with increased haul truck travel distances and time; these increased costs would make the Project more sensitive to fluctuations in commodity (gold, fuel) prices	• Con/Op/Cl: No material effect anticipated
		Summary	**Partially Preferred**	**Preferred**	**Not Preferred**	**Partially Preferred**

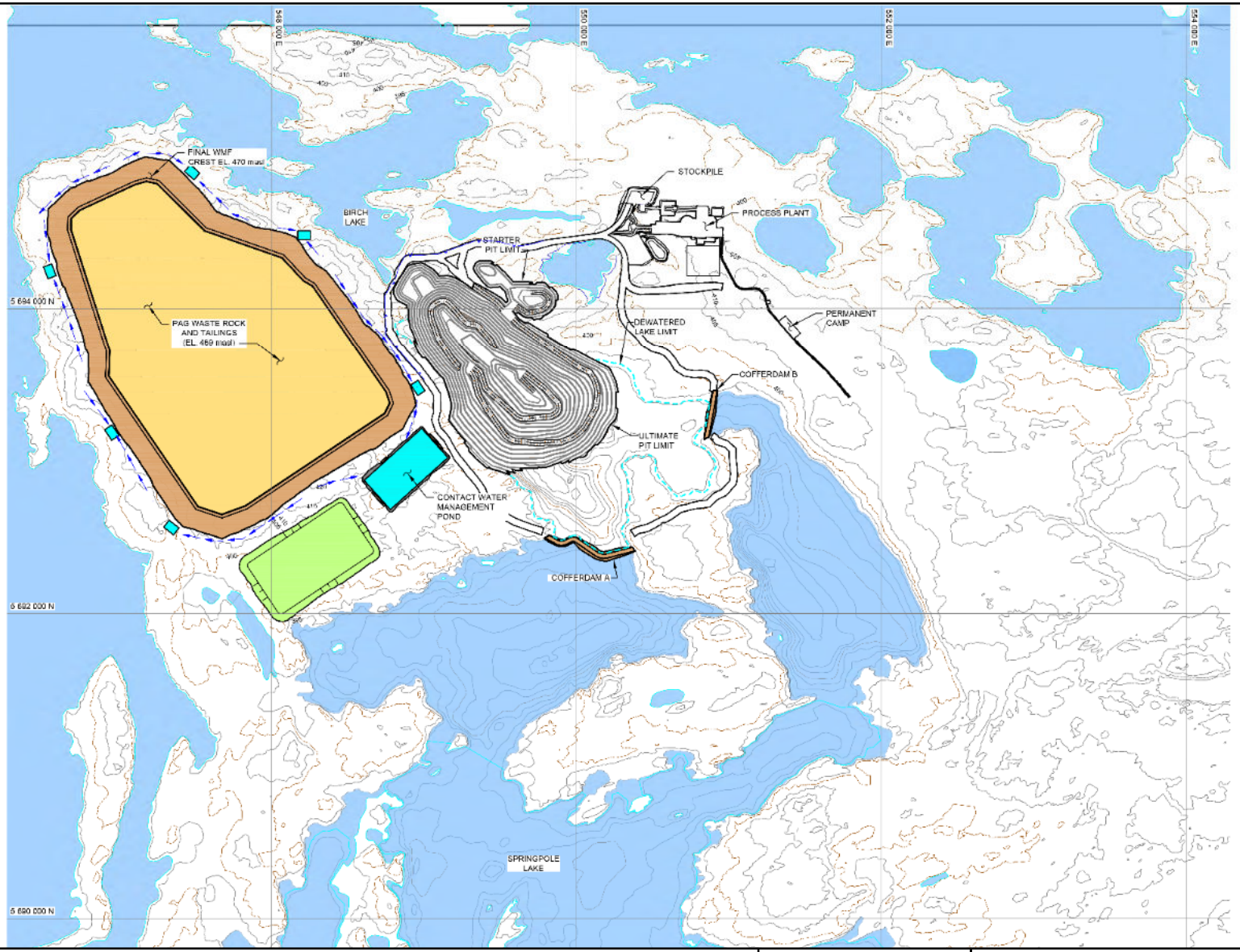
Table 4.9-2: Assessment of Mine Rock and Tailings Storage Strategy Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: CDF to Contain All Thickened Tailings and PAG Mine Rock	Alternative 2: CDF for PAG Mine Rock and NAG Thickened Tailings, with an Integrated Cell for PAG Conventional Slurry Tailings	Alternative 3: CDF for All Mine Rock and NAG Tailings, with a Separate PAG Conventional Slurry Tailings Cell Located Southeast of the Process Plant	Alternative 4: CDF for All Mine Rock and Conventional Slurry Tailings
Technical Performance Objective Assessment			**Partially Preferred**	**Preferred**	**Not Preferred**	**Partially Preferred**
			• Adv: Single facility with simpler water management requirements • Disadv: Increased requirements for management and / or placement of PAG material to avoid oxidation and acid onset	• Adv: Allows for easier segregation and management of PAG tailings • Adv: Reduced power requirements for not dewatering PAG tailings	• Adv: Allows for easier segregation and management of PAG tailings • Disadv: Increase in project footprint and emissions of air, GHG and noise • Disadv: Increase in financial risk, resulting in sensitivity to fluctuations in commodity prices	• Adv: Standard technology widely used for management of NAG and PAG materials • Disadv: Increased water content, resulting in increased management requirements and additional treatment
Amenability to Reclamation (Closure Phase)						
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities, including supporting infrastructure, present	• CI: Facility will be closed out in accordance with regulatory requirements, including physical stability of slopes and mine waste piles	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography, which can be characterized as moderately rugged	• CI: During decommissioning activities, infrastructure will be removed and the affected area rehabilitated to promote natural drainage • CI: PAG materials to be isolated with thick layer of NAG tailings • Facility regraded to promote passive drainage	• CI: During decommissioning activities, infrastructure will be removed and the affected area rehabilitated to promote natural drainage • CI: PAG materials to be isolated with low permeability cover and revegetated • Facility regraded to promote passive drainage	• CI: During decommissioning activities, infrastructure will be removed and the affected area rehabilitated to promote natural drainage • CI: PAG materials to be isolated with low permeability cover and revegetated • Facility regraded to promote passive drainage	• CI: During decommissioning activities, infrastructure will be removed and affected area rehabilitated to promote natural drainage • CI: PAG materials to be isolated with thick layer of NAG tailings • Facility regraded to promote passive drainage
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514, which allows mining-related land use activities • Located within the Trout Lake Forest Management Area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• CI: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator	• CI: There is no difference between the alternatives for this indicator

Table 4.9-2: Assessment of Mine Rock and Tailings Storage Strategy Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: CDF to Contain All Thickened Tailings and PAG Mine Rock	Alternative 2: CDF for PAG Mine Rock and NAG Thickened Tailings, with an Integrated Cell for PAG Conventional Slurry Tailings	Alternative 3: CDF for All Mine Rock and NAG Tailings, with a Separate PAG Conventional Slurry Tailings Cell Located Southeast of the Process Plant	Alternative 4: CDF for All Mine Rock and Conventional Slurry Tailings
	Provide for an aesthetically pleasing site	• The existing landscape at and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator	• Cl: There is no difference between the alternatives for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially Preferred**	**Partially Preferred**	**Partially Preferred**	**Partially Preferred**
			• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed
OVERALL ALTERNATIVE ASSESSMENT			**PARTIALLY PREFERRED**	**PARTIALLY PREFERRED (SELECTED ALTERNATIVE)**	**NOT PREFERRED**	**PARTIALLY PREFERRED**
			• The primary reason for not selecting this alternative is the increase in management and deposition planning for PAG and NAG materials	• The primary reason for selecting this alternative is proximity to the main site and the process plant, resulting in reduced infrastructure requirements and habitat disturbance, the ability to segregate PAG tailings for ease of management and the associated reduction in water treatment requirements	• Although this alternative is similar to the preferred alternative, it was not selected because the larger overall project footprint results in greater habitat fragmentation, increased potential for adverse wildlife interactions, a larger air and noise signature, and increased costs, but without providing any additional benefit	• The primary reason for not selecting this alternative is the requirement for management and treatment of additional water associated with slurry tailings

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op = operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*.



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LEGEND

- EXISTING WATER BODY
- MINE WATER
- FILTERED TAILINGS / PAG WASTE ROCK
- EARTHFILL STRUCTURE
- SURFICIAL SOILS
- PUMP STATION
- WATER MANAGEMENT PIPELINE
- BASIN UNDER DRAIN
- WATER COLLECTION DITCHING
- WATER MANAGEMENT POND

NOTES:
- Mine rock and tailings storage alternative 1 drawing provided by Knight Piésold Consulting, Drawing reference number VA21-01546 Rev.0, 06 December 2021.
- Topography and bathymetry data from Eagle Mapping LiDAR (2011) and Story Environmental (2019).

First Mining Gold

WSP

SPRINGPOLE GOLD PROJECT

Mine Rock and Tailings Storage Alternative 1

Datum: NAD83
Projection: UTM Zone 15N

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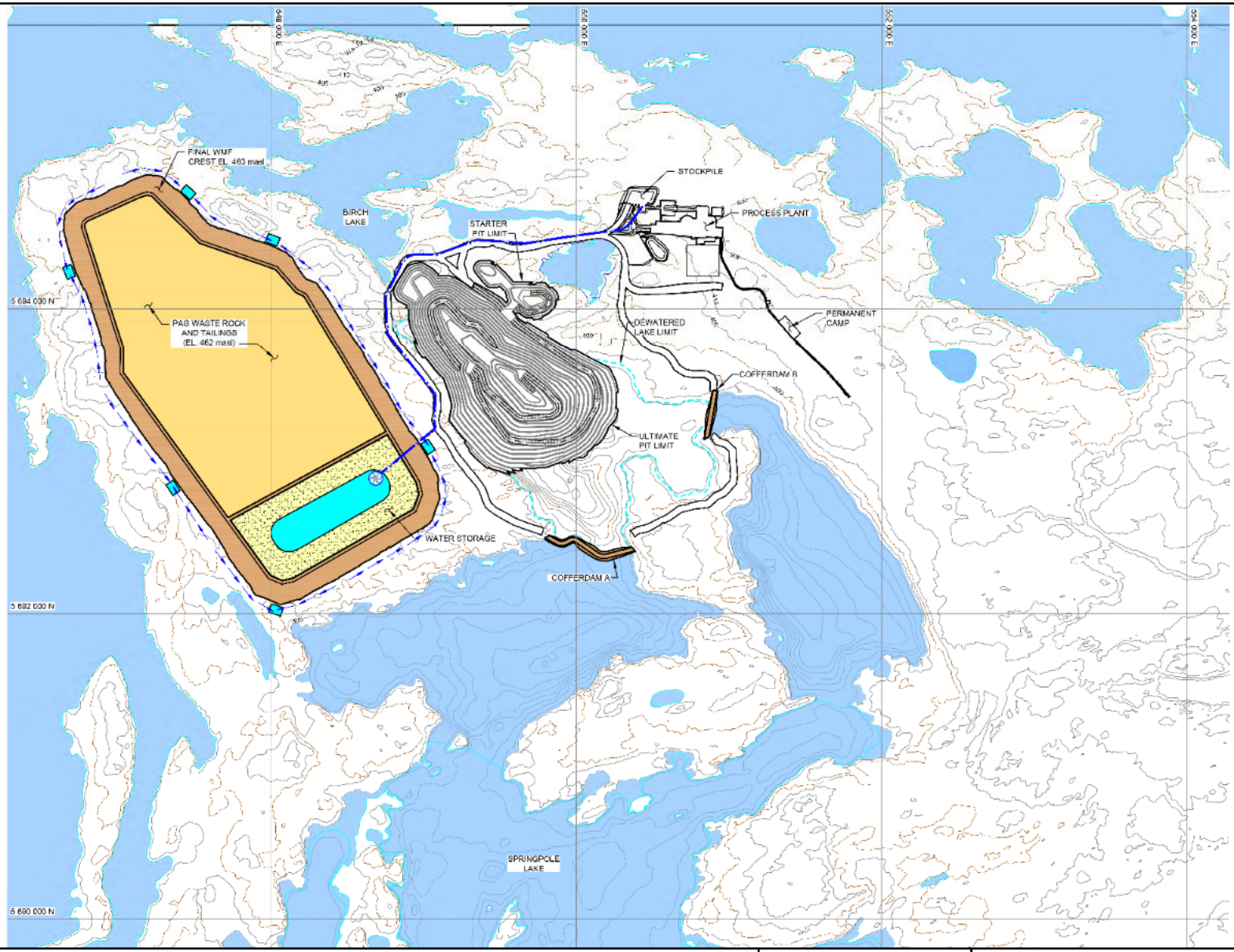
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PROJECT N°: ONS2104

FIGURE: 4.9-1

SCALE: 1:40,000

DATE: July 2024



LEGEND

- EXISTING WATER BODY
- MINE WATER
- FILTERED TAILINGS / PAG WASTE ROCK
- SLURRY TAILINGS
- EARTHFILL STRUCTURE
- PUMP STATION
- WATER MANAGEMENT PIPELINE
- WATER COLLECTION DITCHING
- WATER MANAGEMENT POND

NOTES:
- Mine rock and tailings storage alternative 2 drawing provided by Knight Piésold Consulting, Drawing reference number VA21-01546 Rev.0, 06 December 2021.
- Topography and bathymetry data from Eagle Mapping LiDAR (2011) and Story Environmental (2019).

Datum: NAD83
Projection: UTM Zone 15N

0 0.5 1 2 3 4 5 Kilometres

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FIRST MINING GOLD

WSP

SPRINGPOLE GOLD PROJECT

Mine Rock and Tailings Storage Alternative 2

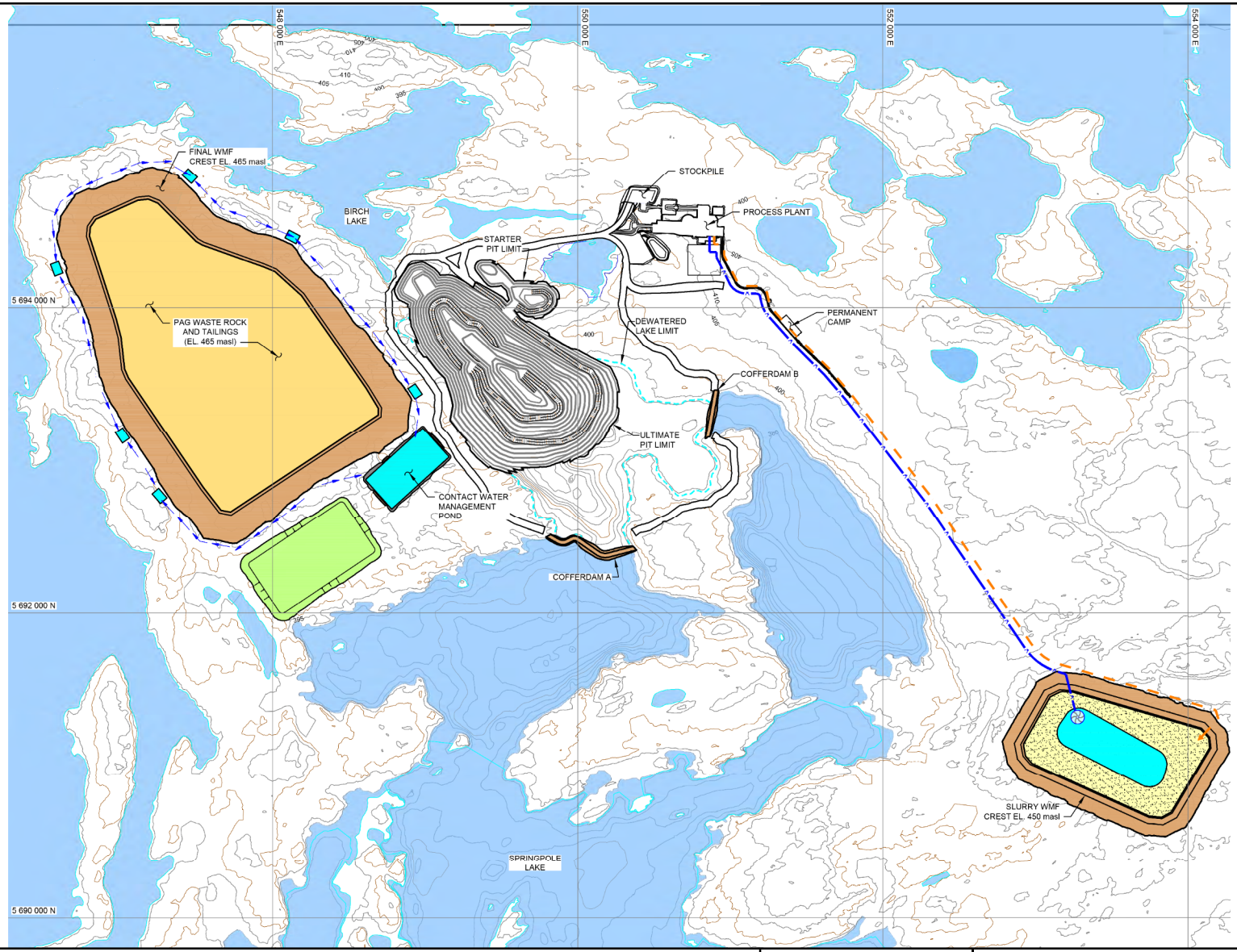
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FIGURE: 4.9-2

SCALE: 1:40,000

DATE: July 2024

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LEGEND

- EXISTING WATER BODY
- MINE WATER
- FILTERED TAILINGS / PAG WASTE ROCK
- SLURRY TAILINGS
- EARTHFILL STRUCTURE
- SURFICIAL SOILS
- PUMP STATION
- WATER MANAGEMENT PIPELINE
- TAILINGS DISTRIBUTION PIPELINE
- WATER COLLECTION DITCHING
- WATER MANAGEMENT POND

NOTES:
- Mine rock and tailings storage alternative 3 drawing provided by Knight Piésold Consulting, Drawing reference number VA21-01546 Rev.0, 06 December 2021.
- Topography and bathymetry data from Eagle Mapping LiDAR (2011) and Story Environmental (2019).

0 0.5 1 2 3 4 5 Kilometres

Datum: NAD83
Projection: UTM Zone 15N

N W E S

First Mining Gold

wsp

SPRINGPOLE GOLD PROJECT

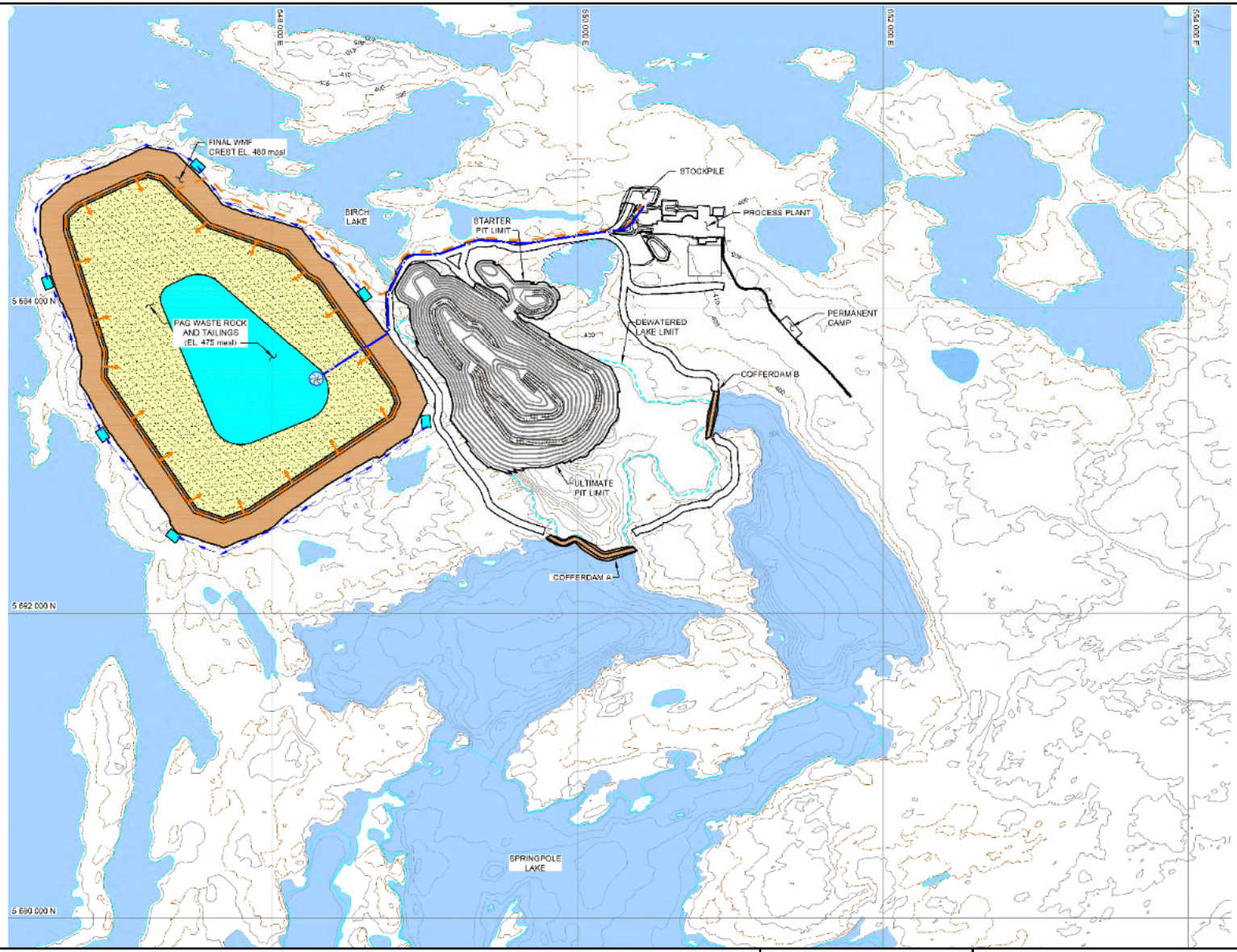
Mine Rock and Tailings Storage Alternative 3

PROJECT N°: ONS2104

FIGURE: 4.9-3

SCALE: 1:40,000

DATE: July 2024



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LEGEND

- EXISTING WATER BODY
- MINE WATER
- SLURRY TAILINGS
- EARTHFILL STRUCTURE
- PUMP STATION
- WATER MANAGEMENT PIPELINE
- TAILINGS DISTRIBUTION PIPELINE
- WATER COLLECTION DITCHING
- WATER MANAGEMENT POND

NOTES:
- Mine rock and tailings storage alternative 4 drawing provided by Knight Piésold Consulting, Drawing reference number VA21-01546 Rev.0, 06 December 2021.
- Topography and bathymetry data from Eagle Mapping LiDAR (2011) and Story Environmental (2019).

0 0.5 1 2 3 4 5 Kilometres

Datum: NAD83
Projection: UTM Zone 15N

N W E S

First Mining Gold

WSP

SPRINGPOLE GOLD PROJECT

Mine Rock and Tailings Storage Alternative 4

PROJECT N°: ONS2104

FIGURE: 4.9-4

SCALE: 1:40,000

DATE: July 2024

4.10 Ore Processing Methods and Technologies

4.10.1 Identified Alternatives

Ore processing was identified in the EIS Guidelines and ToR (Appendices B-1 and B-3) as a Project component to be considered in the EIS/EA. Options for viable alternatives that satisfy the questions presented in Section 4.1.1 for ore processing in the final EIS/EA, including using information from the following sources:

- Engineering studies;
- Workshops, meetings and discussions;
- Consultation on the draft EIS/EA; and
- Professional experience and expertise.

However, a reasonable range of alternatives could not be identified for ore processing. The proposed ore processing approach to meet the criteria in Section 4.1.1 is presented below.

4.10.2 Rationale for Selection

Various methods are theoretically available for liberating gold from gold-bearing ores, but only a limited number of alternatives are viable and proven at a commercial scale. With the exception of gravity separation, all require chemical reagents. Use of gravity separation alone (i.e., without chemical treatment) cannot provide sufficient gold recovery for the Project to be financially viable.

Chemical-based gold recovery methods such as mercury amalgamation, aqua regia gold dissolution and ammonium thiosulphate (or thiosulfate) dissolution are not considered viable alternatives. The historical use of mercury amalgamation for processing of gold ore has caused environmental pollution concerns and is no longer used in the modern industry. Aqua regia is a mixture of concentrated hydrochloric and nitric acids commonly used in small-scale operations for recovering gold from scrap metal and other such sources, but it is not a commercially viable method for recovering gold from large-scale gold ore processing facilities. Thiosulphate-based gold recovery technologies are being investigated for gold ore processing; however, to date this and related technologies are not proven or considered suitable.

The only commercially viable method for recovering gold from the Project ore is appropriate application of a cyanide solution to dissolve the gold present in the ore for recovery (cyanidation). Cyanide is combined with alkaline earth metals for use in processing, typically sodium, potassium or calcium, with sodium cyanide being the commonly utilized reagent. Cyanide can be safely used to extract gold while protecting workers and the environment with appropriate engineering design and application of effective management practices. Cyanide use is the industry standard for gold processing and safe procedures for cyanide handling and subsequent detoxification are well established.

Cyanidation can either occur within a process plant through a series of designed processing stages (for the Project this would include cyanide leaching, carbon adsorption and gold and silver recovery) or in an on-surface heap leach. A heap leach is a large, engineered structure composed of crushed ore stockpile on top of an impermeable pad, which is irrigated with a cyanide solution to extract metals into solution for subsequent recovery. Heap leaching was not considered a viable alternative due to the technical challenges of irrigating a crushed ore stockpile in a northern climate, as well as the additional large land disturbance that would result from using this method.

Processing of ore within a process plant using a cyanidation process is the only reasonable alternative that satisfies the questions in Section 4.1.1.

4.11 Ore Storage Locations

The storage of ore is necessary to allow blending of different ores within the process plant to optimize recovery, as well as to allow mining to continue when the process plant is undergoing maintenance and for processing to continue when mining is temporarily halted (e.g., during blasts or poor weather conditions).

Three types of ore will be produced by the open pit: high grade ore, mid grade ore and low grade ore. Ore not required for immediate processing will be stored in two surface stockpiles; a high/mid grade ore stockpile and a low grade ore stockpile. There are no other reasonable alternatives available for ore storage because of the volume of rock to be stored.

Ore stockpiles will provide a storage buffer for disruptions in mining activities (such as weather conditions or equipment challenges) and optimize processing recovery through blending of ore types, and they are a required component of the Project. To minimize the overall footprint of the Project, the fish habitat development area will be used to store high/mid grade ore that will be consumed at the end of operations. This location is adjacent to the process plant and provides operational efficiency and reduced haulage costs. Other locations for the high/mid grade ore would not provide equivalent environmental benefits. However, alternate locations for the low grade ore stockpiles were assessed.

4.11.1 Identified Alternatives

Two alternative locations for low grade ore storage were identified (Figure 4.11-1) that could provide the footprint needed and were viable (i.e., satisfied the questions in Section 4.1.1):

- **Alternative 1:** adjacent and north of the process plant; and
- **Alternative 2:** between the fish habitat development area and the mine access road.

Placement of the low grade ore stockpile over unnamed lake L-19, which is located near the process plant, was not considered or assessed, as it would result in an unnecessary overprinting of fish habitat. Other locations have been selected as storage locations for mine rock and tailings (i.e., the CDF west of the open pit) or are farther southeast along the mine access road and would unnecessarily expand the Project footprint. By expanding the footprint, there would be an increase in the GHG emissions and equipment needs related to construction, operations and closure (disadvantage for the natural environment and technical performance objectives). Expanding the footprint further also does not offer any advantages or benefit for other performance objectives and indicators.

If a low grade ore storage area is not established (the do nothing alternative), the Project cannot proceed without buffer ore storage between the open pit and process plant. This storage is necessary to allow for blending of different ores within the process plant to optimize recovery, as well as to allow mining to continue when the process plant is undergoing maintenance, and for processing to continue when mining is temporarily halted (e.g., during blasts or poor weather conditions). With the do nothing alternative, the Project does not proceed, and the environmental conditions at the site and surrounding area will not be changed from existing (baseline) conditions; however, the socioeconomic benefits of the Project would also not occur.

4.11.1.1 Alternative 1

Alternative 1 is located immediately adjacent to the process plant and is geographically constrained by Birch Lake and the process plant. As a result of the close proximity to the process plant where the ore will be processed, limited additional infrastructure is required.

4.11.1.2 Alternative 2

This alternative is located east of the open pit and south of the process plant, and would require an additional dedicated haul road. The location has sufficient space to hold all of the mine rock from the open pit at one location. As a result of the distance from the open pit, which is the source of the rock requiring storage, the footprint and the indirect effects of the Project would be expanded.

4.11.2 Assessment of Alternatives

Both locations require relatively large facilities that will overprint terrestrial habitat (although the location will be reclaimed during closure activities) and could reasonably be configured to avoid overprinting waterbodies. The alternative locations are similar with respect to all of the performance objectives (Table 4.11-1) except for the natural environment and technical performance. : The alternatives were assessed for all performance objectives, criteria and indicators; however, the following performance objectives and criteria were identified as the key differentiators:

- Natural Environment:
- Potential effect on air quality and climate
- Technical performance:
- Cost effectiveness.

The key mitigation measures that would minimize the potential environmental effects at both locations are as follows:

- Maintain equipment to manage and reduce air emissions and noise.
- Maintain a land buffer from the lake edge.
- Collect and manage runoff from the ore stockpiles area.
- Process the ore during operations and reclaim the site after operations cease.

4.11.2.1 Alternative 1: Adjacent to Process Plant

Advantages: this alternative offers a high level of operational efficiency and is the most cost-effective alternative as it is closest to the crusher / process plant. This alternative will result in half the GHG emissions as Alternative 2 due to the shorter haulage distance. It has capital and operating costs that can be supported by the Project and provide a competitive return on investment.

Disadvantages: this alternative requires overprinting of terrestrial habitat and wetlands.

4.11.2.2 Alternative 2: Between Fish Habitat Development Area and Mine Access Road

Advantages: no advantages beyond those achieved by Alternative 1.

Disadvantages: this alternative will result in double the GHG emissions compared to Alternative 1 due to a greater haulage distance and requires overprinting of terrestrial habitat. It would also result in higher capital and operating costs and reduced operational efficiency, although could be supported by the Project.

The location between the fish habitat development area and the mine access road is more constraining from an operational perspective in part because it has the disadvantage of greater haul distance from the open pit and to the process plant, which makes it less able to service the site efficiently. In addition, the increased haul distance results in approximately twice the emissions from Alternative 1.

4.11.3 Results Summary and Selected Alternative

Both locations offer viable solutions to the storage requirement. The primary identified difference in performance is related to the ability to service the Project. Alternative 1 (placement of the low grade ore stockpile adjacent to the process plant) supports maintaining a compact site footprint and is the most efficient, resulting in lower costs.

Table 4.11-1: Assessment of Low Grade Ore Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Adjacent to Process Plant	Alternative 2: Between Fish Habitat Development Area and Mine Access Road
Natural Environment				
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting [(1)] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Emissions will be generated during stockpiling, managing the stockpile and extracting the stockpiled ore at Alternative 1; but emissions will not affect attainment of air quality standards • Con/Op: Alternative 1 will result in approximately 50% less emissions from hauling ore, as the total haulage distance is approximately 1 km (open pit to stockpile, stockpile to process plant)	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator • Con/Op: Alternative 2 will result in approximately twice the emissions from hauling ore, as the total haulage distance is approximately 2 km (open pit to stockpile, stockpile to process plant)
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Op/Cl: GHG emissions will be generated during stockpiling, managing the stockpile and extracting the stockpiled ore at Alternative 1; but emissions will not affect attainment of air quality standards • Con/Op: Alternative 1 will result in approximately 50% less GHG emissions from hauling ore, as the total haulage distance is approximately 1 km (open pit to stockpile, stockpile to process plant)	• Con/Op/Cl: GHG emissions will be generated during stockpiling, managing the stockpile and extracting the stockpiled ore at Alternative 2; but emissions will not affect attainment of air quality standards • Con/Op: Alternative 2 will result in approximately twice the GHG emissions from hauling ore, as the total haulage distance is approximately 2 km
	Summary		**Preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality in waterbodies within the PDA meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Op/Cl: Contact water from the stockpile will be collected and treated as needed to that all regulatory requirements will be met during all Project phases	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Op/Cl: No effects; no aquatic habitat is present within the Alternative 1 footprint	• Con/Op/Cl: Alternative 2 will overprint a minor tributary of 0.1 km length
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: No effects; no fish are present	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• Con/Op/Cl: No effects; no aquatic habitat is present within the Alternative 1 footprint	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• Con/Op/Cl: Alternative 1 will overprint 28.3 ha of wetlands which will be permanently altered	• Con/Op/Cl: Alternative 2 will overprint a smaller area of wetlands (10.2 ha) which will be permanently altered
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• Con/Op/Cl: Alternative 1 will overprint a wetland area of which will be permanently altered	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• Con/Op/Cl: Development of the Alternative 1 will displace 50.1 ha of local terrestrial habitat and associated plant species	• Con/Op/Cl: Development of the Alternative 2 will displace 50.5 ha of local terrestrial habitat and associated plant species

Table 4.11-1: Assessment of Low Grade Ore Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Adjacent to Process Plant	Alternative 2: Between Fish Habitat Development Area and Mine Access Road
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op: Noise will be generated during stockpiling, managing the stockpile and extracting the stockpiled ore, including from heavy equipment, backup beepers and rock movement at Alternative 1 • Cl: Very limited noise will result from related reclamation activities	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Ore stockpiling at Alternative 1 may cause a disruption to existing wildlife movement but as this location is within the PDA, avoidance of the area by wildlife is generally expected	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• Con/Op/Cl: No material effects anticipated to wildlife populations	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine, . The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk. •	• Con/Op/Cl: No material effects anticipated; no SAR species identified as present	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Con/Op/Cl: Development of the Alternative 1 will displace 50.1 ha of Category 1 (Boreal population) habitat	• Con/Op/Cl: Development of the Alternative 2 will displace 50.5 ha of Category 1 (Boreal population) habitat
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op: Noise will be generated during stockpiling, managing the stockpile and extracting the stockpiled ore, including from heavy equipment, backup beepers and rock movement at Alternative 1 • Cl: Very limited noise will result from related reclamation activities	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: No material effects anticipated	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Natural Environment Performance Objectives Assessment			**Preferred**	**Partially preferred**
			• Adv: Reduced air emissions and GHG emissions due to shorter overall ore hauling distance • Disadv: Will require overprinting of terrestrial habitat, including wetlands	• Disadv: Increased air emissions and GHG emissions due to shorter overall ore hauling distance • Disadv: Will require overprinting of terrestrial habitat

Table 4.11-1: Assessment of Low Grade Ore Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Adjacent to Process Plant	Alternative 2: Between Fish Habitat Development Area and Mine Access Road
Social, Economic, Cultural and Built Environment				
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effects; no private residence located at or near Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with this alternative; there are no camp / cabin facilities nearby • Con/Op/Cl: Additional noise related to ore stockpiling may affect wilderness perception for recreational users of nearby lake	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: No effects; no effect to access	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Construction and operation of stockpiles at Alternative 1 and closure of the stockpile area will generate noise emissions that will meet regulatory requirements	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects; no water wells present at or near Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects; no surface water supplies present at or near Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op: Stockpiling of ore at Alternative 1 will result in a change to the natural landscape, that will affect local aesthetics • Cl: The potential effect on aesthetics will be removed after operation, when the ore stockpile is depleted	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: No adverse effect to health and safety; air emissions associated with ore stockpiling at Alternative 1 will meet air quality standards	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: No adverse effect to health and safety; emissions will be generated during construction, operations and closure phases; however, will not affect attainment of air quality standards which are protective of health	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects; no drinking water supplies present in Project area	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator

Table 4.11-1: Assessment of Low Grade Ore Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Adjacent to Process Plant	Alternative 2: Between Fish Habitat Development Area and Mine Access Road
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: No effects anticipated as no public access will be available within the PDA and protocols will be established for site traffic safety, including in relation to hauling ore to Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: Alternative 1 is located within the PDA which will not be available for natural resource harvesting	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/Cl: The PDA including Alternative 1 will not be available for tourism and recreational opportunities during the construction, operations and closure phases • Con/Op: Ore stockpiling at Alternative 1 will cause noise and lights during the construction and operations phases which may result in disturbance to recreational users on nearby lakes	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op: Project development, including related to ore stockpiling at Alternative 1, will generate considerable regional and local, employment and business opportunities • Cl: No effects associated with the alternative anticipated	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: No effects anticipated; ore stockpiling at Alternative 1 will not change services	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• Con/Op/Cl: There are no known conflicts with resource management objectives with Alternative 1 that cannot be mitigated through approvals	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator

Table 4.11-1: Assessment of Low Grade Ore Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Adjacent to Process Plant	Alternative 2: Between Fish Habitat Development Area and Mine Access Road
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near Alternative 1 • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near Alternative 1 • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed • Con: Construction work will not alter water levels in the southeast arm of Springpole Lake	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Reserve is distant from Project	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No effects anticipated; there are no known spiritual, ceremonial, cultural heritage and archaeological sites near Alternative 1	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator

Table 4.11-1: Assessment of Low Grade Ore Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Adjacent to Process Plant	Alternative 2: Between Fish Habitat Development Area and Mine Access Road
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: Disruption to habitat will occur due the development of Alternative that may affect traditional hunting, trapping or harvesting which will continue until the site is fully rehabilitated	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially preferred**	**Partially preferred**
			• Neutral: There are very limited anticipated effects on the human environment from the fresh water supply; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are very limited anticipated effects on the human environment from the fresh water supply; there are no differentiating advantages or disadvantages for the criteria and indicators
Technical Objectives				
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Ore stockpiles are commonly used to provide a storage buffer and are predictably effective even for larger scale applications • Cl: Not applicable	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; ore stockpiles are commonly used	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: An ore stockpile at Alternative 1 will be able to consistently meet Project needs	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Alternative 1 is well situated in relation to site infrastructure required for other reasons, and limited new infrastructure is not required	• Con/Op/Cl: Alternative 2 also well situated in relation to site infrastructure, however new infrastructure (haul road) will be required between this location and the process plant
	Summary		**Partially preferred**	**Partially preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Ore stockpiles are commonly use and viewed favourably from the potential to balance ore types and recoveries	• Con/Op/Cl: There is no material difference between Alternative 1 and Alternative 2 for this indicator
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Alternative 1 is best situated for efficiency, as it is located adjacent to the process plant, providing an acceptable return on investment	• Con/Op/Cl: Alternative 2 is located more distant from the process plant, providing reduced efficiency, and potentially requiring additional equipment • Con/Op/Cl: Will provide an acceptable return on investment although less than Alternative 1
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No effect anticipated as dikes will be constructed using rock extracted at site (rather than external supplier)	• Con/Op/Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Preferred**	**Partially preferred**
Technical Performance Objective Assessment			**Preferred**	**Partially preferred**
			• Adv: Capital and operating costs can be supported by the Project and provide a competitive return on investment	• Disadv: Higher capital and operating, and reduced operational efficiency is not preferred, although the costs can be supported by the Project

Table 4.11-1: Assessment of Low Grade Ore Storage Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Adjacent to Process Plant	Alternative 2: Between Fish Habitat Development Area and Mine Access Road
Amenability to Reclamation (Closure Phase)				
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• Cl: No effect; the ore stockpile at Alternative 1 will be processed during operation; no facilities will remain at closure	• Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• Cl: During decommissioning activities, infrastructure will be removed and affected area rehabilitated to promote natural drainage	• Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: The ore stockpile at Alternative 1 will be processed during operation and the site will be returned to an aesthetically pleasing although altered landscape	• Cl: There is no difference between Alternative 1 and Alternative 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially preferred**	**Partially preferred**
			• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed; there are no differentiating advantages or disadvantages for the criteria and indicators
OVERALL ASSESSMENT OF ALTERNATIVE			**PREFERRED (SELECTED ALTERNATIVE)**	**PARTIALLY PREFERRED**
			The primary reason for selecting this alternative is proximity to the process plant, resulting in greater efficiency and lower infrastructure requirements.	Although this alternative is very similar to the preferred alternative it was not selected as an ore stockpile area more distant from the process plant is not preferred for efficiency, and increased capital and operating costs.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op: operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*

546000 547000 548000 549000 550000 551000 552000

5695000 5694000 5693000 5692000

Birch Lake
Birch Lake
Dole Lake
L-1
L-2
L-19
L-20
L-16
Springpole Lake (North Basin)
Springpole Lake (North Basin)

Alternative 1 Adjacent to Process Plant

Alternative 2 Adjacent to Mine Access Road

X:\CA\CAOAK300-OAKMIS-FS1-Project\P2021\Projects\ONS2104_FMG_Springpole_EIS\11_GIS\E\S\MXD\OreStorage_Alternatives_6.mxd

LEGEND

- Proposed Mine Feature
- Watercourse
- Waterbody
- Contours (5 m interval)

Ore Stockpile Location Alternatives

- Alternative 1 Adjacent to Process Plant (50.1 ha)
- Alternative 2 Adjacent to Mine Access Road (50.5 ha)

NOTES:
- Contours extracted from 2020 LiDAR survey.

0 0.5 1 2 3 4 5 Kilometres

Datum: NAD83
Projection: UTM Zone 15N

N W E S

First Mining Gold

wsp

SPRINGPOLE GOLD PROJECT

Ore Stockpile Location Alternatives

PROJECT N°: ONS2104

FIGURE: 4.11-1

SCALE: 1:17,000

DATE: July 2024

4.12 Overburden / Surficial Materials Storage

The development of the Project will result in the following unconsolidated mineral wastes that will require storage:

- Lake bed sediments;
- Overburden; and
- Surficial soil / organics.

Lake bed sediments and overburden will be stripped from the open pit in the dewatered basin to gain access to the ore. Surficial soils and organics and overburden will need to be stripped from the open pit area, CDF embankments, aggregate operation(s), and plant site and infrastructure areas as needed.

4.12.1 Identified Alternatives

These materials will be preferentially used directly for construction purposes as needed, or during progressive reclamation. This will only be possible for a portion of the volume, and storage will still be required of these materials. As these materials are required for reclamation purposes, the materials will be stored close to their future use locations where practicable, for efficiency and to reduce GHG emissions. Storage of these materials is constrained in part by the placement of other facilities with larger footprints and by the nature of the materials.

Storage of overburden / surficial materials was identified in the EIS Guidelines and ToR (Appendices B-1 and B-3) as a Project component to be considered in the EIS/EA. Options for a reasonable range of viable alternatives that satisfy the questions presented in Section 4.1.1 for overburden / surficial materials storage, including using information from the following sources:

- Engineering studies;
- Workshops, meetings and discussions;
- Consultation on the draft EIS/EA; and
- Professional experience and expertise.

However, a reasonable range of alternatives could not be identified for the storage of overburden / surficial materials; therefore, there is only one location suitable that was carried into Section 5.

4.12.2 Rationale for Selection

Overburden and surficial soil / organics are proposed to mainly be stored in a single surface stockpile. With the selection of storage locations for mine rock, tailings and ore, only one potential location was identified for the storage of these materials: between the fish habitat development area and the mine access road. Smaller quantities of organics and topsoil may be retained in small stockpiles within the Project footprint close to where the materials are stripped to ease future reclamation (if the location does not otherwise pose a conflict).

Another location west of the ore stockpiles and north of unnamed lake L-1 was initially identified for review; however, it was not able to fully satisfy the questions in Section 4.1.1. This potential alternative was able to store the required volume, but it would cover a large portion of the natural watershed of unnamed lake L-1, which would affect lake water levels that could not reasonably mitigated except through creation of additional aquatic habitat at excessive costs and was rejected. Other potential locations (such as on the peninsula northwest of the ore stockpiles, southwest of the CDF or farther southeast of the Project site

along the mine access road) would unnecessarily expand the Project footprint, increasing the GHG emissions and equipment needs, and do not offer a benefit for other criteria and indicators.

Lake bed sediments have a naturally high water content and require careful management to handle. They need to be pushed into piles near the stripping location to be partially dewatered for ease of handling. Without this natural dewatering process, they would need to be stored in an additional contained facility, such as a basin with containing embankments, which would expand the Project footprint. The lake bed sediments will be retained in these piles within the dewatered basin if they do not pose a risk to open pit operations; otherwise, they will be trucked and stored at the same location as the overburden.

4.13 Site Buildings, Facilities and General Infrastructure

The following site buildings, facilities and general onsite infrastructure are planned for the Project:

- Process plant;
- Reagent storage building;
- Laboratory building;
- Gatehouse;
- Mine offices;
- Administration and dry (change room) building;
- Workshop and warehouse;
- Truck shop and vehicle wash-bay;
- Power substation and site distribution lines;
- Temporary laydown areas and parking;
- Accommodations complex;
- Fuel depot;
- Explosives storage magazine; and
- Airstrip.

4.13.1 Identified Alternatives

One of the primary goals of the Project is to minimize the Project site surface area, while still providing some flexibility of operational changes. The constraints posed by major site facilities such as the open pit, CDF, process plant and ore stockpiles result in few viable alternatives for the siting of most of the other required components, given the preference to limit the overall site footprint, and to avoid waterbodies and watercourses as practicable. As such, for much of the site buildings, facilities and general infrastructure, there are no alternative locations that would be a determining factor. Some buildings and infrastructure locations are prescribed by acts and regulations. For example, the explosive storage magazine building has stringent regulatory requirements for manufacturing facility siting and operation (see Section 4.26). The siting of fuel depots and the airstrip are also constrained by regulatory requirements.

Site facilities will be supported by related transport, piping and power infrastructure as needed. The overall layout has been developed to facilitate efficient operating conditions with the least travel distances between the facilities and reduced overall site footprint. The positioning of supporting infrastructure and supporting

facilities (such as mine site roads, pipelines and the onsite electrical distribution system) is constrained by the location of facilities that they are intended to service, or the site footprint will be unnecessarily expanded. Alternatives to supporting infrastructure locations are therefore not considered.

A limited number of dedicated construction-related facilities will be required to support the early construction stage. These facilities will likely be located near the mine access road within the Project Development Area (PDA), so that they do not pose a conflict for construction activities.

A reasonable range of alternatives could not be identified for the process plant location as it is required to be located near the ore stockpiles, otherwise the site footprint will be unnecessarily expanded; therefore, there is only one location suitable that was carried into Section 5 (onsite processing).

4.13.2 Rationale for Approach

Ore can be either processed at a facility on site or transported off site for processing. A dedicated process plant will need to be constructed irrespective of the location, as there are no existing process plants within a reasonable trucking distance of the open pit. An onsite location provides the greatest efficiency and would have reduced environmental effects associated with transporting ore, including GHG emissions, as compared to transporting the ore to an offsite location which could also have traffic considerations. The alternative of constructing a dedicated process plant off site cannot be financially supported by the Project and would be not preferred for the cost-effectiveness objective. Accordingly, development of an onsite process plant is the only reasonable alternative.

The ore processing facility is proposed to be located in a centralized area northeast of the open pit, positioned far enough away from the open pit perimeter to protect workers and infrastructure from blast (fly) rock. This location offers the necessary foundation conditions with bedrock near surface, as well as operational efficiency, being proximal to the open pit for ore movement and to the CDF for reduced tailings haulage and piping. No other alternative locations identified during the preliminary engineering design were economically feasible, were sufficiently far from the open pit for safety, and offered other advantages from an environmental perspective.

4.14 Effluent Treatment

The Project process plant will use cyanide for gold dissolution and recovery as per standard industry practice. The effluent and tailings generated by this process will therefore contain free cyanide and cyanide complexed with heavy metals (metallo-cyanide complexes). As such, treatment is required to reduce the level of cyanide in effluent to be protective of the environment and to achieve regulatory requirements.

4.14.1 Identified Alternatives

Treatment is required to reduce the level of cyanide in effluent to be protective of the environment, including and to in order to achieve regulatory requirements. If the Project is unable to provide an effluent that is anticipated to meet regulatory requirements, the Project will not be approved. If the Project does not proceed, and the environmental conditions at the site and surrounding area will not be changed from existing (baseline) conditions.

Alternatives to the treatment of effluent are focused on the reduction of cyanide:

- **Alternative 1:** treated in the process plant for cyanide destruction and heavy metal precipitation, such as using the sulphur dioxide / air treatment process;

- **Alternative 2:** discharged to an appropriately contained area to allow natural degradation of the cyanide over time; and
- **Alternative 3:** discharged to contained area to allow natural degradation, supported by hydrogen peroxide destruction of any residual cyanide prior to discharge to the environment.

Other cyanide destruction and recovery technologies are also available, but the above are considered viable methods as they are the most commonly used, are proven at a commercial scale in northern Ontario and are considered most applicable to the Project from a technical perspective. If a treatment methodology were not applied, the Project could not proceed as effluent would not meet regulatory standards. If the Project did not proceed the socio-economic benefits of the Project would not be realized.

4.14.1.1 Alternative 1: In-Plant Sulphur Dioxide / Air Treatment

In-plant sulphur dioxide / air treatment involves the destruction of cyanide and metallo-cyanide complexes through oxidative processes, with cyanide being converted to cyanate, and metals liberated through cyanide oxidation being subsequently precipitated as insoluble metal hydroxides. Cyanate formed through this process reacts with water (hydrolyzes) within the tailings pond to form ammonia and carbon dioxide. The sulphur dioxide / air treatment process is a costly alternative, but it has the advantage of reducing cyanide concentrations before the effluent leaves the process plant.

This process is entirely within the process plant, and additional mitigation measures unique to this process alternative are not required to minimize potential environmental effects. General mitigation measures that would minimize these potential environmental effects at this location are as follows:

- Monitor water quality within the system regularly to confirm treatment efficacy.
- Provide for additional contact water storage to contain water that does not meet requirements.

4.14.1.2 Alternative 2: Natural Degradation

Cyanide treatment can also occur at the tailings containment location. If effluent or tailings are retained in a surface containment area for a sufficient length of time under the right conditions of temperature and ultraviolet light, the cyanide and metallo-cyanide complexes will naturally break down to simpler, non-toxic compounds without the use of chemical reagents. The principal cyanide loss mechanism in this natural degradation is volatilization of hydrogen cyanide gas to the atmosphere. Cyanide concentrations in the atmosphere generated by this process are too low to pose an environmental or heath risk. Natural degradation has been used successfully at some Ontario gold mines where the process plant discharge is particularly suited to this treatment technology due to low concentrations of associated metals, and where sufficient effluent retention capacity is available in the system for extended effluent aging and batch discharging.

Key mitigation measures that would minimize these potential environmental effects for this process are as follows:

- Schedule and construct embankment raises in advance of need so there is sufficient embankment height at all times to support adequate residence time for natural degradation to occur.
- Reduce the volume of water retained in the facility in late fall to provide maximum storage availability and retention time over the winter when natural degradation is less effective.

4.14.1.3 Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment

Following a natural degradation period, hydrogen peroxide can be used as the oxidizing agent to convert cyanide to cyanate to improve the effluent quality for discharge. The Project design does not have a large pond that could also be used for natural degradation of effluent, and a dedicated water treatment polishing pond would be required for the natural degradation / hydrogen peroxide treatment alternative.

Key mitigation measures that would minimize potential environmental effects for this process are the same as presented for Alternative 2.

4.14.2 Assessment of Alternatives

The alternative process plant effluent treatment methods were assessed for all performance objectives as summarized in Table 4.14-1. The alternative methods are similar with respect to the performance objectives except for the following key natural environment, technical and ability to reclaim the site performance objectives and criteria. The alternatives were assessed for all performance objectives, criteria and indicators; however, the following performance objectives and criteria were identified as the key differentiators:

- Natural environment performance:
- Potential effect on water quality, fish and aquatic habitat; and
- Potential effect on wetlands;
- Potential effect on terrestrial species and habitat; and
- Potential effect on SAR.
- Technical performance:
- Ability to service the site; and
- Cost effectiveness.
- Ability to reclaim the site performance:
- Potential effect on future public safety and Security

The treatment processes are otherwise neutral across the majority of the indicators and criteria.

4.14.2.1 Alternative 1: In-Plant Sulphur Dioxide / Air Treatment

Advantages: with this alternative, the effluent leaving the process plant will have a considerably lower cyanide concentration. As such, this treatment produces high quality effluent standards required to attain or maintain receiving water protection of aquatic life standards. This removes the potential for wildlife including birds to be exposed to ponded water with a higher concentration of cyanide. In addition, the water leaving the process plant within the tailings pipeline would be of better quality, and therefore would reduce potential environmental effect(s) should a pipeline malfunction or accident occur. also increases metals removal efficiencies in tailings ponds and provides for more effective precipitate settling compared to that achievable in clear solutions. Consequently, water storage requirements would be low, which could result in less disturbance to wetlands and terrestrial habitat, including habitat for SAR species.

Disadvantages: no apparent disadvantages over the other two alternatives.

4.14.2.2 Alternative 2: Natural Degradation

Advantages: no apparent advantages over the other two alternatives.

Disadvantages: this alternative has the highest potential risk for poor quality water, and non-compliance with final effluent standards. The CDF would contain increased concentrations of cyanide and heavy metals, contributing to lower seepage quality. As such, additional water storage would be required to provide the necessary retention time for aging, which would require a larger facility footprint and/or a separate polishing pond. This would result in a large footprint, and therefore greater disturbance to wetlands and terrestrial habitat, including habitat for SAR species.

4.14.2.3 Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment

Advantages: this alternative is well understood and simple to operate.

Disadvantages: this alternative requires additional water storage and a larger facility, than in-plant cyanide destruction. From a technical perspective, this method does not destroy ferrocyanide, but precipitates as a base metal complex and the process may leave residual copper in solution (SGS 2005) It also has substantially higher capital costs.

4.14.3 Results Summary and Selected Alternative

Alternative 1, in-plant cyanide destruction using sulphur dioxide / air treatment, is the only preferred alternative and is the selected alternative based on the assessment of net effects in Table 4.14-1 with implementation of key mitigation measures described in Section 4.14.1. This alternative presents the greatest environmental advantages for the Project, including a lower potential for effects on the natural environment and a higher treatment efficacy and would not require a dedicated polishing pond.

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
Natural Environment					
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con: No effects as cyanide use / treatment only occurs during operations • Op/Cl: Would result in minimal release of free cyanide to the atmosphere through volatilization that would continue after operations cease for a period of time, but concentrations would be within O. Reg. 419/05 standards	• Con: No effects; cyanide use introduced during operations • Op/Cl: Would result in minor release of free cyanide to the atmosphere through volatilization that would continue after operations cease for a period of time, but concentrations would be within O. Reg. 419/05 standards	• Con: No effects; cyanide use introduced during operations • Op/Cl: Would result in minor release of free cyanide to the atmosphere through volatilization that would continue after operations cease for a period of time, but concentrations would be within O. Reg. 419/05 standards
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Op/Cl: No material effects; negligible emissions of GHGs	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con: No effects as cyanide use / treatment only occurs during operations • Op/Cl: Sulphur dioxide / air together with extended subsequent effluent aging in the CDF south cell internal pond is able to comply with anticipated, stringent final effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives	• Con: No effects as cyanide use / treatment only occurs during operations • Op/Cl: There is insufficient retention time in CDF south cell internal pond to be able to provide acceptable final effluent quality suitable for achieving Provincial Water Quality Objectives (PWQO) in the receiving water • Op: Highest risk of non-compliance with final effluent standards, compared to Alternatives 1 and 3	• Con: No effects as cyanide use / treatment only occurs during operations • Con/Op/Cl: Effluent aging in the CDF south cell internal pond plus hydrogen peroxide treatment is expected to be able to comply with anticipated, stringent final effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives • Op: Higher risk of non-compliance with final effluent standards compared with Alternative 1
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Op/Cl: Indicator is not applicable to this alternative method; fish habitat area not affected by effluent treatment method	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con: No effects as treatment only occurs during operations • Op/Cl: No effects; treatment produces high quality effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives	• Con: No effects as treatment only occurs during operations • Op/Cl: Potential for effects on fish populations as effluent quality may not achieve PWQO in the receiving water at times	• Con: No effects as treatment only occurs during operations • Op/Cl: No effects; treatment produces high quality effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• Con/Op/Cl: Indicator is not applicable to this alternative method; fish passage not affected by effluent treatment method	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con: No effects as treatment only occurs during operations • Op/Cl: Alternative is able to provide optimal seepage effluent quality and tailings are pre-treated for cyanide destruction prior to storage in the CDF	• Con: No effects as treatment only occurs during operations • Op/Cl: This technology will produce a higher strength cyanide and metals concentrations in tailings pore water and internal pond, which provides a potential for groundwater contamination	• Con: No effects as treatment only occurs during operations • Op/Cl: This technology will produce a higher strength cyanide and metals concentrations in tailings pore water and internal pond, which provides a potential for groundwater contamination
	Summary		**Preferred**	**Not preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• Con/Op/Cl: Water storage requirements will be lower, which could result in overprinting a lower area of wetlands	• Con/Op/Cl: Additional water storage would be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the overprinting of a substantially larger area of wetlands, depending on the location selected	• Con/Op/Cl: Additional water storage could be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the overprinting of a substantially larger area of wetlands, depending on the location selected
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• Con/Op/Cl: Indicator is not applicable to this alternative as wetland connectivity is linked to location rather than method	• Con/Op/Cl: Indicator is not applicable to this alternative	• Con/Op/Cl: Indicator is not applicable to this alternative
	Summary		**Preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• Con/Op/Cl: Water storage requirements will be lower, which could result in overprinting a lower area of terrestrial habitat	• Con/Op/Cl: Additional water storage would be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the overprinting of a substantially larger area of terrestrial habitat, depending on the location selected	• Con/Op/Cl: Additional water storage could be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the overprinting of a substantially larger area of terrestrial habitat, depending on the location selected
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Op: No noise emitted during treatment within the process plant • Con/Op/Cl: A reduced footprint (single facility) would be required limiting the noise footprint associated with construction and operations, including dam construction	• Op: No noise emitted during treatment • Con/Op/Cl Additional water storage would be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result a greater area of noise disturbance associated with construction and operations, including dam construction	• Op: No noise emitted during treatment • Con/Op/Cl Additional water storage could be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result a greater area of noise disturbance associated with construction and operations, including dam construction

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Op/Cl: No direct effect from treatment • Con/Op/Cl: A reduced footprint (single facility) would be required limiting the potential for effects on plant dispersion and wildlife movement corridors	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Additional water storage would be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the disruption of additional plant dispersion and wildlife movement corridors depending on the location selected	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Additional water storage could be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the disruption of additional plant dispersion and wildlife movement corridors depending on the location selected
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• Op/Cl: No direct effect from treatment • Con/Op/Cl: A reduced footprint (single facility) would be required limiting the potential for effects on wildlife population	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Additional water storage would be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the overprinting of a substantially larger area of terrestrial habitat affecting a greater wildlife population • Op: Water with a higher cyanide concentration may be present at times which waterfowl and other species could be exposed to	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Additional water storage could be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the overprinting of a substantially larger area of terrestrial habitat affecting a greater wildlife population • Op: Water with a higher cyanide concentration may be present at times which waterfowl and other species could be exposed to
		Summary	**Preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine, . The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Water storage requirements are anticipated to be lower, which would result in a reduced footprint (single facility) overprinting a lower area of habitat, including potentially SAR habitat	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Additional water storage would be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the overprinting of a substantially larger area of habitat, including potentially SAR habitat	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Additional water storage could be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the overprinting of a substantially larger area of habitat, including potentially SAR habitat
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Op/Cl: No direct effect from treatment • Con/Op/Cl: A reduced footprint (single facility) would be required overprinting a lower area of terrestrial habitat, which could include SAR habitat	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Additional water storage would be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the overprinting of additional SAR habitat	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Additional water storage could be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the overprinting of additional SAR habitat

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Op/Cl: No direct effect from treatment • Con/Op/Cl: A reduced footprint (single facility) would be required limiting the noise footprint that could affect SAR, if present	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Additional water storage would be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in additional disruption to SAR wildlife depending on the location selected, and if SAR are present	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Additional water storage could be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in additional disruption to SAR wildlife depending on the location selected, and if SAR are present
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Op/Cl: No direct effect from treatment • Con/Op/Cl: A reduced footprint (single facility) would be required limiting the potential for effects on SAR wildlife movement corridors	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Additional water storage would be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the disruption of additional SAR wildlife movement corridors depending on the location selected	• Op/Cl: No direct effect from treatment • Con/Op/Cl: Additional water storage could be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this could result in the disruption of additional SAR wildlife movement corridors depending on the location selected
	Summary		**Preferred**	**Partially preferred**	**Partially preferred**
	Natural Environment Performance Objectives Assessment		**Preferred**	**Not preferred**	**Partially preferred**
			• Adv: Sulphur dioxide / air together with extended subsequent effluent aging in the CDF south cell internal pond is the best alternative able to comply with anticipated, stringent final effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives • Adv: A reduced footprint (single facility) would be required limiting the potential for effects on the natural environment	• Disadv: Highest risk of non-compliance with final effluent standards • Disadv: Additional water storage would be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this would result in a large footprint and potential disruption to wildlife, including SAR if present • Disadv: Water with a higher cyanide concentration may be present at times which waterfowl and other species could be exposed to	• Disadv: Higher risk of non-compliance with final effluent standards compared with sulphur dioxide / air alternative • Disadv: Additional water storage would be required to meet the needed retention time for aging, which would require a larger facility footprint and/or a separate polishing pond; this would result in a large footprint and potential disruption to wildlife, including SAR if present • Disadv: Water with a higher cyanide concentration may be present at times which waterfowl and other species could be exposed to
Social, Economic, Cultural and Built Environment					

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: Use of in-plant cyanide destruction could improve resident perception of the overall Project as viewed as a more modern technology and will produce a higher quality tailings stream entering the CDF for management	• Con/Op/Cl: Having tailings ponds with elevated cyanide concentrations beyond those that could be achieved with use of more favourable technologies (such as sulphur dioxide / air) could be viewed negatively by local property owners, irrespective of actual risk	• Con/Op/Cl: Likely to be viewed by local residents as better than natural degradation on its own, but not as favourable as in-plant cyanide destruction • Con/Op/Cl: Having tailings ponds with elevated cyanide concentrations beyond those that could be achieved with use of more favourable technologies (such as sulphur dioxide / air) could be viewed negatively by local property owners, irrespective of actual risk
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with this alternative; noise is not generated by method	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Indicator is not applicable to this alternative; noise is not generated by method	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects; no water wells present in Project area	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: Effects are related to the process plant and CDF construction, operation and decommissioning and are not specific to the in-plant treatment	• Con/Op/Cl: Establishment of a second facility to increase retention time could have additional adverse effects on aesthetics, depending on the location selected	• Con/Op/Cl: Establishment of a second facility to increase retention time could have additional adverse effects on aesthetics, depending on the location selected
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con: No effects as cyanide use / treatment only occurs during operations • Op/Cl: Treatment produces high quality final effluent: no potential for effects on local residents or recreational users	• Con: No effects as cyanide use / treatment only occurs during operations • Op/Cl: Treatment produces high quality final effluent: no potential for effects on local residents or recreational users during normal operation	• Con: No effects as cyanide use / treatment only occurs during operations • Op/Cl: Treatment produces high quality final effluent: no potential for effects on local residents or recreational users

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con: No effects as cyanide use / treatment only occurs during operations • Op/Cl Effectively removes any potential for significant free cyanide emissions to the atmosphere	• Con: No effects as cyanide use / treatment only occurs during operations • Op/Cl Would result in minor release of free cyanide to the atmosphere, but concentrations would be well below health threshold risks	• Con: No effects as cyanide use / treatment only occurs during operations • Op/Cl Would result in minor release of free cyanide to the atmosphere, but concentrations would be well below health threshold risks
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects; no drinking water supplies present in Project area	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; treatment method does not affect traffic	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: Indicator is not applicable to this alternative; treatment method does not affect access	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/Cl: Indicator is not applicable to this alternative; treatment method does not materially affect opportunities	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• • Con/Op/Cl: Project development will generate considerable regional and local employment and business opportunities • Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: Indicator is not applicable to this alternative; treatment method does not affect services	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• Con/Op/Cl: No direct or indirect effect anticipated from treatment method	• Con/Op/Cl: Establishment of a second facility to increase retention time could require additional approvals from the Sustainable Forest Licence holder • Con/Op/Cl: There are unlikely to be conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Op/Cl: Establishment of a second facility to increase retention time could require additional approvals from the Sustainable Forest Licence holder • Con/Op/Cl: There are unlikely to be conflicts with resource management objectives that cannot be mitigated through approvals
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Cl: No effects; alternative does not affect waste recycling or re-use • Op: Treatment process allows for the recovery and re-use of cyanide within the process plant	• Con/Op/Cl: Indicator is not applicable to this alternative treatment method as recycling is not involved	• Con/Op/Cl: Indicator is not applicable to this alternative treatment method as recycling is not involved
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: Indicator is not applicable to this alternative treatment method does not affect heritage resources	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: Indicator is not applicable to this alternative treatment method does not affect heritage resources	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: Indicator is not applicable to this alternative treatment method does not affect views	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: Indicator is not applicable to this alternative treatment method does not affect archaeological resources	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: Indicator is not applicable to this alternative treatment method does not cause land disturbances	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Reserve is distant from Project	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No potential for effects; no site located within the PDA	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: This alternative provides the smallest footprint, and therefore, the least potential to effect access to traditional lands, which will continue during operation and into decommissioning until the site is fully rehabilitated	• Con/Op/Cl: Establishment of a second facility to increase retention time could have the potential to have an increased effect on access to traditional lands, which will continue during operation and into decommissioning until the site is fully rehabilitated	• Con/Op/Cl: Establishment of a second facility to increase retention time could have the potential to have an increased effect on access to traditional lands, which will continue during operation and into decommissioning until the site is fully rehabilitated
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially preferred**	**Partially preferred**	**Partially preferred**
			• Adv: This alternative provides the smallest footprint, and therefore, the least potential to affect the human environment, which will continue during operation and into decommissioning until the site is fully rehabilitated	• Disadv: Establishment of a second facility to increase retention time could increase the potential to have an increased effect on the human environment depending on location of the second facility, which will continue during operation and into decommissioning until the site is fully rehabilitated	• Disadv: Establishment of a second facility to increase retention time could increase the potential to have an increased effect on the human environment depending on location of the second facility, which will continue during operation and into decommissioning until the site is fully rehabilitated

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
Technical Objectives					
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Cl: Not applicable; as cyanide use / treatment only occurs during operations • Op: Used increasingly widely within the gold mining industry since the middle 1980's with predictably good success • Op: Rendering heavy metals in solid phase, increases metals removal efficiencies in tailings ponds, as solid phase metals adhere to tailings solids in the treated tailings slurry discharged from the mill, providing for more effective precipitate settling compared to that achievable in clear solutions • Op: Post-chemical treatment (extended aging in tailings ponds) provides for the effective removal of cyanide destruction breakdown products (cyanate and ammonia)	• Con: Not applicable; as cyanide use / treatment only occurs during operations • Op/Cl: Volatilization of cyanide to the atmosphere, with subsequent breakdown therein, limits the generation of cyanide breakdown products (cyanate and ammonia) within the tailings pond • Op/Cl: Natural degradation is only effective for effluents with low concentrations of associated heavy metals, especially nickel; the effluent has low associated metals • Op/Cl: CDF pore waters would contain increased concentrations of cyanide and heavy metals, contributing to lower seepage quality • Op/Cl: Elevated total cyanide levels to as much as 10 to 20 mg/L, seasonally, would be expected to occur in tailings ponds, which would pose an increased environmental risk in the event of a tailings embankment failure (tailings pond cyanide levels would be below toxicity thresholds for wildlife)	• Con: Not applicable; as cyanide use / treatment only occurs during operations • Op/Cl: Volatilization of cyanide to the atmosphere, with subsequent breakdown therein, limits the generation of cyanide breakdown products (cyanate and ammonia) within the tailings pond • Op/Cl: Use of hydrogen peroxide after effluent aging in tailings ponds reduces residual cyanide and associated heavy metals to low levels, but typically not to levels achieved with use of sulphur dioxide / air on mill slurry • Op/Cl: CDF pore waters would contain increased concentrations of cyanide and heavy metals, contributing to lower quality seepage quality • Op/Cl: Elevated total cyanide levels to as much as 10 to 20 mg/L, seasonally, would be expected to occur in tailings ponds, which would pose an increased environmental risk in the event of a tailings embankment failure (tailings pond cyanide levels would be below toxicity thresholds for wildlife)
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; this form of treatment is commonly used	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Cl: Not applicable; as cyanide use / treatment only occurs during operations • Op/Cl: This alternative for treatment will be able to consistently meet Project needs	• Con: Not applicable; as cyanide use only occurs during operations • Op/Cl: This alternative is unlikely to be able to consistently meet Project needs	• Con: Not applicable; as cyanide use only occurs during operations • Op/Cl: This alternative for treatment will be able to consistently meet Project needs
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Additional facilities / infrastructure not required	• Con/Op/Cl: Expected to require a dedicated polishing / water management pond not currently part of the Project design in order to provide sufficient retention time to be effective	• Con/Op/Cl: May require a dedicated polishing / water management pond not currently part of the Project design in order to provide sufficient retention time to be effective
		Summary	**Preferred**	**Not preferred**	**Not preferred**

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Cl: Not applicable; as cyanide use / treatment only occurs during operations • Op/Cl: Provides the best and most secure method of effluent treatment with minimal environmental risk, including risks associated with potential CDF catastrophic failure • Con/Op/Cl: Anticipated reduced regulatory risk to obtain approvals • Con/Op/Cl: Reduced water storage requirements compared with other options lowering capital and operating costs; although higher plant operating costs	• Con: Not applicable; as cyanide use only occurs during operations • Op/Cl: No reagent costs for treatment (although would not be a material cost to the Project) as the alternative relies only on natural degradation processes • Con/Op/Cl: Likely to be viewed as stepping back from the application of best available, economically achievable technologies resulting in a regulatory risk to obtain approvals • Op/Cl: Higher environmental risk scenario in terms of potential wildlife exposure, long-term seepage concerns, and CDF failure mode risks • Op/Cl: Requires longer storage times, and hence increased embankment containment costs to achieve acceptable environmental performance	• Con: Not applicable; as cyanide use only occurs during operations • Op/Cl: Reduced reagent costs although not a material cost to the Project, as natural degradation processes would remove much of the cyanide and metals prior to hydrogen peroxide chemical treatment • Con/Op/Cl: May be viewed as stepping back from the application of best available, economically achievable technologies resulting in a regulatory risk to obtain approvals • Op/Cl: Higher environmental risk scenario in terms of potential wildlife exposure, long-term seepage concerns, and CDF failure mode risks
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Higher treatment reagent costs but lower capital costs associated with establishing sufficient water retention capacity requirement (i.e., lower tailings embankment costs) • Op: Greater operational CDF water management flexibility, translating to lower overall operating costs	• Con/Op/Cl: Savings in reagent costs more than offset by increased embankment containment costs and long-term seepage management costs	• Con/Op/Cl: Reduced CDF embankment containment requirements compared with natural degradation on its own, but substantially higher than compared with sulphur dioxide / air alternative • Cl: Long-term seepage management costs would be comparable to the natural degradation alternative as there would be elevated cyanide and metals concentrations in the tailings pore water
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: Alternative best able to comply with anticipated, stringent final effluent standards • Con/Op/Cl: Minimizes potential liability costs in the event of a catastrophic embankment failure as lowest volume of water storage	• Con/Op/Cl: Highest risk of non-compliance with final effluent standards • Con/Op/Cl: Increased potential liability costs in the event of a catastrophic tailings embankment failure	• Con/Op/Cl: Higher risk of non-compliance with final effluent standards compared with sulphur dioxide / air alternative • Con/Op/Cl: Increased potential liability costs in the event of a catastrophic tailings embankment failure
		Summary	**Preferred**	**Not preferred**	**Not preferred**

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
		Technical Performance Objective Assessment	**Preferred**	**Not preferred**	**Not preferred**
			• Adv: Provides a proven form of treatment that can reliably support meeting Project requirements • Adv: Lower capital and operating costs	• Adv: Provides an effective form of treatment that can support meeting Project requirements, but presents a higher risk to the environment which could necessitate additional mitigation • Disadv: Substantially higher capital costs based on current knowledge Provides an effective form of treatment that can support meeting Project requirements, but presents a higher risk to the environment which could necessitate additional mitigation	• Adv: Provides a proven form of treatment that can reliably support meeting Project requirements, but presents a higher risk to the environment which could necessitate additional mitigation • Disadv: Substantially higher capital costs based on current knowledge
Amenability to Reclamation (Closure Phase)					
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• CI: Treatment produces high quality final effluent: no potential for effects during closure or post closure	• CI: Higher environmental risk scenario in terms of potential for long-term seepage concerns, and CDF failure mode risks	• CI: Higher environmental risk scenario in terms of potential for long-term seepage concerns, and CDF failure mode risks
		Summary	**Preferred**	**Not preferred**	**Not preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• CI: Indicator is not applicable to this alternative	• CI: There is no difference between Alternatives 1, 2 and 3 for this indicator	• CI: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: Indicator is not applicable to this alternative	• CI: There is no difference between Alternatives 1, 2 and 3 for this indicator	• CI: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• CI: Indicator is not applicable to this alternative	• CI: There is no difference between Alternatives 1, 2 and 3 for this indicator	• CI: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• CI: Indicator is not applicable to this alternative	• CI: There is no difference between Alternatives 1, 2 and 3 for this indicator	• CI: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
		Amenability to Reclamation Performance Objective Assessment	**Preferred**	**Not preferred**	**Not preferred**
			• Adv: Reclamation is predictably effective	• Disadv: Reclamation is less certain as a result of anticipated pore water quality and potential for long-term management	• Disadv: Reclamation is less certain as a result of anticipated pore water quality and potential for long-term management

Table 4.14-1: Assessment of Effluent Treatment Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: In-Plant Sulphur Dioxide / Air Treatment	Alternative 2: Natural Degradation	Alternative 3: Natural Degradation plus Hydrogen Peroxide Treatment
		OVERALL ASSESSMENT OF ALTERNATIVE	**PREFERRED (SELECTED ALTERNATIVE)**	**NOT PREFERRED**	**NOT PREFERRED**
			In-plant cyanide destruction using sulphur dioxide / air treatment is the only preferred alternative and is the selected alternative. This alternative presents the greatest environmental advantages for the Project, including a lower potential for effects on the natural environment, a higher treatment efficacy and would not require a dedicated polishing pond.	Natural degradation does not presents any advantages for the Project. The requirement for a dedicated polishing pond in order potentially produce the quality of effluent required will result in additional unwarranted environmental disturbance.	Natural degradation with hydrogen peroxide polishing does not presents any advantages for the Project. Use of hydrogen peroxide after effluent aging in tailings ponds improves effluent quality, but typically not to levels achieved with use of sulphur dioxide / air on mill slurry The requirement for a dedicated polishing pond in order potentially produce the quality of effluent required will result in additional unwarranted environmental disturbance.

Notes:

(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.

Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op: operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*

4.15 Water Supply

A water supply is required for onsite uses including process water, potable water and miscellaneous uses such as for dust control and vehicle washing, as well as for the accommodations complex (potable water and other domestic use). The Project has been designed to recycle and re-use non-contact and contact water within the Project site as practicable. The recycling of water, where practical for industrial uses, has a number of environmental and economic benefits as opposed to only using fresh water. Further details regarding the site water needs and water balance are provided in Section 5.11.

Even with extensive water recycling proposed for the Project, a fresh water supply will still be required for a portion of the initial process plant start-up needs, potential temporary water deficits within the water management system, specific ore process plant needs and the accommodations complex. Approximately 1.1 million cubic metre per year (Mm^3/yr) of fresh water will be required for the process plant and an additional 0.03 Mm^3/yr for the accommodations complex, on average, during operations over the Project life.

4.15.1 Identified Alternatives

Three alternative sources were considered for the required Project water supply:

- **Alternative 1:** Birch Lake;
- **Alternative 2:** Springpole Lake; and
- **Alternative 3:** Groundwater wells.

There are no other large surface water sources within reasonable proximity to the site that are viable, and municipal water is not available due to the remoteness if of the site. If a fresh water supply is not established, the Project cannot proceed as all of the water needs of the Project cannot by met through re-use and recycling of contact waters. If the Project does not proceed, and the environmental conditions at the site and surrounding area will not be changed from existing (baseline) conditions; and the socioeconomic benefits of the Project will not occur.

Water taken from either surface water or groundwater will be treated to meet the requirements of the particular use. For example, potable water will be treated as necessary so that drinking water quality standards are met.

4.15.1.1 Alternative 1: Birch Lake

Birch Lake is a large regional lake with a surface area of 118 square kilometres (km^2) and a watershed area of approximately 1,050 km^2. The maximum depth is 37 m, with an average depth of 7.4 m. Birch Lake is located north of the Project and is well positioned to provide a water supply by means of a relatively short pipeline (0.6 km). The availability of water from Birch Lake is a function of watershed area and per unit area runoff. Given the very large scale of the lake and the Project needs described above, Birch Lake will be able to meet the Project needs, without a measurable reduction in lake level.

4.15.1.2 Alternative 2: Springpole Lake

Springpole Lake is also a large lake, although smaller than Birch Lake. Springpole Lake has a surface area of 28.6 km^2, watershed area of approximately 98.2 km^2, and a maximum and average depths of 35.1 m and 6.3 m respectively. Springpole Lake would also be able to meet Project needs without a measurable reduction in lake level, although a longer pipeline (1.7 km) would be required to transport the water to the main site area in order to avoid the open pit.

4.15.1.3 Alternative 3: Groundwater Wells

Groundwater wells could be installed to provide water, although groundwater well yields in the site area are limited by the natural low permeability of the bedrock. There are relatively few locations with fractured bedrock or thicker overburden sediments that could potentially support effective water supply wells and for the volume required, multiple well would be needed. This water source may not be able to reasonably meet all of the Project freshwater needs but could potentially assist with the provision of water supply needs during the construction phase, and/or to provide potable water if an appropriate location could be established.

4.15.2 Assessment of Alternatives

All three alternatives identified were carried forward for assessment. Their locations and potential pipeline routings selected to minimize additional land disturbance are shown in Figure 4.15-1.

All alternative assessment criteria and indicators for the performance objectives were considered in the comparative analysis; however, the following performance objectives and criteria were identified as key differentiators:

- Natural environment performance:
- Potential effect on SAR.
- Technical performance:
- Ability to service site; and
- Cost effectiveness.

The results of the alternatives assessment for the primary fresh water supply including for these key differentiating aspects are summarized in Table 4.15-1.

4.15.2.1 Alternative 1: Birch Lake

Advantages: the pipeline and corridor clearing and construction for this alternative will result in limited effects on wildlife and terrestrial habitat, including for SAR. The volume of water taking will not affect lake level and aquatic resources. Birch Lake is large enough that it is a reliable source of water and does not pose a financial or technical risk.

Disadvantages: the required clearing area for this alternative is in Category 1 (high use area) Caribou habitat.

The key mitigation measures that would minimize potential environmental effects at this location are as follows:

- Use standard mitigation measures during construction of in-water works, including to complete construction outside of sensitive fish periods, and employ effective erosion and sediment control measures at and near Birch Lake during construction.
- Design intake infrastructure to meet all regulatory requirements to be protective of fish (e.g., use of fish screens and similar).
- Establish a water-taking structure in a manner that will not materially affect access or use of the waterbody by others.

4.15.2.2 Alternative 2: Springpole Lake

Advantages: the pipeline and corridor clearing and construction for this alternative will result in limited effects on wildlife and terrestrial habitat, including for SAR. The volume of water taking will not affect lake level and aquatic resources. Springpole Lake is large enough that it is a reliable source of water and does not pose a financial or technical risk.

Disadvantages: the required clearing area for this alternative is in Category 1 (high use area) Caribou.

The same key mitigation measures would apply to Alternative 2 as described for Alternative 1.

4.15.2.3 Alternative 3: Groundwater Wells

Advantages: the volume of water taken for this alternative is not anticipated to have affect surface water conditions, aquatic resources, or groundwater levels.

Disadvantages: this alternative requires a greater amount of disturbance to terrestrial habitat and the required clearing area is in Category 1 (high use area) Caribou habitat. It requires an increase to the footprint of the mine and may not be able to provide water at a rate necessary for the mine. It also has an increased cost and is not usually used as the only water supply for a mine. This alternative could also pose a financial risk if the water supply is not as expected.

The key mitigation measures that would minimize potential environmental effects for this source are as follows:

- Avoid placement of wells in sensitive locations; place wells near the PDA and close to other infrastructure (such as the mine access road) if reasonable to minimize creation of new cleared corridors.
- Monitor drawdown during operations to assess potential unexpected effects on the surrounding environment.

4.15.3 Results Summary and Selected Alternative

The Project proposes to re-use and recycle waters captured within the water management system to minimize requirements; however, fresh water will be required. The primary advantages for both Birch Lake and Springpole Lake are that they are very large lakes and can provide the necessary fresh water supply without having a measurable reduction in the lake water level. The Birch Lake location is closer to the process plant, which is the primary water user, resulting in a shorter pipeline which is easier and less costly to build and to operate (lower pumping and energy requirements). The selected fresh water supply alternative for the Project is Alternative 1, taking water from Birch Lake, on balance of advantages and disadvantages, based on the assessment of net effects in Table 4.15-1 with proposed mitigation, including key mitigation measures described briefly in Section 4.15.2.

Table 4.15-1: Assessment of Water Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Birch Lake[2]	Alternative 2: Springpole Lake[2]	Alternative 3: Groundwater Wells[2]
Natural Environment					
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: The quantity of air emissions from the mobile equipment required for infrastructure installation and removal is very low • Op: No effects anticipated from operation as grid power will be used for water pumps	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Cl: The quantity of GHG emissions associated with the installation and removal of the required infrastructure is very low • Op: No GHGs emissions anticipated as grid power will be used for water transfer	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Cl: Potential for short term increases in suspended solids in adjacent waterbodies to be controlled using erosion and sediment control measures, such as silt fencing and turbidity curtains • Op: Surface water quality will not be altered during operation	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Area of fish habitat affected	• Representative of both a coolwater and a coldwater fish community. • Nearshore substrate composition is mostly exposed bedrock and boulders, whereas areas near tributary inflows, sheltered embayments and deeper lake basins have a greater presence of soft fine-grained sediments and aquatic vegetation. • Provides habitat for a diverse fish community, including sportfish species (Burbot, Cisco, Lake Trout, Lake Whitefish, Northern Pike, Rock Bass, Walleye and Yellow Perch) and forage and baitfish species (including Shorthead Redhorse and White Sucker). • Deep basins greater than 12 m are considered important habitat for coldwater fish (Lake Trout and Lake whitefish).	• Con/Cl: Limited in-water infrastructure (i.e., pipeline and intake) is required which will cause disruption of fish habitat at the intake and immediate local area in the order of 50 m^2 • Op: The in-water footprint of the infrastructure (approximately 50 m^2) will continued to be disrupted	• Con/Cl: Limited in-water infrastructure (i.e., pipeline and intake) is required which will cause disruption of fish habitat at the intake and immediate local area in the order of 50 m^2 • Op: The in-water footprint of the infrastructure (approximately 50 m^2) will continued to be disrupted	• Con/Op/Cl: No material effects anticipated as inland waterbodies / fish habitat will be avoided (pipeline would be cross over waterbodies if present along route or use existing infrastructure) and a large drawdown area no expected
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores Springpole Lake species density estimates based on one provincial protocol broadscale monitoring cycle indicate a population density of 0.3 Lake Trout per	• Con/Op/Cl: No effects anticipated because of the type and low area of disturbance, and proposed mitigation measures including that intake infrastructure will meet all regulatory requirements to be protective of fish	• Con/Op/Cl: No effects anticipated because of the type and low area of disturbance, and proposed mitigation measures including that intake infrastructure will meet all regulatory requirements to be protective of fish	• Con/Op/Cl: No effects anticipated as inland waterbodies / fish habitat will be avoided and a large drawdown area no expected

Table 4.15-1: Assessment of Water Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Birch Lake[2]	Alternative 2: Springpole Lake[2]	Alternative 3: Groundwater Wells[2]
		hectare and 2.5 Walleye per hectare • Birch Lake density estimates based on three broadscale monitoring cycles were similar with Lake Trout ranging from 0 to 0.2 fish per hectare and Walleye from 2.4 to 3.1 fish per hectare.	(i.e., use of fish screens and similar)	(i.e., use of fish screens and similar)	
	Ability to maintain conditions for fish passage	• There are no material constraints to fish passage in Birch Lake and Springpole Lake	• Cons/Op/Cl: No effects on waterbodies due to limited water taking volume required compared to the waterbody volumes and with the proposed use of standard construction methods	• Cons/Op/Cl: No effects on waterbodies due to limited water taking volume required compared to the waterbody volumes and with the proposed use of standard construction methods	• Con/Op/Cl: No material effects anticipated as inland waterbodies / fish habitat will be avoided and a large drawdown area no expected
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No direct effects anticipated to groundwater, and no indirect effects as the volume of surface water being taken will not change the lake surface water level causing a potential change in the groundwater level surrounding the lake	• Con/Op/Cl: No direct effects anticipated to groundwater, and no indirect effects as the volume of surface water being taken will not change the lake surface water level causing a potential change in the groundwater level surrounding the lake	• Con/Op: Volume of taking not anticipated to have a material effect on groundwater levels although a measurable local effect may be present in the wells and the immediate area • Cl: No effects as water withdrawal will cease
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA • There are no wetlands present in Birch Lake and Springpole Lake	• Con/Op/Cl: Wetlands could be disturbed to install a pipeline and access road to intake location (anticipated area in the order of 0.5 ha,); however the required infrastructure will be within the disturbed Project footprint resulting in no additional effects on wetlands	• Con/Op/Cl: No material effects anticipated as pipeline and access road to intake will be located in wetlands (<0.1 km length in wetlands)	• Con/Op/Cl: No material effects anticipated as pipeline and access road to intake will be located in wetlands (<0.1 km length in wetlands)
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions • There are no wetlands present in Birch Lake and Springpole Lake	• Con/Op/Cl: The required infrastructure will be within the overall Project footprint and will not cause additional disruption to wetland connectivity	• Con/Op/Cl: No effects are anticipated to wetland connectivity as wetlands will be avoided	• Con/Op/Cl: No effects are anticipated to wetland connectivity as wetlands will be avoided
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities • There are no terrestrial habitat present in Birch Lake and Springpole Lake	• Con: Vegetation clearing required will be within the overall Project footprint and limited additional clearing is required (approximately 0.7 ha total area) • Op/Cl: Habitat disruption will continue until infrastructure removed and area revegetated	• Con: Vegetation clearing required will be within the overall Project footprint and limited additional clearing is required (approximately 1.4 ha total area) • Op/Cl: Habitat disruption will continue until infrastructure removed and area revegetated	• Con: Vegetation clearing will be required to install infrastructure to the wells, although wells will be situated near the mine access road or within the PDA to minimize disruption (approximately 1.9 km pipeline length); disturbance area is undetermined at this time, but may be greater than for Alternatives 1 and 2 • Op/Cl: Habitat disruption will continue until infrastructure removed and area revegetated
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural,	• Con/Cl: No effect anticipated, as there will be only limited (both sound level and duration) noise from the	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator

Table 4.15-1: Assessment of Water Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Birch Lake[2]	Alternative 2: Springpole Lake[2]	Alternative 3: Groundwater Wells[2]
		undeveloped condition	construction and infrastructure removal which will coincide with the Project • Op: No effects anticipated as there will be no noise source		
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies • There is no terrestrial habitat present in Birch Lake and Springpole Lake	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement but as this location is close to the mine, avoidance of the area by wildlife is generally expected	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement but as this location is close to the mine, avoidance of the area by wildlife is generally expected	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement but well location(s) will be close to the mine, and avoidance of the area by wildlife is generally expected
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• Con/Op/Cl: No effects anticipated due to the limited footprint of the required infrastructure or potential for other effects (noted above)	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine, . The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk. • No aquatic SAR have been identified	• Con/Op/Cl: No material effects anticipated as no SAR were observed or otherwise identified as present within or very close to the anticipated infrastructure or intake	• Con/Op/Cl: No material effects anticipated as no SAR were observed or otherwise identified as present within or very close to the anticipated infrastructure or intake	• Con/Op/Cl: No material effects anticipated as locations with known presence of SAR are expected to be avoided (limited SAR were identified as present close to the PDA and none near the potential well area)
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA • No aquatic SAR have been identified	• Con: Required clearing area is located within Category 1 (high use area) (approximately 0.7 ha total area) • Con/Op/Cl: The intake location will be within the PDA and the area may be avoided by Caribou in general	• Con: Required clearing area is located within Category 1 (high use area) (approximately 1.4 ha total area) • Con/Op/Cl: The intake location will be within the PDA and the area may be avoided by Caribou in general	• Con: Required clearing area is located within Category 1 (high use area) (approximately 1.9 km pipeline length) • Con/Op/Cl: As well location(s) will be within or very close to the PDA, the area may be avoided by Caribou in general
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Cl: No effect anticipated, as there will be only limited (both sound level and duration) noise from the construction and infrastructure removal which will coincide with the Project, and related infrastructure will be within or very close to the PDA and additional disruption is not expected, as avoidance of the PDA by wildlife is generally expected • Op: No material effects anticipated as there will be no noise source	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator

Table 4.15-1: Assessment of Water Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Birch Lake[2]	Alternative 2: Springpole Lake[2]	Alternative 3: Groundwater Wells[2]
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies, including Springpole Lake and Birch Lake	• Con/Op/Cl: No effect anticipated as infrastructure will be within or very close to the PDA, as additional disruption is not expected and avoidance of the PDA by wildlife is generally expected (if located outside the PDA wildlife corridors will be avoided)	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Preferred**	**Partially preferred**	**Partially preferred**
	Natural Environment Performance Objectives Assessment		**Preferred**	**Partially preferred**	**Partially Preferred**
			• Adv: Pipeline and corridor clearing and construction will result in limited effects on wildlife and terrestrial habitat including for SAR • Adv: Volume of taking will not have an effect on lake level / aquatic resources, and minimal effect on aquatic habitat • Disadv: Although limited effects on SAR habitat, Category 1 (high use area) Caribou habitat will be crossed	• Adv: Pipeline and corridor clearing and construction will result in limited effects on wildlife and terrestrial habitat including for SAR • Adv: Volume of taking will not have an effect on lake level / aquatic resources, and minimal effect on aquatic habitat • Disadv: Although limited effects on SAR habitat, Category 1 (high use area) Caribou habitat will be crossed	• Adv: Volume of taking not anticipated to have an effect on surface water conditions / aquatics resources, or groundwater levels (except potentially at the well) • Disadv: Pipeline and corridor clearing and construction, and well development will result in limited effects on wildlife including SAR and terrestrial habitat, although greater than other alternatives • Disadv: Although limited effects on SAR habitat, Category 1 (high use area) Caribou habitat will be crossed
Social, Economic, Cultural and Built Environment					
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effects anticipated as there are no private residences near the required infrastructure	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con: Additional noise related to construction may temporarily affect wilderness perception for recreational users although there are no camp / cabin facilities nearby • Con/Op/Cl: No material effects specifically associated with this alternative; there are no camp / cabin facilities nearby	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No effects anticipated as the noise associated with obtaining a fresh water supply will be very low (will not materially increase noise levels) and	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator

Table 4.15-1: Assessment of Water Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Birch Lake[2]	Alternative 2: Springpole Lake[2]	Alternative 3: Groundwater Wells[2]
			will occur at the same time as the overall Project		
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects; no water wells present in Project area	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op: Although limited infrastructure will be present, intake infrastructure and pipeline clearing will be visible from the water and may have an adverse impact on natural aesthetics	• Con/Op: Although limited infrastructure will be present, intake infrastructure and pipeline clearing will be visible from the water and may have an adverse impact on natural aesthetics	• Con/Op/Cl: No effects anticipated as the infrastructure will not be visible from public areas
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: No effects anticipated associated with the water supply as water treatment will be provided appropriate to the source if needed	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Water pipelines are predictably reliable and pipeline is relatively short and will be sited to provide accessibility for inspection	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: No adverse effect to health and safety; limited emissions will be generated during construction, and closure phases; however, will not affect attainment of air quality standards which are protective of health • Op: No effects anticipated from operation of the fresh water supply as grid power will be used for water transfer	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: Siting of water supply location is supportive of producing a high quality drinking water for the Project and additional treatment will be provided to confirm quality if needed	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator

Table 4.15-1: Assessment of Water Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Birch Lake[2]	Alternative 2: Springpole Lake[2]	Alternative 3: Groundwater Wells[2]
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; water source selection does not affect traffic	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes such as Birch Lake and Springpole Lake allow for float plane access	• Con/Op/Cl: Indicator is not applicable to this alternative; as the water supply sources do not affect access	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/Cl: No effects anticipated as the water supply sources are not close to tourism and recreational opportunities	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: Indicator is not applicable to this alternative; provision of water supply will not affect the regional economy	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: No effects anticipated as provision of water supply will not change government services	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission	• Con/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder for pipeline corridor clearing and reclamation • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder for pipeline corridor clearing and reclamation • Con/Op: As Springpole Lake contains Lake Trout, the Lake Trout Policy will need to be met • Con/Op: There are no known conflicts with other resource management objectives that cannot be mitigated through approvals	• Con/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder for pipeline corridor clearing and well locations as needed and reclamation • Con/Op: There are no known conflicts with resource management objectives that cannot be mitigated through approvals

Table 4.15-1: Assessment of Water Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Birch Lake[2]	Alternative 2: Springpole Lake[2]	Alternative 3: Groundwater Wells[2]
		line corridor			
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are distant from withdrawal location	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are distant from withdrawal location	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No material effects anticipated (limited infrastructure will be present; lake intake infrastructure and pipeline clearing will be visible from the water and may have an adverse impact on natural aesthetics) • Con/Op/Cl: Intake is 6.6 km from nearest camp	• Con/Op/Cl: No material effects anticipated (limited infrastructure will be present; lake intake infrastructure and pipeline clearing will be visible from the water and may have an adverse impact on natural aesthetics) • Con/Op/Cl: Intake is 6.8 km from nearest camp	• Con/Op/Cl: No material effects anticipated infrastructure will not be visible from public areas • Con/Op/Cl: Wellfield is 6.8 km from nearest camp
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at the proposed location or pipeline route • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed	• Con/Op/Cl: There are no known archaeological sites at the proposed location or along the proposed pipeline route • Con: Mitigation will be implemented if archaeological sites discovered during construction	• Con/Op/Cl: wells and related infrastructure will be sited to avoid known archaeological sites • There are no known archaeological sites at the proposed location or along the proposed pipeline route • Con: Mitigation will be implemented if archaeological sites discovered during construction
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at the proposed location or pipeline route • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed • Con/Op: Surface water levels and drainage patterns will not be altered	• Con/Op/Cl: No effects; there are no known archaeological sites at the proposed location or pipeline route • Con: Mitigation will be implemented if archaeological sites discovered during construction • Op: Surface water levels and drainage patterns will not be altered	• Con/Op/Cl: No effects; wells and related infrastructure will be sited to avoid known archaeological sites • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed • Op: Surface water levels and drainage patterns will not be altered materially

Table 4.15-1: Assessment of Water Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Birch Lake[2]	Alternative 2: Springpole Lake[2]	Alternative 3: Groundwater Wells[2]
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Reserve is distant from Project	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No material effects anticipated as there is no known disturbance pending receiving additional Traditional Knowledge	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: Although the facility would have a very small footprint, disruption of lands and waters potentially used for Traditional purposes will occur during construction which will continue during operation and into decommissioning •	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially preferred**	**Partially preferred**	**Partially preferred**
			• Neutral: There are very limited anticipated effects on the human environment from the fresh water supply; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are very limited anticipated effects on the human environment from the fresh water supply; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: There are very limited anticipated effects on the human environment from the fresh water supply; there are no differentiating advantages or disadvantages for the criteria and indicators
Technical Objectives					
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Lake intakes / intake water pipelines are commonly used for industrial sites in Ontario and for mines across northern Ontario	• Con/Op/Cl: Lake intakes / intake water pipelines are commonly used for industrial sites in Ontario and for mines across northern Ontario	• Con/Op/Cl: Groundwater is not commonly utilized to support mines in northern Ontario due to the low rate of water supply constraints associated with natural bedrock conditions
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; this form of treatment is commonly used	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Birch Lake is able to provide an effective fresh water supply including for potable water	• Con/Op/Cl: Springpole Lake is able to provide an effective fresh water supply including for potable water	• Con/Op/Cl: Multiple wells and additional infrastructure / disturbance will be required to be able to meet all the freshwater needs
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Pipeline / access road route will be required, to be placed on lands held by FMG, or are Crown lands expected to be accessible on completion of the environmental approvals process	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Preferred**	**Preferred**	**Partially preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Costs for water supply are comparatively low; no material effects anticipated on financing or risk	• Con/Op/Cl: Costs for water supply are comparatively low; no material effects anticipated on financing or risk	• Con/Op/Cl: Costs for water supply are comparatively low; no material effects anticipated on financing or risk

Table 4.15-1: Assessment of Water Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Birch Lake[2]	Alternative 2: Springpole Lake[2]	Alternative 3: Groundwater Wells[2]
					although use of only a groundwater source in a location where large surface water sources are readily available may not be viewed favourably
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Costs for water supply are comparatively low and facilitate a competitive return on investment	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No effects; sufficient water supplies are present locally and do not pose a Project risk	• Con/Op/Cl: No effects; sufficient water supplies are present locally and do not pose a Project risk	• Con/Op/Cl: Use of only a groundwater only water supply may be challenging and could pose a financial risk if the water supply is not as expected / cannot reasonably be provided
	Summary		**Preferred**	**Preferred**	**Partially preferred**
Technical Performance Objective Assessment			**Preferred**	**Preferred**	**Partially preferred**
			• Adv: Provision of water supply for a mine from large lake is reliable and commonly used, and does not pose a financial or technical risk	• Adv: Provision of water supply for a mine from large lake is reliable and commonly used, and does not pose a financial or technical risk	• Adv: Well supply does not pose a financial risk but there will be additional costs • Disadv: Wells are not commonly used as the only water supply for mines and may require multiple wells to be reliable and predictable • Disadv: Use of only a groundwater water supply could pose a financial risk if the water supply is not as expected / cannot reasonably be provided
Amenability to Reclamation (Closure Phase)					
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• Cl: No effects as lake water supply infrastructure does not create safety or security risk and will be removed and affected area rehabilitated	• Cl: No effects as lake water supply infrastructure does not create safety or security risk and will be removed and affected area rehabilitated	• Cl: No effects as well water supply infrastructure does not create safety or security risk and will be removed or decommissioned and sealed to meet regulatory requirements and the affected area rehabilitated
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• Cl: Related infrastructure will be removed or reclaimed to provide for free drainage; no material effects anticipated	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.15-1: Assessment of Water Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Birch Lake[2]	Alternative 2: Springpole Lake[2]	Alternative 3: Groundwater Wells[2]
		• Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes			
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially preferred**	**Partially preferred**	**Partially preferred**
			• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed, ; there are no differentiating advantages or disadvantages for the criteria and indicators (this alternative is expected to be the costliest due to the requirement to seal the wells)
OVERALL ASSESSMENT OF ALTERNATIVE			**PREFERRED (SELECTED ALTERNATIVE)**	**PREFERRED**	**PARTIALLY PREFERRED**
			The primary reason for selecting this alternative is proximity to the main site and the process plant (the primary water user), resulting in lower infrastructure requirements and habitat disturbance, and the ability to provide a reliable supply.	Although this alternative is very similar to the preferred alternative it was not selected as it will require crossing more sensitive SAR habitat and needs longer infrastructure resulting in more habitat disturbance (although within the PDA) and increased cost.	This alternative is considered less preferred as a well water supply will unnecessarily enlarge the footprint of the mine as closer large lake supplies are available, and wells may not be able to provide the necessary water rate for the operation of the mine.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
(2) Water taking is in addition to proposed extensive internal water recycling.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op: operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*

546000 547000 548000 549000 550000 551000 552000

5695000 5694000 5693000 5692000

Birch Lake
Birch Lake
L-1
L-19
Dole Lake
L-20
Alternative 1
Birch Lake
Alternative 2
Springpole
Lake
Potential
Well Area
Springpole Lake
(North Basin)
Springpole Lake
(North Basin)
L-16

X:\CA\CAOAK300-OAK\MIS-FS1-ProjectF\2021\Projects\ONS2104_FMG_Springpole_EIS\11_GIS\EIS\MXD\WaterSupply_Alternatives_4.mxd

LEGEND

- Proposed Mine Feature
- Proposed 230 kV Transmission Line
- Watercourse
- Waterbody
- Contours (5 m interval)

Water Supply Location Alternatives

- Alternative 1 Birch Lake (0.7 km)
- Alternative 2 Springpole Lake (1.4 km)
- Alternative 3 Potential Well Area (1.9 km)

NOTES:
- Contours extracted from 2020 LiDAR survey.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- 230 kV transmission line provided by First Mining Gold, April 2024.

0 0.5 1 2 3 4 5 Kilometres

Datum: NAD83
Projection: UTM Zone 15N

N W E S

First Mining Gold

wsp

SPRINGPOLE GOLD PROJECT

Water Supply Location Alternatives

PROJECT N°: ONS2104 | **FIGURE: 4.15-1**

SCALE: 1:17,000 | DATE: July 2024

4.16 Site Water Management

The requirements for water management are a function of natural topography and watersheds, mine site layout and specific water management requirements related to waters that come into contact with mining facilities. The primary objectives of the Project site water management system are to meet regulatory requirements for discharge and facilitate recycling of water to limit fresh water requirements. The use of a single effluent discharge point to the environment is preferred over the use of multiple discharges to the environment, as the latter presents additional complexity both for management and monitoring and may result in increased environmental disturbance.

A robust system is proposed with internal redundancy to allow management and treatment of minewater, contact runoff water, seepage and process plant effluent during all times of the year. The effluent treatment plant will use industry-proven technologies so that effluent meets all regulatory requirements prior to discharge to the environment.

Given this framework, an integrated and adaptable water management system as described in Section 5.11 is required to achieve these objectives in a sustained and responsive manner. Development and implementation of an integrated system has been proven successful at other northern Ontario mine sites, particularly where open pit mines are present and is considered to be the industry standard. The proposed system will be optimized during the detailed design stage of the Project, in full consideration of comments received through the EA and approvals processes.

A primary component of the integrated site water management system is the CWSP. The CWSP will act as the ultimate collection point for all contact water requiring treatment and provide make-up water to the process plant as needed. Excess water will be pumped to the effluent treatment plant for treatment and subsequent discharge to the environment in accordance with applicable regulatory requirements. Alternative locations are potentially available for the CWSP facility.

4.16.1 Identified Alternatives

The CWSP location must be within a reasonable distance of the facilities that it serves for collection of contact water (e.g., to allow gravity drainage where possible, minimize pumping distance and head). For this purpose, a distance of 2 km from the process plant is a feasible distance associated with operating a water management system in a cold climate based on experience with other operating mine sites. It should be noted that the MDMER require that an assessment of alternatives be completed using the prescribed approach (ECCC 2021) for mineral waste to be approved when over a natural, fish-bearing waterbody. The revised Mine Waste Management Alternatives Assessment (Appendix E) includes an evaluation of the CWSP.

If an effective contact water management system, of which CWSP is part, is not established the Project cannot proceed. This pond is important to the site's water management system and being able to meet Project and regulatory requirements. If the Project does not proceed, and the environmental conditions at the site and surrounding area will not be changed from existing (baseline) conditions, and the socioeconomic benefits of the Project will not occur.

The location of the CWSP is constrained by the placement of other key Project facilities, such as the open pit, process plant, CDF and stockpiles. Placement is further constrained by Birch Lake and Springpole Lake, which are immediately adjacent to the Project site. With these criteria, four alternative locations were identified for the CWSP that met the initial technical requirements of sufficient storage capacity and ability to meet the Project schedule (Figure 4.16-1):

- **Alternative 1:** unnamed lake L-2;

- **Alternative 2:** unnamed lake L-19;
- **Alternative 3:** adjacent to the low grade ore stockpile; and
- **Alternative 4:** adjacent to the mine access road and surficial soil stockpile.

The primary differences amongst the location alternatives are the surface area required, presence of aquatic and/or terrestrial habitat and the need for water-containing structures (embankments).

The MDMER require that an assessment of alternatives be completed using the prescribed approach (ECCC 2021) for mineral waste to be approved when over a natural, fish-bearing waterbody. A revised Mine Waste Management Alternatives Assessment for the Project is provided as Appendix E

4.16.1.1 Alternative 1

Alternative 1 is unnamed lake L-2, which has a surface area of approximately 11.6 ha and a maximum measured depth of 22 m. With this depth, embankments will not be required to meet the storage requirements for the CWSP. The unnamed lake L-2 fish community was assessed during surveys undertaken in spring and summer of 2022 and represents aquatic habitat.

4.16.1.2 Alternative 2

Alternative 2 is unnamed lake L-19, which has a surface area of approximately 16.8 ha and a maximum measured depth of 1.5 m. Hydraulic containment structures (a perimeter embankments) will be required to meet the storage requirements for the CWSP. An embankment of approximately 4 m in height is estimated, which will result in a terrestrial footprint of approximately 3.8 ha and a relatively efficient storage ratio (water storage capacity compared to embankments fill requirement) of 11.4. The unnamed lake L-19 fish community was assessed during surveys undertaken in 2022 and is considered aquatic habitat. A portion of the required embankments construction is on terrestrial habitat.

4.16.1.3 Alternative 3

Alternative 3 does not overprint any waterbodies or watercourses; however, it is located within sensitive Caribou habitat. A hydraulic containment structure would be required to meet the storage requirements at this location, with an embankment height estimated at approximately 7.3 m. The footprint of the facility would be approximately 10.9 ha. With the available area at this location, the facility would be a narrow rectangle, resulting in a relatively low efficiency storage ratio (storage to embankments fill) of 3.7.

4.16.1.4 Alternative 4

Alternative 4 also does not overprint any waterbodies or watercourses but is located in sensitive Caribou habitat. A hydraulic containment structure would be required to meet the storage requirements at this location, with an estimated embankment height of approximately 5 m. The footprint of the facility would be approximately 19.1 ha. There is sufficient space in this area to optimize the facility, with a roughly rectangular shape. The somewhat wider rectangle for this facility results in an efficiency ratio of 4.7.

4.16.2 Assessment of Alternatives

The four potential locations were assessed for all performance objectives as summarized in Table 4.16-1. The alternative methods are similar with respect to the performance objectives except for natural environment and technical performance criteria. All alternative assessment criteria and indicators for the performance objectives were considered in the comparative analysis; however, the following performance objectives and criteria were identified as key differentiators:

- Natural environment performance:
- Potential effect on water quality, fish and aquatic habitat;
- Potential effect on terrestrial species and habitat; and
- Potential effect on SAR.
- Technical performance:
- Ability to service site; and
- Cost effectiveness.

4.16.2.1 Alternative 1

Advantages: this alternative has no additional terrestrial habitat disturbance required, as the site is located between other infrastructure, it would not require expanding the Project footprint. It is located central to the site and is advantageous from the technical perspective, including minimizing need for additional infrastructure and power consumption for pumping. It is also very cost effective as it requires no embankments to provide sufficient water storage. This alternative is commonly used for northern mines.

Disadvantages: the primary disadvantage of this alternative is the disruption of aquatic habitat, as unnamed lake L-2 will be effectively reused for water management.

The key mitigation measures that would minimize potential environmental effects at this location are as follows:

- Obtain approval and remove existing fish for transfer to an appropriate location prior re-use as a water treatment pond.
- Implement a fish habitat offsetting / compensation plan for habitat lost during construction and operations.
- Reclaim the site after Project operations cease.

4.16.2.2 Alternative 2

Advantages: this alternative results in less loss of terrestrial habitat than Alternatives 3 and 4. It is similarly low-cost like Alternative 1, and is commonly used for northern mines.

Disadvantages: A perimeter embankment around lake L-19 will be required to meet the storage requirements for the CWSP, which will result in displacement of terrestrial habitat (approximately 3.8 ha) and aquatic habitat (approximately 16.8 ha). This location would also displace aquatic habitat. The location would expand the Project footprint to the east. It is not located optimally for efficient water management as it is distant from the primary contact water sources.

The key mitigation measures that would minimize potential environmental effects at this location are as follows:

- Obtain approval and remove existing fish for transfer to an appropriate location prior re-use as a water treatment pond.
- Implement a fish habitat offsetting / compensation plan for habitat lost during construction and operations.

- Use standard mitigation measures during construction, including to complete construction outside of sensitive wildlife periods.
- Reclaim the site after Project operations cease.

4.16.2.3 Alternative 3

Advantages: this alternative does not involve displacing aquatic habitat or fish. It is located within the Project footprint and will not require expansion of the footprint.

Disadvantages: With the limited available area at this location, the facility would be a narrow and have a relatively low ratio of water storage to dike requirements (storage to dike fill) of 3.7. Accordingly, the alternative has the high cost of the four alternatives. The pond for this alternative would be constructed in an area identified as sensitive Woodland Caribou habitat.

The key mitigation measures that would minimize potential environmental effects at this location are as follows:

- Re-use NAG mine rock / overburden preferentially to construct the required dikes to minimize rock from a dedicated aggregate source.
- Employ effective erosion and sediment control measures to separate the construction area from unnamed lake L-1 to minimize potential effects.
- Reclaim the site after Project operations cease.

4.16.2.4 Alternative 4

Advantages: this alternative does not involve overprinting any waterbodies or watercourses. It is located adjacent to the mine access road and airstrip, therefore limiting additional disturbance to wildlife.

Disadvantages: this alternative is located in an area identified as sensitive Woodland Caribou habitat. This alternative will also extend the Project footprint farther east. It is not located optimally for water management efficiency as it is distant from the primary contact water sources. This alternative is substantially more costly than Alternatives 1m and 2.

The key mitigation measures that would minimize potential environmental effects at this location are as follows:

- Potentially use the mine access road as part of the pond containment.
- Re-use NAG mine rock / overburden preferentially to construct the required embankments to minimize rock from a dedicated aggregate source.
- Use standard mitigation measures during construction, including to complete construction outside of sensitive wildlife periods.
- Reclaim the site after Project operations cease.

4.16.3 Results Summary and Selected Alternative

The preferred and selected alternative for the CWSP location is Alternative 1 based on the assessment of net effects in Table 4.16-1, with implementation of key mitigation measures described in Section 4.16.2. It is located central to the Project site for optimal efficiency and reduced environmental effects. This alternative also provides the lowest overall cost. Loss of aquatic habitat will be mitigated through fish habitat offsetting and compensation, and there will be no added loss of sensitive Woodland Caribou habitat.

Table 4.16-1: Assessment of Site Water Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Unnamed Lake L-2	Alternative 2: Unnamed Lake L-19	Alternative 3: Location adjacent to Low Grade Ore Stockpile	Alternative 4: Location Adjacent to Surficial Soil Stockpile
Natural Environment						
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: Limited emissions will be generated by heavy equipment use during construction and reclamation; will not affect attainment of air quality standards • Op: No effects during operation	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Cl: Minor GHG emissions will be generated from heavy equipment use during construction and closure phase • Op: No effects during operation	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Cl: Construction and decommissioning activities have the potential to introduce sediment loadings into local watercourses, if not properly managed (sediment and erosion control plan will be in place) • Op: No effects during operation	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Op/Cl: Alternative is a fish bearing pond (Northern Pike, Yellow Perch, Golden Shiner, Common Shiner and Blacknose Shiner were observed); loss of 11.6 ha of fish habitat • Con/Op/Cl: loss of fish habitat will be mitigated through implementation of a fish habitat offsetting / compensation plan	• Con/Op/Cl: Alternative is a fish bearing pond (Bluntnose Minnow, Brook Stickleback, Fathead Minnow, Iowa Darter and Northern Redbelly Dace were observed); loss of 16.8 ha of fish habitat • Con/Op/Cl: loss of fish habitat will be mitigated through implementation of a fish habitat offsetting / compensation plan	• Con/Op/Cl: No effects on fish habitat; no in-water works required • Con: Alternative is very close to Unnamed Lake L-1, and additional erosion and sediment control works may be needed during construction	• Con/Op/Cl: No effects on fish habitat; no in-water works required
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: Fish populations may be affected by the loss of fish habitat, although fish will be relocated in advance from the affected waterbodies	• Con/Op/Cl: Fish populations may be affected by the loss of fish habitat, although fish will be relocated in advance from the affected waterbodies	• Con/Op/Cl: No effects on fish; no in-water works required	• Con/Op/Cl: No effects on fish; no in-water works required
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• Con/Op/Cl: Fish passage will be lost however its minor tributaries also lost through PDA development • Con/Op/Cl: Loss of fish passage will be mitigated through implementation of a fish habitat offsetting / compensation plan	• Con/Op/Cl: Loss of fish passage will be mitigated through implementation of a fish habitat offsetting / compensation plan	• Con/Op/Cl: No effects on fish; no in-water works required	• Con/Op/Cl: No effects on fish; no in-water works required

Table 4.16-1: Assessment of Site Water Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Unnamed Lake L-2	Alternative 2: Unnamed Lake L-19	Alternative 3: Location adjacent to Low Grade Ore Stockpile	Alternative 4: Location Adjacent to Surficial Soil Stockpile
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No disturbance to groundwater required; No effects on groundwater anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Preferred**	**Preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• Con/Op/Cl: No effects anticipated; facility will not be constructed in a wetland	• Con/Op/Cl: No effects anticipated; facility will not be constructed in a wetland	• Con/Op/Cl: No material effects anticipated; a small proportion (0.1 ha) will be constructed in a wetland	• Con/Op/Cl: No material effects anticipated; a small proportion (0.1 ha) will be constructed in a wetland
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• Con/Op/Cl: No material effects anticipated to wetland connectivity as the other nearby wetland will be removed by the Phase 1 open pit	• Con/Op/Cl: No material effects anticipated to wetland connectivity as the other nearby wetland will be removed by the low grade ore stockpile	• Con/Op/Cl: No material effects anticipated; facility will not be constructed near a wetland / no connectivity present	• Con/Op/Cl: No material effects anticipated; facility will not be constructed near a wetland / no connectivity present
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• Con/Op/Cl: No effects anticipated to terrestrial habitat; area is aquatic habitat (lake)	• Con/Op/Cl: Minor effect to terrestrial habitat; loss of 3.8 ha of terrestrial habitat from dam construction	• Con/Op/Cl: Alternative is terrestrial habitat; loss of 10.9 ha of terrestrial habitat (coniferous treed forest)	• Con/Op/Cl: Alternative is terrestrial habitat; loss of x ha of terrestrial habitat (coniferous treed forest)
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No effects anticipated as the associated noise will be very low (will not materially increase noise levels) and will occur at the same time as the overall Project	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: No effects anticipated to terrestrial habitat	• Con/Op/Cl: No material effects anticipated; avoidance of the PDA is expected	• Con/Op/Cl: No material effects anticipated; avoidance of the PDA is expected	• Con/Op/Cl: No material effects anticipated; avoidance of the PDA is expected
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• Con/Op/Cl: No effects anticipated to terrestrial habitat	• Con/Op/Cl: No material effects anticipated; avoidance of the PDA is expected	• Con/Op/Cl: No material effects anticipated; avoidance of the PDA is expected	• Con/Op/Cl: No material effects anticipated; avoidance of the PDA is expected
	Summary		**Preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine,. The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA,	• Con/Op/Cl: A number of terrestrial SAR are known to be present in the region; Lesser Yellowlegs was identified at Alternative W1	• Con/Op/Cl: No SAR species were identified at this alternative location	• Con/Op/Cl: No SAR species were identified at this alternative location	• Con/Op/Cl: No SAR species were identified at this alternative location

Table 4.16-1: Assessment of Site Water Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Unnamed Lake L-2	Alternative 2: Unnamed Lake L-19	Alternative 3: Location adjacent to Low Grade Ore Stockpile	Alternative 4: Location Adjacent to Surficial Soil Stockpile
		SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.				
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Con/Op/Cl: Neutral; waterbodies are considered neutral for Caribou habitat function	• Con/Op/Cl: Although waterbodies are considered neutral for Caribou habitat function, approximately 3.8 ha of Category 1 (high use) Caribou terrestrial habitat will be overprinted (dams) • Con/Op/Cl: The location is near the PDA and the area may be avoided by Caribou in general	• Con/Op/Cl: Located in Category 1 (high use) Caribou habitat (10.9 ha) • Con/Op/Cl: The location is adjacent to the low grade ore stockpile and the area may be avoided by Caribou	• Con/Op/Cl: Located in Category 1 (high use) Caribou habitat (21.1 ha) • Con/Op/Cl: The location is adjacent to the mine access road and airstrip, and the area may be avoided by Caribou
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No material effects anticipated as the associated noise will be very low (will not materially increase noise levels) and will occur at the same time as the overall Project	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Alternative 1 is fully within the main site and will not cause additional disruption to SAR	• Con/Op/Cl: Alternative 2 would extend the PDA; however there would be limited disruption except during the construction and closure phases when heavy equipment are actively used	• Con/Op/Cl: Alternative 3 is fully within the main site and will not cause additional disruption to SAR	• Con/Op/Cl: Alternative 4 would extend the PDA; however it is adjacent to the mine access road / airstrip and a water management pond is not anticipated to cause additional disruption to SAR
	Summary		**Preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Natural Environment Performance Objectives Assessment			**Preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
			• Adv: No loss of terrestrial habitat • Adv: Located within the PDA and will not cause additional terrestrial species disturbance • Adv: Smallest overall surface area which will be mitigated through fisheries habitat compensation plan • Disadv: Will displace aquatic habitat (11.6 ha)	• Adv: Less loss of terrestrial habitat than Alternatives 3 and 4 (but more than Alternative 1) • Disadv: Will displace aquatic habitat (16.8 ha; mitigated through habitat compensation plan) and terrestrial habitat disturbance (3.8 ha) • Disadv: Located in Category 1 (high use) Caribou habitat (3.8 ha) • Disadv: Will expand the PDA further east	• Adv: Will not displace aquatic habitat or fish • Adv: Located within the PDA and will not cause additional wildlife disturbance • Disadv: Pond will be constructed on terrestrial habitat • Disadv: Pond will be constructed on terrestrial habitat / Category 1 (high use) Caribou habitat (10.9 ha)	• Adv: Will not displace aquatic habitat or fish • Adv: Located adjacent to mine access road / airstrip and will cause limited additional disturbance to wildlife • Disadv: Pond will be constructed on terrestrial habitat / Category 1 (high use) Caribou habitat (21.1 ha) • Disadv: Will expand the PDA further east
Social, Economic, Cultural and Built Environment						
	Relative potential change to property value	• The PDA is remote from private	• Con/Op/Cl: No effects; no private	• Con/Op/Cl: There is no difference	• Con/Op/Cl: There is no difference	• Con/Op/Cl: There is no difference

Table 4.16-1: Assessment of Site Water Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Unnamed Lake L-2	Alternative 2: Unnamed Lake L-19	Alternative 3: Location adjacent to Low Grade Ore Stockpile	Alternative 4: Location Adjacent to Surficial Soil Stockpile
Potential Effect on Local Residents and Recreational Users (Social Environment)		residences	residence located at or near Alternative 1	amongst alternatives for this indicator	amongst alternatives for this indicator	amongst alternatives for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with this alternative; there are no camp / cabin facilities nearby	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: No effects; no effect to access	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No effects anticipated as the associated noise will be very low (will not materially increase noise levels) and will occur at the same time as the overall Project	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects; no water wells present at or near Alternative 1	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects; no surface water supplies present at or near Alternative 1	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: No effects; ponds are comment in northern Ontario landscape	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: No adverse effect to health and safety	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Water pipelines are predictably reliable with use of	• Con/Op/Cl: There is no difference amongst alternatives for this	• Con/Op/Cl: There is no difference amongst alternatives for this	• Con/Op/Cl: There is no difference amongst alternatives for this

Table 4.16-1: Assessment of Site Water Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Unnamed Lake L-2	Alternative 2: Unnamed Lake L-19	Alternative 3: Location adjacent to Low Grade Ore Stockpile	Alternative 4: Location Adjacent to Surficial Soil Stockpile
			best management practices for inspections, maintenance and leak detection systems	indicator	indicator	indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: The quantity of air emissions from the mobile equipment required for infrastructure installation and removal is very low and will not impair public health • Op: No effects anticipated from operation of the fresh water supply as grid power will be used for water transfer	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects; no non-Project drinking water supplies present in Project area	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: No effects; no public access will be available within the PDA and limited site traffic associated with Alternative 1	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: Indicator is not applicable to this alternative; water management does not affect access	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**

Table 4.16-1: Assessment of Site Water Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Unnamed Lake L-2	Alternative 2: Unnamed Lake L-19	Alternative 3: Location adjacent to Low Grade Ore Stockpile	Alternative 4: Location Adjacent to Surficial Soil Stockpile
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/Cl: Indicator is not applicable to this alternative; water management does not affect opportunities	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: Indicator is not applicable to this alternative; water management does not affect regional economy	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: Indicator is not applicable to this alternative; power supply does not affect services	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use • Op: This alternative is related to water management and supports water recycling and re-use	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch	• Con/Op/Cl: No effects; camps are distant from location	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.16-1: Assessment of Site Water Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Unnamed Lake L-2	Alternative 2: Unnamed Lake L-19	Alternative 3: Location adjacent to Low Grade Ore Stockpile	Alternative 4: Location Adjacent to Surficial Soil Stockpile
		Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value				
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects; camps are distant from location	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects; camps are distant from location	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near Alternative 1 • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; alternative is an existing pond and no material grading required	• Con/Op/Cl: No effects; alternative is an existing pond and no material grading required	• Con/Op/Cl: No effects anticipated although subsurface work may be required as there are no known archaeological sites at the proposed location or associated pipeline route • Con: Mitigation will be implemented if archaeological sites discovered during construction	• Con/Op/Cl: No effects anticipated although subsurface work may be required as there are no known archaeological sites at the proposed location or associated pipeline route • Con: Mitigation will be implemented if archaeological sites discovered during construction
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Reserve is distant from Project site	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No potential for effects; there are no known sites at or near the PDA	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.16-1: Assessment of Site Water Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Unnamed Lake L-2	Alternative 2: Unnamed Lake L-19	Alternative 3: Location adjacent to Low Grade Ore Stockpile	Alternative 4: Location Adjacent to Surficial Soil Stockpile
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: Disruption to habitats will occur, which will continue during operation and into decommissioning until the site is fully rehabilitated, although with the smallest area, the effect may be less for this alternative	• Con/Op/Cl: Disruption to habitats will occur, which will continue during operation and into decommissioning until the site is fully rehabilitated	• Con/Op/Cl: Disruption to habitats will occur, which will continue during operation and into decommissioning until the site is fully rehabilitated	• Con/Op/Cl: Disruption to habitats will occur, which will continue during operation and into decommissioning until the site is fully rehabilitated
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially preferred**	**Partially Preferred**	**Partially preferred**	**Partially Preferred**
			• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators
Technical Objectives						
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Water management ponds and associated infrastructure are commonly used for industrial sites in Ontario and for mines across northern Ontario • Con/Op/Cl: Water storage capacity can be obtained without use of dams	• Con/Op/Cl: Water management ponds and associated infrastructure are commonly used for industrial sites in Ontario and for mines across northern Ontario • Con/Op/Cl: Reasonable storage to dam volume ratio (11.4) provided	• Con/Op/Cl: Water management ponds and associated infrastructure are commonly used for industrial sites in Ontario and for mines across northern Ontario • Con/Op/Cl: Low storage to dam volume ratio (3.7) make this alternative less efficient	• Con/Op/Cl: Water management ponds and associated infrastructure are commonly used for industrial sites in Ontario and for mines across northern Ontario • Con/Op/Cl: Low storage to dam volume ratio (4.7) make this alternative less efficient
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; this form of water management is commonly used	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Water management is commonly used; Alternative 1 is ideally situated to support these activities	• Con/Op/Cl: Water management is commonly used; although this alternative would be effective it will be less efficient as not ideally situated / not centrally located	• Con/Op/Cl: Water management is commonly used; although this alternative would be effective it will be less efficient as not ideally situated / not centrally located	• Con/Op/Cl: Water management is commonly used; although this alternative would be effective it will be less efficient as not ideally situated / not centrally located
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Alternative is located central to the Project site and limited additional infrastructure will be required	• Con/Op/Cl: Alternative is located outside the PDA and additional infrastructure will be required to access	• Con/Op/Cl: Alternative is located central to the Project site and limited addition infrastructure will be required	• Con/Op/Cl: Alternative is located adjacent to the mine access road and additional infrastructure will be required to access
		Summary	**Preferred**	**Preferred**	**Partially preferred**	**Partially preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Costs for water management are comparatively low; no effects anticipated on financing or risk	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.16-1: Assessment of Site Water Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Unnamed Lake L-2	Alternative 2: Unnamed Lake L-19	Alternative 3: Location adjacent to Low Grade Ore Stockpile	Alternative 4: Location Adjacent to Surficial Soil Stockpile
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Lowest capital costs ($500,000) • Op/Cl: Operating and closure costs are not materially different across alternatives	• Con/Op/Cl: Lower capital costs but similar to Alternative 1 ($760,000) • Op/Cl: Operating and closure costs are not materially different across alternatives	• Con/Op/Cl: Capital costs are considerable higher for this alternative ($2,100,000) • Op/Cl: Operating and closure costs are not materially different across alternatives	• Con/Op/Cl: Capital costs are considerable higher for this alternative ($1,650,000) • Op/Cl: Operating and closure costs are not materially different across alternatives
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No effects; choice of water management location does not pose a Project risk	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Preferred**	**Preferred**	**Partially preferred**	**Partially preferred**
Technical Performance Objective Assessment			**Preferred**	**Preferred**	**Partially preferred**	**Partially preferred**
			• Adv: Commonly used for northern mines • Adv: Lowest capital cost	• Adv: Commonly used for northern mines • Adv: Capital cost comparable to Alternative 1	• Adv: Commonly used for northern mines • Disadv: Capital costs are approximately four times Alternative 1 • Disadv: storage to dam volume ratio is comparatively low	• Adv: Commonly used for northern mines • Disadv: Capital costs are approximately three times Alternative 1 • Disadv: storage to dam volume ratio is comparatively low
Amenability to Reclamation (Closure Phase)						
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• Cl: No effects anticipated from reclamation activities	• Cl: There is no difference amongst alternatives for this indicator	• Cl: There is no difference amongst alternatives for this indicator	• Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• Cl: No material changes to ground conditions as pond currently present; no effects anticipated	• Cl: No material changes to ground conditions as pond currently present; no effects anticipated	• Cl: Passive drainage can be returned during reclamation	• Cl: Passive drainage can be returned during reclamation
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Cl: Location provides aquatic habitat in the baseline condition, which will be returned after rehabilitation; no terrestrial habitat provided	• Cl: Location provides primarily aquatic habitat in the baseline condition, which will be returned after rehabilitation • Cl: limited terrestrial habitat provided after rehabilitation	• Cl: Site to be rehabilitated at closure to terrestrial habitat, in a condition that would be supportive of final land use defined in Closure Plan	• Cl: Site to be rehabilitated at closure to terrestrial habitat, in a condition that would be supportive of final land use defined in Closure Plan
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference amongst alternatives for this indicator	• Cl: There is no difference amongst alternatives for this indicator	• Cl: There is no difference amongst alternatives for this indicator
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference amongst alternatives for this indicator	• Cl: There is no difference amongst alternatives for this indicator	• Cl: There is no difference amongst alternatives for this indicator

Table 4.16-1: Assessment of Site Water Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Unnamed Lake L-2	Alternative 2: Unnamed Lake L-19	Alternative 3: Location adjacent to Low Grade Ore Stockpile	Alternative 4: Location Adjacent to Surficial Soil Stockpile
		low viewer sensitivity, with infrequent viewers for brief time periods				
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
			• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators
OVERALL ASSESSMENT OF ALTERNATIVE			**PREFERRED (SELECTED ALTERNATIVE)**	**PARTIALLY PREFERRED**	**PARTIALLY PREFERRED**	**PARTIALLY PREFERRED**
			The preferred and selected alternative for water management as it is located central to the Project site for optimal efficiency and reduced environmental effects. This alternative also provides the lowest overall cost. Loss of aquatic habitat will be mitigated through compensation.	The alternative for water management as it is outside the Project site and will expand the overall Project footprint to the east. It is not located optimally for water management efficiency. Loss of aquatic habitat will be mitigated through compensation.	This alternative is located within the PDA for reduced environmental effects. This alternative has the highest cost resulting from a need for perimeter hydraulic structures of up to 7.3 m height.	This alternative is located along the mine access road but will expand the Project to the east. It is not located optimally for water management efficiency. This alternative has a high overall cost result from a need for perimeter hydraulic structures of up to 5.0 m height.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = Endangered Species Act; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op: operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*.

546000 547000 548000 549000 550000 551000 552000 553000

5695000 5694000 5693000 5692000

Birch Lake

Birch Lake

Alternative W3

L-1

L-19

Alternative W2

Dole Lake

L-2

Alternative W1

Alternative W4

L-20

Springpole Lake (North Basin)

Springpole Lake (North Basin)

X:\CA\CAOAK300-OAK\MIS-FS1-ProjectF\2021\Projects\ONS2104_FMG_Springpole_EIS\11_GIS\EIS\MXD\Water_Storage_Pond_Alternatives_1.mxd

LEGEND

- Proposed Mine Feature
- Proposed 230 kV Transmission Line
- Watercourse
- Waterbody
- Contours (5 m interval)

Central Water Storage Pond Alternatives

- Alternative Site W1 (12.7 ha)
- Alternative Site W2 (16.7 ha)
- Alternative Site W3 (11.0 ha)
- Alternative Site W4 (21.5 ha)

NOTES:
- Contours extracted from 2020 LiDAR survey.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- 230 kV transmission line provided by First Mining Gold, April 2024.

0 0.5 1 2 3 4 5 Kilometres

Datum: NAD83
Projection: UTM Zone 15N

N W E S

First Mining Gold

wsp

SPRINGPOLE GOLD PROJECT

Central Water Storage Pond Alternatives

PROJECT N°: ONS2104

FIGURE: 4.16-1

SCALE: 1:17,000

DATE: July 2024

4.17 Treated Effluent Discharge Location

Even with the proposed internal water recycling, there will be excess water in the integrated water management system that will require discharge to the environment. The effluent will be treated so that applicable federal and provincial effluent discharge requirements are met, and will be protective of the receiving water aquatic life.

4.17.1 Identified Alternatives

The Project is located adjacent to Birch Lake and Springpole Lake. These are both large lakes that have large assimilative capacities and could potentially receive the treated effluent discharge from the Project. If a location for treated effluent discharge is not established, the Project cannot proceed. If the Project does not proceed, and the environmental conditions at the site and surrounding area will not be changed from existing (baseline) conditions, and the socioeconomic benefits of the Project will not occur. Effluent is proposed to be pumped to a discharge location through an HDPE pipeline, co-located with an access road for maintenance (10 m wide corridor).

In general, effluent discharges to lakes are not preferred if other options are available, as they are naturally less effective at assimilating effluent than riverine receivers, where there is a more defined current to facilitate mixing. The lack of natural mixing in lakes can potentially be mitigated using additional engineering measures, and discharge to a waterbody with high natural mixing capacity is highly beneficial. For this reason, a discharge location within a narrow section of Springpole Lake that has a defined current much like a river, was identified as a potential alternative.

The majority of the watercourses close the Project site are small with limited catchment areas and are not appropriate for the volume of effluent discharge required from the Project. The watercourses would not be able to assimilate the effluent, including having a natural channel of sufficient size to accept the volume of discharge without flooding or excessive erosion. Locations farther away do not provide additional benefit and would result in additional environmental disturbance.

Alternative locations considered for the discharge of treated excess waters from the integrated water management system include locations in the following waterbodies:

- **Alternative 1:** Birch Lake;
- **Alternative 2:** north basin of Springpole Lake; and
- **Alternative 3:** southeast arm of Springpole Lake (Figure 4.17-1).

4.17.1.1 Alternative 1: Birch Lake

A potential discharge location was identified at an outermost point on a peninsula into Birch Lake. This location was identified as potentially offering improved natural mixing over an interior bay location.

4.17.1.2 Alternative 2: North Basin of Springpole Lake

A location was identified near the CDF on the north shore of the north basin of Springpole Lake that would minimize the additional infrastructure and power requirements.

4.17.1.3 Alternative 3: Southeast Arm of Springpole Lake

As the southeast arm of Springpole Lake offers the benefit of natural mixing, and a location was sought that would minimize infrastructure requirements, as well as facilitating ease of construction and operation. The north shore of the southeast arm of Springpole Lake is steep over the majority of its length.

4.17.2 Assessment of Alternatives

The assessment in Table 4.17-1 provides a comparable evaluation for all locations. Additional mitigation will be provided at the selected location if needed to meet regulatory requirements. In all instances, the water discharge structure is anticipated to be developed in a manner that will not materially affect access to or use of the waterbody by others.

All alternative assessment criteria and indicators for the performance objectives were considered in the comparative analysis; however, the following performance objectives and criteria were identified as key differentiators:

- Natural environment performance:
- Potential effect on water quality, fish and aquatic habitat; and
- Potential effect on terrestrial species and habitat.
- Technical performance:
- Ability to service site.

Key mitigation measures that would minimize potential environmental effects for all alternatives are as follows:

- Use standard mitigation measures during construction, including to complete construction outside of sensitive wildlife and fish periods.
- Co-locate the associated pipeline and access road along other infrastructure as practicable to minimize environmental disturbance.
- Monitor lake water quality to confirm model mixing predictions.
    - Reclaim the site after Project operations cease.

4.17.2.1 Alternative 1: Birch Lake

Advantages: this alternative has a shorter length of pipeline corridor, minimizing effects on terrestrial habitat. This alternative has the lowest capital cost for construction.

Disadvantages: this alternative will require more extensive engineering-enhanced mixing to achieve needed mixing results. This would necessitate additional in-water infrastructure and increase the effects on aquatic habitat, although of a relatively minor scale. A new corridor would be required for the pipeline and access road, extending the Project footprint northward into additional terrestrial and SAR habitat including potential effects on Category 1 Caribou habitat.

4.17.2.2 Alternative 2: North Basin of Springpole Lake

Advantages: this pipeline could be located primarily within the proposed Project footprint. This alternative has the second lowest capital cost for construction.

Disadvantages: this alternative will require more extensive engineering-enhanced mixing to achieve needed mixing results. This would necessitate additional in water infrastructure and increase the effects on aquatic habitat, although of a relatively minor scale. This alternative also has potential effects on Category 1 Caribou habitat and has a smaller watershed catchment area, providing reduced overall assimilation capacity and poor mixing ability.

4.17.2.3 Alternative 3: Southeast Arm of Springpole Lake

Advantages: good natural mixing is present in the southeast arm of Springpole Lake because the narrow section has a defined current much like a river. This alternative has strong technical advantages as it will provide the natural mixing of treated effluent over a short distance. This alternative has the highest overall watershed catchment area, providing the greatest overall assimilative capacity.

Disadvantages: this alternative requires a longer pipeline and therefore has the greatest effect on terrestrial habitat, potentially including wetlands and Category 1 Caribou habitat.

4.17.3 Results Summary and Selected Alternative

The preferred and selected alternative for water discharge is Alternative 3, discharge to the southeast arm of Springpole Lake, based on the assessment of key advantages and disadvantages per Table 4.17-1, with implementation of key mitigation measures described Section 4.17.2. The primary reasons are that this location offers the greatest natural effluent mixing and attenuation, as well as the highest overall watershed / catchment area and resultant overall assimilative capacity. The specific location of the discharge will be refined during detailed engineering in full consideration of regulatory advice.

Table 4.17-1: Assessment of Treated Effluent Discharge Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Discharge to Birch Lake Basin	Alternative 2: Discharge to Springpole Lake North Basin	Alternative 3: Discharge to Southeast Arm of Springpole Lake
Natural Environment					
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: Limited affect on air quality from construction and reclamation of related infrastructure • Op/Cl: No effect on air quality from effluent discharge	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Cl: Limited GHG emissions from construction and reclamation of related infrastructure • Op/Cl: No GHG emissions from effluent discharge	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Cl: Limited affect on water quality from construction and reclamation of related infrastructure • Op/Cl: Effluent discharge will meet all regulatory requirements • Op/Cl: Larger overall watershed / catchment area at the discharge location (approximately 188 km^2) provides increased overall assimilative capacity • Op/Cl: A mixing zone is expected to be required at the discharge location prior to attainment of PWQO or equivalent	• Con/Cl: Limited affect on water quality from construction and reclamation of related infrastructure • Op/Cl: Effluent discharge will meet all regulatory requirements • Op/Cl: Low overall watershed / catchment area at the discharge location (2.5 km^2), providing substantially reduced overall assimilative capacity • Op/Cl: A mixing zone is expected to be required at the discharge location prior to attainment of PWQO or equivalent	• Con/Cl: Limited affect on water quality from construction and reclamation of related infrastructure • Op/Cl: Effluent discharge will meet all regulatory requirements • Op/Cl: Largest overall watershed / catchment area at the discharge location (1,308 km^2), providing increased overall assimilative capacity • Op/Cl: The smallest mixing zone is expected to be required at the discharge location prior to attainment of PWQO or equivalent; however the narrowing of the lake at this location presents great opportunities for natural mixing of the treated effluent
	Area of fish habitat affected	• Representative of both a coolwater and a coldwater fish community. • Nearshore substrate composition is mostly exposed bedrock and boulders, whereas areas near tributary inflows, sheltered embayments and deeper lake basins have a greater presence of soft fine-grained sediments and aquatic vegetation. • Provides habitat for a diverse fish community, including sportfish species (Burbot, Cisco, Lake Trout, Lake Whitefish, Northern Pike, Rock Bass, Walleye and Yellow Perch) and forage and baitfish species (including Shorthead Redhorse and White Sucker). • Deep basins greater than 12 m are considered important habitat for coldwater fish (Lake Trout and Lake whitefish)	• Con/Op/Cl: Limited in-water infrastructure is expected to be required (i.e., pipeline and diffuser) • Con/Op/Cl: Potential fish habitat disruption at the discharge location during construction, operations and decommissioning activities	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.17-1: Assessment of Treated Effluent Discharge Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Discharge to Birch Lake Basin	Alternative 2: Discharge to Springpole Lake North Basin	Alternative 3: Discharge to Southeast Arm of Springpole Lake
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores Springpole Lake species density estimates based on one provincial protocol broadscale monitoring cycle indicate a population density of 0.3 Lake Trout per hectare and 2.5 Walleye per hectare • Birch Lake density estimates based on three broadscale monitoring cycles were similar with Lake Trout ranging from 0 to 0.2 fish per hectare and Walleye from 2.4 to 3.1 fish per hectare.	• Con/Op/Cl: Treated effluent will meet regulatory requirements for water quality; No material effects anticipated • Con/Op/Cl: Discharge infrastructure will meet all regulatory requirements to be protective of fish (i.e., use of fish screens and similar)	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain conditions for fish passage	• There are no material constraints to fish passage in Birch Lake, Springpole Lake or the Southeast Arm of Springpole Lake	• Con/Op/Cl: Water discharges will result in a flow at the discharge location up to the approved discharge limit, but will not materially affect fish passage	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects anticipated as treated effluent will be discharged	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• Con/Op/Cl: No material effects anticipated; very limited wetlands are present along the pipeline routing (<0.1 km length through wetlands)	• Con/Op/Cl: There is the potential for disturbance to a limited area of wetlands during construction as they are present along the pipeline routing (0.7 ha) as the pipeline is expected to be supported by a gravel access road	• Con/Op/Cl: There is the potential for disturbance to a limited area of wetlands during construction as they are present along the pipeline routing (1 ha) as the pipeline is expected to be supported by a gravel access road
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• Con/Op/Cl: No material effects anticipated; very limited wetlands are not present along the pipeline routing (<0.1 km); no effect to connectivity • Con/Op/Cl There is the potential for interference with wetland connectivity present along the pipeline routing as the pipeline is expected to be supported by a gravel access road; this can be mitigated by use of culverts and other means	• Con/Op/Cl: No material effects anticipated; limited wetlands are not present along the pipeline routing (<0.7 km); no effect to connectivity • Con/Op/Cl There is the potential for interference with wetland connectivity present along the pipeline routing as the pipeline is expected to be supported by a gravel access road; this can be mitigated by use of culverts and other means	• Con/Op/Cl: No material effects anticipated; limited wetlands are not present along the pipeline routing (<1.0 km); no effect to connectivity • Con/Op/Cl There is the potential for interference with wetland connectivity present along the pipeline routing as the pipeline is expected to be supported by a gravel access road; this can be mitigated by use of culverts and other means
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• Con/Op/Cl: Vegetation clearing will be required to install the pipeline and access road; shorter pipeline routing results in a more limited area of vegetation clearing (approximately 3.5 ha)	• Con/Op/Cl: Vegetation clearing will be required to install the pipeline and access road; shorter pipeline routing results in a more limited area of vegetation clearing (approximately 4.2 ha), with a majority of the length positioned within the mine site	• Con/Op/Cl: Greatest amount of vegetation clearing will be required to install the pipeline and access road as this is the longest route (approximately 9.4 ha)

Table 4.17-1: Assessment of Treated Effluent Discharge Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Discharge to Birch Lake Basin	Alternative 2: Discharge to Springpole Lake North Basin	Alternative 3: Discharge to Southeast Arm of Springpole Lake
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Pipeline and access road are partially outside the mine site footprint and is anticipated to cause additional disruption during construction	• Con/Op/Cl: Pipeline and access road are almost entirely within the existing mine site and is not anticipated to cause additional disruption during construction, operations or closure	• Con/Op/Cl: Pipeline and access road are partially outside the mine site footprint and are anticipated to cause additional disruption primarily during construction
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement; as this location is closer to the mine, avoidance of the area by wildlife is generally expected	• Con/Op/Cl: Pipeline and access road are almost entirely within the mine site footprint and are not anticipated to cause additional disruption during construction, operations or closure	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement as the location is outside the mine site • Con/Op/Cl: Disruption is anticipated to be minimized by burial of the pipeline
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• Con/Op/Cl: No material effects anticipated although there may be disturbance primarily during construction and closure	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Preferred**	**Preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine, . The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk. • No aquatic SAR have been identified	• Con/Op/Cl: No SAR have been identified at or near this potential water discharge pipeline route • Con/Op/Cl: No aquatic SAR have been identified at or near the proposed discharge location	• Con/Op/Cl: A Bald Eagle nest has been identified at or near this potential water discharge pipeline route at proposed access / haul road • Con/Op/Cl: No aquatic SAR have been identified at or near the proposed discharge location	• Con/Op/Cl: No SAR have been identified at or near this potential water discharge pipeline route • Con/Op/Cl: No aquatic SAR have been identified at or near the proposed discharge location
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA • No aquatic SAR have been identified	• Con/Op/Cl: Category 1 (high use area) will be crossed north of the Project site closer to the potential discharge location footprint (the entire, 3.5 km pipeline length) • Con/Op/Cl: The discharge location is closer to the mine site and the area may in general be avoided by Caribou	• Con/Op/Cl: Category 1 (high use area) will be crossed north of the Project site closer to the potential discharge location footprint (the entire, 4.2 km pipeline length) • Con/Op/Cl: The discharge location is closer to the mine site and the area may in general be avoided by Caribou	• Con/Op/Cl: Category 1 (high use area) will be crossed north of the Project site closer to the potential discharge location footprint (the entire, 9.4 km pipeline length)
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Pipeline and access road are partially outside the Project site and is anticipated to cause additional disruption during construction and closure (limited effect during operations) to SAR, as the discharge lake is on a land extension within Birch Lake	• Con/Op/Cl: Pipeline and access road are almost entirely within the Project site and is not anticipated to cause additional disruption to SAR during construction, operations or closure	• Con/Op/Cl: Pipeline and access road are partially outside the main site and are anticipated to cause additional disruption to SAR primarily during construction and decommissioning

Table 4.17-1: Assessment of Treated Effluent Discharge Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Discharge to Birch Lake Basin	Alternative 2: Discharge to Springpole Lake North Basin	Alternative 3: Discharge to Southeast Arm of Springpole Lake
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement; as this location is closer to the mine, avoidance of the area by SAR is generally expected	• Con/Op/Cl: Pipeline and access road are almost entirely within the PDA and are not anticipated to cause additional disruption during construction, operations or closure	• Con/Op/Cl: Pipeline and access road may cause a disruption to existing wildlife movement, particularly during construction, as the location is outside the main site • Con/Op/Cl: Disruption is anticipated to be minimized during operations by burial of the pipeline
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Natural Environment Performance Objectives Assessment			**Partially preferred**	**Partially preferred**	**Preferred**
			• Adv: Shorter length of pipeline corridor minimizing direct effects on terrestrial habitat • Disadv: Potential effects on Category 1 (high use area) Caribou habitat • Disadv: Larger overall watershed / catchment area at the discharge location, providing increased overall assimilative capacity; however poor mixing ability as discharge is into a lake	• Adv: Shorter length of pipeline corridor minimizing direct effects on terrestrial habitat; not expected to affect wetland habitat • Disadv: Potential effects on Category 1 (high use area) Caribou habitat • Disadv: Low overall watershed / catchment area at the discharge location, providing substantially reduced overall assimilative capacity and poor mixing ability as discharge is into a lake	• Adv: Greatest natural effluent mixing / attenuation, as the discharge is into a channelized section of a lake • Adv: Highest overall watershed / catchment area at the discharge location, providing greatest overall assimilative capacity • Disadv: Longer length of pipeline corridor with greatest direct effects on terrestrial habitat including potentially wetlands and Category 1 (high use area) Caribou habitat
Social, Economic, Cultural and Built Environment					
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: Having an effluent discharge into a local waterbody (despite high quality of effluent) could be viewed negatively by local property owners	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con: Additional noise related to construction may temporarily affect wilderness perception for recreational users although there are no camp / cabin facilities nearby • Con/Op/Cl: Having an effluent discharge into a local waterbody (despite high quality of effluent) could be viewed negatively for the wilderness experience	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.17-1: Assessment of Treated Effluent Discharge Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Discharge to Birch Lake Basin	Alternative 2: Discharge to Springpole Lake North Basin	Alternative 3: Discharge to Southeast Arm of Springpole Lake
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No effects anticipated as the noise associated with the discharge location will be very low (will not materially increase noise levels) and will occur at the same time as the overall Project	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects; no water wells present in Project area	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: Although limited infrastructure will be present at discharge point, discharge infrastructure and pipeline clearing will be visible from the water and may have an adverse impact on natural aesthetics	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: Treatment produces high quality final effluent: no potential for effects on local residents or recreational users	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Discharge pipelines are predictably reliable with use of best management practices for inspections, maintenance and leak detection systems	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: Limited affect on air quality from construction and reclamation of related infrastructure which will not affect attainment of air quality standards which are protective of health • Op/Cl: No effect on air quality from effluent discharge	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no material difference between Alternatives 1, 2 and 3 for this indicator
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated	• Con/Op/Cl: No effects; no drinking water supplies present in Project area	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.17-1: Assessment of Treated Effluent Discharge Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Discharge to Birch Lake Basin	Alternative 2: Discharge to Springpole Lake North Basin	Alternative 3: Discharge to Southeast Arm of Springpole Lake
		suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples			
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; effluent discharge does not affect traffic	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: Having an effluent discharge into a local waterbody (despite high quality of effluent) could be viewed negatively by local property owners	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: Indicator is not applicable to this alternative; effluent discharge does not affect access	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/Cl: No material effects anticipated; potential for local concern for recreational activities near discharge location	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: Indicator is not applicable to this alternative; effluent discharge location does not affect the regional economy	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: Indicator is not applicable to this alternative; effluent discharge location does not affect services	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan	• Con/Op/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder for corridor clearing • Con/Op/Cl: There are no known conflicts with resource management	• Con/Op/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder for corridor clearing • Con/Op/Cl: As Springpole Lake contains lake trout, the Lake Trout Policy will	• Con/Op/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder for corridor clearing • Con/Op/Cl: As Springpole Lake contains lake trout, the Lake Trout Policy will

Table 4.17-1: Assessment of Treated Effluent Discharge Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Discharge to Birch Lake Basin	Alternative 2: Discharge to Springpole Lake North Basin	Alternative 3: Discharge to Southeast Arm of Springpole Lake
		• Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	objectives that cannot be mitigated through approvals	need to be met • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	need to be met • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are distant from discharge location (4.9 km away)	• Con/Op/Cl: No effects anticipated; camps are distant from discharge location (6.5 km away)	• Con/Op/Cl: No effects anticipated; camps are distant from discharge location (5.1 km away)
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are distant from discharge location	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are distant from discharge location	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at the proposed location or along pipeline route • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.17-1: Assessment of Treated Effluent Discharge Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Discharge to Birch Lake Basin	Alternative 2: Discharge to Springpole Lake North Basin	Alternative 3: Discharge to Southeast Arm of Springpole Lake
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at the proposed location or pipeline route • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed • Con/Op: Surface water levels and drainage patterns will not be altered	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Reserve is distant from Project	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No potential for effects; there are no known sites along the proposed routes	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator	• Con/Op/Cl: Treated effluent will meet regulatory requirements, and potential pictograph sites are located further downstream; effects to pictographs not anticipated.
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: Disruption to habitats will occur due the development of the pipelines and discharge, which will continue during operation and into decommissioning until the site is fully rehabilitated, although with the shortest pipeline length, the effect may be less for this alternative	• Con/Op/Cl: Disruption to habitats will occur due the development of the pipelines and discharge, which will continue during operation and into decommissioning until the site is fully rehabilitated, although the effect may be similar to Alternative a	• Con/Op/Cl: Disruption to habitats will occur due the development of the pipelines and discharge, which will continue during operation and into decommissioning until the site is fully rehabilitated, although with the longest pipeline length, the effect may be greatest for this alternative
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially preferred**	**Partially preferred**	**Partially preferred**
			• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators
Technical Objectives					
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Effluent discharge pipelines are commonly used for industrial sites in Ontario and for mines across northern Ontario • Con/Op/Cl: Contingency measures (such as leak detection systems) can be incorporated into the pipeline design to maintain pipeline integrity at all times	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; this form of treatment is commonly used	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.17-1: Assessment of Treated Effluent Discharge Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Discharge to Birch Lake Basin	Alternative 2: Discharge to Springpole Lake North Basin	Alternative 3: Discharge to Southeast Arm of Springpole Lake
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Effluent discharges into lakes may require additional measures to provide effective mixing with existing lake waters	• Con/Op/Cl: Effluent discharges into lakes may require additional measures to provide effective mixing with existing lake waters	• Con/Op/Cl: Location provides for better natural effluent mixing at discharge location due to the river-like flow conditions
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Pipeline / access road route will be required, to be placed on lands held by FMG, or are Crown lands expected to be accessible on completion of the environmental approvals process	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Could be perceived as more challenging to gain approval as it is located in the Birch Lake watershed and a lake receiver, potentially affecting financing	• Con/Op/Cl: Could be perceived as more challenging to gain approval as it is a lake receiver, potentially affecting financing	• Con/Op/Cl: No material effects anticipated on financing
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Overall cost of the discharge pipeline and related infrastructure is not expected to be Project limiting • Con/Op/Cl: Shorter route (3.5 km) resulting in lower capital costs based on unit rate per kilometre	• Con/Op/Cl: Overall cost of the discharge pipeline and related infrastructure is not expected to be Project limiting • Con/Op/Cl: Shorter route (4.2 km) resulting in lower capital costs based on unit rate per kilometre	• Con/Op/Cl: Overall cost of the discharge pipeline and related infrastructure is not expected to be Project limiting • Con/Op/Cl: Longest route (9.3 km) resulting in the highest capital costs based on unit rate per kilometre
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No material effects anticipated on financial risk	• Con/Op/Cl: No material effects anticipated on financial risk	• Con/Op/Cl: Alternative best able to comply with anticipated, stringent final effluent standards potentially reducing financial risk
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
		Technical Performance Objective Assessment	**Partially preferred**	**Partially preferred**	**Preferred**
			• Adv: Lowest capital cost for construction based on overall length • Disadv: Effluent discharges into lakes may require additional measures to provide effective mixing with existing lake waters • Disadv: Potential concerns could be raised regarding discharge into Birch Lake, and into a lake receiver	• Adv: Lower capital cost for construction based on overall length • Disadv: Effluent discharges into lakes may require additional measures to provide effective mixing with existing lake waters • Disadv: Potential concerns could be raised regarding discharge into Springpole Lake, and into a lake receiver	• Adv: Discharge to this location is anticipated to be provide the best effluent mixing in a very short distance • Adv: the narrow channel provides the best location for effluent mixing and as such, could provide a lower risk location with respect to obtaining environmental approvals • Disadv: Highest capital cost for construction based on overall length
Amenability to Reclamation (Closure Phase)					
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• Cl: A quality effluent will be discharged: no potential for effects during closure or post closure	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• Cl: Related infrastructure will be removed or reclaimed to provide for free drainage; no effects anticipated	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator

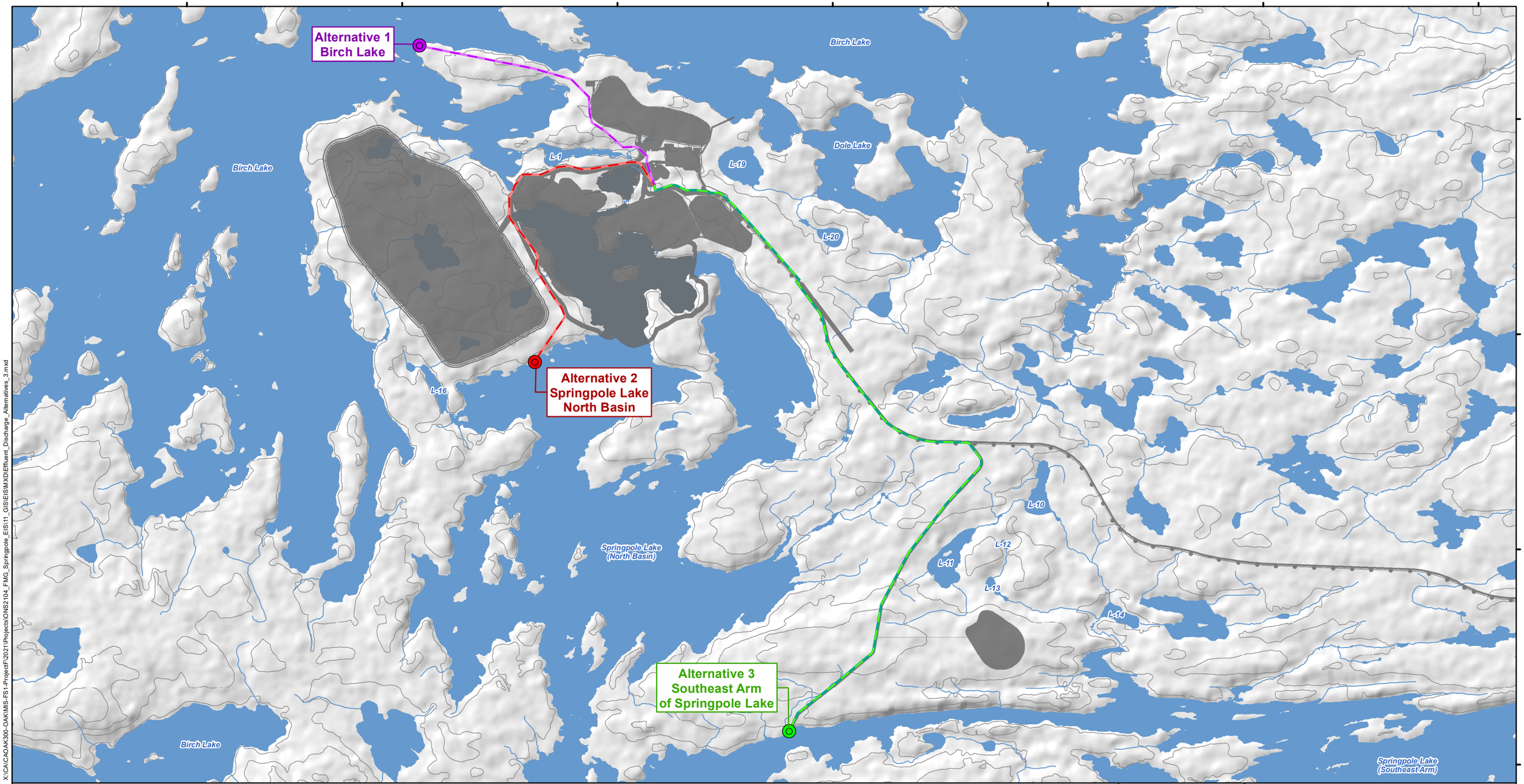
Table 4.17-1: Assessment of Treated Effluent Discharge Location Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Discharge to Birch Lake Basin	Alternative 2: Discharge to Springpole Lake North Basin	Alternative 3: Discharge to Southeast Arm of Springpole Lake
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
	Amenability to Reclamation Performance Objective Assessment		**Partially preferred**	**Partially preferred**	**Partially preferred**
	Amenability to Reclamation Performance Objective Assessment		• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators
	OVERALL ASSESSMENT OF ALTERNATIVE		**PARTIALLY PREFERRED**	**PARTIALLY PREFERRED**	**PREFERRED (SELECTED ALTERNATIVE)**
			This alternative is not preferred primarily for technical reasons; effluent mixing is more challenging within lakes and can result in a larger mixing zone.	This alternative is not preferred primarily for technical reasons; effluent mixing is more challenging within lakes and can result in a larger mixing zone.	The primary reasons are that this location offers the greatest natural effluent mixing and attenuation, as well as the highest overall watershed / catchment area and resultant overall assimilative capacity. This does come at a higher cost associated with the greater infrastructure requirements. The specific location of the discharge will be refined during detailed engineering in full consideration of regulatory advice.

Notes:

(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.

Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op: operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act.*



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LEGEND

- Proposed Mine Feature
- Proposed 230 kV Transmission Line
- Watercourse
- Waterbody
- Contour (10 m intervals)

Treated Effluent Discharge Location Alternatives

- Alternative 1 Birch Lake (3.5 km)
- Alternative 2 Springpole Lake North Basin (4.2 km)
- Alternative 3 Southeast Arm of Springpole Lake (9.4 km)

NOTES:
- Topographic information extracted from LIO, MNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- 230 kV transmission line provided by First Mining Gold, April 2024. 27 September 2021.

0 1 2 4 6 8 10 Kilometres

Datum: NAD83
Projection: UTM Zone 15N

N W E S

First Mining Gold

wsp

SPRINGPOLE GOLD PROJECT

Treated Effluent Discharge Location Alternatives

PROJECT N°: ONS2104 | **FIGURE: 4.17-1**

SCALE: 1:42,000 | DATE: July 2024

4.18 Site Access

The Project site is remote and there is currently no permanent land access. The closest existing road to the site is the Wenasaga Road, which ends near the existing bridge across the Birch River and comes to within approximately 18 km of the Project site. The Wenasaga Road is a publicly owned road currently used for mostly regional forestry activities. The Project site is only accessible by floatplane during the open water season and by ice road for a short period of time in the winter.

4.18.1 Identified Alternatives

Site access was identified in the EIS Guidelines and ToR (Appendices B-1 and B-3) as a Project component to be considered in the EIS/EA. Options for a reasonable range of viable alternatives that satisfy the questions presented in Section 4.1.1 for site access the final EIS/EA, including using information from the following sources:

- Workshops, meetings and discussions;
- Consultation on the draft EIS/EA; and
- Professional experience and expertise.

However, a reasonable range of viable alternatives could not be identified for this component, as an all-season access road is required to access the Project site.

4.18.2 Rationale for Approach

Use of an all-season airstrip alone is not a viable alternative. Very large and heavy equipment is required to construct, operate and close an open pit mine. Shipment of materials by air only to develop a mine could not be financially supported by the Project.

An assessment was made as to whether the Project could be supported by a winter (ice) road in combination with an all-season airstrip. Winter road / airstrip combinations are used to access a limited number of mine sites in Canada; however, all of these mines are located farther north than the Project site. The potential effectiveness of a primary winter road access over the life of mine is of concern given that shorter winters are becoming more prevalent in northern Ontario and winter roads have become more unpredictable and unsafe for travel. A determination was made that a seasonal winter road and airstrip could not effectively meet the access needs for construction, operation and decommissioning of the Project and is not a viable alternative in accordance with Section 4.1.1.

The airstrip would be co-located along the mine access road to transport personnel and equipment to the site on a less frequent basis. Development of the airstrip along with the proposed helicopter pad would also support faster emergency response, which is important for a more remote operation. Co-locating the airstrip with the site mine access road and the mine site will minimize additional footprint expansion and potential environmental effects. This provides the most flexibility to meet the Project needs and is carried forward into Section 5.

4.19 Mine Access Road Route

An all-season gravel road will be constructed to connect the Project site with the existing regional road network. The general design assumption used for the mine access road was that waterbodies should be avoided as feasible, a flatter topography and straight site lines is preferred including for safety reasons, and a shorter distance is generally preferred including to minimize overall terrestrial disturbance.

The closest existing road to the site is the Wenasaga Road, which ends near the existing bridge across the Birch River, and comes within approximately 18 km of the Project site. FMG is aware of the local interest in improving community road access and will collaborate with communities and government on their initiatives outside of the EA process to determine where synergies can be found.

Multiple potential locations for connection of a mine access road to the Wenasaga Road were identified. The presence of many large and small waterbodies close to site, and in particular the southeast arm of Springpole Lake, restricts the number of feasible alternative road routes. An engineering review determined that crossing the southeast arm of Springpole Lake, even at its narrowest (such as near the proposed effluent discharge location, approximately 340 m near top of banks) is not economically feasible and would be technically challenging. Technical issues associated with a potential bridge across Springpole Lake at that location include the very high, steep slopes on both shorelines; however, given the considerable length of road required, a viable route that crossed Springpole Lake could not be identified through engineering studies.

4.19.1 Identified Alternatives

Four viable alternative routes for the mine access road were identified for detailed review (Figure 4.19-1 and Figure 4.19-2):

- **Alternative 1 (17.8 km length):** travels northwest from the end of the Wenasaga Road to site;
- **Alternative 3 (28.1 km length):** travels northwest from a connection point further south on the Wenasaga Road, along the northern shore of Seagrave Lake to the western end of Springpole Lake and north to site;
- **Alternative 4 (28.2 km length):** travels north from a minor road much further south off the Wenasaga Road; and
- **Alternative 5 (18.5 km length):** travels northwest from the end of the Wenasaga Road to site, closer to the southeast arm of Springpole Lake.

None of these alternative routes require a crossing of the southeast arm of Springpole Lake.

Alternative 2 was a similar option to Alternative 1 and 5, but included a northern radial extension (west of Durkin Lake, south of Keigat Lake and east of Birch Lake). Alternative 2 was initially considered and consulted upon during preparation of the draft EIS/EA; however, after additional consultation and technical assessment, it was determined that this preliminary route did not provide any benefit over Alternative 1 and was 7 km longer. Alternative 2 was therefore removed from further consideration and was not considered in the assessment of alternatives for the mine access road route.

The approximate lengths for the mine access road route alternatives are provided in Table 4.19-1.

Table 4.19-1: Summary of Characteristics for the Mine Access Road Route Alternatives

	Total Length (km)	Number of Water Crossings	Length in Wetlands (km)	Length in Classified Caribou Habitat (km)		
				Category 1	Category 2	Total
Alternative 1	17.8	1	3.8	15.4	2.4	17.8
Alternative 3	28.1	11	5.3	16.4	11.7	28.1
Alternative 4	28.2	15	8.7	12.5	13.6	26.1
Alternative 5	18.5	5	4.9	16.8	1.7	18.5

The Project cannot proceed without a mine access road (Section 4.18) and mine access road route. The existing environmental conditions would be unchanged if the Project did not proceed; however, the socioeconomic benefits of the Project would also not occur.

4.19.1.1 Alternative 1

Alternative 1 is the most direct route from the existing all-season road network (Wenasaga Road) and has the shortest length, resulting in the lowest area of terrestrial disturbance. This alternative route was optimized after submission of the draft EIS/EA and does not require any new major crossings of watercourses / waterbodies, and is co-located with the transmission line route for the Project, reducing the overall footprint. This route does not pose a conflict with other site facilities, including haul truck traffic, and enables better safety and security at the site for offsite vehicles and deliveries. In addition, it is located primarily on higher ground, thereby requiring fewer water crossings and having reduced potential effects on natural drainage paths and wetlands.

4.19.1.2 Alternative 3

The Alternative 3 route is one of the longest and crosses the greatest length of Category 1 habitat for Woodland Caribou. An approximately 45 m wide bridge is required at Cromarty Lake, which may pose a navigation constraint, but is expected to be feasible from an engineering and cost perspective. As this route enters the Project site from the west, it must pass immediately adjacent to the CDF and open pit. There are safety concerns regarding the ability to maintain separation between very large haul trucks and offsite vehicles including delivery vehicles. Traffic on the mine access road would need to be held back before, during and after every blast in the open pit. Of greater safety concern, however, is the anticipated conflict that will occur during the construction of the CDF embankments. There will a large number of haul trucks crossing the area at a high frequency rate at the same time that deliveries to site will be at a peak.

This alternative route also does not generally support co-locating with the proposed transmission line, as a parallel transmission line corridor would require placing the transmission line within the blast zone of the open pit, which is not acceptable. If the transmission line were to cross the southeast arm of Springpole Lake, partial co-locating the road and mine access road south of Springpole Lake would be possible.

4.19.1.3 Alternative 4

A western route was identified that connects to the regional road network at a minor road that is connected to the Wenasaga Road further southwest of the Project site. The route is of similar length to Alternative 3, and crosses a similar amount of Caribou habitat, but does not require a major bridge crossing. Like Alternative 3, having the site access road route adjacent to the CDF and open pit is not operationally viable. In addition, there is no reasonable potential for co-locating the transmission line with the road, as it would add 55 km to the Project transmission line because it needs to connect with the Wataynikaneyap Power 230 kilovolt (kV) transmission line (which is located to the east of the Project).

4.19.1.4 Alternative 5

Alternative 5 is similar to Alternative 1, and is also a direct route from the existing all-season road network (Wenasaga Road). It is of similar length, resulting in one of the lowest areasof terrestrial disturbance. It does not require any new major crossings of watercourses / waterbodies. Similar to Alternative 1, as the route enters the site from the east, it does not pose a conflict with other site facilities. Unlike Alternative 1, Alternative 5 requires crossing lower-lying areas and watercourses, which is not preferred for constructability or for maintenance of natural flow conditions. This alternative travels closer to known heritage value pictographs and the TLRU area (Springpole Lake).

4.19.2 Assessment of Alternatives

The alternatives were assessed for all performance objectives, criteria and indicators; however, the following performance objectives and criteria were identified as the key differentiators (Table 4.19-2):

- Natural environment performance:
- Potential effect on air quality and climate;
- Potential effect on terrestrial species and habitat; and
- Potential effect on SAR.
- Social, economic, cultural and built Environment
- Potential effect on local residents and recreational users (social environment);
- Potential effect on infrastructure (built environment);
- Potential effect on public health and safety (social environment); and
- Potential effect on Indigenous communities (cultural environment).
- Technical performance:
- Ability to service site; and
- Cost effectiveness.

All alternatives avoid larger waterbodies, although they will require watercourse crossings and will also need cross-drainage culverts, including to maintain wetland connectivity. The advantages of Alternatives 1 and 5, and of Alternatives 3 and 4, are in summary similar, and for that reason are described together in the bullets below.

Key mitigation measures that would minimize potential environmental effects for all routes are as follows:

- Obtain and implement requirements of an Overall Benefit Permit for effects on SAR including habitat effects.
- Use standard mitigation measures during construction, including to complete construction outside of sensitive wildlife and fish periods.
- Meet regulatory requirements for water crossing design and construction, including for fish passage.
- Prepare and implement measures from an erosion and sediment control plan.
- Monitor and manage dust creation during road construction and use.
- Use NAG mine rock or clean aggregate for construction and road maintenance.
- Minimize road corridor width as practicable, while designing for safe sightlines and sufficient space for snow removal.
- Maintain a log of wildlife interactions and wildlife crossing areas, and employ adaptive management measures if needed.
- Require adherence to speed limits on FMG roads and strongly encourage Project employees and contractors to adhere to local speed limits.

- As reasonable, co-locate the access road with other infrastructure to minimize environmental disturbance.
- Reclaim the site after Project operations cease.

4.19.2.1 Alternatives 1 and 5

- **Advantages:** these alternatives have the most direct route and shortest overall lengths, with a minimized length of new corridor. In addition, the route aligns well with the potential community access under consideration for development by Cat Lake First Nation and supports an overall enhancement of the regional road network. These alternatives are co-located with a transmission line corridor along much of its length to help support the construction of the transmission line and reduce the number of new linear corridors for the Project.
- **Disadvantages:** no apparent disadvantages over Alternatives 3 and 4

4.19.2.2 Alternatives 3 and 4

- **Advantages:** no apparent advantages over Alternatives 1 and 5.
- **Disadvantages:** the longer length of new corridor creation associated with these alternatives results in more direct impacts to terrestrial habitat, including for SAR, potential for aggregate sourcing, GHG emissions and considerably higher construction costs. In addition, the route passes immediately adjacent to the open pit; traffic on the mine access road would need to be held back before, during and after every blast in the open pit. The route passing through the site poses a safety concern regarding the ability to maintain separation between very large haul trucks and offsite vehicles including delivery vehicles, particularly when the CDF embankments are being constructed. The route also does not support co-locating with the proposed transmission line, as the transmission line would be within the blast zone of the open pit, which is not acceptable. Alternative 3 has the additional disadvantage of requiring a major bridge crossing at Cromarty Lake, while Alternative 4 requires a moderate bridge crossing at Satterly Lake. Bridge crossings require additional time to construct and add to the overall cost for the road.

The results of the assessment of alternative routes listing differentiating aspects for the mine access road are summarized in Table 4.19-2. Additional assessment of the site access road alternatives in relation to potential effects on SAR is provided in Appendix T.

4.19.3 Results Summary and Selected Alternative

The preferred mine access road routes are Alternatives 1 and 5, with Alternative 1 being the selected alternative based on the assessment of net effects in Table 4.19-2, with implementation of key mitigation measures described in Section 4.19.2. The primary reason for the selection of Alternative 1 is that it has the least overall effect on the natural environment, as effects on Caribou (Boreal population) can be mitigated through an Overall Benefit Permit. Alternative 5 is very similar to Alternative 1, but has not been selected as it has the disadvantage that it is located closer to the pictographs, and is both longer and crosses greater low-lying areas, and therefore has reduced constructability and more watercourse crossings, which are anticipated to increase the overall costs.

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing(1)	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
Natural Environment						
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Emissions will be generated during construction of the road, use of the road by vehicles including during operations, and decommissioning; but emissions will not affect attainment of air quality standards • Con/Op/Cl: Alternative 1 is the shortest road (17.78km) which will result in the least amount of emissions during construction, operations and closure (approximately 50% of Alternatives 2 and 3)	• Con/Op/Cl: Emissions will be generated during construction of the road, use of the road by vehicles including during operations, and decommissioning; but emissions will not affect attainment of air quality standards • Con/Op/Cl: Alternative 3 is the longest road (28.1 km) which will result in the greatest amount of emissions during construction, operations and closure (approximately twice Alternatives 1 and 5)	• Con/Op/Cl: Emissions will be generated during construction of the road, use of the road by vehicles including during operations, and decommissioning; but emissions will not affect attainment of air quality standards • Con/Op/Cl: Alternative 4 is the longest road (28.2 km) which will result in the greatest amount of emissions during construction, operations and closure (approximately twice Alternatives 1 and 5)	• Con/Op/Cl: Emissions will be generated during construction of the road, use of the road by vehicles including during operations, and decommissioning; but emissions will not affect attainment of air quality standards • Con/Op/Cl: Alternative 4 is a shorter road (18.5 km) which will result in the least amount of emissions during construction, operations and closure (approximately 50% of Alternatives 3 and 4)
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Op/Cl: GHG emissions will be generated during construction of the road, use of the road by vehicles including during operations, and decommissioning • Con/Op/Cl: Alternative 1 is the shortest road (17.8 km) which will result in the least amount of emissions during construction, operations and closure (approximately 50% of Alternatives 3 and 4)	• Con/Op/Cl: GHG emissions will be generated during construction of the road, use of the road by vehicles including during operations, and decommissioning • Con/Op/Cl: Alternative 2 is the longest road (28.1 km) which will result in the greatest amount of GHG emissions (approximately twice Alternatives 1 and 5)	• Con/Op/Cl: GHG emissions will be generated during construction of the road, use of the road by vehicles including during operations, and decommissioning • Con/Op/Cl: Alternative 2 is the longest road (28.2 km) which will result in the greatest amount of GHG emissions (approximately twice Alternatives 1 and 5)	• Con/Op/Cl: GHG emissions will be generated during construction of the road, use of the road by vehicles including during operations, and decommissioning • Con/Op/Cl: Alternative 1 is the shortest road (18.5 km) which will result in the least amount of emissions during construction, operations and closure (approximately 50% of Alternatives 3 and 4)
		Summary	**Preferred**	**Partially preferred**	**Partially preferred**	**Preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Op/Cl: All regulatory requirements will be met during all Project phases, with mitigation measures employed including during the construction and closure phase as needed to control sediment loading and potential releases to any local watercourses (sediment and erosion control plan will be in place)	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Cl: No bridges are required • Con/Cl: Fish habitat disruption from one watercourse crossing if best construction practices are not followed (sediment and erosion control plan will be in place) • Op: No effects anticipated	• Con/Cl: A substantial (45 m) bridge is required at Cromarty Lake which could require in-water works • Con/Cl: Fish habitat disruption from watercourse crossings / bridge installation during construction if best construction practices are not followed (sediment and erosion control plan will be in place) • Op: No effects anticipated	• Con/Cl: A bridge crossing is required at Satterly Lake which could require in-water works • Con/Cl: Fish habitat disruption from watercourse crossings / bridge installation during construction if best construction practices are not followed (sediment and erosion control plan will be in place) • Op: No effects anticipated	• Con/Cl: No l bridges are anticipated to be required • Con/Cl: Fish habitat disruption from watercourse crossings if best construction practices are not followed (sediment and erosion control plan will be in place) • Op: No effects anticipated
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: Fish populations may be affected by the limited loss of fish habitat, although fish will be relocated as practicable • Con/Op/Cl: loss of fish habitat will be mitigated through implementation of a fish habitat offsetting / compensation plan	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• Con/Op/Cl: No material effects anticipated; water crossings will be required to be designed and installed to maintain fish passage during all Project phases	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects on groundwater anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• Con/Op/Cl: Construction would target higher ground where feasible, which is more available for this alternative • Con/Op/Cl: Shortest length crossing of wetlands (3.8 km) • Con/Op/Cl: Potential for disturbance to wetlands during construction, however, a culvert would be installed to maintain functionality of the wetland will not be affected	• Con/Op/Cl: Moderate length crossing of wetlands (5.3 km) • Con/Op/Cl: Potential for disturbance to wetlands during construction, however, culverts would be installed to maintain functionality of the wetland will not be affected	• Con/Op/Cl: Longest length crossing of wetlands (8.7 km) • Con/Op/Cl: Potential for disturbance to wetlands during construction, however, culverts would be installed to maintain functionality of the wetland will not be affected	• Con/Op/Cl: Shorter length crossing of wetlands (4.9 km) • Con/Op/Cl: Potential for disturbance to wetlands during construction, however, culverts would be installed to maintain functionality of the wetland will not be affected

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• Con/Op/Cl: Wetland connectivity will be affected by new road; however, culverts will be regularly placed to maintain hydraulic connectivity as practicable	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• Con/Op/Cl: Shortest length (17.7 km) / terrestrial habitat disturbance area • Con/Op/Cl: Co-located with transmission line to reduce number of new corridors	• Con/Op/Cl: Long length (28.1 km) and greatest terrestrial habitat disturbance • Con/Op/Cl: Limited potential for co-location with transmission line	• Con/Op/Cl: Long length (28.2 km) and greatest terrestrial habitat disturbance • Con/Op/Cl: No potential for co-location with transmission line	• Con/Op/Cl: Short length (18.5 km) / terrestrial habitat disturbance area • Con/Op/Cl: Co-located in part with transmission line to reduce number of new corridors
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Cl: Noise will be created during construction/decommissioning but will not remain at the same place for long • Con/Op/Cl: Ongoing noise during use of the road	• Con/Cl: Noise will be created during construction/decommissioning but will not remain at the same place for long • Con/Op/Cl: Ongoing noise during use of the road • Con/Op/Cl: As a longer route, the alternative will also result in potential noise effects over a larger area	• Con/Cl: Noise will be created during construction/decommissioning but will not remain at the same place for long • Con/Op/Cl: Ongoing noise during use of the road • Con/Op/Cl: As a longer route, the alternative will also result in potential noise effects over a larger area	• Con/Cl: Noise will be created during the construction phase but will not remain at the same place for long, as the road construction or decommissioning progresses • Con/Op/Cl: Ongoing noise during use of the road
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Road and cleared shoulders may become a preferential wildlife corridor for some species • Con/Op/Cl: No anticipated effect on plant dispersion	• Con/Op/Cl: Road and cleared shoulders may become a preferential wildlife corridor for some species • Con/Op/Cl: As a longer route, the alternative will also potentially result in effects over a bigger area • Con/Op/Cl: No anticipated effect on plant dispersion	• Con/Op/Cl: Road and cleared shoulders may become a preferential wildlife corridor for some species • Con/Op/Cl: As a longer route, the alternative will also potentially result in effects over a bigger area • Con/Op/Cl: No anticipated effect on plant dispersion	• Con/Op/Cl: Road and cleared shoulders may become a preferential wildlife corridor for some species • Con/Op/Cl: No anticipated effect on plant dispersion
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• Con/Op/Cl: Road and cleared shoulders have the potential to act as a corridor for large predators, thereby affecting species such as Caribou and Moose • Con/Op/Cl: Potential for wildlife collisions primarily from road traffic during operations, but also during construction and closure	• Con/Op/Cl: Road and cleared shoulders have the potential to act as a corridor for large predators, thereby affecting species such as Caribou and Moose • Con/Op/Cl: Potential for wildlife collisions primarily from road traffic during operations, but also during construction and closure	• Con/Op/Cl: Road and cleared shoulders have the potential to act as a corridor for large predators, thereby affecting species such as Caribou and Moose • Con/Op/Cl: Potential for wildlife collisions primarily from road traffic during operations, but also during	• Con/Op/Cl: Road and cleared shoulders have the potential to act as a corridor for large predators, thereby affecting species such as Caribou and Moose • Con/Op/Cl: Potential for wildlife collisions primarily from road traffic during operations, but also during construction and closure

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
				• Con/Op/Cl: As a longer route, the alternative will also potentially result in effects over a bigger area	construction and closure • Con/Op/Cl: As a longer route, the alternative will also potentially result in effects over a bigger area	
		Summary	**Preferred**	**Partially preferred**	**Partially preferred**	**Preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine,. The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• Con/Op/Cl: The following SAR were observed (individuals or evidence) or otherwise identified as present near Alternative 1 during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis; Threatened (ESA, SARA): Boreal Caribou Threatened (ESA) / Special Concern (SARA): Eastern Whip-poor will.	• Con/Op/Cl: The following SAR were observed (individuals or evidence) or otherwise identified as present near Alternative 3 during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): ; Special Concern (ESA,SARA): Barn Swallow, Canada Warbler, Common Nighthawk;	• Con/Op/Cl: The following SAR were observed (individuals or evidence) or otherwise identified as present near Alternative 4 during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; T Special Concern (ESA,SARA): Barn Swallow, Canada Warbler, Common Nighthawk;	• Con/Op/Cl: The following SAR were observed (individuals or evidence) or otherwise identified as present near Alternative 5 during baseline investigations: Endangered (ESA,SARA): Caribou, iLittle Brown Myotis; Threatened (ESA, SARA): Boreal Caribou; Threatened (ESA) / Special Concern (SARA): Eastern Whip-poor-will.
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	**Endangered (ESA, SARA):** • Crosses 15.4 km of Category 1 high use habitat for Caribou • Crosses 2.4 km of Category 2 seasonal habitat for Caribou • Little Brown Myotis were detected in the area (and near this route) Directly affects 0.23 km^2 of bat foraging habitat and 0.52 km^2 of bat maternity roosting • **Threatened (ESA, SARA):** No direct habitat loss for Eastern Whip-poor will is expected, but 4.34 km^2 of habitat indirectly affected **Threatened (ESA), Special Concern (SARA):** • Wolverine tracks were recorded along the edges of lakes and streams in multiple locations, but no dens or individuals were observed	**Endangered (ESA, SARA):** • Crosses 16.4 km of Category 1 high use habitat for Caribou (Boreal population) • Crosses 11.7 km of Category 2 seasonal habitat for Caribou • Little Brown Myotis were detected in the area • Directly affects 0.16 km^2 of bat foraging habitat and 0.81 km^2 of bat maternity roosting **Threatened (ESA, SARA):** • Directly affects 0.12 km^2 of Eastern Whip-poor will habitat and 17.53 km^2 indirectly. **Threatened (ESA), Special Concern (SARA):**	**Endangered (ESA, SARA):** • Little Brown Myotis were detected in the area • Directly affects 26 km^2 of bat foraging habitat and 0.79 km^2 of bat maternity roosting **Threatened (ESA, SARA):** • Crosses 12.5 km of Category 1 high use habitat for Caribou (Boreal population) • Crosses 13.6 km of Category 2 seasonal habitat for Caribou • Directly affects 0.11 km^2 of Eastern Whip-poor will habitat and 11.37 km^2 indirectly • Barn swallow active nest was recorded near this route (Project site)	**Endangered (ESA, SARA):** • Little Brown Myotis were detected in the area (and near this route) • Directly affects 0.26 km^2 of bat foraging habitat and 0.54 km^2 of bat maternity roosting **Threatened (ESA, SARA):** • Crosses 16.8 km of Category 1 high use habitat for Caribou (Boreal population) • Crosses 1.7 km of Category 2 seasonal habitat for Caribou • No direct habitat loss for Eastern Whip-poor will is expected, but 4.24 km^2 of habitat indirectly affected

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
			• Directly affects 0.51 km^2 of high and moderate quality Wolverine habitat, and indirectly affects 462 km^2 **Threatened (ESA)** Directly affects 0.19 km^2 of Lesser Yellowlegs habitat and 27.76 km^2 indirectly **Special Concern (ESA, SARA)** Directly affects 0.01 km^2 of Short-eared Owl habitat and 3.42 km^2 indirectly	• Wolverine tracks were recorded along the edges of lakes and streams in multiple locations and closest to this routing, but no dens or individuals were observed • Directly affects 0.73 km^2 of high and moderate quality Wolverine habitat, and indirectly affects 548 km^2 • Barn swallow active nest was recorded near this route (Project site) • Common Nighthawk and Olive-sided flycatcher were recorded near this route **Threatened (ESA)** • Directly affects 0.41 km^2 of Lesser Yellowlegs habitat and 41.68 km^2 indirectly **Special Concern (ESA, SARA)** • Directly affects 0.03 km^2 of Short-eared Owl habitat and 4.70 km^2 indirectly	**Threatened (ESA), Special Concern (SARA):** • Wolverine tracks were recorded along the edges of lakes and streams in multiple locations, but no dens or individuals were observed • Directly affects 0.76 km^2 of high and moderate quality Wolverine habitat, and indirectly affects 577 km^2 • Common Nighthawk was recorded near this route **Threatened (ESA)** • Directly affects 0.55 km^2 of Lesser Yellowlegs habitat and 51.77 km^2 indirectly **Special Concern (ESA, SARA)** • Directly affects 0.03 km^2 of Short-eared Owl habitat and 5.31 km^2 indirectly	**Threatened (ESA), Special Concern (SARA):** • Wolverine tracks were recorded along the edges of lakes and streams in multiple locations, but no dens or individuals were observed • Directly affects 0.50 km^2 of high and moderate quality Wolverine habitat, and indirectly affects 473 km^2 **Threatened (ESA)** • Directly affects 0.23 km^2 of Lesser Yellowlegs habitat and 27.13 km^2 indirectly **Special Concern (ESA, SARA)** • Directly affects 0.02 km^2 of Short-eared Owl habitat and 3.55 km^2 indirectly
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Cl: Noise will be created during the construction phase but will not remain at the same place for long, as the road construction or decommissioning progresses • Con/Cl: Construction and decommissioning will be timed to avoid sensitive periods for SAR including Caribou • Con/Op/Cl: Ongoing noise during use of the road • Op: Ongoing noise during use of the road which will be of particular concern for the Category 1 (high use nursery area) habitat which is present along the route	• Con/Cl: Noise will be created during the construction phase but will not remain at the same place for long, as the road construction or decommissioning progresses • Con/Cl: Construction and decommissioning will be timed to avoid sensitive periods for SAR including Caribou • Con/Op/Cl: Ongoing noise during use of the road • Op: Ongoing noise during use of the road which will be of particular concern for the Category 1 (high use nursery area) habitat which is present immediately west of the northern portion of the route	• Con/Cl: Noise will be created during the construction phase but will not remain at the same place for long, as the road construction or decommissioning progresses • Con/Cl: Construction and decommissioning will be timed to avoid sensitive periods for SAR including Caribou • Con/Op/Cl: Ongoing noise during use of the road • Op: Ongoing noise during use of the road which will be of particular concern for the Category 1 (high use nursery area) habitat which is present immediately west of the northern portion of the route	• Con/Cl: Noise will be created during the construction phase but will not remain at the same place for long, as the road construction or decommissioning progresses • Con/Cl: Construction and decommissioning will be timed to avoid sensitive periods for SAR including Caribou • Con/Op/Cl: Ongoing noise during use of the road • Op: Ongoing noise during use of the road which will be of particular concern for the Category 1 (high use nursery area) habitat which is present along the route

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
				• Con/Op/Cl: As a longer route, the alternative will also potentially result in noise effects over a bigger area	• Con/Op/Cl: As a longer route, the alternative will also potentially result in noise effects over a bigger area	
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Road and cleared shoulders may become a preferential wildlife corridor for large predators, thereby affecting species such as Caribou • Con/Op/Cl: Co-located with transmission line to reduce number of new corridors	• Con/Op/Cl: Road and cleared shoulders may become a preferential wildlife corridor for large predators, thereby affecting species such as Caribou • Con/Op/Cl: As a longer route, the alternative will also potentially result in effects over a bigger area • Con/Op/Cl: Limited potential for co-locating with transmission line (transmission line could potentially cross the southeast arm of Springpole Lake if technically feasible) to join route	• Con/Op/Cl: Road and cleared shoulders may become a preferential wildlife corridor for large predators, thereby affecting species such as Caribou • Con/Op/Cl: As a longer route, the alternative will also potentially result in effects over a bigger area • Con/Op/Cl: It is not feasible to co-locate the required transmission line along the entire length with this road alternative, resulting in a need for two linear corridors, substantially increasing the new corridor creation	• Con/Op/Cl: Road and cleared shoulders may become a preferential wildlife corridor for large predators, thereby affecting species such as Caribou • Con/Op/Cl: Co-located with transmission line to reduce number of new corridors
	Summary		**Preferred**	**Partially preferred**	**Not preferred**	**Preferred**
Natural Environment Performance Objectives Assessment			**Preferred**	**Partially preferred**	**Not preferred**	**Partially preferred**
			• Adv: Alternative 1 is the shortest road (17.7 km) which will result in the adverse environmental effects over the least areas • Adv: The required transmission line could potentially be co-located along or near a portion of the route, minimizing new corridor creation	• Disadv: Alternative 3 is the longest road (28.1 km) which will result in adverse environmental effects over the greatest areas (twice Alternative 1 and 5) • Disadv: Limited potential for co-locating with transmission line (transmission line could potentially cross the southeast arm of Springpole Lake if technically feasible) to join route	• Disadv: Alternative 4 is the longest road (2.28 km) which will result in adverse environmental effects over the greatest areas (twice Alternative 1 and 5) • Disadv: It is not feasible to co-locate the required transmission line along the entire length with this road alternative, resulting in a need for two linear corridors, substantially increasing the new corridor creation	• Adv: Alternative 5 is a shorter road (18 km) which will result in the adverse environmental effects over the least areas • Adv: The required transmission line could potentially be co-located along or near a portion of the route, minimizing new corridor creation
Social, Economic, Cultural and Built Environment						
Potential Effect on Local Residents and	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effects; no private residence located at or near Alternative 1	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
Recreational Users (Social Environment)	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: Additional noise related to the road may affect wilderness perception for recreational users; there are no camp / cabin facilities nearby • Con/Op/Cl: Potential income opportunity to support construction of the mine access road for local construction company • Con/Op/Cl: Maintenance / snow clearing of road will be required during operations	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: Will create a new road that could be used by others including Indigenous peoples, up to the site security control location • Con/Op/Cl: The southern portion of the route aligns well with proposed permanent access under consideration for development by the Cat Lake First Nation	• Con/Op/Cl: Will create a new road that could be used by others including Indigenous peoples, , up to the site security control location	• Con/Op/Cl: Will create a new road that could be used by others including Indigenous peoples, , up to the site security control location	• Con/Op/Cl: Will create a new road that could be used by others including Indigenous peoples, hunters, cottagers, up to the site security control location • Con/Op/Cl: The southern portion of the route aligns well with proposed permanent access under consideration for development by the Cat Lake First Nation
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Potential for increased sound in areas of land use and potentially cabins / camps, but not affecting ability to attain provincial noise guidelines	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects anticipated; no known water wells near route	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects anticipated; surface water supplies present near route	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time	• Con/Op/Cl: Increased road access may result in additional general disturbance to the remote land users, not related to mine activities • Con/Op/Cl: Cleared corridor and road will have an adverse impact on	• Con/Op/Cl: Increased road access may result in additional general disturbance to the remote land users, not related to mine activities • Con/Op/Cl: Cleared corridor and	• Con/Op/Cl: Increased road access may result in additional general disturbance to the remote land users, not related to mine activities • Con/Op/Cl: Cleared corridor	• Con/Op/Cl: Increased road access may result in additional general disturbance to the remote land users, not related to mine activities • Con/Op/Cl: Cleared corridor and road will have an adverse impact

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		periods	natural aesthetics where a viewpoint is present	road will have an adverse impact on natural aesthetics where a viewpoint is present • Con/Op/Cl: Bridge crossing at Cromarty Lake will affect lake views	and road will have an adverse impact on natural aesthetics where a viewpoint is present; bridge crossing of the Springpole Lake west of the North Basin will affect lake views	on natural aesthetics where a viewpoint is present
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: With the construction of an engineered road, using typical and required safety measures, there is no effects anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Preferred**	**Partially preferred**	**Partially preferred**	**Preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: The southern portion of the route aligns well with proposed permanent access under consideration for development by the Cat Lake First Nation and supports enhancement of the regional road network	• Con/Op/Cl: No material effects anticipated; the road will connect to the mine site and does not support access to a community	• Con/Op/Cl: No material effects anticipated; the road will connect to the mine site and does not support access to a community	• Con/Op/Cl: The southern portion of the route aligns well with proposed permanent access under consideration for development by the Cat Lake First Nation and supports enhancement of the regional road network
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Preferred**	**Partially preferred**	**Partially preferred**	**Preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: No adverse effect to health and safety; emissions will be generated during construction, operations and closure phases; however they will not affect attainment of air quality standards which are protective of health	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects; no drinking water supplies present in Project area	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: FMG will use best practices to manage safe use of the road related to the Project as possible, recognizing that a portion of the road will be on Crown land and will not be fully under FMG's control	• Con/Op/Cl: Requires routing of access road alongside haul roads onsite near open pit; even with a separator berm, this could increase potential for vehicle conflicts particularly at crossing locations with drivers not familiar with site conditions (such as deliveries) • Con/Op/Cl: Requires routing of access road adjacent to the south and east embankments of the CDF; this poses a conflict during the construction of the CDF embankments, as there will be a large number of haul trucks cross the area at high frequency, at the same time that deliveries to site will be at a peak • Con/Op/Cl: FMG will utilize best practices to manage safe use of the road related to the Project as possible, recognizing that a portion of the road will be on Crown land and will not be fully under FMG's control	• Con/Op/Cl: Requires routing of access road alongside haul roads onsite near open pit; even with a separator berm, this could increase potential for vehicle conflicts particularly at crossing locations with drivers not familiar with site conditions (such as deliveries) • Con/Op/Cl: Requires routing of access road adjacent to the south and east embankments of the CDF; this poses a conflict during the construction of the CDF embankments, as there will be a large number of haul trucks cross the area at high frequency, at the same time that deliveries to site will be at a peak • Con/Op/Cl: FMG will utilize best practices to manage safe use of the road related to the Project as possible, recognizing that a portion of the road will be on Crown land and will not be fully under FMG's control	• Con/Op/Cl: FMG will use best practices to manage safe use of the road related to the Project as possible, recognizing that a portion of the road will be on Crown land and will not be fully under FMG's control
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Preferred**	**Not preferred**	**Not preferred**	**Preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
		• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Potential income opportunity to support construction of the mine access road for local construction company • Con/Op/Cl: Maintenance / snow clearing of road will be required during operations			
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: New corridor will provide for substantially increased all-season access to new areas; access will become less available after closure	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/ New corridor will provide for increased access to new areas which could increase recreational opportunities; • Cl: access will become less available after closure	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: No associated material effects anticipated to regional economy	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect services	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• Con/Op/Cl: Applicable approvals will be obtained including the Sustainable Forest Licence holder for the road corridor • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
		• Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor				
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use • Con:, NAG mine rock may be re-used in the construction	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from route	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from route	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from route • Con/Op/Cl: Cleared road and water crossings will have an adverse impact on natural aesthetics if viewpoint is present	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA	• Con/Op/Cl: No effects; there are no known archaeological sites at or near route	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
		• Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed			
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near route • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed • Con: Construction work will not alter water levels in the southeast arm of Springpole Lake	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: The eastern portion of the route aligns well with proposed permanent access under consideration for development by the Cat Lake First Nation and supports enhancement of the regional road network	• Con/Op/Cl: No potential for alignment with First Nation community access	• Con/Op/Cl: No potential for alignment with First Nation community access	• Con/Op/Cl: The eastern portion of the route aligns well with proposed permanent access under consideration for development by the Cat Lake First Nation and supports enhancement of the regional road network
		Summary	**Preferred**	**Partially preferred**	**Partially preferred**	**Preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No effects anticipated; there are no known spiritual, ceremonial, cultural heritage and archaeological sites near route	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: These alternatives will all create a new road that could be used by Indigenous peoples • Con/Op/Cl: Disruption to habitats will occur due the development and operation of the road, which will continue during operation and into decommissioning	• Con/Op/Cl: There is no known difference amongst alternatives for this indicator	• Con/Op/Cl: There is no known difference amongst alternatives for this indicator	• Con/Op/Cl: There is no known difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Preferred**	**Not preferred**	**Not preferred**	**Preferred**
			• Adv: The eastern portion of the route aligns well with proposed permanent access under consideration for development by the Cat Lake First Nation and supports enhancement of the regional road network	• Disadv: Traffic concern with the potential for conflict between access road and haul road vehicles	• Disadv: Traffic concern with the potential for conflict between access road and haul road vehicles	• Adv: The eastern portion of the route aligns well with proposed permanent access under consideration for development by the Cat Lake First Nation and supports enhancement of the regional road network

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
				• Disadv: Major bridge crossing at Cromarty Lake may not be preferred due to aesthetics / visual effects on lake users		
Technical Objectives						
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Construction of all-season mine access roads connecting to the local / regional road network is common for mines in northern Ontario and are predicably reliable	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; roads are commonly used	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Mine access road is required to supply access to the site; contingency is not available • Con/Op/Cl: Route is expected to be reliable excluding aspects outside FMG's control, such as weather	• Con/Op/Cl: Requires routing of access road alongside haul roads onsite near open pit; even with a separator berm, this could increase potential for vehicle conflicts particularly at crossing locations with drivers not familiar with site conditions (such as deliveries) • Con/Op/Cl: Requires routing of access road adjacent to the south and east embankments of the CDF; this poses a conflict during the construction of the CDF embankments, as there will be a large number of haul trucks cross the area at high frequency, at the same time that deliveries to site will be at a peak	• Con/Op/Cl: Requires routing of access road alongside haul roads onsite near open pit; even with a separator berm, this could increase potential for vehicle conflicts particularly at crossing locations with drivers not familiar with site conditions (such as deliveries) • Con/Op/Cl: Requires routing of access road adjacent to the south and east embankments of the CDF; this poses a conflict during the construction of the CDF embankments, as there will be a large number of haul trucks cross the area at high frequency, at the same time that deliveries to site will be at a peak	• Con/Op/Cl: Mine access road is required to supply access to the site; contingency is not available • Con/Op/Cl: Route is expected to be reliable excluding aspects outside FMG's control, such as weather
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Agreements will be needed for road corridor where others hold surface rights, including occupancy agreement(s) for Crown lands	• Con/Op/Cl: Agreements will be needed for road corridor where others hold surface rights, including occupancy agreement(s) for Crown lands	• Con/Op/Cl: Agreements will be needed for road corridor where others hold surface rights, including occupancy agreement(s) for Crown lands	• Con/Op/Cl: Agreements will be needed for road corridor where others hold surface rights, including occupancy agreement(s) for Crown lands

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
				• Con/Op: Unable to effectively service the site while the CDF embankments are being constructed • Con/Op/Cl: Federal approval will be required for new infrastructure (bridge crossing) to provide continued lake navigation	• Con/Op: Unable to effectively service the site while the CDF embankments are being constructed • Con/Op/Cl: Has the potential conflict with a number of existing mineral claims	
		Summary	**Preferred**	**Not preferred**	**Not preferred**	**Preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: There is a potential risk to being able to obtain approval to impact Category 1 (high use area) Caribou habitat, which could be perceived as less attractive	• Con/Op/Cl: Could be perceived as less attractive due the additional costs and requirement to gain approval for a major bridge crossing	• Con/Op/Cl: Could be perceived as less attractive due the additional costs and requirement to gain approval for a moderate bridge crossing • Con/Op/Cl: Could be perceived as more challenging to gain approval due to crossing of existing multiple mineral claims	• Con/Op/Cl: There is a potential risk to being able to obtain approval to impact Category 1 (high use nursery area) Caribou habitat, which could be perceived as less attractive
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Overall cost of the mine access road is not expected to be Project limiting • Con/Op/Cl: Shortest road route and without a major / moderate bridge crossing is expected to result in the lowest capital and operating costs, although the potential cost associated with compensating for Caribou habitat loss has not been assessed as yet	• Con/Op/Cl: Overall cost of the mine access road is not expected to be Project limiting • Con/Op/Cl: Shorter road route but requiring a major bridge crossing will result in higher capital but will retain lower overall operating costs	• Con/Op/Cl: Cost for construction and operation of the mine access road is not expected to be Project limiting, but in combination with a separate transmission line corridor and additional land acquisition / agreement costs is expected to be Project limiting • Con/Op/Cl: Moderate road route length requiring a moderate bridge crossing will result in higher capital	• Con/Op/Cl: Overall cost of the mine access road may be Project limiting depending on costs for land agreements and/or approvals • Con/Op/Cl: Shorter road route and without a major / moderate bridge crossing is expected to result in the lowest capital and operating costs, although the potential cost associated with compensating for Caribou habitat loss has not been assessed as yet
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No effect anticipated as road will be constructed using rock extracted by FMG (rather than external supplier)	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Preferred**	**Partially preferred**	**Not preferred**	**Preferred**

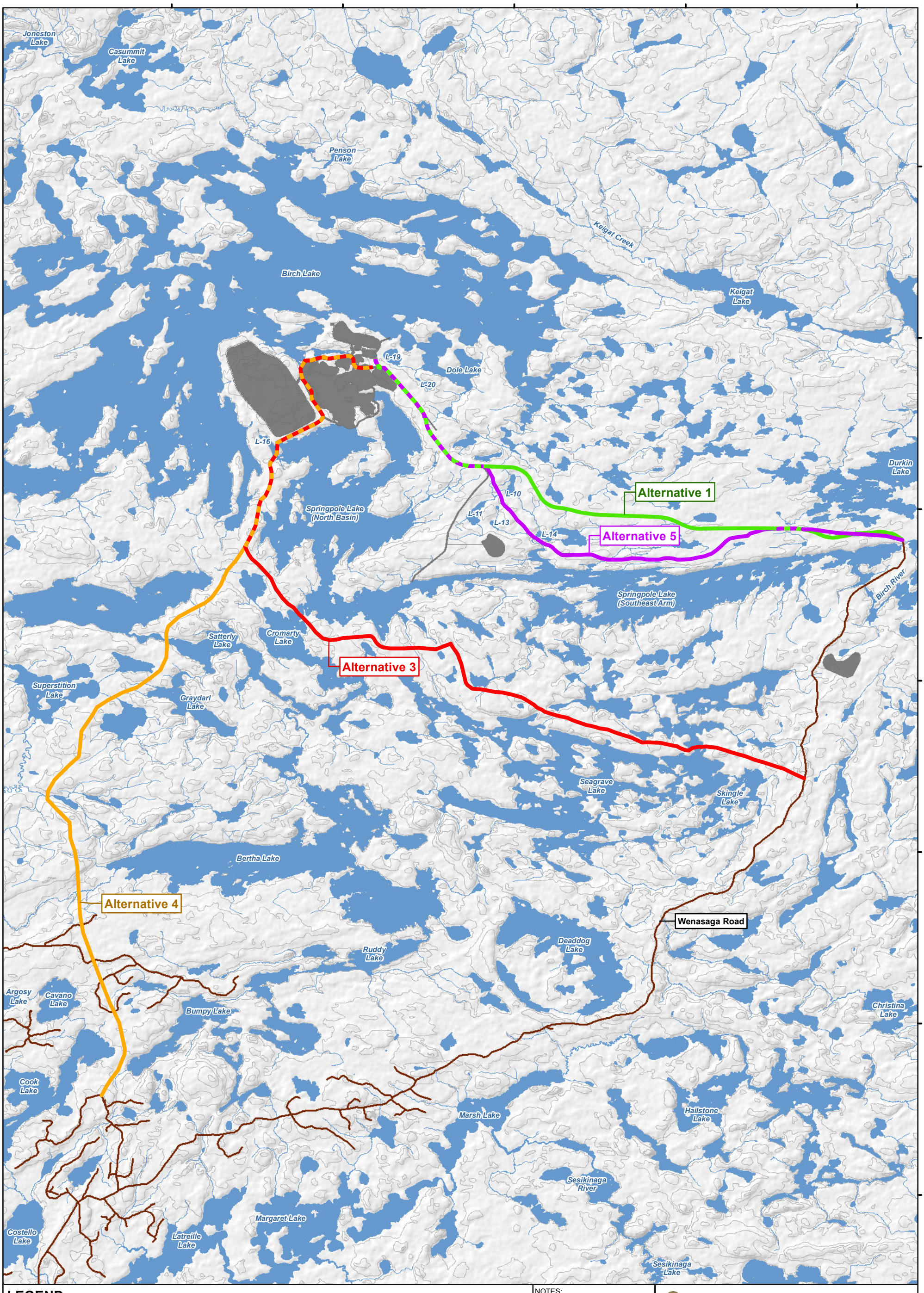
Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
Technical Performance Objective Assessment			**Preferred**	**Not preferred**	**Not preferred**	**Preferred**
			• Adv: Lower capital and operating costs based on overall length (17.2 km) and current knowledge	• Disadv: Additional approvals expected to be required • Disadv: Higher capital cost based on longer overall length (28.1 km) and assuming additional cost for major bridge crossing • Disadv: Inability to co-locate with transmission line will increase costs for that structure	• Disadv: Additional agreements / approvals expected to be required • Disadv: Higher capital cost based on greater length (28.2 km) and assuming additional cost for moderate bridge crossing • Disadv: Inability to co-locate with transmission line will increase costs for that structure • Disadv: There could be additional land acquisition / agreement costs which could also increase costs	• Adv: Lower capital and operating costs based on overall length (17.8 km) and current knowledge
Amenability to Reclamation (Closure Phase)						
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• CI: No material effects anticipated; route does not pose a risk	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• CI: During decommissioning activities, culverts will be removed and affected area rehabilitated to promote natural drainage	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: If rehabilitated, the road will return to terrestrial habitat (road could potentially be retained to reinforce the regional road network)	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• CI: If rehabilitated, the road will return to terrestrial habitat; bridges and watercourse crossing would be removed and affected areas restored as fish habitat as applicable (road could potentially be retained to reinforce the regional road network)	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator

Table 4.19-2: Assessment of Mine Site Access Road Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: North from the Wenasaga Road to Birch River Crossing, Northwest to Site	Alternative 3: Northwest from Wenasaga Road, along the Northern Shore of Seagrave Lake to the Western End of Springpole Lake and North to Site	Alternative 4: Western Option from a Minor Road off the Wenasaga Road	Alternative 5: Northwest from the end of the Wenasaga Road to Site, Closer to the Southeast Arm of Springpole Lake
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: If rehabilitated, the road will return to terrestrial habitat and eventually blend into the surround landscape (road could potentially be retained to reinforce the regional road network)	• Cl: There is no difference amongst alternatives for this indicator	• Cl: There is no difference amongst alternatives for this indicator	• Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
			• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed; there are no differentiating advantages or disadvantages for the criteria and indicators
OVERALL ASSESSMENT OF ALTERNATIVE			**PREFERRED (SELECTED ALTERNATIVE)**	**NOT PREFERRED**	**NOT PREFERRED**	**PREFERRED**
			Alternative 1 will provide a viable road route for the project that minimizes adverse effects on the natural environment as a result of its shortest length and the potential to be co-located in part with the transmission line, minimizing new corridor creation. The eastern portion of the route aligns well with proposed permanent access under consideration for development by the Cat Lake First Nation and supports enhancement of the regional road network.	Alternative 3 is not able to fully support the Project at all times. The road is in conflict with construction and raising of the south and east embankments of the CDF. This alternative is a longer route, with twice the length of Alternatives 1 and 5, resulting in unnecessary adverse environmental effects.	Alternative 4 is not able to fully support the Project at all times. The road is in conflict with construction and raising of the south and east embankments of the CDF. This alternative is a longer route, with twice the length of Alternatives 1 and 5, resulting in unnecessary adverse environmental effects.	Alternative 5 will provide a viable road route for the project that minimizes adverse effects on the natural environment as a result of its shorter length and the potential to be co-located in part with the transmission line, minimizing new corridor creation. It is less preferred because it requires crossing lower-lying areas and watercourses, which is not preferred for constructability or for maintenance of natural flow conditions. The eastern portion of the route aligns well with proposed permanent access under consideration for development by the Cat Lake First Nation and supports enhancement of the regional road network.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op: operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*.



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LEGEND

- Proposed Mine Feature
- Existing Road
- Watercourse
- Waterbody
- Contour (10 m intervals)

Mine Access Road Route Alternatives

- Alternative 1 (17.7 km)
- Alternative 3 (28.1 km)
- Alternative 4 (28.2 km)
- Alternative 5 (18.6 km)

NOTES:
- Topographic information extracted from LIO, MNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.

Datum: NAD83
Projection: UTM Zone 15N

0 1 2 4 6 8 10 Kilometres

First Mining Gold

WSP

SPRINGPOLE GOLD PROJECT

Mine Access Road Route Alternatives

PROJECT N°: ONS2104 | **FIGURE: 4.19-1**

SCALE: 1:102,000 | DATE: October 2024

545000 550000 555000 560000 565000

5700000 5695000 5690000 5685000 5680000 5675000 5670000

Joneston Lake
Casummit Lake
Penson Lake
Keigat Creek
Birch Lake
Keigat Lake
L-19
Dole Lake
L-20
L-16
Springpole Lake (North Basin)
L-10
L-11
L-13
L-14
Alternative 1
Alternative 5
Durkin Lake
Birch River
Springpole Lake (Southeast Arm)
Satterly Lake
Cromarty Lake
Alternative 3
Superstition Lake
Graydarl Lake
Seagrave Lake
Skingle Lake
Gull Lake
Bertha Lake
Alternative 4
Wenasaga Road
Ruddy Lake
Deaddog Lake
Argosy Lake
Cavano Lake
Bumpy Lake
Christina Lake
Cook Lake
Marsh Lake
Hailstone Lake
Sesikinaga River
Margaret Lake
Costello Lake
Latreille Lake
Sesikinaga Lake

X:\CA\CAOAK300-OAKMIS-FS1-Project\P2021\Projects\ONS2104_FMG_Springpole_EIS\11_GIS\EIS\MXD\Mine_Access_Road_Alternatives_SWA_8.mxd

LEGEND

- Proposed Mine Feature
- Classified Habitat*
- Existing Road
- Watercourse
- Waterbody
- Contour (10 m intervals)

Mine Access Road Route Alternatives

- Alternative 1 (17.7 km)
- Alternative 3 (28.1 km)
- Alternative 4 (28.2 km)
- Atlernative 5 (18.6 km)

NOTES:
- Topographic information extracted from LIO, MNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP 2023.
* Classified habitat represent simplified delineations of known category 1 caribou habitat regions (MECP GHD (2024), telemetry kernels, high density aerial survey observations, RSF predicted areas) The simplified delineations utilize the Natural Heritage Information Centre (NHIC MNRF 2024) provincial tessellation boundaries and reflect broad areas of known high use caribou habitat.

Datum: NAD83
Projection: UTM Zone 15N

0 1 2 4 6 8 10 Kilometres

N W E S

First Mining Gold

WSP

SPRINGPOLE GOLD PROJECT

Mine Access Road Route Alternatives and Classified Habitat

PROJECT N°: ONS2104 | **FIGURE: 4.19-2**

SCALE: 1:102,000 | DATE: October 2024

4.20 Workforce Accommodations

It is expected that during the construction phase approximately 1,270 workers will be required while during operation phase it is expected that approximately 280 workers will be required. However, workers will rotate in 12-hour shifts, and only a portion will be onsite at a time.

4.20.1 Identified Alternatives

Workforce accommodations was identified in the EIS Guidelines (Appendix B-1) as a Project component to be considered in the EIS/EA. Options for a reasonable range of viable alternatives that satisfy the questions presented in Section 4.1.1 for workforce accommodation in the final EIS/EA, including using information from the following sources:

- Workshops, meetings and discussions;
- Consultation on the draft EIS/EA; and
- Professional experience and expertise.

However, a reasonable range of alternatives could not be identified for this component. The proposed approach to workforce accommodations to meet the criteria in Section 4.1.1 is presented below.

4.20.2 Rationale for Approach

Use of existing or new offsite residences was not considered for the Project due to the remote location and availability in the area. The Project site is distant from existing communities, and under existing conditions, there is no road access to the closest two communities and therefore and travel is not a safe or reasonable for daily commute, particularly after 12-hour shifts and/or during poor weather conditions. Only an onsite accommodations complex was considered viable. An onsite accommodations complex has the additional benefit of minimizing potential effects on the housing availability in the region.

The factors considered for locating onsite accommodations were as follows:

- General proximity to site infrastructure to reduce requirement for dedicated infrastructure;
- Compatibility with other Project components; and
- Security considerations, with the facility located outside the main site if practical.

A location was identified along the mine access road that meets these criteria for both a temporary construction camp and the permanent accommodations complex that is a reasonable distance from the remainder of the Project site. Other alternative locations were not identified or assessed due to the relatively small footprint of the facility and goal to minimize the overall site footprint.

4.21 Workforce Transportation

The primary means of regular access to the site for workers will be by the mine access road. As identified in Section 4.0, workers will stay on site and will return to their home communities at the end of their work cycle. There are two primary means whereby workers can travel by road to site, either by individual vehicles, which would be inclusive of both single occupancy and voluntary carpooling, or by means of communal bus(es).

An airstrip may also be established to transport personnel to the site. Development of an airstrip (along with the proposed helicopter pad) would also support faster emergency response. The viability of an airstrip near the Project site to support the effective travel of workers to site by charter plane, likely from Sioux Lookout, is currently being evaluated. If developed, an airstrip would also support medical evacuations and emergency supply deliveries.

Without transport of workers to site, the Project could not proceed. The existing environmental conditions that would be unchanged, and the socioeconomic benefits of the Project would not occur.

4.21.1 Identified Alternatives

Two alternatives were assessed for primary workforce transportation:

- **Alternative 1:** busing offered from centralized location(s); and
- **Alternative 2:** individual vehicle travel for the majority of workers.

Air travel for all workers is not financially feasible and therefore not a viable means of primary workforce transport for the Project.

4.21.2 Assessment of Alternatives

The two identified alternatives were assessed for all performance objectives in Table 4.21-1.The following were the identified as key differentiating criteria:

- Natural environment performance:

Potential effect on air quality and climatePotential effect on terrestrial species and habitat; and

Potential effect on SAR.

- Social, economic, cultural and built environment performance:

Potential effect on public health and safety (social environment);

Potential effect on local businesses and economy (economic environment); and

Potential effect on traditional land use (cultural environment).

4.21.2.1 Alternative 1: Busing from Centralized Location(s)

Advantages: this alternative results in improved worker safety, reduction in the potential for wildlife collisions, and reduced GHG emissions. Environmental effects from busing can be mitigated through maintenance of equipment, consideration of electric vehicles, and maintaining a log of wildlife sightings and interactions to provide information to support adaptive management. Busing of the Project workforce also provides a potential business opportunity for a third party. Traffic would be reduced with a lower number of vehicles on the roads.

Disadvantages: this alternative provides reduced flexibility for workers.

4.21.2.2 Alternative 2: Individual Vehicles

Advantages: this alternative allows works the flexibility that individual vehicles offer. FMG may need to offer this flexibility to be able to attract workers to a remote location, primarily from proximate Indigenous communities. This alternative would allow FMG to request workers to inform environmental staff of wildlife sightings and interactions to support adaptive management.

Disadvantages: this alternative involves individual workers driving along a relatively remote road after long shifts and is a potential safety hazard. This alternative does not provide a potential business opportunity for a third party. Increased road traffic will cause increased disruption to traditional land users.

Mitigation methods for this alternative could include:

- Encouraging staff to carpool to minimize environmental effects; and,
- Requiring staff to comply with speed limits

4.21.3 Results Summary and Selected Alternative

The preferred and selected alternative for workforce transport is Alternative 1, busing the majority of workers to site from a centralized location, based on the assessment of net effects in Table 4.21-1. Use of individual vehicles is considered partially preferred, and may be the form of transport for certain Individuals working at the Project, as well as for certain phases of the Project.

Table 4.21-1: Assessment of Workforce Transportation Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Bussing Offered from Centralized Location(s)	Alternative 2: Individual Vehicle Travel
Natural Environment				
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Minimal effect on air quality; no effect on meeting regulatory requirements	• Con/Op/Cl: Increased emissions due to the considerably higher number of vehicles travelling to site; no effect on meeting regulatory requirements
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Op/Cl: Limited GHG emissions will be associated with bussing	• Con/Op/Cl: Increased GHG emissions from use of individual vehicles due to the higher number of vehicles travelling to site
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to water quality	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to fish habitat	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to fish populations	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to fish passage	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to groundwater	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to wetlands	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to wetland connectivity	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• Con/Op/Cl: Minimal disruption along road due to bus travel back and forth to site	• Con/Op/Cl: Higher disruption along roads will occur due to traffic and travel back and forth to site, due to number of vehicles on the roads
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: all regulatory requirements will be met (reduced vehicle numbers and associated noise generated for this alternative)	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Indicator is not applicable to transport of workers; avoidance of transport corridors is generally expected	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• Con/Op/Cl: Avoidance of transport corridors is generally expected; however the reduced vehicle numbers for this alternative would result in a lower potential for wildlife interactions	• Con/Op/Cl: Avoidance of transport corridors is generally expected; however the increased vehicle numbers / traffic for this alternative would result in increased potential for wildlife interactions

Table 4.21-1: Assessment of Workforce Transportation Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Bussing Offered from Centralized Location(s)	Alternative 2: Individual Vehicle Travel
		Summary	**Preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine,. The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk. • Other SAR species may be present depending on the travel route taken over existing infrastructure	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to SAR species presence	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to SAR habitat displacement	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: all regulatory requirements will be met (reduced vehicle numbers and associated noise generated for this alternative)	• Con/Op/Cl: all regulatory requirements will be met (increased vehicle numbers and associated noise generated for this alternative)
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Avoidance of transport corridors by SAR is generally expected; however the reduced vehicle numbers for this alternative would result in a lower potential for wildlife interactions	• Con/Op/Cl: Avoidance of transport corridors by SAR is generally expected; however the increased vehicle numbers / traffic for this alternative would result in increased potential for wildlife interactions
		Summary	**Preferred**	**Partially preferred**
		Natural Environment Performance Objectives Assessment	**Preferred**	**Partially preferred**
			• Air emissions including GHG, and periodic noise and light emissions are considerably less with implementation of scheduled bus service • Reduced vehicle numbers would result in a lower potential for wildlife interactions potentially including SAR	• Although regulatory requirements will still be met, air emissions including GHG, and periodic noise and light emissions are considerably more with personal vehicle use • Increased vehicle numbers are anticipated to result in greater potential for vehicle – wildlife interactions
Social, Economic, Cultural and Built Environment				
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effect anticipated; there are no residences on the mine access road	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No effect anticipated; there are no known camp-related facilities on the mine access road	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to provision of access	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator

Table 4.21-1: Assessment of Workforce Transportation Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Bussing Offered from Centralized Location(s)	Alternative 2: Individual Vehicle Travel
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No material effects anticipated as the noise associated with the traffic will be low although above background levels	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to water well supplies (there are no known water well residences on the mine access road)	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to drinking water supply (there are no known drinking water supplies on the mine access road)	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: No material effects anticipated although bussing will reduce the volume of traffic and level of disturbance	• Con/Op/Cl: No material effects anticipated although higher traffic on roads, particularly on shift change days, could be more disturbing to other local users
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: Bussing will reduce the volume of traffic and potentially increase the safety for road travellers	• Con/Op/Cl: Higher traffic on roads from use of only individual vehicles, particularly on shift change days, could be less safe
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to provision of access	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to provision of access
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to provision of power supply	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Limited effect on air quality; no effect on attainment of air quality standards which are protective of health	• Con/Op/Cl: Limited effect on air quality (although increased emissions due to the considerably higher number of vehicles travelling to site); no effect on attainment of air quality standards which are protective of health
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to drinking water supply	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator

Table 4.21-1: Assessment of Workforce Transportation Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Bussing Offered from Centralized Location(s)	Alternative 2: Individual Vehicle Travel
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: Reduced traffic is expected to result in greater safety, and a reduced potential for accidents • Con/Op/Cl: By having consolidated transportation, vehicles can be more readily tracked to confirm people arrive safely	• Con/Op/Cl: Increased number of vehicles on the main road is expected to result in an increased potential for accidents • Con/Op/Cl: Greater potential for individual vehicles to not be identified as overdue / missing, such as during poor weather conditions
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: Potential positive effect / potential business opportunity for a third party for bussing of people	• Con/Op/Cl: Alternative 2 does not provide any business opportunities
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: The increase in traffic on existing roads associated with the Project will not affect existing access	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/Cl: The increase in traffic on existing roads associated with the Project will not affect tourism and recreational opportunities	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: Transport of workers will not materially affect the regional economy	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: Indicator is not applicable to this alternative; transport of workers does not affect services	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• Con/Op/Cl: Indicator is not applicable to this alternative; transport of workers is not related to land use	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator

Table 4.21-1: Assessment of Workforce Transportation Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Bussing Offered from Centralized Location(s)	Alternative 2: Individual Vehicle Travel
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: Indicator is not applicable to alteration of cultural heritage resources	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: Indicator is not applicable to built heritage resource or heritage attributes	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: Indicator is not applicable to obstruction of views	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: Indicator is not applicable to transport of workers as surface disturbance is not involved	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: Indicator is not applicable to transport of workers as surface disturbance is not involved	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Reserves are distant from Project and is not expected to be located along the travel route	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No potential for effects; there are no known sites along the proposed travel route	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: Reduced disruption to due to less traffic	• Con/Op/Cl: Increased disruption to habitat due to traffic and travel back and forth to site with a higher number of vehicles on the roads
		Summary	**Preferred**	**Partially preferred**

Table 4.21-1: Assessment of Workforce Transportation Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Bussing Offered from Centralized Location(s)	Alternative 2: Individual Vehicle Travel
		Social, Economic, Cultural and Built Environment Performance Objective Assessment	**Preferred**	**Partially preferred**
			• Adv: Lower potential for disturbance associated with traffic, and reduced number of vehicles could result in lower potential for accidents • Adv: Potential business opportunity for a third party for transport of personnel and bus / transfer station	• Disadv: Travel to site by individual vehicles has the potential to result in a larger number of accidents, and is anticipated to be a less safe option • Disadv: Higher traffic on roads could be disturbing to other local users
Technical Objectives				
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Proven and effective technology utilized to improve safety and reduce potential for wildlife interactions with vehicles	• Con/Op/Cl: A number of mines in Ontario allow individual vehicles to travel to site
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to transport of workers as no new technology is involved	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Disruption of travel would occur with poor weather conditions; however with travel protocol in place, personnel safety is not expected to be at risk	• Con/Op/Cl: Disruption of individual travel would occur with poor weather conditions; however personnel safety could be at greater risk as individuals would assess travel protocol
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Limited effects; would require establishment of a bus station / location at a centralized location with adequate parking, if existing facility(ies) are not viable	• Con/Op/Cl: No effects; no additional infrastructure required, except parking at the site
		Summary	**Partially preferred**	**Partially preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Could be viewed attractively as it could provide other opportunities (e.g. ,local contractor, personnel benefit)	• Con/Op/Cl: No effects anticipated from individual travel
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Comparatively higher operating cost borne by FMG rather than individuals, but is not limiting	• Con/Op/Cl: No cost anticipated for FMG other than provision of parking at site, although it could be reflected in salary requirements
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No anticipated effects on financial risk	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
		Technical Performance Objective Assessment	**Partially preferred**	**Partially preferred**
			• Adv: Proven and effective technology; can reliably transport personnel to site • Adv: Could provide other opportunities (e.g., local contractor, personnel benefit) • Disadv: Higher operating cost (but is not limiting)	• Adv: Proven and effective technology; can reliably transport personnel to site • Adv: Anticipated lower cost alternative for FMG
Amenability to Reclamation (Closure Phase)				
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• Cl: Reduced traffic with this alternative may result in greater public safety and a reduced potential for accidents; potential risk ends after closure activities are completed	• Cl: Increased traffic with this alternative may result in greater public safety and a reduced potential for accidents; potential risk ends after closure activities are completed
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• Cl: Indicator is not applicable to transport of workers	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator

Table 4.21-1: Assessment of Workforce Transportation Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Bussing Offered from Centralized Location(s)	Alternative 2: Individual Vehicle Travel
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Cl: Disruption to habitats will occur due to traffic and travel back and forth to site, which would be reduced with a lower number of vehicles on the access road; potential effect ends after closure activities are completed	• Cl: Increased potential disruption to habitats with increased traffic with this alternative ends after closure activities are completed • Cl: Limited area disturbed (additional parking lot) to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• Cl: No effects on land use associated with transport of workers by bus	• Cl: Limited area disturbed (parking lot) to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: No effects on land use associated with transport of workers by bus	• Cl: Limited area disturbed (parking lot) to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife
	Summary		**Partially preferred**	**Partially preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially preferred**	**Partially preferred**
			• Adv: Offsite station / infrastructure is expected to not be under the care and control of FMG, and therefore does not provide any opportunity for reclamation	• Adv: Limited area disturbed to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife
OVERALL ASSESSMENT OF ALTERNATIVE			**PREFERRED (SELECTED ALTERNATIVE)**	**PARTIALLY PREFERRED**
			The preferred and selected alternative for workforce transport is to bus the majority of workers to site from a centralized location once required infrastructure is in place. It is however recognized that workers often prefer individual travel.	Transport of workers and contractors by individual vehicle along is considered partially preferred. It may be the prevalent form of transport for certain phases of the Project, as well as for workers / contractors that require a vehicle for use on site.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured LSA = Local Study Area; Op: operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act.*

4.22 Domestic Sewage Management

There will be a need to manage and treat domestic sewage during all phases of the Project.

4.22.1 Identified Alternatives

Sewage treatment is required at locations where workers are present and a municipal service is not available. Three alternatives were considered for domestic sewage treatment at the Project site:

- **Alternative 1:** package sewage treatment plant
- **Alternative 2:** septic tank(s) and tile field(s); and
- **Alternative 3:** onsite storage tanks with offsite treatment at existing sewage treatment plant.

The Project cannot proceed without a means of domestic sewage management that meets regulatory requirements. The existing environmental conditions would be unchanged if the Project did not proceed; however, the socioeconomic benefits of the Project would also not accrue.

4.22.1.1 Alternative 1: Package Sewage Treatment Plant

A package sewage treatment plant consists of a pre-engineered and pre-fabricated modular system designed to treat domestic sewage. The plant is able to produce a final effluent quality that can be either released directly to the environment or into an integrated water management system. The plant will also produce a sludge product, which is disposed of separately. There are three primary types of package sewage treatment plants: rotating biological contactors, sequencing batch reactor systems and membrane bioreactor plants. Each system has its technical advantages and disadvantages from an operability standpoint and requires qualified operators to maintain the system. These different technologies are effectively equivalent from the environmental perspective and have not been assessed separately.

4.22.1.2 Alternative 2: Septic Tanks and Tile Field(s)

The septic tanks and tile field(s) system alternative consists of below ground / near below ground holding tanks into which sewage is pumped (or fed by gravity), allowing solids to settle. Clarified liquid flows to a set of buried permeable pipes (the tile field) that enable the liquid to permeate into the ground over a broad area. Bacterial processes within the ground naturally break down elements in the liquid to safe levels. Sewage solids will be periodically removed from the septic tank(s) for disposal off site at an existing facility operated by others. Tile fields are optimally developed in coarse soils such as sandy loams. Where these materials are not naturally present, the tile field is constructed with aggregate transported to site. Sufficient setbacks must be in place to avoid potential release of seepage that has not been fully treated in area waterbodies / watercourses and potable groundwater sources. Septic tank and tile field systems are generally used for smaller scale applications.

4.22.1.3 Alternative 3: Offsite Treatment

Offsite treatment of sewage will require storage of the untreated sewage in tanks on site and trucking of raw sewage to a local sewage treatment plant. The number and volume of tanks required is related to the number of workers, as well as the frequency of transport. The scale of the onsite facilities is similar to the two other alternatives but could be higher if less frequent transport is preferred to reduce traffic.

4.22.2 Assessment of Alternatives

The alternatives were assessed for all performance objectives; however, the following performance objectives and criteria were the identified as the key differentiators:

- Natural environment performance:

Potential effect on terrestrial species and habitat.

- Technical performance:

Ability to service site.

The results of the assessment of alternatives for domestic sewage treatment listing differentiating aspects are detailed in Table 4.22-1.

4.22.2.1 Alternative 1: Package Sewage Treatment Plant

Advantages: this alternative has the ability to reliably produce a high quality effluent that can meet regulatory requirements, from a facility with a fairly small footprint. It can be operated without reliance on outside facilities or requiring ongoing transport of waste off site and can be readily scaled up or down to match the number of workers present. It is not expected to result in adverse environmental effects. The cost of this alternative is competitive and is a risk free technology.

Disadvantages:

The primary mitigation measures associated with this form of sewage treatment relate to effective design and operation, including ongoing monitoring on system effectiveness.

4.22.2.2 Alternative 2: Septic Tanks and Tile Field(s)

Advantages: this alternative involves well known proven technology. Operating costs are low and generally limited to the costs to have the tank(s) pumped and inspected periodically.

Disadvantages: the technology in this alternative is better suited to smaller scale operations. Based on the site conditions, this option has the disadvantage of requiring additional lands and site preparation including appropriate aggregate / imported fill material for the tile field. This alternative has a larger footprint than Alternative 1 and will displace terrestrial habitat. There is also potential for seepage that could affect water quality.

There are limited mitigation measures required to reduce environmental effects with this form of sewage treatment, and as with Alternative 1, they relate to effective design and operation, including ongoing monitoring on system effectiveness.

4.22.2.3 Alternative 3: Offsite Treatment

Advantages: this alternative requires minimal additions to the site footprint. It would also generate local business opportunities. This alternative is a proven and effective technology.

Disadvantages: this alternative relies on suitable capacity at the receiving facility. It also relies on reaching and maintaining an agreement for receipt of domestic sewage waste, and will result in additional road traffic. Transporting raw sewage off site for treatment, particularly during the construction phase when there is a higher number of workers, could pose a logistical challenge, even if an offsite facility were identified with sufficient capacity. There would be increased emissions related to transport and potential for wildlife interactions. This alternative has the highest cost compared to the other alternatives.

Mitigation for this alternative relates primarily to the transport aspect, including scheduling of transport appropriately to minimize the potential for wildlife interactions and requiring the contractor to use properly maintained equipment and follow FMG and public speed limits.

4.22.3 Results Summary and Selected Alternative

The preferred and selected alternative for domestic sewage treatment is Alternative 1, use of a package plant treatment system, which will provide the best quality effluent and greatest reliability despite somewhat increased capital and operating costs. This selection is based on the assessment of net effects in Table 4.22-1 with proposed mitigation, including key mitigation measures described in Section 4.22.2. Temporary tanks and transport off site to an existing sewage treatment plant may be used, including potentially early in the construction phase and in the decommissioning phase, as well as during plant maintenance periods.

Table 4.22-1: Assessment of Domestic Sewage Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Package Sewage Treatment Plant (STP) [2]	Alternative 2: Septic Tanks and Tile Field(s)	Alternative 3: Offsite Treatment of Sewage
Natural Environment					
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: No material air quality emissions from a package STP	• Con/Op/Cl: No material air quality emissions from septic tank / tile fields	• Con/Op/Cl: limited emissions will be generated from transport of the sewage to an offsite STP
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Op/Cl: No material air quality emissions from a package STP	• Con/Op/Cl: No material air quality emissions from septic tank / tile fields	• Con/Op/Cl: limited GHG emissions generated from transport of the sewage to an offsite STP
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Op/Cl: Potential for effects on water quality due to discharge or spill, however, the STP will be designed to meet applicable water quality guidelines and/or objectives	• Con/Op/Cl: Potential for effects on water quality due to seepage from tile field; facility will be designed to meet applicable water quality guidelines and/or objectives including development on surface as needed to avoid high water table	• Con/Op/Cl: Transport of sewage from the site has the potential to increase the risk of spills • Con/Op/Cl: No effects from existing offsite facility
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Op/Cl: Indicator is not applicable to this alternative method; fish habitat area not affected by sewage treatment method	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: No effects; treatment produces high quality effluent standards required to attain or maintain receiving water protection of aquatic life standards, or scientifically defensible alternatives	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• Con/Op/Cl: Indicator is not applicable to this alternative method; fish passage not affected by sewage treatment method	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects; treatment produces high quality effluent	• Con/Op/Cl: No material effects; tile field will have a localized effect on groundwater quality	• Con/Op/Cl: No effects; treatment produces high quality effluent
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• Con/Op/Cl: No effects anticipated; the treatment system will not be sited in a wetland	• Con/Op/Cl: No effects anticipated; the treatment system will not be sited in a wetland	• Con/Op/Cl: Transport of sewage from the site will not affect wetlands; no effects from existing offsite facility
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• Con/Op/Cl: No effects anticipated; the treatment system will not be sited in a wetland / affect connectivity	• Con/Op/Cl: No effects anticipated; the treatment system will not be sited in a wetland / at a location anticipated to affect connectivity	• Con/Op/Cl: Transport of sewage from the site will not affect wetland connectivity; no effects from existing offsite facility
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**

Table 4.22-1: Assessment of Domestic Sewage Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Package Sewage Treatment Plant (STP) [2]	Alternative 2: Septic Tanks and Tile Field(s)	Alternative 3: Offsite Treatment of Sewage
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• Con/Op/Cl: Potential for minor habitat disruption, however, it would be sited to minimize any effect	• Con/Op/Cl: The septic tank(s) and tile field will have a medium sized footprint (when compared to the STP) that will result in habitat disruption, however, it would be sited to minimize any effect	• Con/Op/Cl: Potential for minor habitat disruption (tanks), however, it would be sited to minimize any effect
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No effects; no anticipated noise from plant operation	• Con/Op/Cl: No effects; no anticipated noise from plant operation	• Con/Op/Cl: Limited increased noise emissions from transport of sewage to offsite facility; limited increased potential for vehicle – wildlife interactions
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Would be located within the footprint of mine site area; No anticipated effect from plant operation	• Con/Op/Cl: Would be located within the footprint of mine site area; No anticipated effect from plant operation	• Con/Op/Cl: Limited potential effect as wildlife avoidance of PDA and transport corridor is generally expected
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• Con/Op/Cl: Located within the footprint of mine site area No anticipated effect from plant operation	• Con/Op/Cl: Located within the footprint of mine site area No anticipated effect from plant operation	• Con/Op/Cl: Limited potential effect as wildlife avoidance of PDA and transport corridor is generally expected; however there could be a limited increased potential for vehicle – wildlife interactions
	Summary		**Preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine, . The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• Con/Op/Cl: No SAR were observed (individuals or evidence) or otherwise identified as present or very close to the proposed STP site during baseline investigations	• Con/Op/Cl: SAR could be present, depending on the location identified as appropriate for the tanks / tile field	• Con/Op/Cl: Existing facility, no SAR anticipated to be present
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Con/Op/Cl: Category 2 habitat for Caribou present (within Project site)	• Con/Op/Cl: SAR habitat could be present, depending on the location identified as appropriate for the tanks / tile field; Category 2 habitat for Caribou likely present (would be sited to avoid Category 1 habitat preferentially)	• Con/Op/Cl: Existing facility, no SAR habitat anticipated to be present
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No effects; no anticipated noise from plant operation	• Con/Op/Cl: No effects; no anticipated noise from plant operation	• Con/Op/Cl: Limited increased noise emissions from transport of sewage to offsite facility; limited increased potential for vehicle – wildlife interactions

Table 4.22-1: Assessment of Domestic Sewage Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Package Sewage Treatment Plant (STP) [2]	Alternative 2: Septic Tanks and Tile Field(s)	Alternative 3: Offsite Treatment of Sewage
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: No anticipated effect from plant operation	• Con/Op/Cl: No anticipated effect from plant operation	• Con/Op/Cl: Limited potential effect as wildlife avoidance of PDA and transport corridor is generally expected
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
	Natural Environment Performance Objectives Assessment		**Preferred** • Adv: The STP will have a small footprint that will displace limited terrestrial habitat and have the potential for effects on water quality (however, the STP will be designed to meet permitted effluent discharge criteria)	**Partially preferred** • Disadv: The septic tank(s) and tile field will have a medium sized footprint (when compared to the STP) that will displace terrestrial habitat • Disadv: Alternative has the potential for effects on water quality due to seepage from tile field (however, facility will be designed to meet applicable water quality guidelines and/or objectives)	**Partially preferred** • Adv: Transport of sewage to an offsite facility requires limited additional facility footprint (tanks) • Disadv: Alternative requires an unwarranted increase in traffic, resulting in increased emissions (air, GHG and noise) and potential for increased spills, wildlife interactions and disturbance to SAR
Social, Economic, Cultural and Built Environment					
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effect anticipated; there are no known residences near the PDA	• Con/Op/Cl: No effect anticipated; there are no known residences near the PDA	• Con/Op/Cl: No effect anticipated; there are no residences on the mine access road road
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: No effect anticipated to income opportunities	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with this alternative	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: Potential income opportunity for a third-party for transport of sewage to offsite treatment plant
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to provision of access	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No effects; no anticipated noise from plant operation	• Con/Op/Cl: No effects; no anticipated noise from plant operation	• Con/Op/Cl: No material effect as there will be a very limited increase in noise emissions from transport of sewage to offsite facility
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects; no water wells present in Project area	• Con/Op/Cl: No effects; no water wells present in Project area	• Con/Op/Cl: No effects, there are no known water wells in the Project area or on the mine access road
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area or on the mine access road
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: Location would be adjacent to mine site and no effects anticipated from sewage treatment system	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.22-1: Assessment of Domestic Sewage Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Package Sewage Treatment Plant (STP) [2]	Alternative 2: Septic Tanks and Tile Field(s)	Alternative 3: Offsite Treatment of Sewage
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: Engineered design and operated in accordance with safety requirements; No effects anticipated from sewage treatment system	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl:; No effects; no material air quality emissions from a package STP	• Con/Op/Cl: No effects; no material air quality emissions from septic tank / tile fields	• Con/Op/Cl: Limited emissions will be generated from transport of the sewage to an offsite STP
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects; no drinking water supplies present in Project area	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: No effects anticipated from sewage treatment system; no transport of sewage by vehicle	• Con/Op/Cl: No effects anticipated from sewage treatment system; no transport of sewage by vehicle	• Con/Op/Cl: Increased sewage-related traffic, despite operational safeguards onsite roads, could increase the chance of an accident
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**

Table 4.22-1: Assessment of Domestic Sewage Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Package Sewage Treatment Plant (STP) [2]	Alternative 2: Septic Tanks and Tile Field(s)	Alternative 3: Offsite Treatment of Sewage
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with the alternative anticipated	• Con/Op/Cl: No effect; no material opportunities are associated with this treatment method	• Con/Op/Cl: Potential business opportunity for a third party for transport of the sewage offsite
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: Indicator is not applicable to this alternative; treatment method does not affect access	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/Cl: Indicator is not applicable to this alternative; treatment method does not materially affect opportunities	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: Indicator is not applicable to this alternative; treatment method does not affect the regional economy	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: Indicator is not applicable to this alternative; treatment method does not affect services	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• Con/Op/Cl: No direct or indirect effect anticipated from treatment method	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**

Table 4.22-1: Assessment of Domestic Sewage Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Package Sewage Treatment Plant (STP) [2]	Alternative 2: Septic Tanks and Tile Field(s)	Alternative 3: Offsite Treatment of Sewage
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: Indicator is not applicable to this alternative treatment method does not affect heritage resources	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: Indicator is not applicable to this alternative treatment method does not affect heritage resources	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: Indicator is not applicable to this alternative treatment method does not affect views	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: Indicator is not applicable to this alternative treatment method does not affect archaeological resources	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: Indicator is not applicable to this alternative treatment method does not cause land disturbances	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Reserve is distant from Project	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No potential for effects; no site located within the PDA	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**

Table 4.22-1: Assessment of Domestic Sewage Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Package Sewage Treatment Plant (STP) [2]	Alternative 2: Septic Tanks and Tile Field(s)	Alternative 3: Offsite Treatment of Sewage
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: This alternative provides the smallest footprint, and therefore, the least potential to effect access to traditional lands, which will continue during operation and into decommissioning until the site is fully rehabilitated	• Con/Op/Cl: Although the septic tank(s) and tile field(s) would have a small footprint, disruption to habitat will occur during construction which will continue during operation and into decommissioning	• Con/Op/Cl: Limited disruption to habitats will occur due to the transport of domestic sewage offsite (construction, operations and decommissioning)
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**
	Social, Economic, Cultural and Built Environment Performance Objective Assessment		**Partially preferred**	**Partially preferred**	**Partially preferred**
			• Adv: This alternative provides the smallest footprint entirely within the PDA, and therefore, the least potential to affect the human environment, which will continue until the site is fully rehabilitated	• Adv: This alternative provides the small footprint entirely within the PDA, and therefore, the least potential to affect the human environment, which will continue until the site is fully rehabilitated	• Adv: This alternative provides a smaller footprint within the PDA compared to Alternative 2, but likely greater than Alternative 1 • Disadv: Alternative 3 requires activities (transport of sewage) outside the PDA and has a greater potential to interact with the human environment although to a limited extent, which will continue until the site is fully rehabilitated
Technical Objectives					
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Proven and effective technology	• Con/Op/Cl: Although proven and effective technology, it is generally better suited to smaller scale operations without onsite accommodations	• Con/Op/Cl: Transporting sewage to an offsite treatment facility is a proven and effective technology
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; this form of treatment is commonly used	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: This alternative for treatment will be able to consistently meet Project needs	• Con/Op/Cl: This alternative is unlikely to be able to consistently meet Project needs due to potential constraints related to availability of appropriate lands and overall system capacity	• Con/Op/Cl: This alternative may to be able to consistently meet Project needs due to potential constraints related to availability of appropriate lands and overall system capacity; although there is the potential for sewage pick-up delay due to traffic delays, road conditions or weather
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Limited additional infrastructure is required	• Con/Op/Cl: This alternative may be constrained by the availability of appropriate lands	• Con/Op/Cl: Limited additional infrastructure is required
		Summary	**Preferred**	**Not preferred**	**Preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Proven and effective technology with no operational risks	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.22-1: Assessment of Domestic Sewage Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Package Sewage Treatment Plant (STP) [2]	Alternative 2: Septic Tanks and Tile Field(s)	Alternative 3: Offsite Treatment of Sewage
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: alternative has a moderate comparable cost and which can be supported by the Project	• Con/Op/Cl: alternative has the lowest comparable cost, and which can be supported by the Project Lowest cost • Con/Op/Cl: Tile field construction may require imported material (to be determined) which would increase the cost	• Con/Op/Cl: alternative has a highest comparable cost, but can be supported by the Project
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No material financial risks are associated with this alternative	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Technical Performance Objective Assessment			**Preferred**	**Not preferred**	**Partially preferred**
			• Adv: Onsite STP is a proven and effective technology that provides a reliable method for sewage management • Adv: An onsite STP provides a cost competitive, risk free technology	• Disadv: Septic tank(s) and tile field(s) are not utilized for this scale of operation in northern climates • Disadv: There may be potential constraints related to availability of appropriate lands and overall system capacity • Disadv: Tile fields could require additional material and site preparation as compared to an onsite prefabricated STP	• Adv: Transporting sewage to an offsite STP is a proven and effective technology • Disadv: Potential for sewage pick-up delay due to traffic delays, road conditions or weather • Disadv: The cost associated with this alternative is highest
Amenability to Reclamation (Closure Phase)					
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• Cl: Treatment produces high quality final effluent: no potential for effects during closure or post closure	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• Cl: Indicator is not applicable to this alternative	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Cl: Smallest area disturbed to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife	• Cl: Limited area disturbed (although more than the STP) to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife	• Cl: Limited area disturbed (tank locations) to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator

Table 4.22-1: Assessment of Domestic Sewage Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Package Sewage Treatment Plant (STP) [2]	Alternative 2: Septic Tanks and Tile Field(s)	Alternative 3: Offsite Treatment of Sewage
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator	• Con/Op/Cl: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially preferred**	**Partially preferred**	**Partially preferred**
			• Adv: Smallest area disturbed to be rehabilitated at closure consistent with the Closure Plan	• Adv: Limited area (although more than the STP) disturbed to be rehabilitated at closure consistent with the Closure Plan	• Adv: Small area (tanks) disturbed to be rehabilitated at closure consistent with the Closure Plan • Disadv: Alternative would not be under the care and control of FMG, and therefore does not provide any opportunity for reclamation apart from the tank locations
OVERALL ASSESSMENT OF ALTERNATIVE			**PREFERRED (SELECTED ALTERNATIVE)**	**NOT PREFERRED**	**NOT PREFERRED**
			A package plant treatment system will provide the best quality effluent and greatest reliability, despite somewhat increased capital and operating costs.	Although proven and effective technology, it is generally better suited to smaller scale operations and is not expected to be able to consistently meet Project needs	Temporary tanks and transport off site to an existing sewage treatment plant may be used including potentially early in the construction phase and in the decommissioning phase, as well as during plant maintenance periods. Transporting raw sewage off site for treatment, would pose a logistical challenge, even if an offsite facility was identified with sufficient capacity.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
(2) Rotating biological contactor, sequencing batch reactor or membrane bioreactor.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = ; LSA = Local Study Area; Op: operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*.

4.23 Solid Waste Management

Both solid non-hazardous and hazardous waste will be produced during all phases of the Project. This section applies to day-to-day non-hazardous solid wastes that would require disposal during the mine construction, operations, and closure phases, but excludes demolition wastes associated with mine closure (which is assessed in Section 4.30).

Hazardous wastes such as used petroleum products, batteries, spent solvents, biomedical wastes, as well as contaminated soils, will be shipped off site in accordance with regulatory requirements. Consideration was not given to permanent storage and/or treatment of hazardous wastes on the site, as it is not economically practical or preferred from an environmental perspective to establish a hazardous waste treatment facility on site for the low volume anticipated to be produced.

Non-hazardous wastes are expected to consist of materials such as the following:

- Domestic waste (food scraps, refuse, clothing);
- Combustible wastes (wood, paper products); and
- Other inert wastes (scrap metals, glass and plastics).

4.23.1 Identified Alternatives

The following alternatives were considered for solid waste disposal:

- **Alternative 1:** offsite disposal at an existing approved landfill(s); and
- **Alternative 2:** development of a new onsite landfill.

Recycling of waste materials will also be fully considered. Establishment of an onsite incinerator was not considered a viable alternative due to the anticipated challenges with obtaining the necessary environmental approval(s) and the potential challenge of meeting anticipated strict emissions requirements.

The Project cannot proceed without a means of solid waste management that meets the Ontario regulatory requirements. The existing environmental conditions would be unchanged if the Project did not proceed; however, the socioeconomic benefits of the Project would also not accrue.

4.23.1.1 Alternative 1: Offsite Disposal at an Existing Approved Landfill

There are two approved offsite landfills which have capacity and are potentially willing to accept waste from the Project: the Hidden Lake Landfill located approximately 400 km from the Project site that services the Town of Sioux Lookout and the surrounding area and a municipal landfill in Ear Falls (approximately 160 km from the Project site).

4.23.1.2 Alternative 2: Development of an Onsite Landfill

Preferentially, a landfill development would be on lands held by FMG that are not in conflict with other proposed facilities and infrastructure or with environmental constraints. If a new landfill site were to be developed, site-specific investigations would be required to investigate the subsurface and hydrogeologic conditions.

4.23.2 Assessment of Alternatives

The alternatives were assessed for all performance objectives; however, the following performance objectives and criteria were identified as the key differentiators:

- Natural environment performance:
  - Potential effect on water quality, fish and aquatic habitat.
  - Technical performance:
  - Cost effectiveness.
- Amenability to reclamation performance:
  - Potential effect on future land / land use.

The results of the assessment of alternatives for solid waste management listing differentiating aspects are detailed in Table 4.23-1.

4.23.2.1 Alternative 1: Offsite Disposal at an Existing Approved Landfill

Advantages: this alternative involves transporting waste to an existing offsite landfill is that the waste is removed from the site and responsibility for the waste is transferred to a separate licenced operator, within an existing facility that is designed to manage potential environmental effects. It would have no effect on groundwater or fish habitat. There will be potential business opportunities associated with this alternative.

Disadvantages: this alternative involves ongoing traffic and GHG emissions from transporting the waste off site. There could also be delays in waste pickup due to traffic, road conditions, and weather. This alternative is considered to be overall more costly than Alternative 2.

Mitigation for this alternative relates primarily to the transport aspect, including scheduling of transport appropriately to minimize the potential for wildlife interactions and requiring the contractor to use properly maintained equipment and follow FMG and public speed limits.

4.23.2.2 Alternative 2: Develop an Onsite Landfill

Advantages: this alternative has lower GHG emissions and potential for wildlife interactions related to traffic. This alternative has lower operating costs than Alternative 1.

Disadvantages: this alternative would potentially attract nuisance wildlife to the site and would require additional operational support, including for environmental monitoring and nuisance management, and will have higher capital costs. This alternative could also potentially impact groundwater. This alternative requires a small footprint onsite and will displace a limited amount of terrestrial habitat. No business opportunities are associated with this alternative. There is also a potential risk of liability at closure.

Key mitigation measures that would minimize potential environmental effects associated with this alternative are as follows:

- Properly site and design of the landfill to take advantage of local geologic conditions to constrain leachate movement and provide sufficient buffer from waterbodies / watercourses and sensitive locations.
- Collect and treat leachate.
- Effectively sort waste so that only domestic waste is deposited in the landfill.
- Compact and regularly cover waste to avoid attracting wildlife.
- Place a fence if needed to prevent blowing debris.

4.23.3 Results Summary and Selected Alternative

Hazardous wastes such as used petroleum products, batteries and spent solvents, as well as biomedical wastes, will be shipped off site in accordance with regulatory requirements.

The preferred and selected alternative is to transport domestic solid waste to an existing facility off site. This alternative has been selected on balance of the net effects in Table 4.23-1 with proposed mitigation, including key mitigation measures described briefly in Section 4.23.2. In addition, FMG has obtained a letter from the existing local facility confirming that the waste can be accepted. It is expected to be somewhat more costly compared to developing an onsite landfill, but it expected to provide adequate service availability and capacity for the Project's needs.

Table 4.23-1: Assessment of Solid Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Offsite Disposal at an Existing Approved Landfill	Alternative 2: Develop an Onsite Landfill
Natural Environment				
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Limited emissions will be generated from transport of the waste to an offsite landfill	• Con/Op/Cl: No material air quality emissions from an onsite landfill
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Op/Cl: Limited GHG emissions will be generated from transport of the waste to an offsite landfill	• Con/Op/Cl: Very limited GHGs may be emitted from decomposition of organic waste in a domestic landfill
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Op/Cl: No effects from existing facility or from normal transport operations	• Con/Op/Cl: No material effects on surface water discharges from an onsite landfill
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Op/Cl: Fish habitat will not be affected by solid waste transport	• Con/Op/Cl: Fish habitat will not be affected by solid waste landfilling (landfill will be appropriately sited)
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: Fish will not be affected by solid waste transport	• Con/Op/Cl: Fish habitat will not be affected by solid waste landfilling (landfill will be appropriately sited)
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• Con/Op/Cl: Fish passage will not be affected by solid waste transport	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects; groundwater will not be affected by solid waste transport	• Con/Op/Cl: Groundwater could be affected by an onsite landfill, however this will be mitigated through engineering design, and treatment of leachate if needed
		Summary	**Preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• Con/Op/Cl: No effects; wetlands will not be affected by solid waste transport	• Con/Op/Cl: No effects anticipated; the landfill will not be sited in a wetland
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• Con/Op/Cl: No effects; wetland connectivity will not be affected by solid waste transport	• Con/Op/Cl: No effects anticipated; the landfill will not be sited in a wetland
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• Con/Op/Cl: No effects anticipated; a temporary storage area will be established within the Project footprint	• Con/Op/Cl: Potential for minor habitat disruption; however, it would be sited to minimize any effect
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Limited increased noise emissions from transport of sewage to offsite facility; limited increased potential for vehicle – wildlife interactions	• Con/Op/Cl: Limited noise emissions that will occur at the same time as the overall Project
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Limited potential effect as wildlife avoidance of PDA and transport corridor is generally expected	• Con/Op/Cl: Limited potential effect as wildlife avoidance of PDA is generally expected
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals,	• Con/Op/Cl: Limited potential effect as wildlife	• Con/Op/Cl: Potential effects can be mitigated

Table 4.23-1: Assessment of Solid Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Offsite Disposal at an Existing Approved Landfill	Alternative 2: Develop an Onsite Landfill
		bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	avoidance of PDA and transport corridor is generally expected; however there could be a limited increased potential for vehicle – wildlife interactions	through proper waste management practices
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• Con/Op/Cl: Existing facility, no SAR anticipated to be present	• Con/Op/Cl: SAR could be present, depending on the location identified as appropriate for the onsite landfill
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Con/Op/Cl: Existing facility, no SAR habitat anticipated to be present	• Con/Op/Cl: SAR habitat could be present, depending on the location identified as appropriate; Category 2 habitat for Caribou likely present (would be sited to avoid Category 1 habitat preferentially)
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Existing facility, no SAR habitat anticipated to be present • Con/Op/Cl: Limited potential effect as wildlife avoidance of the transport corridor is generally expected; however there could be a limited increased potential for vehicle – wildlife interactions	• Con/Op/Cl: No anticipated effect from landfill operation as the limited associated noise emissions will occur at the same time as the overall Project
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Limited potential effect as wildlife avoidance of the transport corridor is generally expected; however there could be a limited increased potential for vehicle – wildlife interactions	• Con/Op/Cl: No anticipated effect from landfill operation as wildlife avoidance of PDA is generally expected
		Summary	**Partially preferred**	**Partially preferred**
		Natural Environment Performance Objectives Assessment	**Partially preferred**	**Partially preferred**
			• Adv: Limited onsite facilities / land disturbance will be required • Disadv: Transport of the waste to an offsite landfill will generate air emissions including GHG • Disadv: could be a limited increased potential for vehicle – wildlife interactions	• Disadv: The landfill footprint will displace limited terrestrial habitat
Social, Economic, Cultural and Built Environment				
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effect anticipated; there are no known residences on the mine access road	• Con/Op/Cl: No effect anticipated; there are no known residences near the PDA
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities

Table 4.23-1: Assessment of Solid Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Offsite Disposal at an Existing Approved Landfill	Alternative 2: Develop an Onsite Landfill
			• Con/Op/Cl: Potential income opportunity for a third-party to transport solid waste to approved facility • Con/Op/Cl: Facility will receive fees for waste storage	• Con/Op/Cl: No material effects specifically associated with this alternative
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to provision of access	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No material effect as there will be a very limited increase in noise emissions from transport of solid waste to an offsite facility	• Con/Op/Cl: No effects anticipated as the noise associated with waste management will be very low (will not materially increase noise levels) and will occur at the same time as the overall Project
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects, there are no known water wells in the Project area or on the mine access road	• Con/Op/Cl: No effects; no water wells present in Project area
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area or on the mine access road	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: No facility on site, and therefore no change in aesthetics; No effects anticipated from waste transport	• Con/Op/Cl: Facility would be incorporated into mine site area and no change in aesthetics anticipated; No effect from waste transport
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: Existing facility operated in accordance with regulatory requirements; No effects anticipated from waste transport	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: limited emissions will be generated from transport of the waste to an offsite landfill	• Con/Op/Cl: No adverse effect to health and safety; limited emissions will be generated during construction, operations and closure phases; however, they will not affect attainment of air quality standards which are protective of health
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects; no drinking supplies present in Project area or on the mine access road	• Con/Op/Cl: No effects; no drinking supplies present in Project area

Table 4.23-1: Assessment of Solid Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Offsite Disposal at an Existing Approved Landfill	Alternative 2: Develop an Onsite Landfill
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: Increased waste-related traffic, despite operational safeguards onsite roads, could increase the chance of an accident	• Con/Op/Cl: No effects anticipated from onsite landfill
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: Potential business opportunity for a third party for transport of the waste offsite • Con/Op/Cl: Facility will receive fees for waste storage	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No effect; no material opportunities are associated with this management method
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: Indicator is not applicable to this alternative; management method does not affect access	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/Cl: Indicator is not applicable to this alternative; management method does not materially affect opportunities	• Con/Op/Cl: No effects anticipated as landfill will be sited distant from tourism and recreational opportunities
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: Indicator is not applicable to this alternative; management method does not affect the regional economy	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: This alternative relies on access to a local landfill and will affect the life of the existing facility, but can proceed only with the agreement of the operator	• Con/Op/Cl: Indicator is not applicable to this alternative; waste management method does not affect services
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• Con/Op/Cl: No direct or indirect effect anticipated from management method	• Con/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder for pipeline corridor clearing and reclamation • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals
		Summary	**Partially preferred**	**Partially preferred**

Table 4.23-1: Assessment of Solid Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Offsite Disposal at an Existing Approved Landfill	Alternative 2: Develop an Onsite Landfill
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable; this alternative is related to waste management	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable; this alternative is related to waste management	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are distant from mine site	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are distant from mine site	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are distant from mine site	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: Indicator is not applicable to this alternative management method does not affect archaeological resources	• Con/Op/Cl: Landfill and related infrastructure will be sited to avoid known archaeological sites • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: Indicator is not applicable to this alternative management method does not cause land disturbances	• Con/Op/Cl: Landfill and related infrastructure will be sited to avoid known archaeological sites • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed • Con: Work will not alter water levels
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Reserve is distant from Project	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No potential for effects; no site located within the PDA	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: This alternative provides the smallest footprint (for temporary waste handling), and therefore, the least potential to effect access to traditional lands, which will continue during operation and into decommissioning until the site is fully rehabilitated	• Con/Op/Cl: Although the facility would have a very small footprint, disruption to habitat will occur due to construction, operations and decommissioning until the site is fully rehabilitated
		Summary	**Partially preferred**	**Partially preferred**

Table 4.23-1: Assessment of Solid Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Offsite Disposal at an Existing Approved Landfill	Alternative 2: Develop an Onsite Landfill
		Social, Economic, Cultural and Built Environment Performance Objective Assessment	**Partially preferred**	**Partially preferred**
			• Adv: Potential business opportunity for a third party for transport of solid waste to approved facility • Disadv: Relies on access to a local landfill and will affect the life of the existing facility, but can proceed only with the agreement of the operator • Disadv: Potential effects from solid waste transport off site and potential for increased traffic interactions	• Disadv: No material opportunities are associated with this management method
Technical Objectives				
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Proven and effective technology	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; this form of treatment is commonly used	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Dependence on third party operator to remove hazardous waste from site • Con/Op/Cl: Disruption could occur with weather disruption of travel or road access	• Con/Op/Cl: This alternative may to be able to consistently meet Project needs; ability to service site is within FMG control
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: A landfill (with capacity) to support the Project could be located a significant distance away from the PDA	• Con/Op/Cl: No effects anticipated
		Summary	**Partially preferred**	**Partially preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Operated by a third party with liability presumed to be held by that party • Con/Op/Cl: Existing offsite landfill may require expansion, which may be requested to be funded partly or in whole by FMG • Con/Op/Cl: Risk of operation delay or issues given that the landfill is operated by a third party	• Con/Op/Cl: Potential risk of liability at closure, which will require long-term management and monitoring
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Comparatively higher operating cost compared to an onsite landfill but are not limiting to the Project	• Con/Op/Cl: Lower operating cost due waste not being transported offsite • Con/Op/Cl: Comparatively higher capital cost rather than an existing offsite landfill but overall costs are not limiting to the Project
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No material effects anticipated	• Con/Op/Cl: Potential risk of liability at closure, which will require long-term management and monitoring
		Summary	**Preferred**	**Partially preferred**
		Technical Performance Objective Assessment	**Preferred**	**Partially preferred**
			• Adv: Proven and effective technology • Disadv: Potential for waste pick-up delay due to traffic delays, road conditions or weather	• Adv: Proven and effective technology • Adv: Can reliably support Project activities • Disadv: Higher capital cost and longer monitoring costs but lower operating costs • Disadv: Potential risk of liability at closure

Table 4.23-1: Assessment of Solid Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Offsite Disposal at an Existing Approved Landfill	Alternative 2: Develop an Onsite Landfill
Amenability to Reclamation (Closure Phase)				
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• Cl: No effects anticipated	• Cl: Landfill will be closed in accordance with regulatory requirements; no material effects anticipated
		Summary	**Partially Preferred**	**Partially Preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• Cl: Indicator is not applicable to this alternative	• Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Cl: Smallest area disturbed to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife	• Cl: Limited area disturbed (although more than for Alternative 1) to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Preferred**	**Partially preferred**
	Amenability to Reclamation Performance Objective Assessment		**Preferred**	**Partially preferred**
			• Adv: No material effects anticipated. Alternative would not be under the care and control of FMG	• Adv: Limited area disturbed to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife • Disadv: Landfilled waste will be present although landfill will be closed in accordance with regulatory requirements
	OVERALL ASSESSMENT OF ALTERNATIVE		**PREFERRED (SELECTED ALTERNATIVE)**	**PARTIALLY PREFERRED**
			The preferred and selected alternative is to transport domestic solid waste to an existing facility off site, such as the Hidden Lake Landfill pending commercial agreements. This alternative is expected to be overall more costly compared to developing an onsite landfill, but it expected to provide adequate service availability and capacity for the Project's needs.	Development of an onsite landfill is has not be selected, as a new domestic landfill at the site will require additional operational support including for environmental monitoring, and will have higher capital costs. There will also be a long term liability and management required for the site.

Notes:

(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.

Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op: operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act.*

4.24 Power Supply

Power will be required during all phases of the Project, with the majority of the requirement associated with the process plant and primary crusher. Near the end of construction, and into commissioning and operations, the power requirement at the site will increase to approximately 55 megawatts (MW) of power. Energy-saving equipment and processes will be used where practical; however, conservation cannot materially change the energy requirements. The site is not currently connected to the provincial electrical grid.

4.24.1 Identified Alternatives

Grid power and onsite diesel generators are commonly used for power at Canadian mine sites. Natural gas-fired generation may also be used where a natural gas source is reasonably available. The regional natural gas pipeline is very distant from the Project site, and transport of compressed natural gas is also not viable from an economic perspective; therefore natural gas-fired onsite generation was not considered further.

Development of a dedicated hydro-electric generation station or a geothermal power supply were not considered viable for the Project and were not assessed. Construction of a new hydroelectric generating station, which would require damming a large watercourse if available, could not be financially supported by the Project, and would have greater unnecessary adverse environmental effects. Development of a geothermal source at the scale required for the Project would not be financially viable or technically feasible given the local geothermal conditions. Other alternative energy sources were fully considered in the assessment of viable alternatives.

Four power supply alternatives were identified for assessment:

- **Alternative 1:** connection to the regional electrical grid;
- **Alternative 2:** onsite diesel generation;
- **Alternative 3:** wind turbines; and
- **Alternative 4:** solar panel farm.

If a power supply is not established, the Project cannot proceed and the environmental conditions would be unchanged; however, the socioeconomic benefits of the Project could not occur.

4.24.1.1 Alternative 1: Connection to the Regional Electrical Grid

Mine sites in Canada are typically supplied power by means of new transmission lines when there is a transmission line with sufficient capacity for connection within a reasonable distance. The transmission line alternative is subject to potential disruptions such as blackouts that can occur with the provincial electrical grid. These disruptions can be caused by natural occurrences such as storm events or by decisions from the power generating authority. Contingency back-up generators will be needed and will be available for emergency power.

There are two primary transmission lines that cross the region:

- Existing E1C 115 kV transmission line owned by Hydro One Networks Inc., located approximately 26 km south of the site; and
- Wataynikaneyap Power 230 kV transmission line located approximately 73 km south of the site.

The existing E1C transmission line does not currently have sufficient capacity to support the Project and is not a feasible alternative. Should capacity become available prior to construction of the Project, this alternative may be re-assessed and could potentially be preferred over the Wataynikaneyap transmission line as it is closer to the Project site.

An engineering assessment was completed to assess the appropriate transmission line voltage needed to support the Project (115, 138 or 230 kV) and associated transformer station (Nordmin 2021). Based on this assessment and in recognition of the lack of current capacity of regional electrical grid / E1C 115 kV transmission line, it was determined that a 230 kV transmission line would be preferred to support the Project, with the only alternative being connection to the Wataynikaneyap Power 230 kV transmission line.

4.24.1.2 Alternative 2: Onsite Diesel Generation

Onsite diesel-fired generators could provide a reliable power source for the mine. Diesel-fired generators typically have self-contained double-walled fuel tanks for immediate fuel storage and are equipped with appropriate measures to prevent and monitor tank ruptures or overflows in the day tank. At the scale required, the generators would be supplied by a fuel line to a fuel tank farm, which would have multiple tanks sized to meet the requirements of the generators, as well as other onsite fuel needs.

4.24.1.3 Alternatives 3 and 4 Renewable Energy (wind and solar) Sources

A renewable energy scoping study was completed for the Project to investigate the technical and commercial potential of including renewable energy generation in the mine site design (SLR 2021). The study was completed in consideration of comments received on the Project to date, as a well as for corporate environmental, social and governance values. Renewable energy technology options were considered only if they were both technically and commercially feasible for implementation in the next few years. As a result, the study looked at wind and photo-voltaic solar power, and the required energy storage associated with both.

The natural kinetic energy of wind can be converted into electricity, for immediate use and/or storage until needed. Wind turbines can be erected to capture wind energy when the wind speed is sufficient to move the turbine blades. The turbines also include wind speed setpoint, above which energy is not collected, as the turbine may be damaged in high winds. Installed wind power capacity has expanded in Canada in recent years and is proven technology, although with limitations.

Solar photovoltaic technology uses solar cells to directly convert sunlight into electricity. The potential for solar energy varies as is it entirely reliant on the sun, and availability will also vary between summer and winter months.

Both wind and solar technologies require energy storage for subsequent energy use, most commonly in the form of batteries. Multiple types of batteries are available; however, lithium-ion, lead-acid and zinc-hybrid cathode are considered most viable for the Project based on investigations to date (SLR 2021).

4.24.2 Assessment of Alternatives

Four power supply alternatives were assessed for the Project in response to comments received during ongoing consultation and engagement, although only Alternatives 1 and 2 are considered potentially viable alternatives:

- Alternative 1: Connection to the regional electrical grid;
- Alternative 2: Onsite diesel generation;
- Alternative 3: Wind turbines; and

- Alternative 4: Solar panel farm.

All alternative assessment criteria and indicators for the performance objectives were considered in the comparative analysis; however, the following performance objectives and criteria were identified as the key differentiators for power supply (Table 4.24-1):

- Natural environment performance:
  - Potential effect on air quality and climate;
  - Potential effect on terrestrial species and habitat; and
  - Potential effect on SAR.
- Social, economic, cultural and built environment performance:
  - Potential effect on local business and economy (economic environment);
  - Potential effects on regional economy (economic environment);
  - Potential effect on heritage resources (cultural environment);
  - Potential effect on Indigenous communities (cultural environment);
  - Potential effect on spiritual and ceremonial sites (cultural environment); and
  - Potential effect on traditional land use;
- Technical performance:_
  - Ability to service site; and
  - Cost effectiveness.
- Amenability to reclamation performance:

Potential effect of future land / land use

4.24.2.1 Alternative 1: Connection to the Regional Electrical Grid

Advantages: this alternative is the best proven technical solution. It provides the most business opportunities for local suppliers throughout all phases of the Project. This alternative involves lower GHG emissions than Alternative 2 and is overall expected to have limited environmental effects during operations. This alternative could provide access to remote areas for hunting and recreational activities.

Disadvantages: this alternative has largest overall footprint and direct effect on terrestrial, aquatic, wetland, and SAR habitat. This alternative is not free from emissions, as the provincial power grid is also partially generated with fossil fuels. The creation of corridors could increase predation on Caribou. This alternative may affect views and landscapes in the local area and could be subject to disruptions from natural causes.

4.24.2.2 Alternative 2: Onsite Diesel Generation

Advantages: this alternative provides the greatest flexibility to support all the Project phases. This alternative has the smallest footprint of all the alternatives assessed. It also provides business opportunities for local suppliers during all phases of the Project. This alternative is expected to be able to avoid Category 2 Caribou habitat and are not expected to have any other effects on SAR.

Disadvantages: this alternative requires ongoing purchase and transport of fuel and will produce greater GHG emissions and potential traffic concerns, particularly if used for the operations phase. It also results in increased noise levels from the generator and fuel trucks. This alternative has very high operating costs and potential financial risk due to fuel prices.

4.24.2.3 Alternative 3: Wind Turbines

Advantages: this alternative has a smaller footprint than alternatives 1 and 4 and results in low air emissions. Business opportunities for local suppliers could occur during construction and decommissioning.

Disadvantages: this alternative is not technically or financially feasible for the Project. This alternative also alters the local viewscape more than other alternatives and has the potential to change local migration patterns for birds, potentially resulting in bird mortality.

4.24.2.4 Alternative 4: Solar Panel Farm

Advantages: this alternative produces limited air emissions and has a smaller footprint than Alternative 1. Business opportunities for local suppliers could occur during construction and decommissioning.

Disadvantages: this alternative is not technically or financially feasible for the Project.

4.24.3 Results Summary and Selected Alternative

The preferred and selected alternative for power supply is Alternative 1, connection to the regional electrical grid by means of a 230 kV transmission line and related infrastructure, based on the assessment of net effects in Table 4.24-1 with proposed mitigation, including key mitigation measures described in Section 4.24.2. The high overall cost of fuel and the instability in fuel prices, as well as considering the additional air and GHG emissions, makes the overall assessment of diesel generation not preferred. Diesel generation will, however, provide a temporary reliable power supply until the connection is available and after it is decommissioned during the closure phase, as well as a contingency supply during power disruptions. The potential application of wind and solar power as a supplemental power source will be investigated further for the Project during detailed design, as well as opportunities to draw power from a regional biomass facility.

Table 4.24-1: Assessment of Power Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Connection to Regional Electrical Grid[(2)]	Alternative 2: Onsite Diesel Generation	Alternative 3: Wind Turbines	Alternative 4: Solar Panel Farm
Natural Environment						
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: Emissions will be generated during and limited to the construction and closure phases; however, emissions will not affect attainment of air quality standards • Op: No direct emissions during operation	• Con/Op/Cl: Diesel generators will result in emissions of particulate matter, sulphur dioxide, nitrogen oxides, and carbon dioxide throughout the life of the Project and additional emissions from transport of diesel fuel to site; mitigation can be employed to confirm air quality standards are met	• Con/Cl: Emissions will be generated during and limited to the construction and closure phases; however, emissions will not affect attainment of air quality standards • Op: No direct emissions during operation	• Con/Cl: Emissions will be generated during and limited to the construction and closure phases; however, emissions will not affect attainment of air quality standards • Op: No direct emissions during operation
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Cl: Minor GHG emissions will be generated from heavy equipment use during construction and closure phase	• Con/Op/Cl: Emissions of GHG will be generated throughout the life of the Project • Con/Op/Cl: Additional GHG emissions from transport of diesel fuel to site	• Con/Cl: Minor GHG emissions will be generated during construction and closure phase • Op: No direct emissions during operation	• Con/Cl: Minor GHG emissions will be generated during construction and closure phase • Op: No direct emissions during operation
		Summary	**Preferred**	**Partially preferred**	**Preferred**	**Preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Cl: Construction and decommissioning activities have the potential to introduce sediment loadings into local watercourses, if not properly managed (sediment and erosion control plan will be in place) • Op: No effects during operation	• Con/Op/Cl: No effect during normal operations, but potential for increased risk of diesel fuel spill on site and during transport of fuel to site, but	• Con/Op/Cl: Construction and decommissioning activities have the potential to introduce limited sediment loadings into local watercourse(s), if not properly managed (sediment and erosion control plan will be in place) • Op: Once constructed, no potential for effects to surface anticipated; No effects during operation	• Con/Op/Cl: Construction and decommissioning activities have the potential to introduce limited sediment loadings into local watercourse(s), if not properly managed (sediment and erosion control plan will be in place) • Op: No effects during operation
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Cl: Potential fish habitat disruption from watercourse crossing and vegetation clearing during construction if best construction practices are not followed (sediment and erosion control plan will be in place) • Op: No effects as no in-water infrastructure will be required	• Con/Op/Cl: No effects; no in-water works required	• Con/Op/Cl: No effects; no in-water works required	• Con/Op/Cl: No effects; no in-water works required
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: No material effects anticipated as no in-water works / travel through watercourse and with planned sediment and erosion control	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• Con/Op/Cl: No in-water works and no effects on fish passage anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.24-1: Assessment of Power Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connection to Regional Electrical Grid[2]	Alternative 2: Onsite Diesel Generation	Alternative 3: Wind Turbines	Alternative 4: Solar Panel Farm
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects on groundwater anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• Con: Potential for disturbance to wetlands during construction, however, this effect would be mitigated by winter construction; therefore, the functionality of the wetland will not be affected • Op: No anticipated effects anticipated to wetlands during operation	• Con/Op/Cl: No effects anticipated; facility will not be constructed in a wetland	• Con/Op/Cl: No material effects anticipated; facility will not be constructed in a wetland	• Con/Op/Cl: No material effects anticipated; facility will not be constructed in a wetland
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• Con/Op/Cl: No effects anticipated to wetland connectivity as small structures are proposed and no permanent access	• Con/Op/Cl: No effects anticipated to wetland connectivity as small structures are proposed outside of wetlands	• Con/Op/Cl: No effects anticipated to wetland connectivity as small structures are proposed outside of wetlands	• Con/Op/Cl: Con/Op/Cl: No effects anticipated to wetland connectivity; any grading required will continue drainage patterns
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• Con/Op/Cl: Depending on the route selected, a transmission line will have the largest footprint, in the order of 375 ha (or more) • Con/Op/Cl: Transmission line results in creation of forest edge habitat which is preferred by some wildlife species including Moose; however, woodland species would be displaced as the corridor is cleared • Con/Op/Cl: Transmission line corridor has potential to act as a corridor for large predators, thereby affecting species such as Caribou and Moose	• Con/Op/Cl: Diesel generators would have a very limited footprint (less than 1 ha) for 55 megawatts	• Con/Op/Cl: Clearing of vegetation will be required depending on location(s) sited, anticipated to be in the order of 25 ha to produce the approximate power needed (SaskWind 2020)	• Con/Op/Cl: Clearing of vegetation will be required depending on location(s) sited, anticipated to be in the order of 50 ha to produce the scale of power needed (GreenCoast 2021) and anticipated to be more for a northern location
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Cl: Noise will be created during the construction and closure phases but will be temporary and mobile • Op: No material noise generation or other disturbance anticipated	• Con/Op/Cl: Generator sound emissions would contribute to overall site sound emissions • Con/Op/Cl: Additional noise emissions from trucking diesel fuel to site	• Con/Op/Cl: Wind turbines will produce noise that would contribute to overall Project sound emissions; noise increases on the order of 35 to 45 dB, 300 m away as well as infrasound that cannot be heard by humans	• Con/Op/Cl: No material effects anticipated; minor noise created during construction
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except	• Con/Op/Cl: Cleared route may become a preferential wildlife	• Con/Op/Cl: No material effects anticipated; generators will be	• Con/Op/Cl: No material effects anticipated, although birds may	• Con/Op/Cl: No material effects anticipated with the assumption

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Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connection to Regional Electrical Grid[2]	Alternative 2: Onsite Diesel Generation	Alternative 3: Wind Turbines	Alternative 4: Solar Panel Farm
		by natural conditions, such as topography and presence of waterbodies	corridor for some species, although an existing corridor may be present along much of the length depending on the routing selected	situated close to other Project facilities within the main site	avoid wind turbines reducing local biodiversity	an appropriate site can be identified
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• Con/Cl: Potential for wildlife collisions during construction and closure, and increased predation within the cleared corridor during all • Con/Op/Cl: Potential for increased predation within the cleared corridor	• Con/Op/Cl: Increased traffic related to fuel transport may result in increased wildlife interactions	• Con/Op/Cl: Potential for interactions between wind turbines and birds / bats • Op: Wind turbines may result in increased bird mortality (in order of 5 to 10 birds per year per turbine)	• Con/Op/Cl: No material effects anticipated
		Summary	**Partially preferred**	**Preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine, . The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• Con/Op/Cl: A number of SAR are known to be present in the region, although they may not be present where power infrastructure is sited	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Con/Op/Cl: The transmission line route will be unable to avoid Category 1 (high use area) and Category 2 (seasonal range) Caribou habitat (and potentially other SAR habitat) as a result of regional connection locations • Con/Op/Cl: The area of habitat affected is dependent on the final route selected	• Con/Op/Cl: It is expected that siting will be unable to avoid Category 2 (seasonal range) Caribou habitat (and potentially other SAR habitat) • Con/Op/Cl: The area of habitat affected is dependent on the final locations selected	• Con/Op/Cl: It is expected that siting will be unable to avoid Category 2 (seasonal range) Caribou habitat (and potentially other SAR habitat)	• Con/Op/Cl: It is expected that siting will be unable to avoid Category 2 (seasonal range) Caribou habitat (and potentially other SAR habitat)

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Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connection to Regional Electrical Grid[2]	Alternative 2: Onsite Diesel Generation	Alternative 3: Wind Turbines	Alternative 4: Solar Panel Farm
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Potential for disturbance will depend on siting but will be primarily outside the main site will cause additional disruption to SAR primarily during construction and decommissioning • Con/Cl: Noise will be created during the construction and closure phase but will be temporary and mobile • Op: No material noise generation or other disturbance anticipated	• Con/Op/Cl: Potential for disturbance will depend on siting; generators will be within the main site will not cause additional disruption to SAR • Con/Op/Cl: Generator sound emissions would be long term and contribute to overall site sound emissions • Con/Op/Cl: Additional noise emissions from trucking diesel fuel to site	• Con/Op/Cl: Potential for disturbance will depend on siting; wind turbines and access road are expected to be outside the main site and are anticipated to cause additional disruption to SAR primarily during construction and decommissioning • Op: Wind turbines will produce noise that would be long term and contribute to overall Project sound emissions	• Con/Op/Cl: Potential for disturbance will depend on siting; solar farm and access road are expected to be outside the main site and are anticipated to cause additional disruption to SAR primarily during construction and decommissioning • Op: No effects anticipated
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Creation of a new corridor or expansion of the existing corridor could increase predation on Caribou where present	• Con/Op/Cl: It is expected that siting will be unable to avoid Category 2 (seasonal range) Caribou habitat (and potentially other SAR habitat) and could disrupt movement corridors • Con/Op/Cl: Generators will be within the main site will not cause additional disruption to SAR	• Con/Op/Cl: Potential for disturbance will depend on siting; wind turbines and access road are expected to be outside the main site and are anticipated to cause additional disruption to SAR primarily during construction and decommissioning	• Con/Op/Cl: Potential for disturbance will depend on siting; solar farm and access road are expected to be outside the main site and are anticipated to cause additional disruption to SAR primarily during construction and decommissioning
	Summary		**Partially preferred**	**Preferred**	**Partially preferred**	**Partially preferred**
Natural Environment Performance Objectives Assessment			**Partially preferred**	**Preferred**	**Partially preferred**	**Partially preferred**
			• Disadv: Land clearance / disturbance and potential for wildlife / SAR disturbance • Adv: Limited environment effects during operation • Disadv: Potential increased wildlife interactions during construction • Disadv: Potential for increased predation through land clearing and creation / expansion of corridor	• Adv: Smallest footprint / very limited habitat displacement and will be located within main site • Disadv: Increased emissions (air, GHG and noise) due to onsite generators and transport of diesel to site • Disadv: Potential for greater wildlife interactions from increased traffic from fuel transport	• Adv: Land disturbance is moderate for facility with related infrastructure • Disadv: Will expand the Project footprint resulting in additional habitat disturbance, including potentially SAR habitat • Disadv: Will result in additional noise (likely away from the main site) and bird / bat strikes • Disadv: Will result in direct mortality to bird and bats	• Adv: Land disturbance is moderate for facility with related infrastructure • Disadv: Will expand the Project footprint resulting in additional habitat disturbance, including potentially SAR habitat
Social, Economic, Cultural and Built Environment						
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: Potential to impact property values away from the mine site if the routing selected is in proximity to residents	• Con/Op/Cl: No material effects anticipated beyond any effect on property values associated with the mine site; there are no nearby residences	• Con/Op/Cl: No material effects anticipated beyond any effect on property values associated with the mine site, assuming location is nearby	• Con/Op/Cl: No material effects anticipated beyond any effect on property values associated with the mine site, assuming location is nearby

Table 4.24-1: Assessment of Power Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connection to Regional Electrical Grid[2]	Alternative 2: Onsite Diesel Generation	Alternative 3: Wind Turbines	Alternative 4: Solar Panel Farm
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Cl: Potential income opportunity to support construction of the transmission line for local construction company • Op: No material effects anticipated	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: Potential income opportunity for a local fuel contractor to haul fuel to site	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with this alternative	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effects specifically associated with this alternative
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: Will create a new corridor along transmission line that could be used by for recreational purposes	• Con/Op/Cl: No effects to local access	• Con/Op/Cl: No effects anticipated to local access	• Con/Op/Cl: No effects anticipated to local access
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Cl: Noise will be created during the construction and closure phase but will be temporary and mobile and will not affect attainment of provincial noise guideline levels • Op: No material noise generation anticipated	• Con/Op/Cl: Increased noise emissions from generators, however emissions will not affect attainment of provincial noise guideline levels; there are no nearby residences • Con/Op/Cl: Additional noise emissions from trucking diesel fuel to site	• Con/Op/Cl: Increased noise emissions from turbines, however emissions will not affect attainment of provincial noise guideline levels and there are no nearby residences	• Con/Op/Cl: No effects anticipated
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No material effects anticipated; water wells (if any) along potential routing would be avoided	• Con/Op/Cl: No effects; no water wells present in Project area	• Con/Op/Cl: No effects; no water wells present in Project area	• Con/Op/Cl: No effects; no water wells present in Project area
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects anticipated; drinking water supply systems along potential routing would be avoided	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: Cleared corridor and transmission line will have an adverse impact on natural aesthetics where a viewpoint is present; although most of the route is located away from populated areas	• Con/Op/Cl: No effects anticipated from generator facility	• Con/Op/Cl: Turbines will rise above the landscape by necessity, and are anticipated to have an adverse impact on natural aesthetics where a viewpoint is present	• Con/Op/Cl: Effects may be able to be avoided by site selection
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Cl: • Op: No effects anticipated from operation of a transmission line	• Con/Op/Cl: Increased traffic related to fuel transport over a longer distance may result in safety concerns for residents	• Con/Op/Cl: No effects anticipated assuming sited on the FMG lands	• Con/Op/Cl: No effects anticipated assuming sited on the FMG lands
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

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Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connection to Regional Electrical Grid[2]	Alternative 2: Onsite Diesel Generation	Alternative 3: Wind Turbines	Alternative 4: Solar Panel Farm
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Power supply is dedicated to the Project, no effects on public power infrastructure • Cl: Could potentially reinforce the local power grid if transmission line is transferred to Hydro One Networks Inc.	• Con/Op/Cl: Power supply is dedicated to the Project, no effects on public power infrastructure	• Con/Op/Cl: Power supply is dedicated to the Project, no effects on public power infrastructure	• Con/Op/Cl: Power supply is dedicated to the Project, no effects on public power infrastructure
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: Emissions will be generated during and limited to the construction and closure phases; however, emissions will not affect attainment of air quality standards which are protective of health • Op: No direct emissions during operation excluding from periodic limited maintenance activities	• Con/Op/Cl: Diesel generators will result in emissions of particulate matter, sulphur dioxide, nitrogen oxides, and carbon dioxide throughout the life of the Project and additional emissions from transport of diesel fuel to site; mitigation can be employed to confirm air quality standards which are protective of health are met	• Con/Op/Cl: Limited emissions will result from the installation of equipment and collection of passive energy	• Con/Op/Cl: Limited emissions will result from the installation of equipment and collection of passive energy
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects anticipated; no material effects on surface water expected and drinking water supply systems along potential routing if any, would be avoided	• Con/Op/Cl: No effects; no drinking water supplies present in Project area	• Con/Op/Cl: No effects; no drinking water supplies present in Project area	• Con/Op/Cl: No effects; no drinking water supplies present in Project area
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: 230 kV transmission line will generate electric and magnetic fields along the corridor when operating; however electric and magnetic fields lose strength exponentially with distance and the transmission line will be set back from any residential areas such that there would be no health risk associated with electromagnetic fields	• Con/Op/Cl: No effects; No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: No effects; No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: No effects; No effects; there are no electromagnetic emissions associated with this alternative
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: No material effects anticipated as safeguards will be in place for site roads during construction and demolition • Op: No effects anticipated	• Con/Op/Cl: Increased fuel haul traffic, despite operational safeguards on site roads, could increase the chance of an accider	• Con/Op/Cl: No effects anticipated from onsite facility	• Con/Op/Cl: No effects anticipated from onsite facility

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Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connection to Regional Electrical Grid[2]	Alternative 2: Onsite Diesel Generation	Alternative 3: Wind Turbines	Alternative 4: Solar Panel Farm
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Cl: Opportunities may be available for local suppliers during construction and decommissioning may provide some contracts • Op: Opportunities for periodic vegetation clearing may be available to maintain conductor clearance during operation	• Con/Op/Cl: Additional business opportunities for local fuel contactor to haul fuel to site	• Con/Cl: Construction and decommissioning may provide some contracts for local suppliers • Op: No opportunities expected during operation	• Con/Cl: Construction and decommissioning may provide some contracts for local suppliers • Op: No opportunities expected during operation
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: Transmission line corridor has potential to increase access to areas for natural resource harvesting	• Con/Op/Cl: No effects on access anticipated	• Con/Op/Cl: No effects on access anticipated	• Con/Op/Cl: No effects on access anticipated
		Summary	**Preferred**	**Preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con: Construction of a transmission line present a significant local opportunity for multiple contracts • Op/Cl: No effects anticipated	• Con/Op/Cl: No material effects anticipated	• Con/Op/Cl: No material effects anticipated	• Con/Op/Cl: No material effects anticipated
		Summary	**Preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: Indicator is not applicable to this alternative; power supply does not affect services	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake	• Con/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder for transmission line clearing • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Op/Cl: Any resource management objectives that could be impacted by local power infrastructure will already be impacted by the mine site	• Con/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals

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Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connection to Regional Electrical Grid[2]	Alternative 2: Onsite Diesel Generation	Alternative 3: Wind Turbines	Alternative 4: Solar Panel Farm
		Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor				
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated assuming route is distant from camps	• Con/Op/Cl: No effects anticipated; camps are distant from Project site	• Con/Op/Cl: No effects anticipated; camps are distant from Project site	• Con/Op/Cl: No effects anticipated; camps are distant from Project site
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: May directly or indirectly affect built heritage and cultural heritage landscapes depending on route chosen	• Con/Op/Cl: No effects anticipated; camps are distant from Project site	• Con/Op/Cl: No effects anticipated; camps are distant from Project site	• Con/Op/Cl: No effects anticipated; camps are distant from Project site
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole / Birch Lake Portage / Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: The transmission line will alter the existing visual landscape, and may directly or indirectly affect built heritage and cultural heritage landscapes depending on route chosen	• Con/Op/Cl: No effects anticipated; camps are distant from Project site; generators will be located within the Project site	• Con/Op/Cl: Wind turbines will alter the existing visual landscape, and may directly or indirectly affect built heritage and cultural heritage landscapes depending on location chosen	• Con/Op/Cl: No effects anticipated; camps are distant from Project site; solar farm will be located near the Project site
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: Infrastructure will be sited to avoid known archaeological sites • Con: Mitigation will be implemented if archaeological sites discovered during construction	• Con/Op/Cl: Facility and related infrastructure will be sited to avoid known archaeological sites • Con: Mitigation will be implemented if archaeological sites discovered during construction	• Con/Op/Cl: Facility and related infrastructure will be sited to avoid known archaeological sites • Con: Mitigation will be implemented if archaeological sites discovered during construction	• Con/Op/Cl: Facility and related infrastructure will be sited to avoid known archaeological sites • Con: Mitigation will be implemented if archaeological sites discovered during construction

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Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connection to Regional Electrical Grid[2]	Alternative 2: Onsite Diesel Generation	Alternative 3: Wind Turbines	Alternative 4: Solar Panel Farm
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No material grading / effects anticipated for this alternative and no potential to alter water levels	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Preferred**	**Partially preferred**	**Preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: Potential for effects on First Nation Reserves and communities dependent upon route selection	• Con/Op/Cl: No potential for effects; the Reserve is distant from Project site	• Con/Op/Cl: No potential for effects; the Reserve is distant from Project site	• Con/Op/Cl: No potential for effects; the Reserve is distant from Project site
		Summary	**Partially preferred**	**Preferred**	**Preferred**	**Preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: Potential for effects spiritual or ceremonial site along the transmission line dependent upon route	• Con/Op/Cl: No potential for effects; no site located within the PDA	• Con/Op/Cl: Potential for effects spiritual or ceremonial site depending on location chosen	• Con/Op/Cl: No potential for effects as could be avoided by site selection
		Summary	**Partially preferred**	**Preferred**	**Partially preferred**	**Preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: Transmission line corridor may provide increased access to traditional lands • Con/Op/Cl: Disruption to habitats will occur due to construction, operation and decommissioning of the transmission line	• Con/Op/Cl: Onsite diesel generation will have limited direct disruption to habitats due to its small footprint during construction, operation and decommissioning phase, but will have an indirect effect from noise generation when operating	• Con/Op/Cl: Onsite wind turbine(s) will have a direct disruption to habitats during construction, operation and decommissioning due to its footprint, but will have a greater visual effect	• Con/Op/Cl: Onsite solar panels will have a direct disruption to habitats during construction, operation and decommissioning due to its footprint
		Summary	**Partially preferred**	**Preferred**	**Preferred**	**Preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially preferred**	**Preferred**	**Partially preferred**	**Preferred**
			• Adv: Provides enhanced employment / contracting opportunities during construction • Adv: Provides increased access to remote areas for hunting and recreational activities • Disadv: May affect views and landscapes depending on route selected • Disadv: May affect Reserve land / spiritual and ceremonial sites, depending on route selected	• Adv: No offsite land effects, including potential visual effects • Adv: Greater potential for contracting opportunities during operations phase (supply and trucking of fuel) • Disadv: Increased traffic related to fuel transport may result in safety concerns for residents	• Adv: Minor air emissions will be generated during construction and closure phase • Adv: Construction and decommissioning may provide some contracts for local suppliers • Disadv: May affect views and landscapes depending on location(s) selected	• Adv: Minor air emissions will be generated during construction and closure phase • Adv: Construction and decommissioning may provide some contracts for local suppliers

Table 4.24-1: Assessment of Power Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connection to Regional Electrical Grid[2]	Alternative 2: Onsite Diesel Generation	Alternative 3: Wind Turbines	Alternative 4: Solar Panel Farm
Technical Objectives						
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Common for mines in northern Ontario and has been implemented successfully many times • Con/Op/Cl: Emergency generators can be used to provide a contingency	• Con/Op/Cl: Diesel power generation is used across many industries in remote areas as a power source • Con/Op/Cl: Additional generators can be brought online in the event of a generator failure or scheduled maintenance	• Con/Op/Cl: Wind energy technology is available but not known to be effective as a sole power source for a large scale mine	• Con/Op/Cl: Solar energy technology is available but not effective as a sole power source for a northern, large scale mine
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Wataynikaneyap transmission line has sufficient available capacity • Con/Op/Cl: Any provincial grid outages are outside control of FMG (back-up generators will be used as a contingency)	• Con/Op/Cl: Power supply will not be disrupted by provincial grid outages • Con/Op/Cl: May require excess generating capacity (i.e., an additional generator above design load) and storage (in case of road disruptions)	• Con/Op/Cl: Wind energy technology is available but is not a reliable sole power source for a large scale mine • Con/Op/Cl: Could be used as a supplementary power source	• Con/Op/Cl: Solar energy technology is available but is not a reliable sole power source for a northern, large scale mine • Con/Op/Cl: Could be used as a supplementary power source
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Agreements will be needed for corridor where others hold surface rights, including occupancy agreement(s) for Crown lands • Con/Op/Cl: Additional temporary accesses will be required for transmission line construction and decommissioning	• Con/Op/Cl: Can be placed on available land planned for the mine site development	• Con/Op/Cl: Siting needs may require that the wind turbine(s) to be located outside the area currently proposed for development	• Con/Op/Cl: May require a larger footprint outside the area currently proposed for development
		Summary	**Preferred**	**Preferred**	**Not preferred**	**Not preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Transmission line can potentially be affected by storm events, fires or other natural occurrences, which would in turn affect site operations	• Con/Op/Cl: Higher operating costs are a disincentive to investment	• Con/Op/Cl: Use solely of wind turbines to power a large scale mine is expected to be viewed unfavourably, although use of renewable resources as a supplemental power source is expected to be viewed favourably	• Con/Op/Cl: Use solely of solar panels to power a large scale mine is expected to be viewed unfavourably, although use of renewable resources as a supplemental power source is expected to be viewed favourably
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Capital costs include land agreements, corridor clearing and transmission line construction • Op: Lowest operating cost alternative (cost of electricity with industry rebates and occasional inspections / maintenance)	• Con/Op/Cl: Capital costs are low, including generating units and fuel tanks • Op: Highest operating cost (cost of fuel, transport and ongoing maintenance)	• Con/Op/Cl: Wind turbine(s) in combination with the required battery storage sufficient to power a large scale mine, could not be financially supported by the Project	• Con/Op/Cl: Solar panels in combination with the required battery storage sufficient to power a large scale mine, could not be financially supported by the Project

Table 4.24-1: Assessment of Power Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connection to Regional Electrical Grid[2]	Alternative 2: Onsite Diesel Generation	Alternative 3: Wind Turbines	Alternative 4: Solar Panel Farm
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: Price of electricity from provincial grid is relatively stable	• Con/Op/Cl: Price of fuel is somewhat unstable without futures	• Con/Op/Cl: Site-generated power is not expected to present an ongoing financial risk	• Con/Op/Cl: Site-generated power is not expected to present an ongoing financial risk
		Summary	**Preferred**	**Not preferred**	**Not preferred**	**Not preferred**
		Technical Performance Objective Assessment	**Preferred**	**Not preferred**	**Not preferred**	**Not preferred**
			• Adv: Commonly used for northern mines • Adv: Can provide sufficient power capacity to support all phases of the Project • Adv: Lowest operating cost • Disadv: Subject to supply disruptions from natural causes • Disadv: Highest capital cost • Disadv: Land agreements and/or approvals will be required	• Adv: Used across many industries in remote areas • Adv: Can provide sufficient power capacity to support all phases of the Project • Adv: Lowest capital cost • Adv: Very reliable supply • Disadv: Highest operating costs • Disadv: Potential financial risk from fuel costs	• Disadv: Wind turbine(s) cannot effectively service the Project; it may be a potential supplementary power supply • Disadv: Wind turbines do not present a financially competitive alternative	• Disadv: Solar panels cannot effectively service the Project; it may be a potential supplementary power supply • Disadv: Solar panels do not present a financially competitive alternative
Amenability to Reclamation (Closure Phase)						
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• Cl: No effects anticipated from reclamation activities	• Cl: There is no difference amongst alternatives for this indicator	• Cl: There is no difference amongst alternatives for this indicator	• Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• Cl: No material changes to ground conditions; no effects anticipated	• Cl: There is no difference amongst alternatives for this indicator	• Cl: There is no difference amongst alternatives for this indicator	• Cl: There is no difference amongst alternatives for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Cl: If rehabilitated by FMG, the cleared corridor will be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife (larger area to be rehabilitated) • Cl: If line ownership is transferred at the end of mine life to another owner, habitat will remain a corridor that is cleared of larger trees	• Cl: Limited area disturbed to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• Cl: If rehabilitated by FMG, the cleared corridor will be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife (larger area to be rehabilitated) • Cl: If line ownership is transferred at the end of mine life to another owner, habitat will remain a corridor that is cleared of larger trees	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan

Table 4.24-1: Assessment of Power Supply Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connection to Regional Electrical Grid[2]	Alternative 2: Onsite Diesel Generation	Alternative 3: Wind Turbines	Alternative 4: Solar Panel Farm
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: If rehabilitated by FMG, the cleared corridor will be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife (larger area to be rehabilitated) • Cl: If line ownership is transferred at the end of mine life to another owner, habitat will remain a corridor that is cleared of larger trees	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Cl: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan
	Summary		**Partially preferred**	**Preferred**	**Preferred**	**Preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially preferred**	**Preferred**	**Preferred**	**Preferred**
			• Adv: Reclamation is predictably effective • Adv: Can provide large area of varied successional habitat during regrowth • Disadv: With the larger footprint, the transmission line alternative will require additional reclamation efforts	• Adv: Diesel generators are amenable to reclamation with the smallest footprint	• Adv: Reclamation is predictably effective with a small footprint	• Adv: Reclamation is predictably effective
OVERALL ASSESSMENT OF ALTERNATIVE			**PREFERRED (SELECTED ALTERNATIVE)**	**NOT PREFERRED [3]**	**NOT PREFERRED [4]**	**NOT PREFERRED [4]**
			The preferred and selected alternative for power supply is connection to the regional electrical grid. This alternative provides the lowest overall cost, reliable power supply for the mine.	The high overall cost of fuel and the instability in fuel prices diesel generation as not preferred as the primary power source. Diesel generation will provide a reliable power supply until grid power is available and after it is decommissioned, as well as a contingency supply during power disruptions.	Wind turbines are not a feasible primary power source and have the potential to alter the local viewscape. The potential application as a supplemental power source will be investigated further for the Project during detailed design.	Solar panels are not a feasible primary power source. The potential application as a supplemental power source will be investigated further for the Project during detailed design.

Sources:
GreenCoast 2021; SaskWind 2020.
Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
(2) The E1C line (115 kV) could be a source of power, however there is currently no additional capacity available in this system (timeline for planned upgrades by Hydro One is unknown). Should this change, the assessment of a 115 kV transmission line would be very similar to the assessment for a 230 kV transmission line. As the connection location for a 115 kV transmission line would be closer to site and the corridor width narrower, effects on the natural environmental would be less for a 115 kV than a 230 kV transmission line detailed in this table.
(3) Onsite diesel generation will be required for the portions of the construction and decommissioning Project phases which have lower power needs, when proposed grid power is not available.
(4) Wind turbines and solar panels could potentially act as a supplementary power source.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op: operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*.

4.25 Transmission Line Routes

As indicated in Section 4.24, power will be required during all phases of the Project, and the preferred alternative for the primary source of power is connection to the regional Wataynikaneyap Power 230 kV transmission line. The primary considerations for identifying potential transmission line routes were as follows:

- Minimize overall length in order to minimize terrestrial disturbance, as well as costs.
- Avoid large waterbodies / watercourses so that construction and permanent infrastructure in water are not required.
- Minimize length of new corridor (i.e., not adjacent to an existing linear corridor) as practicable; although new corridors can provide access for recreational opportunities, they also provide easy corridors for predators, including wolves that hunt Caribou.
- Avoid conflicting land uses as reasonable, including traditional land use, mining claims and active dispositions.
- Where reasonable, locate near existing road network to minimize construction access needs and terrestrial disturbance.

4.25.1 Identified Alternatives

Four alternative routes (Figure 4.25-1 and Figure 4.25-2) were identified to connect the Project site to the Wataynikaneyap Power 230 kV transmission line. All four alternatives are located near the mine access road and Wenasaga Road for the northern portion, which eases construction and helps limit the number of new infrastructure corridors:

- **Alternative 1:** follows primarily along the proposed mine access road to the E1C line, continuing parallel to the existing E1C line for majority of the remaining length (57 km);
- **Alternative 2:** follows primarily along the proposed mine access road to the E1C line, parallelling the E1C line part way, but diverting southeast to avoid Slate Falls Nation Reserve;
- **Alternative 3:** follows primarily along the proposed mine access road to the E1C line, parallelling the E1C line part way, but diverting south and then east to avoid Slate Falls Nation Reserve near the Slate Falls Road; and
- **Alternative 4:** follows primarily along the proposed mine access road part of the way to the E1C line, diverting southwest avoiding some of the classified habitat for Caribou (Boreal population) crossed by the E1C line, to continue near the Slate Falls Road.

All four of the assessed alternatives have a similar northern section, located near the Wenasaga Road, which will reduce the requirements for new access during construction of the transmission line.

The approximate lengths for the transmission line corridors are summarized in Table 4.25-1.

Table 4.25-1: Transmission Line Corridor Lengths

	Total Length (km)	New Corridor Length (not adjacent to E1C (km)	Length Crossing Select Caribou Habitat (km) (2)		
			Category 1 (nursery)	Category 1 (wintering)	Category 2 (seasonal)
Alternative 1	93.9	35.5	41.7	17.6	21.5
Alternative 2	100.5	91.5	18.3	9.9	30.4
Alternative 3	88.9	68.9	17.0	14.2	19.6
Alternative 4	114.4	114.4	21.5	5.2	60.8

Note:
(1) These lengths do not include temporary construction access, if needed.
(2) Not all categories are listed; length will not add up to total length.

Grid power was determined to be the preferred energy source; however, a new grid connection is needed. Routing of this new connection is a required component of the Project. The Project cannot proceed without a reliable power supply. The existing environmental conditions would be unchanged if the Project did not proceed; however, the socioeconomic benefits of the Project would also not accrue.

4.25.1.1 Alternative 1

Alternative 1 is one of the shorter transmission line routes (approximately 94 km) and has the greatest length adjacent to other linear corridors. The alternative requires crossing Slate Falls Nation land and would require support of the community and agreements with a number of mining claim holders. The Slate Falls Nation has indicated they are supportive of this route following consultation and engagement on the draft EIS/EA and the opportunity to view other potential alternative routes.

4.25.1.2 Alternative 2

This alternative is the same as Alternative 1 for the northern portion of its length, but it diverts south to avoid crossing the Slate Falls Nation and is longer as a result (approximately 101 km total length). This southern portion of the route travels cross undisturbed land and has been oriented to avoid major waterbodies.

4.25.1.3 Alternative 3

Alternative 3 is also the same as Alternative 1 for the northern portion of its length, but it diverts south farther east to take advantage of the access provided by the Slate Falls Road. This alternative offers the shortest overall route (89 km).

4.25.1.4 Alternative 4

This route follows the Wenasaga Road farther to the southwest than the other alternatives, crossing the E1C transmission line, and is routed in a radial manner farther to the south to avoid a Woodland Caribou overwintering area, but remains very close to this habitat type. It is the longest of the routes fully assessed, with a total length of 114 km.

4.25.1.5 Other Potential Route Alternatives

Routing the transmission line entirely along the Wenasaga Road to connect with the E1C corridor and establishment of a new corridor along the E1C corridor would add between approximately 49 and 61 km to the length of the transmission line and cannot be financially supported by the Project. As a result, this additional alternative was not assessed.

A potential western route (similar to Alternative 2 for the mine access road) was also reviewed, but it would add approximately 55 km to the transmission line length. This route cannot be financially supported by the Project. It would also require the transmission line to be established within the blast radius of the open pit at site, which does not meet requirements for system integrity and reliability and is unacceptable.

4.25.2 Assessment of Alternatives

All alternative assessment criteria and indicators for the performance objectives were considered in the comparative analysis; however, the following performance objectives and criteria were identified as the key differentiators for transmission line routing (Table 4.25-1):

- Natural environment performance:
  - Potential effect on terrestrial species and habitat; and
  - Potential effect on SAR.
- Social, economic, cultural and built environment performance:
  - Potential effect on local residents and recreational users (social environment); and
  - Potential effect on infrastructure (built environment).
- Technical performance:
  - Ability to service the site effectively; and
  - Cost effectiveness.

Additional assessment of the transmission line route alternatives is relation to SAR is provided in Appendix T.

All alternative routes avoid crossing larger waterbodies, and no in-water work or structures are proposed. The key advantages and disadvantages of each alternative corridor route, in addition to those already listed in the descriptions above, are as follows:

4.25.2.1 Alternative 1

- **Advantages:** this alternative has a shorter overall length / corridor clearing area (93.9 km / 375.7 ha) and minimized length of new corridor creation. It also provides the opportunity to reinforce the existing power infrastructure and avoids area of known traditional land and resource use. This corridor parallels existing corridors, therefore would be preferred from the perspective of reduced new corridor lengths for Caribou predation. This alternative has a lower capital cost. This alternative was requested by Slate Falls Nation.
- **Disadvantages:** this alternative is anticipated to require land access agreements and/or acquisitions. This alternative also may create preferential wildlife corridors, which could increase predation on Caribou. This alternative has the greatest potential conflict with existing mineral claims.

4.25.2.2 Alternative 2

- **Advantages:** the southern portion of the corridor route for this alternative is near the Slate Falls Road, which will ease construction access. The route crosses the road that provides access to the Slate Falls Reserve (Vermillion River Road), providing an accessible future connection for the

Reserve to the regional electrical grid in addition to the existing E1C connection should the Reserve require it. This alternative has a lower capital cost.

- **Disadvantages:** this alternative has a longer route / corridor clearing area (100.5 km / 401.8 ha), with a relatively short length adjacent or near to existing infrastructure corridors. This alternative also may create preferential wildlife corridors, which could increase predation on Caribou.

4.25.2.3 Alternative 3

- **Advantages:** this alternative has the shortest overall length / required corridor clearing area (88.9 km / 355.4 ha), with no known conflicts with land tenure / ownership. The route crosses the road that provides access to the Slate Falls Reserve (Vermillion River Road), providing an accessible future connection for the Reserve to the regional electrical grid in addition to the existing E1C connection should the Reserve require it. This alternative has no known conflict with mineral claims. This alternative has a lower capital cost.
- **Disadvantages:** this alternative crosses larger area of undisturbed land known to be used for traditional land and resources use and has limited existing roads available to support construction of the southernmost portion. This alternative also may create preferential wildlife corridors, which could increase predation on Caribou.

4.25.2.4 Alternative 4

- **Advantages:** this alternative has the lowest required amount of clearing area within Category 1 (high use) habitat for Woodland Caribou (106.8 ha).
- **Disadvantages:** this alternative has the longest route / corridor clearing area (114.4 km / 457.6 ha), which will result in more direct impacts to terrestrial habitat, GHG emissions and considerable higher construction costs. This alternative also may create preferential wildlife corridors, which could increase predation on Caribou. This corridor may also affect a number of existing camps nearby and may cause conflict with existing mineral claims. This alternative has the highest capital cost.

The key mitigation measures that would apply to all alternatives are as follows:

- Co-locate the transmission line with other existing infrastructure corridors to limit additional accessway and length of new corridors created as reasonable to minimize environmental disturbance.
- Avoid areas of greater sensitivity, including wetlands, large waterbodies and camps / residences.
- Obtain and implement requirements of an Overall Benefit Permit for effects on SAR including habitat effects.
- Use standard mitigation measures during construction, including maintenance of root mass along corridor, completing construction outside of sensitive wildlife periods, and employing effective erosion and sediment control measures as needed near watercourses.
- Decommission the power infrastructure at closure and support re-growth of vegetation within the corridor.

4.25.3 Results Summary and Selected Alternative

Alternative 1 and 2 has been identified as preferred with Alternative 1 being the selected route. This route was selected based on the assessment of net effects in Table 4.25-2 with proposed mitigation, including key mitigation measures described briefly in Section 4.25.2. It has the advantage of having the greatest length adjacent to the existing E1C transmission line. Alternative 3 has the shortest overall length, but was not selected based on the result of consultation / engagement, which identified areas of traditional land and resource use along the route.

Optimizations to the route of Alternative 1 may be identified during detailed engineering to better accommodate other interests, including the ability to reach agreements. Any route adjustments are anticipated to remain within the offsite infrastructure study area and have been assessed within this EIS/EA.

Table 4.25-2: Assessment of Transmission Line Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Near Site Access Road to E1C Line, Parallel to E1C Line for Majority of Length, Connect to Wataynikaneyap Transmission Line	Alternative 2: Near Site Access Road to E1C Line, Parallel E1C Line Part Way, before Diverting Southeast to Avoid Slate Falls Reserve to Connect to Wataynikaneyap Transmission Line	Alternative 3: Near Site Access Road to E1C Line, Parallel E1C Part Way, before Diverting Southeast and near the Slate Falls Road to Connect to Wataynikaneyap Transmission Line	Alternative 4: Near Site Access Road to E1C Line in Part, Diverting Southwest, Avoiding Category 1 and 2 Caribou Habitat, and near the Slate Falls Road to Connect to Wataynikaneyap Transmission Line
Natural Environment						
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: Emissions will be generated during clearing of the corridor and installation of the transmission line and from line decommissioning; but emissions will not affect attainment of air quality standards • Op: Limited emissions during operation excluding from periodic limited inspection and maintenance activities • Con/Op/Cl: Alternative 1 is a shorter length (93.9 km) which will result in a lower amount of emissions	• Con/Cl: Emissions will be generated during clearing of the corridor and installation of the transmission line and from line decommissioning; but emissions will not affect attainment of air quality standards • Op: Limited emissions during operation excluding from periodic limited inspection and maintenance activities • Con/Op/Cl: Alternative 2 is a longer length (100.5 km) which will result in a higher amount of emissions	• Con/Cl: Emissions will be generated during clearing of the corridor and installation of the transmission line and from line decommissioning; but emissions will not affect attainment of air quality standards • Op: Limited emissions during operation excluding from periodic limited inspection and maintenance activities • Con/Op/Cl: Alternative 3 is the shortest length (88.9 km) which will result in the least amount of emissions	• Con/Cl: Emissions will be generated during clearing of the corridor and installation of the transmission line and from line decommissioning; but emissions will not affect attainment of air quality standards • Op: Limited emissions during operation excluding from periodic limited inspection and maintenance activities • Con/Op/Cl: Alternative 4 is the longest length (114.4 km) which will result in the least amount of emissions
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Cl: GHG emissions will be generated from heavy equipment use during clearing of the corridor and installation of the transmission line and from line decommissioning • Op: Limited emissions during operation excluding from periodic limited inspection and maintenance activities • Con/Op/Cl: Alternative 1 is a shorter length (93.9 km) which will result in a lower amount of GHG emissions	• Con/Cl: GHG emissions will be generated from heavy equipment use during clearing of the corridor and installation of the transmission line and from line decommissioning • Op: Limited emissions during operation excluding from periodic limited inspection and maintenance activities • Con/Op/Cl: Alternative 2 is a longer length (100.5 km) which will result in a higher amount of GHG emissions	• Con/Cl: GHG emissions will be generated from heavy equipment use during clearing of the corridor and installation of the transmission line and from line decommissioning • Op: Limited emissions during operation excluding from periodic limited inspection and maintenance activities • Con/Op/Cl: Alternative 3 is the shortest length (88.9 km) which will result in the least amount of GHG emissions	• Con/Cl: GHG emissions will be generated from heavy equipment use during clearing of the corridor and installation of the transmission line and from line decommissioning • Op: Limited emissions during operation excluding from periodic limited inspection and maintenance activities • Con/Op/Cl: Alternative 4 is the longest length (114.4 km) which will result in the least amount of GHG emissions
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Cl: Construction and decommissioning activities have the potential to introduce sediment loadings into local watercourse, if not properly managed (sediment and erosion control plan will be in place) • Op: No effects anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.25-2: Assessment of Transmission Line Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Near Site Access Road to E1C Line, Parallel to E1C Line for Majority of Length, Connect to Wataynikaneyap Transmission Line	Alternative 2: Near Site Access Road to E1C Line, Parallel E1C Line Part Way, before Diverting Southeast to Avoid Slate Falls Reserve to Connect to Wataynikaneyap Transmission Line	Alternative 3: Near Site Access Road to E1C Line, Parallel E1C Part Way, before Diverting Southeast and near the Slate Falls Road to Connect to Wataynikaneyap Transmission Line	Alternative 4: Near Site Access Road to E1C Line in Part, Diverting Southwest, Avoiding Category 1 and 2 Caribou Habitat, and near the Slate Falls Road to Connect to Wataynikaneyap Transmission Line
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con: Potential fish habitat disruption from watercourse crossing and vegetation clearing during construction if best construction practices are not followed (sediment and erosion control plan will be in place) • Con: No very large watercourses will be crossed that require pole placement in water / fish habitat • Op/Cl: No effects anticipated as there will be no disruption to fish habitat	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: No disruption to fish habitat and therefore no effects on populations anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• Con/Op/Cl: No disruption to fish habitat and therefore no effects on fish passage anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No disturbance below the water table and therefore no effects anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• Con/Cl: Potential for disturbance to wetlands during construction and decommissioning, however, this effect would be mitigated by winter construction; therefore, the functionality of the wetland will not be affected • Con/Cl: Construction would target higher ground where feasible • Op: No effects anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.25-2: Assessment of Transmission Line Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Near Site Access Road to E1C Line, Parallel to E1C Line for Majority of Length, Connect to Wataynikaneyap Transmission Line	Alternative 2: Near Site Access Road to E1C Line, Parallel E1C Line Part Way, before Diverting Southeast to Avoid Slate Falls Reserve to Connect to Wataynikaneyap Transmission Line	Alternative 3: Near Site Access Road to E1C Line, Parallel E1C Part Way, before Diverting Southeast and near the Slate Falls Road to Connect to Wataynikaneyap Transmission Line	Alternative 4: Near Site Access Road to E1C Line in Part, Diverting Southwest, Avoiding Category 1 and 2 Caribou Habitat, and near the Slate Falls Road to Connect to Wataynikaneyap Transmission Line
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• Con/Op/Cl: No structures will be installed that will affect wetland connectivity; access will be by winter roads through wetland areas and an all-season road will not be established	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• Con/Op/Cl: Shorter length (93.9 km) / moderate area of vegetation clearing / maintenance (373.6 ha, assuming 40 m corridor) required • Con/Op/Cl: Transmission line results in creation of forest edge habitat which is preferred by some wildlife species including Moose; however, woodland species would be displaced as corridor is cleared • Con/Op/Cl: Transmission line corridor has potential to act as a corridor for large predators, thereby affecting species such as Caribou and Moose	• Con/Op/Cl: Shorter length (100.5 km) / moderate area of vegetation clearing / maintenance (402.4 ha) required • Con/Op/Cl: Transmission line results in creation of forest edge habitat which is preferred by some wildlife species including Moose; however, woodland species would be displaced as the corridor is cleared • Con/Op/Cl: Transmission line corridor has potential to act as a corridor for large predators, thereby affecting species such as Caribou and Moose	• Con/Op/Cl: Shortest length (88.9 km), lowest area of vegetation clearing / maintenance (356.4 ha) required • Con/Op/Cl: Transmission line results in creation of forest edge habitat which is preferred by some wildlife species including Moose; however, woodland species would be displaced as the corridor is cleared • Con/Op/Cl: Transmission line corridor has potential to act as a corridor for large predators, thereby affecting species such as Caribou and Moose	• Con/Op/Cl: Longest length (114.4 km), greatest area of vegetation clearing / maintenance (457.6 ha) required • Con/Op/Cl: Highest creation of forest edge habitat, preferred by some wildlife species including Moose; however, woodland species would be displaced as the corridor is cleared • Con/Op/Cl: Transmission line corridor has potential to act as a corridor for large predators, thereby affecting species such as Caribou and Moose
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Cl: Noise will be created during the construction and decommissioning phases but will not remain at the same place for long, as the transmission line construction progresses • Op: There will be infrequent periodic maintenance during the operations phase, likely needing helicopter support which will cause infrequent increases in noise levels	• Con/Cl: Noise will be created during the construction and decommissioning phases but will not remain at the same place for long, as the transmission line construction progresses • Op: There will be infrequent periodic maintenance during the operations phase, likely needing helicopter support which will cause infrequent increases in noise levels • Con/Op/Cl: As a longer route, the alternative will also potentially result in noise effects over a bigger area	• Con/Cl: Noise will be created during the construction and decommissioning phases but will not remain at the same place for long, as the transmission line construction progresses • Op: There will be infrequent periodic maintenance during the operations phase, likely needing helicopter support which will cause infrequent increases in noise levels	• Con/Cl: Noise will be created during the construction and decommissioning phases but will not remain at the same place for long, as the transmission line construction progresses • Op: There will be infrequent periodic maintenance during the operations phase, likely needing helicopter support which will cause infrequent increases in noise levels • Con/Op/Cl: As a longer route, the alternative will also potentially result in noise effects over a bigger area

Table 4.25-2: Assessment of Transmission Line Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Near Site Access Road to E1C Line, Parallel to E1C Line for Majority of Length, Connect to Wataynikaneyap Transmission Line	Alternative 2: Near Site Access Road to E1C Line, Parallel E1C Line Part Way, before Diverting Southeast to Avoid Slate Falls Reserve to Connect to Wataynikaneyap Transmission Line	Alternative 3: Near Site Access Road to E1C Line, Parallel E1C Part Way, before Diverting Southeast and near the Slate Falls Road to Connect to Wataynikaneyap Transmission Line	Alternative 4: Near Site Access Road to E1C Line in Part, Diverting Southwest, Avoiding Category 1 and 2 Caribou Habitat, and near the Slate Falls Road to Connect to Wataynikaneyap Transmission Line
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Corridor may become a preferential wildlife corridor for some species • Con/Op/Cl: No anticipated effect on plant dispersion	• Con/Op/Cl: Corridor may become a preferential wildlife corridor for some species • Con/Op/Cl: As a longer route, the alternative will also potentially result in effects over a bigger area • Con/Op/Cl: No anticipated effect on plant dispersion	• Con/Op/Cl: Corridor may become a preferential wildlife corridor for some species • Con/Op/Cl: No anticipated effect on plant dispersion	• Con/Op/Cl: Corridor may become a preferential wildlife corridor for some species • Con/Op/Cl: As a longer route, the alternative will also potentially result in effects over a bigger area • Con/Op/Cl: No anticipated effect on plant dispersion
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• Con/Op/Cl: Potential for wildlife collisions during construction and decommissioning • Con/Op/Cl: Increased predation with presence of a cleared corridor until vegetation regrowth is complete	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Preferred**	**Partially preferred**	**Preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine, . The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• Con/Op/Cl: The following SAR are known to be present close to the proposed Alternative 1 corridor based on Project baseline investigations (Appendix P), although not necessarily within the area of anticipated direct disturbance: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• Con/Op/Cl: The following SAR are known to be present close to the proposed Alternative 2 corridor based on Project baseline investigations (Appendix P), although not necessarily within the area of anticipated direct disturbance: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk	• Con/Op/Cl: The following SAR are known to be present close to the proposed Alternative 3 corridor based on Project baseline investigations (Appendix P), although not necessarily within the area of anticipated direct disturbance: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk	• Con/Op/Cl: The following SAR are known to be present close to the proposed Alternative 4 corridor based on Project baseline investigations (Appendix P), although not necessarily within the area of anticipated direct disturbance: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA	• Little Brown Myotis: There will be 1.29 km^2 of foraging habitat and 3.42 km^2 of maternity roosting habitat directly affected, and 77.17 km^2 of foraging habitat	• Little Brown Myotis: There will be 1.58 km^2 of foraging habitat and 3.46 km^2 of maternity roosting habitat directly affected, and 85.56 km^2 of	• Little Brown Myotis: There will be 1.39 km^2 of foraging habitat and 3.20 km^2 of maternity roosting habitat directly affected, and 80.09 km^2 of	• Little Brown Myotis: There will be 1.65 km^2 of foraging habitat and 3.95 km^2 of maternity roosting habitat directly affected, and 85.68 km^2 of

Table 4.25-2: Assessment of Transmission Line Route Alternatives

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		• Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	and 149.06 km^2 of maternity roosting habitat indirectly affected. • Con/Op/Cl: This alternative crossed the following habitats for Caribou: Category 1 (nursery), 166.9 ha; Category 1 (winter), 70.5 ha; Category 2 (seasonal range), 85.9 ha; and Category 3 (remaining range), 10.6 ha • Con/Op/Cl: As this corridor parallels existing corridors to the greatest extent it would be preferred from the perspective of reducing potential for Caribou predation; this corridor directly affects only the following habitat areas for Caribou that are not adjacent to the E1C transmission line: Category 1 (nursery), 41.6 ha; Category 1 (winter), 3.2 ha; Category 2 (seasonal range), 99.6 ha; and Category 3 (remaining range), 0 ha for Caribou (144.4 ha not along the E1C transmission line) • Lesser Yellowlegs: There will be 1.81 km^2 of habitat directly affected, and 89.08 km^2 indirectly affected. • Wolverine: There will be 3.23 ha of high and moderate quality habitat directly affected and 1,627 km^2. indirectly affected. • Eastern Whip-poor will: There will be 0.47 km^2 of habitat directly affected, and 23.72 km^2 indirectly affected.	foraging habitat and 165.96 km^2 of maternity roosting habitat indirectly affected. • Con/Op/Cl: This alternative crossed the following habitats for Caribou: Category 1 (nursery), 73.2 ha; Category 1 (winter), 39.5 ha; Category 2 (seasonal range), 121.4 ha; and Category 3 (remaining range), 107.8 ha • Con/Op/Cl: This corridor is also located in part along the E1C transmission line which will reduce the potential for Caribou predation; this corridor has only the following habitat for Caribou that are not adjacent to the E1C transmission line: Category 1 (nursery), 52.4 ha; Category 1 (winter), 59.6 ha; Category 2 (seasonal range), 172.4 ha; and Category 3 (remaining range), 80.4 ha for Caribou (364.8 ha not along the E1C transmission line) • Lesser Yellowlegs: There will be 1.56 km^2 of habitat directly affected, and 86.10 km^2 indirectly affected. • Wolverine: There will be 3.04 ha of high and moderate quality habitat directly affected and 1,653 km^2 indirectly affected. • Eastern Whip-poor will: There will be 0.79 km^2 of habitat directly affected, and 38.13 km^2 indirectly affected. • Lesser Yellowlegs: There will be 1.56 km^2 of habitat directly affected, and 86.10 km^2 indirectly affected.	foraging habitat and 145.35 km^2 of maternity roosting habitat indirectly affected. • Con/Op/Cl: This alternative crossed the following habitats for Caribou: Category 1 (nursery), 68.1 ha; Category 1 (winter), 56.6 ha; Category 2 (seasonal range), 78.4 ha; and Category 3 (remaining range), 104.4 ha • Con/Op/Cl: This corridor is also located in part along the E1C transmission line which will reduce the potential for Caribou predation; this corridor has only the following habitat for Caribou that are not adjacent to the E1C transmission line: Category 1 (nursery), 45.2 ha; Category 1 (winter), 24.4 ha; Category 2 (seasonal range), 106.4 ha; and Category 3 (remaining range), 100 ha for Caribou (276 ha not along the E1C transmission line) • Lesser Yellowlegs: There will be 1.54 km^2 of habitat directly affected, and 80.30 km^2 indirectly affected. • Wolverine: There will be 3.05 ha of high and moderate quality habitat directly affected and 1,511 km^2 indirectly affected. • Eastern Whip-poor will: There will be 0.46 km^2 of habitat directly affected, and 24.51 km^2 indirectly affected. • Short-eared Owl: There will be 0.31 km^2 of habitat directly affected, and 20.57 km^2 indirectly affected.	foraging habitat and 192.76 km^2 of maternity roosting habitat indirectly affected. • Con/Op/Cl: This alternative crossed the following habitats for Caribou: Category 1 (nursery), 86.2 ha; Category 1 (winter), 20.7 ha; Category 2 (seasonal range), 243.4 ha; and Category 3 (remaining range), 93.9 ha • Con/Op/Cl: This corridor is not adjacent to the E1C (or other) transmission line • Lesser Yellowlegs: There will be 1.71 km^2 of habitat directly affected, and 89.35 km^2 indirectly affected. • Wolverine: There will be 3.50 ha of high and moderate quality habitat directly affected and 1,835 km^2 indirectly affected. • Eastern Whip-poor will: There will be 1.12 km^2 of habitat directly affected, and 54.45 km^2 indirectly affected. • Short-eared Owl: There will be 0.35 km^2 of habitat directly affected, and 18.23 km^2 indirectly affected.

Table 4.25-2: Assessment of Transmission Line Route Alternatives

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			• Short-eared Owl: There will be 0.31 km^2 of habitat directly affected, and 20.48 km^2 indirectly affected.	• Short-eared Owl: There will be 0.41 km^2 of habitat directly affected, and 22.10 km^2 indirectly affected.		
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Cl: Potential temporary increase in sounded during the construction and decommissioning phases but will not remain at the same place for long • Op: There will be infrequent periodic maintenance during the operations phase, likely needing helicopter support which will cause infrequent increases in noise levels	• Con/Cl: Potential temporary increase in sounded during the construction and decommissioning phases but will not remain at the same place for long • Op: There will be infrequent periodic maintenance during the operations phase, likely needing helicopter support which will cause infrequent increases in noise levels • Con/Op/Cl: As a longer route, the alternative will also potentially result in noise effects over a bigger area	• Con/Cl: Potential temporary increase in sounded during the construction and decommissioning phases but will not remain at the same place for long • Op: There will be infrequent periodic maintenance during the operations phase, likely needing helicopter support which will cause infrequent increases in noise levels	• Con/Cl: Potential temporary increase in sounded during the construction and decommissioning phases but will not remain at the same place for long • Op: There will be infrequent periodic maintenance during the operations phase, likely needing helicopter support which will cause infrequent increases in noise levels • Con/Op/Cl: As a longer route, the alternative will also potentially result in noise effects over a bigger area
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Shorter length corridor may become a preferential wildlife corridor which while advantageous for some species, could increase predation on Caribou where present • Con/Op/Cl: As this corridor parallels existing corridors to the greatest extent, it would reduce new corridor lengths for Caribou predation • Con/Op/Cl: There is the potential the disruption of existing travel corridors that could result in increased predation	• Con/Op/Cl: Moderate length corridor may become a preferential wildlife corridor which while advantageous for some species, could increase predation on Caribou where present • Con/Op/Cl: There is the potential the disruption of existing travel corridors that could result in increased predation	• Con/Op/Cl: Shortest length corridor may become a preferential wildlife corridor which while advantageous for some species, could increase predation on Caribou where present • Con/Op/Cl: This alternative has the smallest requirement for new corridors, not paralleling existing linear corridors including existing transmission lines • Con/Op/Cl: There is the potential the disruption of existing travel corridors that could result in increased predation	• Con/Op/Cl: Longest length corridor may become a preferential wildlife corridor which while advantageous for some species, could increase predation on Caribou where present • Con/Op/Cl: There is the potential the disruption of existing travel corridors that could result in increased predation • Con/Op/Cl: This corridor is located in a corridor between two Category 1 high use areas, in part which could be additionally disruptive / resulting in increased predation
		Summary	**Preferred**	**Partially preferred**	**Preferred**	**Partially preferred**

Table 4.25-2: Assessment of Transmission Line Route Alternatives

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Natural Environment Performance Objectives Assessment			**Preferred** • Adv: Shorter length corridor may become a preferential wildlife corridor which while advantageous for some species, could increase predation on Caribou where present • Adv: As this corridor parallels existing corridors to the greatest extent, it would be preferred from the perspective of reduced new corridor lengths for Caribou predation • Disadv: There is the potential the disruption of existing travel corridors that could result in increased predation	**Partially preferred** • Adv: Moderate length of corridor minimizing direct effects on terrestrial habitat • Disadv: Corridor provides a shorter length along the existing linear corridor (E1C), which could result in increased opportunities for predation for Caribou from additional new corridor creation • Disadv: There is the potential the disruption of existing travel corridors that could result in increased predation	**Preferred** • Adv: Shortest length of transmission line corridor minimizing direct effects on terrestrial habitat • Adv: Corridor has an increased length along existing linear corridor (E1C), minimizing new corridors which could result in increased opportunities for predation for Caribou • Disadv: There is the potential the disruption of existing travel corridors that could result in increased predation	**Not preferred** • Disadv: Longest length of transmission line results in the greatest direct effects on terrestrial habitat • Disadv: Alternative has the greatest new corridor creation which could result in the greatest opportunities for predation for Caribou • Disadv: There is the potential the disruption of existing travel corridors that could result in increased predation
Social, Economic, Cultural and Built Environment						
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: Much of the proposed transmission line corridor is located away from populated areas and should not have an impact on property values	• Con/Op/Cl: Much of the proposed transmission line corridor is located away from populated areas and should not have an impact on property values	• Con/Op/Cl: Much of the proposed transmission line corridor is located away from populated areas and should not have an impact on property values	• Con/Op/Cl: Much of the proposed transmission line corridor is located away from populated areas and should not have an impact on property values • Con/Op/Cl: Corridor passes near a number of camps, but there is no expected effect on property values
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: Potential income opportunity to support construction of the transmission line for local companies • Con/Op/Cl: Maintenance of clearing of the transmission line corridor will be required during operations	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

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	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: Although an all-season access road will not be established, a new corridor cleared of woody vegetation will be established along transmission line that could be used by hunters, ATVs, snowmobiles • Con/Op/Cl: This alternative provides the shortest length of new corridor through areas without existing access	• Con/Op/Cl: Although an all-season access road will not be established, a new corridor cleared of woody vegetation will be established along transmission line that could be used by hunters, ATVs, snowmobiles • Con/Op/Cl: This alternative provides a shorter length of new corridor through areas without existing access	• Con/Op/Cl: Although an all-season access road will not be established, a new corridor cleared of woody vegetation will be established along transmission line that could be used by hunters, ATVs, snowmobiles • Con/Op/Cl: This alternative provides a moderate length of new corridor through areas without existing access	• Con/Op/Cl: Although an all-season access road will not be established, a new corridor cleared of woody vegetation will be established along transmission line that could be used by hunters, ATVs, snowmobiles • Con/Op/Cl: This alternative provides the greatest length of new corridor through areas without existing access
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: Potential temporary increase in sound during corridor clearing and transmission line construction but will not remain at the same place for long as the transmission line construction progresses; but not affecting ability to attain provincial noise guidelines	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects anticipated; no known water wells near route	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects anticipated; no surface water supplies present near route	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: Potential disturbance and change in aesthetics for residents of Slate Falls Nation Reserve • Con/Op/Cl: Cleared corridor and transmission line will have an adverse impact on natural aesthetics where a viewpoint is present	• Con/Op/Cl: Areas most impacted for aesthetics are located away from populated areas • Con/Op/Cl: Cleared corridor and transmission line will have an adverse impact on natural aesthetics where a viewpoint is present • Con/Op/Cl: Temporary disturbance may occur during construction for remote land users in the vicinity	• Con/Op/Cl: Areas most impacted for aesthetics are located away from populated areas • Con/Op/Cl: Cleared corridor and transmission line will have an adverse impact on natural aesthetics where a viewpoint is present • Con/Op/Cl: Temporary disturbance during construction for remote land users in the vicinity	• Con/Op/Cl: Areas most impacted for aesthetics are located away from populated areas • Con/Op/Cl: Cleared corridor and transmission line will have an adverse impact on natural aesthetics where a viewpoint is present • Con/Op/Cl: Temporary disturbance during construction for remote land users in the vicinity

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			• Con/Op/Cl: There may be temporary disturbance during construction as a portion of the corridor traverses the Slate Falls Nation Reserve (adjacent to existing transmission line)	• Con/Op/Cl: The transmission may be visible from camp along the proposed corridor (to be determined / could potentially be re-routed to avoid)		• Con/Op/Cl: The transmission line may be visible from camp(s) and there are three camp reasonably proximal to the corridor
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Not preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: No material effects anticipated; some limited disruption during construction at transmission line road crossings	• Con/Op/Cl: Could affect travel along Slate Falls Road during construction	• Con/Op/Cl: No material effects anticipated; some limited disruption during construction at transmission line road crossings	• Con/Op/Cl: Could affect travel along Slate Falls Road during construction
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Will reinforce the local power grid if transmission line is transferred to Hydro One Networks Inc.	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Preferred**	**Partially preferred**	**Preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Cl: No adverse effect to health and safety; emissions will be generated during construction, operations and closure phases; however they will not affect attainment of air quality standards which are protective of health • Op: Limited emissions will occur from inspection and maintenance activities which will not affect attainment of air quality standards	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Op/Cl: No effects anticipated; no drinking water supplies are currently identified, but if present would be avoided	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

Table 4.25-2: Assessment of Transmission Line Route Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Near Site Access Road to E1C Line, Parallel to E1C Line for Majority of Length, Connect to Wataynikaneyap Transmission Line	Alternative 2: Near Site Access Road to E1C Line, Parallel E1C Line Part Way, before Diverting Southeast to Avoid Slate Falls Reserve to Connect to Wataynikaneyap Transmission Line	Alternative 3: Near Site Access Road to E1C Line, Parallel E1C Part Way, before Diverting Southeast and near the Slate Falls Road to Connect to Wataynikaneyap Transmission Line	Alternative 4: Near Site Access Road to E1C Line in Part, Diverting Southwest, Avoiding Category 1 and 2 Caribou Habitat, and near the Slate Falls Road to Connect to Wataynikaneyap Transmission Line
		• Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples				
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: All regulatory requirements will be met • Con/Cl: There are no electromagnetic emissions associated with these phases • Op: 230 kV transmission line will generate electric and magnetic fields along the corridor; although electric and magnetic fields lose strength exponentially with distance, the transmission line will be set back from any residential areas such that there would be no health risk associated with electromagnetic fields	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: FMG will utilize best practices to manage safe use of the road related to the transmission line, recognizing that the majority of the roads used for access will be on Crown land and will not be fully under FMG control	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: Potential income opportunity to support construction of the transmission line for local construction company	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

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			• Con/Op/Cl: Maintenance of clearing of the transmission line corridor will be required during operations			
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: New corridor may provide unplanned access to new areas	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/Cl: No material effects anticipated although new corridor may provide for increased access to new areas	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: No associated material effects anticipated to regional economy although the transmission line construction will be a large temporary contract	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect services	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• Con/Op/Cl: Applicable approvals will be obtained including the Sustainable Forest Licence holder for the road corridor • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

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		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are located distant from route	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No known isolation of built heritage resources or heritage attribute	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: Cleared corridor and transmission line will have an adverse impact on natural aesthetics where a viewpoint is present • Con/Op/Cl: This alternative has the greatest length along an existing transmission line and would therefore result in the least changes in views if present	• Con/Op/Cl: Cleared corridor and transmission line will have an adverse impact on natural aesthetics where a viewpoint is present (such as at transmission line road / trail crossings)	• Con/Op/Cl: Cleared corridor and transmission line will have an adverse impact on natural aesthetics where a viewpoint is present (such as at transmission line road / trail crossings)	• Con/Op/Cl: Cleared corridor and transmission line will have an adverse impact on natural aesthetics where a viewpoint is present (such as at transmission line road / trail crossings)
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near the alternative route • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed including by avoidance	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator

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			due to the limited need for subsurface disturbance (pole placement)			
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: No effects; there are no known archaeological sites at or near the alternative route • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed • Con/Op: Work will not alter water levels	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: Requires routing through Slate Falls Nation Reserve and may support existing community power infrastructure; route has been requested by First Nation	• Con/Op/Cl: Crosses the road that provides access to the Slate Fall Reserve (Vermillion River Road), providing an accessible future connection for the Reserve to the regional electrical grid in addition to the existing E1C connection should the Reserve require	• Con/Op/Cl: Crosses the road that provides access to the Slate Fall Reserve (Vermillion River Road), providing an accessible future connection for the Reserve to the regional electrical grid in addition to the existing E1C connection should the Reserve require	• Con/Op/Cl: No potential for effects; the Reserve is distant from route
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No effects anticipated; there are no known spiritual, ceremonial, cultural heritage and archaeological sites near route	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: Potential for increased access along corridor (although shortest length not along existing corridor, E1C) • Con/Op/Cl: Disruption to habitats will occur due to construction, operation and decommissioning of the transmission line • Con/Op/Cl: The avoids intersecting identified traditional land use areas	• Con/Op/Cl: Potential for increased access along corridor • Con/Op/Cl: Disruption to habitats will occur due to construction, operation and decommissioning of the transmission line • Con/Op/Cl: The route potentially intersects traditional land use areas identified by Indigenous communities	• Con/Op/Cl: Potential for increased access along corridor • Con/Op/Cl: Disruption to habitats will occur due to construction, operation and decommissioning of the transmission line • Con/Op/Cl: The route potentially intersects traditional land use areas identified by Indigenous communities	• Con/Op/Cl: Potential for increased access along corridor • Con/Op/Cl: Disruption to habitats will occur due to construction, operation and decommissioning of the transmission line • Con/Op/Cl: The route potentially intersects traditional land use areas s

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	Summary		**Preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Preferred**	**Partially preferred**	**Preferred**	**Partially preferred**
			• Adv: Routed through Slate Falls Nation Reserve, ongoing discussion with the community suggests route is feasible • Disadv: Has the greatest potential conflict with existing mineral claims	• Disadv: May affect a camp along the corridor • Disadv: May pose a potential conflict with existing mineral claims	• Adv: Potentially provides increased access to remote lands • Adv: Has no known conflict with mineral claims	• Adv: Potentially provided the greatest amount of new access to remote lands • Disadv: May affect a number of camps along the corridor • Disadv: May pose a potential conflict with existing mineral claims
Technical Objectives						
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Building transmission lines to connect to the provincial grid is common for mines in northern Ontario and has been implemented successfully many times • Con/Op/Cl: Contingency of an emergency power source is available if needed	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Wataynikaneyap transmission line has sufficient available capacity (Phase 1 completed)	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Agreements will be needed for corridor where others hold surface rights, including occupancy agreement(s) for Crown lands; this alternative may have the greatest conflict with existing mineral claims • Con/Op/Cl: Additional temporary accesses will be required for transmission line construction and decommissioning	• Con/Op/Cl: Agreements will be needed for corridor where others hold surface rights, including occupancy agreement(s) for Crown lands • Con/Op/Cl: Additional temporary accesses will be required for transmission line construction and decommissioning	• Con/Op/Cl: Agreements will be needed for corridor where others hold surface rights, including occupancy agreement(s) for Crown lands • Con/Op/Cl: Additional temporary accesses will be required for transmission line construction and decommissioning	• Con/Op/Cl: Agreements will be needed for corridor where others hold surface rights, including occupancy agreement(s) for Crown lands • Con/Op/Cl: Additional temporary accesses will be required for transmission line construction and decommissioning

Table 4.25-2: Assessment of Transmission Line Route Alternatives

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			• Con/Op/Cl: Requires routing through Slate Falls Nation Reserve; route has been requested by First Nation as well as potentially meeting additional federal regulatory requirements			
		Summary	**Partially Preferred**	**Preferred**	**Partially Preferred**	**Partially Preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: Could be perceived as more challenging to gain approval due to crossing of Reserve lands and multiple existing mineral claims	• Con/Op/Cl: Could be perceived as more challenging to gain approval due to crossing of existing multiple mineral claims	• Con/Op/Cl: No material effects anticipated	• Con/Op/Cl: Could be perceived as more challenging to gain approval due to crossing of existing multiple mineral claims
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Overall cost of the transmission line is not expected to be Project limiting (approximately $46 M) • Con/Op/Cl: Shorter transmission line resulting in lower capital costs based on unit rate per kilometre • Con/Op/Cl: Could potentially be more costly depending on costs for land agreements and/or approvals	• Con/Op/Cl: Overall cost of the transmission line is not expected to be Project limiting (approximately $50 M) • Con/Op/Cl: Shorter transmission line resulting in lower capital costs based on unit rate per kilometre • Con/Op/Cl: Could potentially be more costly depending on costs for land agreements and/or approvals	• Con/Op/Cl: Overall cost of the transmission line is not expected to be Project limiting (approximately $44 M) • Con/Op/Cl: Shortest transmission line resulting in lowest capital costs based on unit rate per kilometre • Con/Op/Cl: No known land agreements needed which would increase costs further	• Con/Op/Cl: Longest transmission line resulting in highest capital costs (approximately $56M) • Con/Op/Cl: Could potentially be more costly depending on costs for land agreements and/or approvals
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: Price of electricity from provincial grid is relatively stable	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator	• Con/Op/Cl: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Preferred**	**Not preferred**
Technical Performance Objective Assessment			**Partially preferred**	**Partially preferred**	**Preferred**	**Not preferred**
			• Adv: Lower capital cost for construction based on overall length • Adv: Requires routing through Slate Falls Nation Reserve; route has been requested by First Nation • Disadv: Has the greatest potential conflict with existing mineral claims	• Adv: Lower capital cost for construction based on overall length • Disadv: Has the potential conflict with a number of existing mineral claims • Disadv: There could be additional land acquisition / agreement costs	• Adv: Lower capital cost for construction based on overall length • Adv: No known conflict with the existing land base	• Disadv: Has the potential conflict with a number of existing mineral claims • Disadv: Highest capital cost based on overall length • Disadv: There could be additional land acquisition / agreement costs which could also increase risk

Table 4.25-2: Assessment of Transmission Line Route Alternatives

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			• Disadv: There could be considerable additional land acquisition / agreement costs			
Amenability to Reclamation (Closure Phase)						
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• CI: Engineered structure constructed in accordance with regulatory requirements for safety; No material effects anticipated	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• CI: Infrastructure preferentially located above the high water mark; No material effects anticipated	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: If rehabilitated, the corridor will return to terrestrial habitat (transmission line could potentially be retained to reinforce the provincial electrical grid)	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• CI: If rehabilitated the cleared corridor will return as terrestrial habitat	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Advantages will depend on whether transmission line corridor is rehabilitated as part of final reclamation or transferred to another owner to reinforce the provincial electrical grid If the transmission line is removed and corridor rehabilitated, it should return to wildlife habitat relatively quickly once right of maintenance ceases	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator	• CI: There is no difference amongst alternatives for this indicator

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			• If line transferred at end of mine life, corridor will become part of provincial infrastructure			
		Summary	**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially preferred**	**Partially preferred**	**Partially preferred**	**Partially preferred**
			• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Reclamation requirements are not expected to be materially different for any of the alternatives assessed; there are no differentiating advantages or disadvantages for the criteria and indicators
OVERALL ASSESSMENT OF ALTERNATIVE			**PREFERRED (SELECTED ALTERNATIVE)**	**PARTIALLY PREFERRED**	**PREFERRED**	**NOT PREFERRED**
			Alternative 1 has a shorter length corridor provides less overall disturbance and the greatest length paralleling existing infrastructure corridors, creating fewer new corridors. It requires routing through Slate Falls Nation Reserve which has been requested by the First Nation to date. This alternative has a lower capital cost for construction based on overall length, but may require the greatest number of agreements and potentially financial compensation expected to be needed for corridor where others hold surface rights.	Alternative 3 has a moderate length of corridor minimizing direct effects on terrestrial habitat. It has a greater length not along existing corridors, which could result in increased opportunities for predation for Caribou.	Alternative 4 provides the shortest length of transmission line corridor minimizing direct effects on terrestrial habitat, and greater length along existing linear corridor, minimizing new corridors which could result in increased opportunities for predation for Caribou. It has a lower capital cost for construction based on overall length and no known conflicts with the existing land base.	Alternative 5 has the longest length of transmission line resulting in the greatest direct effects on terrestrial habitat and greatest new corridor creation. This could result in the greatest opportunities for predation for Caribou. It also has the highest capital cost based on overall length.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op: operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act*.

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SPRINGPOLE GOLD PROJECT

Alternative 1

Alternative 2

Alternative 3

Alternative 4

SLATE FALLS NATION

Ear Falls to Pickle Lake (E1C)

Wataynikaneyap Transmission Line

Keigat Lake
Zionz Lake
Obaskaka River
Strout Lake
Birch Lake
Cluderay Lake
Dorothy Lake
Springpole Lake
Fawcett Lake
Muskegsagagen Lake
Wright Lake
Shabumeni Lake
Nabemakoseka Lake
Gull Lake
Superstition Lake
Scanes Lake
Granitebooss Lake
Seagrave Lake
Kezik Lake
Jacknife Lake
Grace Lake
Mousetrap Lake
Bertha Lake
Deaddog Lake
Washagomis Lake
Ruddy Lake
Christina Lake
Strachan Lake
Fry Lake
Woman Lake
Bumpy Lake
Fawthrop Lake
Teevin Lake
Narrow Lake
Hailstone Lake
Senior Lake
Wesleyan Lake
Okanse Lake
Cook Lake
Drum Lake
Mukukee Lake
Philchub Lake
Margaret Lake
Found Lake
Latreille Lake
North Bamaji Lake
Woman River
Sesikinaga Lake
Perrigo Lake
Bamaji Lake
Austin Lake
Honderich Lake
Pembina Lake
Rowe Lake
Snelgrove Lake
Confederation Lake
Brokenmouth River
One Island Lake
Jeanette Lake
Coyston Lake
Roadhouse Lake
Blackstone Lake
Fly Lake
Drake Lake
Wakeman Lake
Polzin Lake
Buddell Lake
Dalgas Lake
Jubilee Lake
Lake St. Joseph
Fly Creek
Slate Lake
Curie Lake
Kesaka Lake
Roadhouse River
Trist Lake
Ben Lake
Lower Slate Lake
Avis Lake
Papaonga Lake
Root Lake
Badrock Lake
Ogani Lake
Sharp Lake
Otatakan Lake
Churchill Lake
Whitemud Lake
Polka Lake

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LEGEND

- Proposed Mine Feature
- Existing Road
- Winter Road
- Existing Transmission Line
- First Nation Reserve
- Watercourse
- Waterbody

230 kV Transmission Line Route Alternatives

- Alternative 1 (93.9 km)
- Alternative 2 (100.5 km)
- Alternative 3 (88.9 km)
- Alternative 4 (114.4 km)

NOTES:
- Topographic information extracted from LIO, MNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- 230 kV transmission line provided by First Mining Gold, April 2024.

Datum: NAD83
Projection: UTM Zone 15N

0 10 20 40 60 80 100 Kilometres

FIRST MINING GOLD

wsp

SPRINGPOLE GOLD PROJECT

230 kV Transmission Line Route Alternatives

PROJECT N°: ONS2104

FIGURE: 4.25-1

SCALE: 1:325,000

DATE: October 2024

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SPRINGPOLE GOLD PROJECT

Alternative 1

Alternative 2

Alternative 3

Alternative 4

SLATE FALLS NATION

Ear Falls to Pickle Lake (E1C)

Wataynikaneyap Transmission Line

Keigat Lake
Zionz Lake
Obaskaka River
Strout Lake
Birch Lake
Springpole Lake
Cluderay Lake
Dorothy Lake
Shabumeni Lake
Fawcett Lake
Muskegsagagen Lake
Wright Lake
Nabemakoseka Lake
Gull Lake
Superstition Lake
Scanes Lake
Seagrave Lake
Kezik Lake
Graniteboss Lake
Grace Lake
Jacknife Lake
Mousetrap Lake
Bertha Lake
Deaddog Lake
Washagomis Lake
Ruddy Lake
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Fawthrop Lake
Teevin Lake
Narrow Lake
Hailstone Lake
Senior Lake
Wesleyan Lake
Okanse Lake
Cook Lake
Drum Lake
Mukukee Lake
Philchub Lake
Margaret Lake
Found Lake
Latreille Lake
North Bamaji Lake
Sesikinaga Lake
Bamaji Lake
Honderich Lake
Woman River
Perrigo Lake
Snelgrove Lake
Austin Lake
Pembina Lake
Rowe Lake
Confederation Lake
Brokenmouth River
Coyston Lake
One Island Lake
Jeanette Lake
Roadhouse Lake
Blackstone Lake
Fly Lake
Drake Lake
Wakeman Lake
Polzin Lake
Buddell Lake
Dalgas Lake
Jubilee Lake
Fly Creek
Lake St. Joseph
Slate Lake
Curie Lake
Kesaka Lake
Roadhouse River
Ben Lake
Lower Slate Lake
Avis Lake
Trist Lake
Papaonga Lake
Root Lake
Badrock Lake
Ogani Lake
Sharp Lake
Otatakan Lake
Churchill Lake
Whitemud Lake
Polka Lake

LEGEND

- Proposed Mine Feature
- Classified Habitat*
- Existing Road
- Winter Road
- Existing Transmission Line
- First Nation Reserve
- Watercourse
- Waterbody

230 kV Transmission Line Route Alternatives

- Alternative 1 (93.9 km)
- Alternative 2 (100.5 km)
- Alternative 3 (88.9 km)
- Alternative 4 (114.4 km)

NOTES:
- Topographic information extracted from LIO, MNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1, 26 June 2023 and modified by WSP 2023.
* Classified habitat represent simplified delineations of known category 1 caribou habitat regions (MECP GHD (2024), telemetry kernels, high density aerial survey observations, RSF predicted areas). The simplified delineations utilize the Natural Heritage Information Centre (NHIC) MNRF 2024) provincial tessellation boundaries and reflect broad areas of known high use caribou habitat.

Datum: NAD83
Projection: UTM Zone 15N

0 10 20 40 60 80 100 Kilometres

N W E S

FIRST MINING GOLD

WSP

SPRINGPOLE GOLD PROJECT

230 kV Transmission Line Route Alternatives and Classified Habitat

PROJECT N°: ONS2104

FIGURE: 4.25-2

SCALE: 1:325,000

DATE: October 2024

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4.26 Explosive Handling and Storage

Explosives are required for blasting during open pit operations, and potentially during the construction phase where bedrock requires removal. Mining operations require a relatively large quantity of explosives on an ongoing basis over the life of the mine to extract rock from the open pit. These explosives will be prepared in an explosive manufacturing facility, the location of which is highly controlled by standards under the federal *Explosives Act* (RSC 1985, c. E-17) and is dependent in part on the location of other site facilities. Storage of explosives will be required in onsite magazine(s), irrespective of where they are manufactured, due to the relatively frequent explosives use. The location of magazines is equally controlled by standards (BNQ 2015).

4.26.1 Identified Alternatives

The manufacturing, transportation and storage of explosives is highly controlled in Canada. The following alternatives identified for manufacture of explosives for the Project:

- **Alternative 1:** onsite manufacturing; and
- **Alternative 2:** offsite manufacturing.

There are a limited number of existing explosives manufacturers and manufacturing facilities in Ontario and Manitoba, a large number of which are mine-dedicated facilities.

The Project cannot proceed without explosives, which are required for mining and potentially some construction activities. The existing environmental conditions would be unchanged if the Project did not proceed; however, the socioeconomic benefits of the Project would also not accrue.

4.26.2 Assessment of Alternatives

The alternatives were assessed for all performance objectives; however, the following performance objective and criteria were identified as the key differentiators:

- Technical performance:
- Ability to service site; and
- Cost effectiveness.

The results of the assessment of alternatives for the location of the required explosives manufacturing facility for the Project is detailed in Table 4.26-1.

The key mitigation measures that would apply to all alternatives are as follows:

- scheduling of transport to minimize the potential for wildlife interactions as reasonable,
- requiring the contractor to use properly maintained equipment, and
- follow FMG and public speed limits.

4.26.2.1 Alternative 1: Onsite Explosives Manufacturing Facility

It is common practice for mining operations at this scale of Project to contract a company to manufacture explosives on site. Given the remoteness of the Project site, onsite manufacturing is advantageous from the environmental, technical and economic perspectives:

Advantages: this alternative provides a reliable explosives source without risk of disruption, such as during poor road or weather conditions. There are also lower operating costs associated with prepared explosives on site and potential for a limited number of opportunities for specialized contractors.

Disadvantages: there are higher capital costs associated with construction of an explosives facility on site (a supplier may be willing to establish a facility for commitment to ongoing usage). This alternative also increased the traffic associated with transporting explosives, rather than just transporting materials.

4.26.2.2 Alternative 2: Offsite Explosives Manufacturing Facility

The ongoing transportation of the manufactured explosives required for the Project is also a proven approach, but it would result in a minor increase the truck traffic as compared to shipment of the individual source materials in bulk:

Advantages: this alternative has limited capital costs related to temporary onsite storage of pre-packaged explosives.

Disadvantages: this alternative involves potential for shipment disruption due to traffic delays, road conditions or poor weather. This alternative has higher operating costs associated with transporting explosives to site on a regular basis and would nominally increase the risk of traffic accidents and collisions with wildlife.

4.26.3 Results Summary and Selected Alternative

Alternative 1, establishment of an onsite manufacturing facility, is the selected alternative based on the assessment of net effects in Table 4.26-1 with proposed mitigation, including key mitigation measures described briefly in Section 4.26.2. The transport of explosives in large quantities from an offsite manufacturing facility (Alternative 2) is considered partially preferred given commercial constraints, as FMG does not intend to operate the facility.

Siting of the explosives-related facilities on site is highly regulated in Canada and requires appropriate setbacks from other site infrastructure to meet regulated safety requirements, as described in Section 5.4.6 pursuant to the *Explosives Act*. A preliminary location has been identified for siting of these facilities without unnecessarily expanding the overall Project footprint. The final locations for these facilities will be determined in accordance with regulatory requirements.

Table 4.26-1: Assessment of Explosives Handling and Storage Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Onsite Explosives Manufacturing Facility under Care and Control of FMG or Contractor	Alternative 2: Offsite Explosives Manufacturing Facility under Care and Control of Approved Contractor
Natural Environment				
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Minor emissions will be generated during construction, operation and closure phase; however emissions will not affect attainment of air quality standards	• Con/Op/Cl: No impact on air quality and climate from existing facility, however additional emissions will result from trucking of explosives to site • Con/Op/Cl: Limited emissions will be generated from the additional traffic associated with transport of fabricated explosive materials to site
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• Con/Op/Cl: Limited GHG emissions will result from fuel usage during manufacturing on site	• Con/Op/Cl: Limited GHG emissions will result from fuel usage during transport of explosives to site for use
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• Con/Op/Cl: No effects on water quality from onsite manufacturing facility; all contact water will be internal to the building or treated	• Con/Op/Cl: No effects from existing facility or from normal transport operations
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• Con/Op/Cl: No effects anticipated; the facility will not be constructed in fish habitat	• Con/Op/Cl: Fish habitat will not be affected by normal transport operations
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• Con/Op/Cl: No effects anticipated; fish will not be affected by manufacturing	• Con/Op/Cl: No effects anticipated; fish will not be affected by normal transport operations
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• Con/Op/Cl: No effects anticipated; fish passage will not be affected by manufacturing	• Con/Op/Cl: No effects anticipated; fish passage will not be affected by normal transport operations
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects on groundwater from onsite manufacturing facility; all contact water will be internal to the building (concrete base) or treated	• Con/Op/Cl: No effects from existing facility or from normal transport operations
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• Con/Op/Cl: No effects anticipated; the facility will avoid siting in low lying areas	• Con/Op/Cl: No effects; wetlands will not be affected by explosives transport
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• Con/Op/Cl: No effects anticipated; the facility will be sited to affect wetland connectivity	• Con/Op/Cl: No effects; wetlands will not be affected by explosives transport
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• Con/Op/Cl: Facility will have a small footprint (less than approximately 1 ha) that will displace limited terrestrial habitat	• Con/Op/Cl: No material effects anticipated (very limited footprint on site for storage)
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op: Limited noise will be created during the construction and operations phase but is not anticipated to materially affect the overall site noise generation • Cl: No effects anticipated as explosives will no longer be used	• Con/Op: Limited increased noise emissions from transport of explosives from an offsite facility; limited increased potential for vehicle – wildlife interactions • Cl: No effects anticipated as explosives will no longer be used

Table 4.26-1: Assessment of Explosives Handling and Storage Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Onsite Explosives Manufacturing Facility under Care and Control of FMG or Contractor	Alternative 2: Offsite Explosives Manufacturing Facility under Care and Control of Approved Contractor
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: Limited potential effect as wildlife avoidance of PDA is generally expected	• Con/Op/Cl: Limited potential effect as wildlife avoidance of PDA and transport corridor is generally expected
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• Con/Op/Cl: Facility has a small footprint, which will not affect wildlife populations; No effects anticipated	• Con/Op/Cl: Limited potential effect as wildlife avoidance of PDA and transport corridor is generally expected; however there could be a limited increased potential for vehicle – wildlife interactions
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• Con/Op/Cl: No effects anticipated (no SAR were observed (individuals or evidence) or otherwise identified as present or very close to the proposed location	• Con/Op/Cl: No additional effects anticipated (will be transported on mine access road and existing infrastructure)
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Con/Op/Cl: The location will be constrained by federal regulations on explosive facility siting, however quality of SAR habitat present if any, will be considered as reasonable; the currently location is on the border of Caribou Category 1 (high use) and Category 2 (seasonal range) habitat	• Con/Op/Cl: Existing facility, no new SAR habitat displaced
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No anticipated effect from facility construction, operation, or closure limited noise is not anticipated to disturb SAR	• Con/Op/Cl: Limited increased noise emissions from transport of explosives from an offsite facility; limited increased potential for vehicle interactions with SAR if present
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• Con/Op/Cl: No anticipated effect from facility operation as wildlife avoidance of PDA is generally expected	• Con/Op/Cl: Limited potential effect as wildlife avoidance of the transport corridor is generally expected; however there could be a limited increased potential for vehicle – wildlife interactions
	Summary		**Partially Preferred**	**Partially Preferred**
	Natural Environment Performance Objectives Assessment		**Partially Preferred**	**Partially Preferred**
			• Adv: the facility will not have a material effect on air quality or noise • Adv: the facility will not have an effect on fish or fish habitat • Disadv: The facility will have a small footprint that will displace limited terrestrial habitat	• Adv: Limited new facilities constructed on site • Disadv: Limited emissions (air, GHG, noise) from explosives transport to site • Disadv: Increased potential for wildlife interactions due to increased traffic
Social, Economic, Cultural and Built Environment				
	Relative potential change to property value	• The PDA is remote from private residences	• Con/Op/Cl: No effect anticipated; there are no known residences near the PDA	• Con/Op/Cl: No effect anticipated; there are no known residences on the mine access road

Table 4.26-1: Assessment of Explosives Handling and Storage Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Onsite Explosives Manufacturing Facility under Care and Control of FMG or Contractor	Alternative 2: Offsite Explosives Manufacturing Facility under Care and Control of Approved Contractor
Potential Effect on Local Residents and Recreational Users (Social Environment)	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: No material effect on income opportunities; a local fuel contractor will haul fuel to site requiring local truck drivers (fuel is needed in explosive manufacturing)	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities • Con/Op/Cl: Potential income opportunity for a qualified third-party contractor for transport of explosives (highly regulated and available only to limited companies)
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to provision of access	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• Con/Op/Cl: No effects anticipated as the noise associated will be very low (will not materially increase noise levels)	• Con/Op/Cl: No material effect as there will be a very limited increase in noise emissions from transport of explosives
	Distance from known water well supplies	• No water well supply systems are present	• Con/Op/Cl: No effects; no water wells present in Project area	• Con/Op/Cl: No effects, there are no known water wells in the Project area or on the mine access road
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area	• Con/Op/Cl: No effects; no surface water drinking supplies present in Project area or on the mine access road
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Con/Op/Cl: No effects; no change in landscape or viewscapes from facility	• Con/Op/Cl: No effects as there is no change in landscape or viewscpares
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• Con/Op: No effects anticipated from onsite explosive manufacturing because materials are only active if mixed in appropriate proportions, placed under certain confined conditions and detonated with an external device • Cl: No effects anticipated as explosives will no longer be used	• Con/Op:Increased risk of safety because explosives active prior to delivery on site. • Cl: No effects anticipated as explosives will no longer be used
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to access	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to power supply	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• Con/Op/Cl: Indicator is not applicable to this alternative; not related to pipeline systems	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• Con/Op/Cl: Minor emissions will be generated; however emissions will not affect attainment of air quality standards which are protective of health	• Con/Op/Cl: No impact on air quality and climate from existing facility, however, limited emissions will be generated from transport of the explosives

Table 4.26-1: Assessment of Explosives Handling and Storage Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Onsite Explosives Manufacturing Facility under Care and Control of FMG or Contractor	Alternative 2: Offsite Explosives Manufacturing Facility under Care and Control of Approved Contractor
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• Con/Op/Cl: No effects; no drinking supplies present in Project area	• Con/Op/Cl: No effects; no drinking supplies present in Project area or on the mine access road
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• Con/Op/Cl: No effects; there are no electromagnetic emissions associated with this alternative	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• Con/Op/Cl: No effects anticipated from onsite facility as no additional traffic due to onsite facility	• Con/Op/Cl: Increased explosives-related traffic, despite operational safeguards associated with onsite roads, could increase the chance of an accident
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• Con/Op/Cl: Indicator is not applicable to this alternative / does not affect health services	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• Con/Op/Cl: Project development will generate considerable regional and local, employment and business opportunities	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• Con/Op/Cl: Indicator is not applicable to this alternative; explosive manufacturing does not affect access	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• Con/Op/Cl: Indicator is not applicable to this alternative; explosive manufacturing does not opportunities	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• Con/Op/Cl: Indicator is not applicable to this alternative; explosive manufacturing does not affect the regional economy	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• Con/Op/Cl: Indicator is not applicable to this alternative; explosive manufacturing does not affect services	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan	• Con/Cl: Applicable approvals will be obtained including the Sustainable Forest Rights holder for pipeline corridor clearing and reclamation • Con/Op/Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• Con/Op/Cl: No direct or indirect effect anticipated from this alternative

Table 4.26-1: Assessment of Explosives Handling and Storage Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Onsite Explosives Manufacturing Facility under Care and Control of FMG or Contractor	Alternative 2: Offsite Explosives Manufacturing Facility under Care and Control of Approved Contractor
		• Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor		
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material generation	• Con/Op/Cl: There is no apparent difference between Alternatives 1 and 2 for this indicator; although there is the potential for additional packaging waste with this alternative
	Potential for material to be recycled / re-used	• There are no facilities present	• Con/Op/Cl: No effects; alternative does not affect waste material recycling or re-use	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are distant from explosive manufacturing activities	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are distant from explosive manufacturing activities	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• Con/Op/Cl: No effects anticipated; camps are distant from explosive manufacturing activities	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: Archaeological sites could be discovered, but will be managed and/or mitigated as needed	• Con/Op/Cl: Indicator is not applicable to this alternative; no subsurface work associated with this alternative
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• Con/Op/Cl: • Con: Archaeological sites could be discovered, but will be managed and/or mitigated as needed • Con: Work will not alter water levels in the southeast arm of Springpole Lake	• Con/Op/Cl: Indicator is not applicable to this alternative; no subsurface work or alteration to drainage is associated with this alternative
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• Con/Op/Cl: No potential for effects; the Reserve is distant from the mine site	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**

Table 4.26-1: Assessment of Explosives Handling and Storage Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Onsite Explosives Manufacturing Facility under Care and Control of FMG or Contractor	Alternative 2: Offsite Explosives Manufacturing Facility under Care and Control of Approved Contractor
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• Con/Op/Cl: No potential for effects; no site located within the PDA	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• Con/Op/Cl: Although the facility would have a small footprint, disruption to habitat will occur due to construction, operations and decommissioning until the site is fully rehabilitated	• Con/Op/Cl: Increased traffic from shipment of explosives in specialized transports (rather than source materials) would result in increased disruption to habitats from travel back and forth to site (construction and operations)
	Summary		**Partially preferred**	**Partially preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially preferred** • Adv: No material effects anticipated • Disadv: No material opportunities are associated with the facility	**Partially preferred** • Adv: No material effects anticipated • Adv: Limited opportunities to specialized contractors with this alternative • Disadv: Increase in traffic associated with transporting explosives rather than source materials in bulk
Technical Objectives				
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Con/Op/Cl: Manufacturing explosives on mining sites (by licensed contractors) is common for larger open pit operations in Ontario, as it provides a reliable explosives source without risk of disruption during poor road conditions	• Con/Op/Cl: Transport of manufactured explosives to mine sites for use is used for mines in northern Ontario and has been implemented successfully many times
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• Con/Op/Cl: Indicator is not applicable to this alternative; this is not new technology	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Manufacturing explosives on mining sites provides a reliable explosives source without risk of disruption, such as during poor road or weather conditions	• Con/Op/Cl: Potential for shipment disruption during poor road or weather conditions
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• Con/Op/Cl: Regulatory requirements for onsite manufacturing facility are stringent • Con/Op/Cl: Suitable land base is anticipated to be available within lands under FMG control	• Con/Op/Cl: No effects from existing facility; infrastructure will be present for other Project needs
	Summary		**Preferred**	**Partially preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: Higher risk of mining disruption due to lack of explosives supply during poor road or weather conditions
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• Con/Op/Cl: Higher capital costs associated with construction of an explosives facility on site • Con/Op/Cl: Lower operating costs associated with prepared explosives on site; a contractor may be willing to establish a facility for commitment to ongoing usage	• Con/Op/Cl: Limited capital costs (temporary onsite storage only) as an existing offsite facility will be utilized • Con/Op/Cl: Higher operating costs associated with transporting explosives to site on a regular basis
	Degree to which alternative provides financial risk	• There are no facilities present	• Con/Op/Cl: No effects anticipated	• Con/Op/Cl: There is no difference between Alternatives 1 and 2 for this indicator

Table 4.26-1: Assessment of Explosives Handling and Storage Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Onsite Explosives Manufacturing Facility under Care and Control of FMG or Contractor	Alternative 2: Offsite Explosives Manufacturing Facility under Care and Control of Approved Contractor
	Summary		**Preferred**	**Partially preferred**
	Technical Performance Objective Assessment		**Preferred**	**Partially preferred**
			• Adv: Manufacturing explosives on mining sites (by licensed contractors) is common for open pit operations in Ontario • Adv: Onsite manufacturing of explosive has improved reliability of supply • Adv: Lower operating costs associated with prepared explosives on site • Disadv: Higher capital costs associated with construction of an explosives facility on site	• Adv: Transport of manufactured explosives to mine sites for use is used for mines in northern Ontario and has been implemented successfully many times • Adv: Limited capital costs (temporary onsite storage only) as an existing offsite facility will be utilized • Disadv: Potential for shipment disruption due to traffic delays, road conditions or poor weather • Disadv: Higher operating costs associated with transporting explosives to site on a regular basis
Amenability to Reclamation (Closure Phase)				
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• CI: No material effects anticipated; facility will be removed during demolition	• Con/Op/CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially Preferred**	**Partially Preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• CI: No material effects on drainage; Indicator is not applicable to this alternative	• Con/Op/CI: There is no difference between Alternatives 1 and2 for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: Small area disturbed to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife	• Con/Op/CI: There is no difference between Alternatives 1, 2 and 3 for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• CI: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Con/Op/CI: There is no difference between Alternatives 1 and 2 for this indicator
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• CI: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• Con/Op/CI: There is no difference between Alternatives1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
	Amenability to Reclamation Performance Objective Assessment		**Partially preferred**	**Partially preferred**
			• Disadv: Small area disturbed to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife	• Adv: Excluding onsite storage, alternative would not be under the care and control of FMG and therefore does not provide any opportunity for reclamation • Adv: Limited area disturbed (storage) to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife

Table 4.26-1: Assessment of Explosives Handling and Storage Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Onsite Explosives Manufacturing Facility under Care and Control of FMG or Contractor	Alternative 2: Offsite Explosives Manufacturing Facility under Care and Control of Approved Contractor
		OVERALL ASSESSMENT OF ALTERNATIVE	**PREFERRED (SELECTED ALTERNATIVE)**	**PARTIALLY PREFERRED**
			Establishment of an onsite manufacturing facilities is the selected alternative, as it provides a reliable supply at a cost that can be supported by the Project. There are no material differences between the two alternatives from an environmental perspective.	Manufacturing of explosives offsite at an existing facility and transport to an onsite may be used including potentially early in the construction phase, as well as during plant maintenance periods. Transporting explosives regularly to site, could pose a logistical challenge and result in shipment disruption and impact on mining operations. There are also higher operating costs associated with transporting explosives to site on a regular basis.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
Adv = advantage; Cl = closure phase; Con = construction phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured; LSA = Local Study Area; Op: operations phase; RSA = Regional Study Area; SARA = *Species at Risk Act.*

4.27 Aggregate Supply

The majority of aggregate required to develop the Project will be inert mine rock produced incidental to ore extraction. It can be difficult, however, to produce aggregate for concrete and other strictly defined applications from mine rock.

4.27.1 Identified Alternatives

There are no commercial aggregate operations located close to the Project site or proposed mine access road. None of the existing commercial aggregate operations are feasible alternatives, given the distance from site and the volume of sand and gravel required.

Aggregate supply was identified in the EIS Guidelines and ToR (Appendices B-1 and B-3) as a Project component to be considered in the EIS/EA. Options for a reasonable range of viable alternatives that satisfy the questions presented in Section 4.1.1 for aggregate supply in the final EIS/EA, including using information from the following sources:

- Professional experience and expertise (including review of publicly available mapping);
- Desktop investigations;
- Field investigations; and
- Meetings and discussions;
- Consultation on the draft EIS/EA.

Two locations (Figure 4.27-1) were identified that are potentially viable and may be able to provide aggregate for the Project based on initial desktop identification of potential sites and field investigations (Wood 2020):

- **Alternative 1:** north of southeast arm of Springpole Lake (JP17a, JP17b, JP18); and
- **Alternative 2:** off Wenasaga Road (north; JP10, JP11, JP12, JP13).

A third location, off Wenasaga Road (south; JP1), is distant from both the mine access road and Project site and is not considered viable except for a specialized aggregate type if the required material could not obtained from Alternatives 1 or 2.

Without the development of a dedicated aggregate source, the Project cannot proceed and the environmental conditions would be unchanged.

4.27.2 Rationale for Approach

Preferentially, the aggregate source would be located closer to the intended use in order to reduce effects related air and GHG emissions, traffic and disruption associated with trucking the material, and operating costs. Accordingly, there is the potential that both locations will be developed for different uses if the types of materials required are available.

Both Alternatives 1 and 2 have been carried forward into Section 5 (Project Description) to allow potential effects to be assessed, should they both be developed.

550000 555000 560000 565000

5700000 5695000 5690000 5685000 5680000 5675000

Birch Lake
Keigat Creek
Keigat Lake
L-19
Dole Lake
L-20
L-16
Springpole Lake (North Basin)
L-10
L-12
L-11
L-13
Durkin Lake
Springpole Lake (Southeast Arm)
Birch River
Cromarty Lake
Satterly Lake
Graydarl Lake
Seagrave Lake
Skingle Lake
Bertha Lake
Deaddog Lake
Ruddy Lake
Gull Lake
Bumpy Lake
Christina Lake
Hailstone Creek
Hailstone Lake
Marsh Lake
Sesikinaga River

Location 1 North of Southeast Arm of Springpole Lake

Location 2 Off Wenasaga Road (North)

Location 3 Off Wenasaga Road (South)

Wenasaga Road

X:\CA\CAOAK300-OAK\MIS-FS1-Project\FY2021\Projects\ONS2104_FMG_Springpole_EIS\11_GIS\EIS\MXD\Sand_and_Gravel_Alternative_7.mxd

LEGEND

- Proposed Mine Feature
- Proposed 230 kV Transmission Line
- Existing Road
- Watercourse
- Waterbody
- Contour (10 m intervals)

Sand and Gravel Resource Area

- Location 1 North of Southeast Arm of Springpole Lake (32.3 ha)
- Location 2 Off Wenasaga Road (North) (51.9 ha)
- Location 3 Off Wenasaga Road (South) (9.5 ha)

NOTES:
- Topographic information extracted from LIO, MNRF.
- Proposed site plan provided by Ausenco, drawing number 104496-GX-03000-31344-003, Rev 1. 26 June 2023 and modified by WSP July 2023.
- 230 kV transmission line provided by First Mining Gold, April 2024.

0 1 2 4 6 8 10 Kilometres

Datum: NAD83
Projection: UTM Zone 15N

N W E S

First Mining Gold

WSP

SPRINGPOLE GOLD PROJECT

Aggregate Source Locations

PROJECT N°: ONS2104

FIGURE: 4.27-1

SCALE: 1:81,000

DATE: October 2024

4.28 Mine Closure – Dewatered Open Pit Basin

Mine decommissioning and closure must be completed to satisfy the Mine Rehabilitation Code under Ontario Regulation 35/24, Rehabilitation of Lands, of the *Mining Act* (RSO 1990, c. M.14) (or future equivalent). A closure plan will be developed during the environmental approvals process for the Project as required by the *Mining Act*, and will be periodically refined over the life of the mine. Feedback gained through ongoing consultation and engagement activities including on the final EIS/EA will be incorporated into the regulatory closure plan and subsequent amendments.

4.28.1 Identified Alternatives

The primary intent of reclamation and closure of the open pit and the dewatered open pit basin is to achieve a physically safe and chemically stable environment, to help mitigate the environmental effects of the mine development and operation. The open pit must be closed out in accordance with the Ontario *Mining Act*. Section 21 of the 2024 Mine Rehabilitation Code provides the potentially acceptable strategies for reclamation and closure of open pits if fully justified in the closure plan, including:

- Backfilling;
- Flooding;
- Sloping if determined to be more appropriate than backfilling or flooding;
- If backfilling, flooding or sloping are impracticable, boulder fencing or berming may be used;
- If all of the measures above are impracticable, fencing and signs may be used if fully justified in the closure plan.

Leaving the basin unfilled with fencing, signage and ongoing dewatering would present a safety hazard to the public and is not a viable option.

The alternative of fully backfilling (or partially backfilling) the open pit with mineral waste after mine production ceases was considered; however it is not economically feasible. Fully backfilling with mineral waste also may not be preferred from the environmental perspective, as it would require the re-disturbance and re-introduction of oxygen to PAG mineral wastes being managed to reduce ML/ARD potential within the CDF. Strategic recontouring of a portion of the basin is proposed to create fish habitat during Project operations (Section 5.19.3.1).

The only viable reclamation alternative that is economically feasible and would also meet requirements for environmental protection and public safety is to fill the dewatered open pit basin with water to create a waterbody. It will take decades for the dewatered basin to fill with water to an equilibrium level naturally with only direct precipitation and groundwater inflow. Refilling the dewatered open pit basin is proposed by enhanced means (controlled transfer of water from a nearby lake) to facilitate the creation of sustainable fish habitat sooner. Shorter duration of filling is anticipated to result in overall cost savings with respect to site management costs over time, as well as potentially a reduction in rehabilitation security held by the Province.

There are two nearby large waterbodies that could be used to expedite filling of the dewatered open pit basin with water:

- Springpole Lake; and
- Birch Lake.

Monitoring of the water quality in the open pit basin will be conducted while filling is occurring and for a period of time after in accordance with the regulatory closure plan. Additional water is also proposed to be taken from a nearby surface water source and transferred into the basin.

The infrastructure requirements to transfer water into the dewatered basin from either lake would be approximately equivalent, and the infrastructure could be placed on lands disturbed by the Project. Springpole Lake is preferred as the source of fresh water to support filling of the open pit basin as it has a much larger watershed area than Birch Lake. For that reason, a greater volume of water could be taken from Springpole Lake to expedite refilling than from Birch Lake with less environmental effect. A limit would be placed on the quantity of water transferred from Springpole Lake into the dewatered basin to minimize potential environmental effects.

Once the dewatered open pit basin is filled with water and the water quality meets regulatory requirements, the alternatives are as follows:

- **Alternative 1:** connect the filled basin lake to Springpole Lake; or
- **Alternative 2:** keep the filled basin lake separate from Springpole Lake.

In order to reconnect the filled open pit basin to Springpole Lake, modification would be made to the dikes to provide a hydraulic connection to allow flow of surface water and movement of fish, as well as boat travel.

4.28.2 Assessment of Alternatives

The alternatives were assessed for all performance objectives. Table 4.28-1 summarizes the assessment of the reconnection of the refilled open pit basin with Springpole Lake when the open pit basin water quality meets regulatory requirements in the near and long term. The following performance objective and criteria were identified as the key differentiators:

- Natural environment performance:
  - Potential effect on air quality and climate; and
  - Potential Effect on Water Quality, Fish and Aquatic Habitat.
- Social, Economic, Cultural and Built Environment performance:
  - Potential Effect on Local Residents and Recreational Users (Social Environment);
  - Potential Effect on Tourism and Recreation (Economic Environment); and
  - Potential Effect on Traditional Land Use (Cultural Environment).
- Technical performance:
  - Ability to service site; and
  - Cost effectiveness.
- Amenability to reclamation performance:
  - Potential effect on future public safety and security; and
  - Potential effect on future land / land use.

4.28.2.1 Alternative 1: Connect Filled Basin Lake to Springpole Lake

Advantages: providing the free passage of fish between the filled open pit basin and Springpole Lake and will not require the ongoing pumping and maintenance of infrastructure at the site. Connection of the basin lake with the remainder of the lake provides longer term sustainable water management. This alternative will provide the opportunities for aquatic species to be more consistent with other local waterbodies.

Disadvantages: this alternative will have temporary noise and sediment release during reconnections activities.

The key mitigation measures that would minimize the potential environmental effects from Alternative 1 are as follows:

- Conduct a water quality monitoring program during basin filling, during dike decommissioning and after reconnection to provide information to support connection and confirm long-term water quality.
- Use standard mitigation measures during partial dike removal, including working outside of sensitive wildlife and fish periods and employing effective erosion and sediment control measures such as silt curtains to separate the dike removal area from the open water / remainder of the lake.
- Minimize the distance for the rock removed from the dike to reduce air emissions including GHGs, potentially re-using the rock to create shoal habitat in the filled lake basin.

4.28.2.2 Alternative 2: Filled Basin Lake to Remain Separate from Springpole Lake

Advantages: this alternative will provide economic opportunities for the ongoing maintenance of pumping and power infrastructure at the site.

Disadvantages: retaining an isolated basin in the very long term offers no environmental benefits and could pose a technical challenge. Retaining the refilled open pit basin isolated from Springpole Lake after water quality meets requirements may affect the diversity of the species present and require active stocking. This alternative involves lost opportunity for fully returning the use of that portion of Springpole Lake and the requirement for long-term maintenance to retain isolation. Presence of dikes at the water surface when the mine site has been reclaimed with present a potential safety hazard for boaters.

- The key mitigation measures that would minimize the potential environmental effects related to this alternative primarily relate to air emissions from the power supply:
- Position generators close to greatest power requirement and within the main site to minimize emissions off site and infrastructure needs.
- Meet regulatory requirements for air and noise emissions.
- Provide proper maintenance of generators and ongoing monitoring of air emissions.
- Establish equipment and procedures to support safe diesel transport.

4.28.3 Results Summary and Selected Alternative

The preferred and selected alternative is Alternative 1, filling the dewatered open pit basin with water from Springpole Lake and reconnecting the open pit to Springpole Lake by lowering the dikes as needed when the open pit basin water quality meets, and is predicted to continue to meet, the regulatory requirements in the near and long term.

Table 4.28-1: Assessment of Filled Open Pit Basin Lake Connection Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Connect Filled Basin Lake to Springpole Lake[(2)]	Alternative 2: Filled Basin Lake to Remain Separate from Springpole Lake[(2)]
Natural Environment				
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• CI: No material air emissions released during closure or effects anticipated	• CI: There would be long term air emissions from the diesel generators required to pump water and maintain water levels below the dikes to keep basin separate (maintenance of grid power long term would be feasible for this low power requirement)
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• CI: No effects anticipated	• CI: There would be long term GHG emissions from the diesel generators required to pump water and maintain water levels below the dikes to keep basin separate
		Summary	**Preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• CI: No material effects anticipated; connection will be planned to minimize potential changes to overall lake level • CI: Reclamation will re-establish surface water conditions	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• CI: Reconnecting the basin lake (with constructed / fish habitat enhancements) would support the reestablishment of a self-sustaining fish population in the north basin of Springpole Lake, and enhance the quantity of fish habitat in Springpole Lake	• CI: Fish habitat that was enhanced or constructed as compensation for mine effects, could be underutilized or may lack sufficient fish habitat for specific life stages
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• CI: Removal in part or breaching of the dike(s) when basin lake water quality meets water quality criteria would allow free passage of fish between the residual basin lake and Springpole Lake thereby maintaining fish populations	• CI: Filled open pit basin would be an isolated waterbody and the development of a self-sustaining fish population could require either passively or active stocking to maintain diversity
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• CI: Removal in part or breaching of the dike(s) when basin lake water quality meets water quality criteria would allow free passage of fish between the filled open pit basin and Springpole Lake	• CI: Filled open pit basin would be an isolated waterbody and would not be conducive to fish passage with Springpole Lake • CI: With the lower water level, basin would be isolated from upstream watercourses
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• CI: With return of the surface water level within the basin, groundwater levels will return to baseline condition	• CI: The lower surface water level within the basin would maintain a depressed groundwater level near the basin
		Summary	**Preferred**	**Not preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• CI: No additional wetland areas disturbance; no effects anticipated to wetlands	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• CI: No additional wetland areas disturbance; no effects anticipated to wetland connectivity	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• CI: No additional terrestrial habitat disturbance; no effects anticipated	• CI: There is no difference between Alternatives 1 and 2 for this indicator

Table 4.28-1: Assessment of Filled Open Pit Basin Lake Connection Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connect Filled Basin Lake to Springpole Lake[2]	Alternative 2: Filled Basin Lake to Remain Separate from Springpole Lake[2]
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• CI: Partial removal during the closure phase will result in temporary localized noise which may disturb wildlife	• Additional long-term noise from pumping and continuation of operation of site
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• CI: No additional terrestrial habitat disturbance; no effects anticipated	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• CI: No effects anticipated	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.No aquatic SAR present	• CI: No effects; anticipated; SAR are not expected to be present at the active mine site when reclamation is initiated	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA • No aquatic SAR present	• CI: No effects anticipated	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• CI: Partial removal during the closure phase will result in localized noise which may disturb wildlife	• CI: Additional long-term noise from pumping and continuation of operation of site (discharge pipeline and other require infrastructure)
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• CI: No effects anticipated	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
	Natural Environment Performance Objectives Assessment		**Preferred** • Adv: Will provide the opportunities for aquatic species more consistent with other local waterbodies • Adv: reconnection will provide the free passage of fish between the filled open pit basin and Springpole Lake • Disadv: temporary effects (noise and sediment release) during reconnection activities	**Partially preferred** • Disadv: The quality of the fish habitat would be reduced if the basin lake remained an isolated waterbody • Disadv: Reestablishment of a significant, self-sustaining fish population in the north basin of Springpole Lake may require active stocking
Social, Economic, Cultural and Built Environment				
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• CI: No effect anticipated; there are no fresidences near the PDA	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• CI: Project closure will generate considerable regional and local, employment and business opportunities	• CI: Project closure will generate considerable regional and local, employment and business opportunities

Table 4.28-1: Assessment of Filled Open Pit Basin Lake Connection Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connect Filled Basin Lake to Springpole Lake[2]	Alternative 2: Filled Basin Lake to Remain Separate from Springpole Lake[2]
			• CI: No material effects specifically associated with this alternative; there are no camp / cabin facilities nearby	• CI: Operation and maintenance of the pumping system and site could present a local income opportunity
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• CI: Indicator is not applicable to this alternative; not related to provision of access	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• CI: Partial removal during the closure phase will result in temporary localized noise which may disturb wildlife	• CI: Additional long-term noise from pumping and continuation of operation of site (discharge pipeline and other require infrastructure)
	Distance from known water well supplies	• No water well supply systems are present	• CI: No effects; no water wells present in Project area	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• CI: No effects; no surface water drinking supplies present in Project area	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• CI: No effects anticipated; once filled there will be no visual difference of the lake surface	• CI: No material effects anticipated; dikes will remain separating the lake surface
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• CI: No effects anticipated; temporary restrictions at the location may be put in place to provide safety during reclamation work	• CI: Potential for material effects through the long term presence of dikes in a remote location • CI: Would require safety signage and potentially other measures to warn boaters
	Summary		**Preferred**	**Partially preferred**
	Summary		**Preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• CI: Indicator is not applicable to this alternative; not related to access	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• CI: Indicator is not applicable to this alternative; not related to power supply	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• CI: Indicator is not applicable to this alternative; not related to pipeline systems	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• CI: No material air emissions during closure or effects anticipated that will not affect attainment of air quality standards which are protective of health	• CI: There would be long term air emissions from the diesel generators but these would be low level and not present a health concern; they will not affect attainment of air quality standards which are protective of health
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated level of sulphate and metals in some samples	• CI: No effects; no drinking supplies present in Project area	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• CI: No effects; there are no electromagnetic emissions associated with this alternative	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• CI: No effects; there are no traffic-related effects related to this alternative	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• CI: Indicator is not applicable to this alternative / does not affect health services	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**

Table 4.28-1: Assessment of Filled Open Pit Basin Lake Connection Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connect Filled Basin Lake to Springpole Lake[2]	Alternative 2: Filled Basin Lake to Remain Separate from Springpole Lake[2]
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• CI: Project development will generate considerable regional and local, employment and business opportunities • CI: No material effects specifically associated with the alternative anticipated	• CI: Operation and maintenance of the pumping system and site could present a local income opportunity
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• CI: Provides reestablishment of a harvesting area, if confidence in water quality and/or fish health is achieved	• CI: Isolated lake is not expected to provide equivalent opportunities for harvesting
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• CI: Provides reestablishment of a recreational opportunities, if confidence in water quality and/or fish health is achieved	• CI: Isolated lake is not expected to provide equivalent opportunities
	Summary		**Preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• CI: No effects anticipated	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• CI: Indicator is not applicable to this alternative; reclamation method does not affect services	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• CI: Applicable approvals will be obtained • CI: As Springpole Lake contains Lake Trout, the Lake Trout Policy will need to be met • CI: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• CI: No material effects anticipated
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• CI: Indicator is not applicable to this alternative; alternative does not affect waste material generation	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• CI: Indicator is not applicable to this alternative; alternative does not affect waste material recycling or re-use	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• CI: No effects anticipated; camps are distant from mine site reclamation activities	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA	• CI: No effects anticipated; camps are distant from reclamation activities	• CI: There is no difference between Alternatives 1 and 2 for this indicator

Table 4.28-1: Assessment of Filled Open Pit Basin Lake Connection Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connect Filled Basin Lake to Springpole Lake[2]	Alternative 2: Filled Basin Lake to Remain Separate from Springpole Lake[2]
		• The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value		
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• CI: No effects anticipated; camps are distant from reclamation activities	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• CI: Indicator is not applicable to this reclamation method; does not affect archaeological resources	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• CI: Indicator is not applicable to this reclamation method; does not cause land disturbances	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• CI: No potential for effects; the Reserve is distant from Project	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• CI: No effects anticipated	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• CI: Reconnection will return the basin to more productive habitat and allow for free passage of fish species	• Disruption to habitat and species presence will continue as long as lake isolation remains
	Summary		**Preferred**	**Partially preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Preferred**	**Partially preferred**
			• Adv: Reconnection offer the opportunity for re-use of the basin lake • Potential for effects (positive or negative) will depend on how the basin lake water quality and fish health in the basin lake is viewed by users of Springpole Lake	• Disadv: Presence of dikes in the long term at the water surface when other evidence of a mine site is gone, presents an increased potential safety hazard for boaters • Potential for effects (positive or negative) will depend on how the basin lake water quality and fish health in the basin lake is viewed by users of Springpole Lake

Table 4.28-1: Assessment of Filled Open Pit Basin Lake Connection Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connect Filled Basin Lake to Springpole Lake[2]	Alternative 2: Filled Basin Lake to Remain Separate from Springpole Lake[2]
Technical Objectives				
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• CI: Reconnection of basin lakes to the natural environment is common when basin lake water quality meets regulatory requirements	• CI: Isolation is not typically considered in the long term
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• CI: Indicator is not applicable to this alternative; no new technology is involved	• CI: Maintaining isolation in the long term could prove problematic with potential requirement for eventual dike replacement
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• CI: Indicator is not applicable to this alternative; the alternative does not service the Project	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• CI: No effects; no additional infrastructure is required for this alternative	• CI: Infrastructure associated with maintaining pumps will be required
	Summary		**Preferred**	**Partially preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• CI: Connection of the basin lake to Springpole Lake is expected to be viewed favourably as it removes the potential risk of dike erosion or failure in the long term	• CI: Retaining the basin lake in isolation given its close proximity to Springpole Lake is not expected to be viewed favourably
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• CI: Connection of the basin lake to Springpole Lake supports a competitive return on investment	• CI: Maintenance of the dikes in the long term would increase the overall costs, but is not expected to affect attaining a competitive return on investment
	Degree to which alternative provides financial risk	• There are no facilities present	• CI: No effects anticipated	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Preferred**	**Partially preferred**
	Technical Performance Objective Assessment		**Preferred**	**Partially preferred**
			• Adv: Proven and effective technology • Adv: Anticipated to be viewed favourably and provide a competitive return on investment	• Adv: Expected to provide a competitive return on investment, but not be looked at as favourably • Disadv: Ability to maintain isolation in the long term is not proven given that the basin lake is adjoining Springpole Lake
Amenability to Reclamation (Closure Phase)				
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• CI: No effects anticipated	• CI: Presence of dikes in the long term at the water surface when other evidence of a mine site is gone, presents an increased potential safety hazard for boaters
	Summary		**Preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• CI: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan; natural local drainage would be supported	• CI: Filled open pit basin would be an isolated waterbody; with the lower water level, basin would be isolated from upstream watercourses

Table 4.28-1: Assessment of Filled Open Pit Basin Lake Connection Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Connect Filled Basin Lake to Springpole Lake[2]	Alternative 2: Filled Basin Lake to Remain Separate from Springpole Lake[2]
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan	• CI: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan, and may provide additional habitat for existing fish population	• CI: Site to be rehabilitated at closure to a condition that would be supportive of final land use defined in Closure Plan
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• CI: Removal of the dikes to below water level will return a natural appearance to the lake	• CI: Dikes will remain separating the lake surface affecting the natural aesthetics of the area
	Summary		**Preferred**	**Partially preferred**
	Amenability to Reclamation Performance Objective Assessment		**Preferred**	**Partially preferred**
			• Adv: Connection of basin lakes during reclamation with acceptable water quality to the environment provides longer term sustainable water management • Disadv: No apparent disadvantages	• Adv: No apparent advantages • Disadv: The basin lake being isolated from Springpole Lake could result in additional long-term maintenance requirements for the dikes to maintain public safety
	OVERALL ASSESSMENT OF ALTERNATIVE		**PREFERRED (SELECTED ALTERNATIVE)**	**PARTIALLY PREFERRED**
			The preferred and selected alternative is to fill the dewatered open pit basin with water and reconnect the open pit to Springpole Lake when the open pit basin water quality meets and is predicted to meet, the regulatory requirements in the near and long term.	Retaining an isolated basin in the very longer term offers no environmental benefits and could pose a technical challenge.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
(2) Effects assume water would be pumped over the dikes to maintain water level; if pumping and discharge to the operational discharge was required, there would be additional effects from power requirements and maintenance of the pipeline infrastructure.
Adv = advantage; CI = closure phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured ; LSA = Local Study Area; RSA = Regional Study Area; SARA = *Species at Risk Act.*

4.29 Mine Closure – Co-disposal Facility

The CDF is proposed to contain two discrete cells: a north cell that contains co-disposed PAG mine rock and NAG thickened tailings and a south cell that contains PAG conventional slurry tailings.

4.29.1 Identified Alternatives

The north cell has been designed so that NAG thickened tailings will isolate the PAG mine rock from atmospheric oxygen during operations. At closure, a final cover will need to be placed to further isolate the PAG mine rock. Two primary alternatives have been identified to reclaim the north cell and further isolate PAG materials from atmospheric oxygen:

- **Alternative N1:** placement of a thick layer of NAG thickened tailings following completion of life of mine PAG mine rock disposal within the north cell; and
- **Alternative N2:** designed cover of natural, low permeability material (such as local clays).

The south cell contains PAG conventional slurry tailings, which at the time that processing ceases and deposition stops will be partially aerially exposed and partially underwater. A cover will need to be placed over the cell to inhibit future acid generation. Two primary alternatives have been identified for the permanent cover that will be placed over the south cell:

- **Alternative S1:** designed cover, such as of low permeability material; and
- **Alternative S2:** partial water cover combined with designed cover.

The alternative of a full water cover over the south cell or north cell is not considered a viable alternative. In order to implement a complete water cover over either cell, the surface would need to be fully flooded to maintain the underlying PAG mine waste in a saturated state. The surrounding embankments would need to be raised and potentially reinforced to support the large volume of water required to fully flood the area and maintain the flooding in consideration of seasonal climatic conditions, as well as long-term climate changes. Water-impounding embankments require additional ongoing maintenance and monitoring for both water quality and embankments stability. In addition, use of a full water cover with an elevated facility may also result in greater water movement through the CDF materials and increased seepage through the PAG mine waste mass, which may result in poorer quality seepage.

The key mitigation measures that would minimize the potential environmental effects from all alternatives are as follows:

- Maintain equipment to manage and reduce air emissions and noise.
- Establish an appropriate lighting strategy to minimize offsite effects.
- Properly transport, store and management fuel.
- Maintain a land buffer from the lake edge.
- Monitor environmental conditions, including runoff and seepage quality, during and after decommissioning to confirm efficacy of the proposed reclamation approach.
- Monitor revegetation success and establishment of a sustainable vegetation cover.

4.29.2 Assessment of Alternatives

The alternatives were assessed for all performance objectives. The results of the assessment of alternatives for reclamation of the CDF north cell and south cell listing differentiating aspects are summarized in Table 4.29-1 and Table 4.29-2, respectively. The following performance objective and criteria were identified as the key differentiators for the north cell:

- Natural environment performance:
  - Potential effect on water quality, fish, and aquatic habitat.
- Technical performance:
  - Ability to service site; and
  - Cost effectiveness.

There were no differentiating performance objectives and criteria identified for the south cell.

The CDF will contain PAG mine rock and tailings. An operational management strategy has been developed to minimize potential ML/ARD during operations. Alternatives for final reclamation of the CDF have been identified that support this approach and are expected to support this approach after closure without additional mitigation to protect the environment. The alternatives proposed and assessed have been proven to limit the contact of the PAG mineral wastes with oxygen in the long term, and meet the closure objectives for the CDF at other mining sites. The primary differentiator amongst the alternatives is therefore the length of time to implement the alternative, ease of implementation and costs.

For the north cell, placement of a thick NAG tailings cover near the end of operations will allow closure of the north cell sooner, such that revegetation can take place, and will have a lower overall cost. Placement of lower permeability cover is expected to take longer and be substantially more costly. The key advantages and disadvantages of each alternative are as follows:

4.29.2.1 Alternative N1

Advantages: this alternative involves a NAG tailings cover, which will be effective in mitigating ML/ARD for PAG mine rock. The NAG tailings cover can be established during operations, resulting in a much lower cost and schedule advantages. This alternative is expected to provide better overall groundwater quality.

Disadvantages: this alternative requires additional planning of tailings placement during operations phase.

4.29.2.2 Alternative N2

Advantages: this alternative has a cover that will be effective in mitigating ML/ARD for PAG mine rock.

Disadvantages: this alternative requires additional heavy equipment use and related air, GHG and noise emissions. It will also extend the period until the cell is fully reclaimed and include high additional costs related to the placement of the designed cover during closure. This alternative may be less effective sat maintaining groundwater quality. This alternative has a substantially higher cost that Alternative N1.

The key advantages and disadvantages of each reclamation alternative for the south cell are as follows:

4.29.2.3 Alternative S1

Advantages: the designed cover for this alternative will be predictably effective in mitigating ML/ARD for PAG mine rock. This alternative will involve substantial vegetation cover, which will provide additional terrestrial habitat. The cover is predicitbly effective in the long term and is not affected by climate change.

Disadvantages: this alternative does not provide the potential for a more varied environment (dry, wetland, and pond).

4.29.2.4 Alternative S2

Advantages: the cover with this alternative will be effective in mitigating ML/ARD for PAG mine rock. Additional terrestrial habitat will be developed with the sustainable vegetation cover as well as the potential for wetland habitat

Disadvantages: this alternative requires the maintenance of a partial water cover in perpetuity may be challenging with climate change. It also requires the creation of a partial water cover has the potential to drive additional seepage through the tailings mass, which may result in release of poor quality seepage.

4.29.3 Results Summary and Selected Alternative

Reclamation design will be considered further during preparation of the regulatory closure plan. For the purposes of the final EIS/EA, the selected alternatives for the CDF are placement of a NAG tailings cover over the north cell (Alternative N1) and a designed low permeability cover over the south cell (Alternative S1), both followed by the addition of a growth medium and revegetation. These alternatives were selected based on the assessment of key advantages and disadvantages provided in Table 4.29-1 and Table 4.29-2 and with proposed mitigation measures described in Section .

Table 4.29-1: Assessment of Co-disposal Facility North Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative N1: Layer of NAG Tailings	Alternative N2: Designed Low Permeability Cover
Natural Environment				
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• CI: NAG thickened tailings will be placed progressively during operations over the PAG mine rock to isolate the rock from atmospheric oxygen; a limited area (on the order of 10%) may still require a low permeability cover at closure • CI: Limited additional emissions during closure phase expected associated with final shaping	• CI: Emissions will be generated by heavy equipment use placing and shaping the cover over the entire surface; however, they will not affect attainment of air quality standards
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• CI: Limited additional GHG emissions during closure phase expected associated with final shaping	• CL: GHG emissions will be generated by heavy equipment use placing the cover
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• CI: Placement of cover will be protective of surface runoff quality and seepage, and will support meeting PWQO in the receiving waters	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• CI: No effects; no aquatic habitat is present	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• CI: No effects; no fish are present	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• CI: No effects; no aquatic habitat is present	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• CI: No effects anticipated; progressive placement of NAG tailings during operation and a low permeability cover over remaining area will mitigate potential groundwater effects •	• CI: Placement of a low permeability cover at closure will mitigate potential groundwater effects; however it is not expected to be as effective as Alternative 1
		Summary	**Preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• CI: No effects; no wetlands are present	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• CI: No anticipated effects; no wetlands are present	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• CI: Surface will be revegetated to create terrestrial habitat supportive of final land use defined in Closure Plan	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• CI: Limited noise will result from related reclamation activities concurrent with demolition and reclamation of the overall Project	• CI: Noise will be generated by heavy equipment use placing and shaping the cover at the same time as demolition and reclamation of the overall Project
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• CI: Limited potential effect as wildlife avoidance of PDA during closure is generally expected	• CI: There is no difference between Alternatives 1 and 2 for this indicator

Table 4.29-1: Assessment of Co-disposal Facility North Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative N1: Layer of NAG Tailings	Alternative N2: Designed Low Permeability Cover
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• CI: No effects anticipated	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• CI: SAR are not expected to be present at the active mine site when reclamation is initiated	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: No SAR habitat present at closure; surface will be revegetated to create terrestrial habitat supportive of final land use defined in Closure Plan	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• CI: Limited potential effect as SAR avoidance of PDA during closure is generally expected	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• CI: No SAR movement corridors present at closure	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
		Summary	**Partially preferred**	**Partially preferred**
		Natural Environment Performance Objectives Assessment	**Preferred**	**Partially preferred**
			• Adv: Progressive placement of a cover during operation / final low permeability cover over a limited remaining area is expected to provide for better overall groundwater quality	• Disadv: Placement of a cover at closure may be less effective at maintaining groundwater quality • Disadv: Completion of reclamation solely at closure will result in additional air and sound emissions from the placement of the cover
Social, Economic, Cultural and Built Environment				
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• CI: No effect anticipated as no residences nearby; closure will improve aesthetics of the CDF	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• CI: Project closure will generate considerable regional and local, employment and business opportunities • CI: Labour and equipment would be used during operations to place NAG tailings cover; limited additional opportunities at closure	• CI: Project closure will generate considerable regional and local, employment and business opportunities • CI: Additional labour and equipment will be required to place the cover, which could present additional opportunities
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• CI: Indicator is not applicable to this alternative; not related to provision of access	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• CI: No material effects anticipated as the noise will be low (will not materially increase noise levels) and will occur at the same time as the overall Project	• CI: Noise will be generated by heavy equipment use placing and shaping the cover; however it will not affect attainment of provincial noise guidelines and will occur at the same time as the

Table 4.29-1: Assessment of Co-disposal Facility North Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative N1: Layer of NAG Tailings	Alternative N2: Designed Low Permeability Cover
				overall Project
	Distance from known water well supplies	• No water well supply systems are present	• CI: No effects; no water wells present in Project area	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• CI: No effects; no surface water supplies present in the Project area	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• CI: No additional effects from closure activities; closure will improve aesthetics of the CDF	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• CI: No effects anticipated from CDF closure	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• CI: Indicator is not applicable to this alternative; not related to access	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• CI: Indicator is not applicable to this alternative; not related to power supply	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• CI: Indicator is not applicable to this alternative; not related to pipeline systems	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• CI: Limited additional emissions during closure phase that will not affect attainment of air quality standards which are protective of health	• CI: Emissions will be generated by heavy equipment use placing the cover; however they will not affect attainment of air quality standards which are protective of health
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• CI: No effects; no non-Project drinking water systems present in Project area	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• CI: No effects; there are no electromagnetic emissions associated with this alternative	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• CI: Indicator is not applicable to this alternative / does not affect traffic conditions	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• CI: Indicator is not applicable to this alternative / does not affect health services	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• CI: Project development will generate considerable regional and local, employment and business opportunities • CI: No material effects specifically associated with the alternative anticipated	• CI: Cover placement may provide additional contracts for local suppliers
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• CI: Indicator is not applicable to this alternative; does not affect access	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**

Table 4.29-1: Assessment of Co-disposal Facility North Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative N1: Layer of NAG Tailings	Alternative N2: Designed Low Permeability Cover
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• CI: No effects anticipated	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• CI: No effects anticipated	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• CI: Indicator is not applicable to this alternative; reclamation method does not affect services	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• CI: There are no known conflicts with resource management objectives that cannot be mitigated through approvals • CI: Rehabilitation will return the site to productive habitat	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• CI: No effects; alternative does not affect waste material generation	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• CI: No effects; alternative does not affect waste material recycling or re-use	• CI: Site overburden will be used to create the cover for this alternative
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• CI: No effects anticipated; camps are distant from reclamation activities	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• CI: No effects anticipated; camps are distant from reclamation activities	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• CI: No effects anticipated; camps are distant from reclamation activities	• CI: There is no difference between Alternatives 1 and 2 for this indicator

Table 4.29-1: Assessment of Co-disposal Facility North Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative N1: Layer of NAG Tailings	Alternative N2: Designed Low Permeability Cover
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• CI: Indicator is not applicable to this alternative reclamation method does not affect archaeological resources	• CI: No effect; landfill will be sited on existing disturbed lands
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• CI: Indicator is not applicable to this alternative reclamation method does not cause land disturbances	• CI: No effect; landfill will be sited on existing disturbed lands
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• CI: No potential for effects; the Reserve is distant from Project	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• CI: No potential for effects; no site located within the PDA	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• CI: This alternative will not cause additional effect access to traditional lands	• CI: Landfill will be sited on existing disturbed lands, and no additional effect to access to traditional lands is expected
	Summary		**Partially preferred**	**Partially preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially preferred**	**Partially preferred**
			• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators
Technical Objectives				
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• CI: Proven and effective technology	• CI: Proven and effective technology; although Alternative 1 may offer additional benefits
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• CI: Indicator is not applicable to this alternative; this is not a new form of reclamation	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• CI: Alternative is predictably effective and anticipated to meet Project needs	• CI: Alternative is predictably effective and anticipated to meet Project needs; although Alternative 1 may offer additional benefits
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• CI: Indicator is not applicable to this alternative; no additional infrastructure needed	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Preferred**	**Partially preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• CI: Expected to be viewed positively, as the majority of the reclamation work is completed concurrent to operations activities	• CI: Additional costs would accrue from placement of the cover. The costs would be in the order of nine times those of Alternative 1.
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• CI: No additional costs; revegetation costs the same as Alternative 2	• CI: Significantly higher cost as a full cover would be required; does not facilitate an acceptable return on investment

Table 4.29-1: Assessment of Co-disposal Facility North Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative N1: Layer of NAG Tailings	Alternative N2: Designed Low Permeability Cover
	Degree to which alternative provides financial risk	• There are no facilities present	• CI: No material effects anticipated; technology is predictable effective and reduces potential Project risks from PAG rock storage	• CI: Placement of the cover will rely on a relatively dry surface, extending the reclamation timelines • CI: Use of a cover at closure over a large area does not present a financial risk, although there is the potential that if not properly installed future maintenance could be required
		Summary	**Preferred**	**Partially preferred**
		Technical Performance Objective Assessment	**Preferred**	**Partially preferred**
			• Adv: NAG tailings cover can established during operations, resulting in much lower cost • Disadv: Requires additional planning of tailings placement during operations phase	• Disadv: Although a proven technology, present a higher risk to groundwater quality than Alternative 1 as containment does not occur until closure • Disadv: Substantially higher cost but could be supported by the project • Disadv: May present a schedule concern as work cannot proceed until surface is sufficient dry for accessibility
Amenability to Reclamation (Closure Phase)				
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• CI: No effects anticipated with the CDF including after closure	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• CI: Passive drainage will commence after area is reclaimed and water quality assured	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: Anticipated to be supportive of local wildlife after rehabilitation	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• CI: Area will be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife • CI: There are no known conflicts with resource management objectives that cannot be mitigated through approvals	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• CI: CDF will remain as a raise mound on closure; however once vegetation is fully established it will be more consistent with the surrounding environment	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**

Table 4.29-1: Assessment of Co-disposal Facility North Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative N1: Layer of NAG Tailings	Alternative N2: Designed Low Permeability Cover
		Amenability to Reclamation Performance Objective Assessment	**Partially preferred** • Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	**Partially preferred** • Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators
		OVERALL ASSESSMENT OF ALTERNATIVE	**PREFERRED (SELECTED ALTERNATIVE)** NAG tailings cover can established during operations, resulting in much lower cost. Technology is predictably effective which can be confirmed during operations, and reduces potential Project risks from PAG rock storage	**PARTIALLY PREFERRED** Placement of a low permeability cover will allow saturation of the soil cover sufficient to provide an oxygen barrier and maintain saturation of the underlying tailings to prevent oxidation, however there would be a schedule delay in implementation and high additional costs.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
Adv = advantage; Cl = closure phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured ; LSA = Local Study Area; RSA = Regional Study Area; SARA = *Species at Risk Act.*

Table 4.29-2: Assessment of Co-disposal Facility South Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative S1: Designed Low Permeability Cover	Alternative S2: Combined Water Cover / Low Permeability Cover
Natural Environment				
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• CI: Emissions will be generated by heavy equipment placing the cover; however, they will not affect attainment of air quality standards	• CI: Equivalent emissions will be generated by heavy equipment for placing the cover • CI: Additional emissions may be generated if embankments need raised to provide capacity for the water cover • CI: Neither will affect attainment of air quality standards
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• CI: GHG emissions will be generated by heavy equipment used to place the cover	• CI: GHG emissions will be generated by heavy equipment placing the cover and for raising embankments if needed
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• CI: Low permeability cover will mitigate ML/ARD for PAG tailings by repelling surface rain and runoff	• CI: Maintaining partial water cover / saturation will mitigate ML/ARD for PAG tailings • CI: Use of a water cover in part, may result in greater water movement through the CDF materials and increased seepage through the tailings mass, which may result in poorer quality seepage
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• CI: Low permeability cover will mitigate ML/ARD for PAG tailings by repelling surface rain and runoff	• CI: Maintaining partial water cover / saturation will mitigate ML/ARD for PAG tailings • CI: Use of a water cover in part, may result in greater water movement through the CDF materials and increased seepage through the tailings mass, which may result in poorer quality seepage
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• CI: No effects; no wetlands are present	• CI: No wetlands are present; however a wetland could potentially be created at the water cover / low permeability cover interface
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• CI: Surface will be revegetated to create terrestrial habitat supportive of final land use defined in Closure Plan	• CI: A portion of the surface will be revegetated to create terrestrial habitat supportive of final land use defined in Closure Plan
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• CI: Noise will be generated by heavy equipment use placing and shaping the cover; however it will not affect attainment of provincial noise guidelines and will occur at the same time as the overall Project	• CI: Noise will be generated by heavy equipment use placing and shaping the cover and raising embankments if needed; however it will not affect attainment of provincial noise guidelines and will occur at the same time as the overall Project

Table 4.29-2: Assessment of Co-disposal Facility South Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative S1: Designed Low Permeability Cover	Alternative S2: Combined Water Cover / Low Permeability Cover
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine,. The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Natural Environment Performance Objectives Assessment			**Partially preferred**	**Partially preferred**
			• Adv: Cover will be effective in mitigating ML/ARD for PAG tailings • Adv: Sustainable vegetation cover to be developed, will provide additional terrestrial habitat	• Adv: Additional terrestrial habitat will be developed with the sustainable vegetation cover as well as the potential for wetland habitat • Adv: The cover will be effective in mitigating ML/ARD for PAG tailings • Disadv: Alternative has the potential to drive additional seepage through the tailings mass, which may result in poor quality seepage
Social, Economic, Cultural and Built Environment				
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to maintain or provide local access	• A single all-season road provides access to the local area	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator

Table 4.29-2: Assessment of Co-disposal Facility South Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative S1: Designed Low Permeability Cover	Alternative S2: Combined Water Cover / Low Permeability Cover
		• There is no all-season access to the PDA		
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Distance from known water well supplies	• No water well supply systems are present	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• CI: Emissions will be generated by heavy equipment placing the cover; however, they will not affect attainment of air quality standards	• CI: Equivalent emissions will be generated by heavy equipment for placing the cover • CI: Additional emissions may be generated if embankments need raised to provide capacity for the water cover • CI: Neither will affect attainment of air quality standards
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**

Table 4.29-2: Assessment of Co-disposal Facility South Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative S1: Designed Low Permeability Cover	Alternative S2: Combined Water Cover / Low Permeability Cover
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Waste Materials (Built Environment)	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator

Table 4.29-2: Assessment of Co-disposal Facility South Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative S1: Designed Low Permeability Cover	Alternative S2: Combined Water Cover / Low Permeability Cover
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Social, Economic, Cultural and Built Environment Performance Objective Assessment			**Partially preferred**	**Partially preferred**
			• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators	• Neutral: Criteria / indicators are not materially different across alternatives; there are no differentiating advantages or disadvantages for the criteria and indicators

Table 4.29-2: Assessment of Co-disposal Facility South Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative S1: Designed Low Permeability Cover	Alternative S2: Combined Water Cover / Low Permeability Cover
Technical Objectives				
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• Proven and effective technology that is not affected by climate change	• Proven and effective technology; however, the ability to maintain a partial water cover in perpetuity may be challenging with climate change • Establishment of only a partial cover, would avoid water stored against embankments
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• CI: No additional infrastructure needed	• CI: To maintain a partial water cover, a higher embankment than otherwise needed would be constructed.
		Summary	**Preferred**	**Preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• CI: Additional costs would accrue from placement of a low permeability cover	• CI: Additional costs would accrue from placement of a water cover requiring additional embankment construction, as well as the placement of the low permeability cover • CI: A full water cover is not anticipated to be viewed unfavourably / a higher risk
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Degree to which alternative provides financial risk	• There are no facilities present	• CI: Placement of the cover will rely on a relatively dry surface, extending the reclamation timelines • CI: Use of a cover at closure over a large area does not present a financial risk, although there is the potential that if not properly installed future maintenance could be required	• CI: Development of a Project that relies on a water cover in part at closure may present an increased financial risk • CI: The dry cover could require future maintenance if not properly installed
		Summary	**Partially preferred**	**Partially preferred**
		Technical Performance Objective Assessment	**Partially preferred**	**Partially preferred**
			• Adv: Provides an acceptable return on investment • Adv: A designed low permeability cover is predictably effective in the very long term and is not affected by climate change	• Adv: Provides an acceptable return on investment • Disadv: Maintenance of a partial water cover in perpetuity may be challenging with climate change
Amenability to Reclamation (Closure Phase)				
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• CI: No effects anticipated with the CDF including after closure	• CI: No effects anticipated with the CDF including after closure
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator

Table 4.29-2: Assessment of Co-disposal Facility South Cell Closure Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative S1: Designed Low Permeability Cover	Alternative S2: Combined Water Cover / Low Permeability Cover
		• Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes		
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• CI: There is no difference amongst the alternatives for this indicator	• CI: There is no difference amongst the alternatives for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Amenability to Reclamation Performance Objective Assessment			**Partially preferred** • Adv: Cover will be effective in mitigating ML/ARD for PAG tailings • Adv: Sustainable vegetation cover to be developed, will provide additional terrestrial habitat	**Partially preferred** • Adv: The cover will be effective in mitigating ML/ARD for PAG tailings • Adv: Additional terrestrial habitat will be developed with the sustainable vegetation cover as well as the potential for wetland habitat
OVERALL ASSESSMENT OF ALTERNATIVE			**PREFERRED (SELECTED ALTERNATIVE)** Placement of a low permeability cover will allow saturation of the soil cover sufficient to provide an oxygen barrier and maintain saturation of the underlying tailings to prevent oxidation, without the potential to drive additional seepage through the tailings mass (and more so than Alternative 3), which may result in poor quality seepage	**PREFERRED** Creation of a partial water cover has the potential to drive additional seepage through the tailings mass, which may result in release of poor quality seepage. Establishing a permanent water pond may not be feasible in the very long term and could pose additional technical risks.

Notes:

(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.

Adv = advantage; CI = closure phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured ; LSA = Local Study Area; RSA = Regional Study Area; SARA = *Species at Risk Act*.

4.30 Mine Closure – Demolition Waste

Non-hazardous demolition wastes that are not transported off site for re-use or sale will require permanent disposal. Hazardous waste from closure will be transported off site for management. Consideration was not given to permanent storage and/or treatment of hazardous wastes on the site, as it is not economically practical or preferred from an environmental perspective to establish a hazardous waste treatment facility on site for the low quantities that will be produced.

4.30.1 Identified Alternatives

Demolition wastes will generally require disposal in an approved landfill either on site or off site, similar to solids wastes produced during the construction and operations phase. Disposal of general demolition wastes in the dewatered open pit basin was not considered, because it is not acceptable to interested parties, including provincial regulators and Indigenous communities. The approved offsite landfills are potentially available, but are located distant from the Project site (Section 4.23).

The following alternatives were considered:

- **Alternative 1:** truck non-hazardous demolition waste off site to an existing landfill; and
- **Alternative 2:** develop an onsite demolition landfill for non-hazardous wastes.

4.30.2 Assessment of Alternatives

The alternatives were assessed for all performance objectives. The full assessment of alternatives for domestic waste management are detailed in Table 4.30-1. The following performance objective and criteria were identified as the key differentiators:

- Natural environment performance:
  - Potential effect on terrestrial species and habitat.
- Technical performance:
  - Ability to service site; and
  - Cost effectiveness.

4.30.2.1 Alternative 1: Truck Non-hazardous Demolition Waste off Site to an Existing Landfill

Advantages: this alternative will not cause additional natural environmental effects or land disturbance at the site. It has potential business opportunities for a third party to transport the waste to the approved facility.

Disadvantages: this alternative will have substantially greater transport requirements and associated increased GHG emissions. It will also have an increase in traffic levels, potentially resulting in additional accidents and wildlife encounters. It has a negative effect on regional landfill capacity for other users.

The key mitigation measures that would minimize the potential environmental effects for this alternative relates primarily to ensuring a location is selected and contract established well before closure and related to the transport aspect including the following:

- Schedule transport appropriately to minimize the potential for wildlife interactions as practicable.
- Require the contractor use properly maintained equipment.

- Require the contractor to follow FMG and public speed limits.

4.30.2.2 Alternative 2: Develop an Onsite Demolition Landfill for Non-hazardous Wastes

Advantages: this alternative provides the most flexibility and reliability and lowest Project costs. It would not affect regional infrastructure (roads or landfill capacity) and could potentially be located within an already disturbed location (such as the ore stockpile area near the process plant) to avoid new land disturbances.

Disadvantages: this alternative requires long-term monitoring to confirm all environmental requirements are met and continue to be met. This alternative is not associated with any business opportunities for the local business community.

The key mitigation measures that would minimize the potential environmental effects associated with this alternative are as follows:

- Properly site and design the landfill to take advantage of local geologic conditions to constrain leachate movement and provide sufficient buffer from waterbodies / watercourses and sensitive locations.
- Collect and treat leachate.
- Effectively sort waste so that only appropriate demolition waste is deposited in the landfill.
- Place a fence if needed to prevent blowing debris.

4.30.3 Results Summary and Selected Alternative

The preferred and selected alternative for the final EIS/EA is Alternative 2, to store the non-hazardous demolition waste in an approved onsite landfill, assuming a suitable location can be identified, pending the results of regulatory guidance and ongoing consultation and engagement activities during future provincial environmental approvals processes. This alternative provides reduced net effects as summarized in the assessment of key advantages and disadvantages in Table 4.30-1, and with proposed mitigation described briefly in Section 4.30.2.

Table 4.30-1: Assessment of Demolition Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[(1)]	Alternative 1: Truck Non-hazardous Demolition Waste Off Site to an Existing Landfill	Alternative 2: Develop an Onsite Demolition Landfill for Non-hazardous Wastes
Natural Environment				
Potential Effect on Air Quality and Climate	Level and quality of air emissions	• Good air quality is present attributed to the rural setting[1] with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• CI: Additional emissions will be generated from transport of the waste to an offsite landfill that will not have a material effect	• CI: No material air quality emissions from operation an onsite landfill
	Level of additional emissions or GHGs generated	• No material GHG emissions present	• CI: Limited GHG emissions generated from transport of the waste to an offsite landfill	• CI: No material GHG emissions from operation an onsite landfill
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Water Quality, Fish and Aquatic Habitat	Level and quality of surface water discharges	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids	• CI: No effects from existing facility or from normal transport operations	• CI: No material effects on water quality from an onsite landfill
	Area of fish habitat affected	• Abundant and varied fish habitat is present • Coolwater or coldwater communities are present in local waterbodies	• CI: Fish habitat will not be affected by solid waste transport	• CI: Fish habitat will not be affected by solid waste landfilling (landfill will be appropriately sited)
	Ability to maintain fish populations	• Local waterbodies support intermediate morphoedaphic index (potential fish yield) scores	• CI: Fish will not be affected by solid waste transport	• CI: Fish habitat will not be affected by solid waste landfilling (landfill will be appropriately sited)
	Ability to maintain conditions for fish passage	• Fish passage is generally available, unless constrained naturally by either seasonal flow conditions or beaver activity	• CI: Fish passage will not be affected by solid waste transport	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain groundwater flow direction, level and quality	• Groundwater flow and levels are natural and unconstrained • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some samples	• CI: No effects; groundwater will not be affected by solid waste transport	• CI: Groundwater could be affected by an onsite landfill, however this will be mitigated through engineering design, and treatment of leachate if needed
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Wetlands	Area of wetlands affected	• Wetlands are present in low-lying areas and represent 18% of the PDA	• CI: No effects; wetlands will not be affected by solid waste transport	• CI: No effects anticipated; the landfill will not be sited in a wetland
	Ability to maintain wetland connectivity	• Natural wetland connectively is present reflecting local topographic and subsurface conditions	• CI: No effects; wetlands will not be affected by solid waste transport	• CI: No effects anticipated; the landfill will not be sited in a wetland
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Terrestrial Species and Habitat	Area of terrestrial habitat displaced	• Varied terrestrial habitat is present, including primarily upland areas, but also riparian areas and wetlands • A portion of the PDA has been cleared by past site activities	• CI: No effects anticipated as no new area will be disturbed	• CI: No effects anticipated as landfill would be sited in an area disturbed by Project operations
	Level of noise disturbance and presence of other harm and harassment to wildlife	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• CI: Limited increased noise emissions from transport of demolition waste to offsite facility • CI: Higher potential for vehicle – wildlife interactions due to the number of waste transport trucks required for removal of all demolition waste	• CI: Limited noise emissions that will occur at the same time as demolition and reclamation of the overall Project
	Ability to maintain plant dispersion and wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• CI: No new facilities required and wildlife avoidance of PDA and transport corridor is generally expected	• CI: Limited potential effect as wildlife avoidance of PDA during closure is generally expected

Table 4.30-1: Assessment of Demolition Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Truck Non-hazardous Demolition Waste Off Site to an Existing Landfill	Alternative 2: Develop an Onsite Demolition Landfill for Non-hazardous Wastes
	Ability to maintain wildlife populations	• Birds, ungulates, furbearers and small mammals, bats, and limited amphibian and reptile species are present reflecting local habitat and natural species distributions	• CI: Limited potential effect as wildlife avoidance of PDA and transport corridor is generally expected • CI: There will be increased potential for vehicle – wildlife interactions due to the high number of waste transport vehicles required	• CI: No effects anticipated with proposed proper waste management
		Summary	**Partially preferred**	**Preferred**
Potential Effect on SAR	Status of species present (Endangered, Threatened, Special Concern) per ESA and SARA	• Wolverine, . The following SAR were observed (individuals or evidence) or otherwise identified as present or near to the proposed Project site footprint during baseline investigations: Endangered (ESA,SARA): Little Brown Myotis, Northern Myotis; Threatened (ESA, SARA): Boreal Caribou, Lesser Yellowlegs; Threatened (ESA) / Special Concern (SARA): Wolverine, Eastern Whip-poor will; Special Concern (ESA,SARA): Short-eared Owl, Barn Swallow, Canada Warbler, Common Nighthawk.	• CI: Existing facility, no SAR anticipated to be present	• CI: No effects anticipated as landfill would be sited in an area disturbed by Project operations
	Area and type of SAR habitat displaced	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• CI: Existing facility, no SAR habitat anticipated to be present	• CI: No effects anticipated as landfill would be sited in an area disturbed by Project operations
	Level of noise disturbance and presence of other harm and harassment to SAR	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• CI: Existing facility, no SAR habitat anticipated to be present • CI: Limited increased noise emissions from transport of demolition waste to offsite facility • CI: Higher potential for vehicle – wildlife interactions due to the number of waste transport trucks required for removal of all demolition waste	• CI: Limited noise emissions that will occur at the same time as demolition and reclamation of the overall Project
	Ability to maintain SAR wildlife movement corridors	• Plant dispersion and wildlife corridor are unconstrained except by natural conditions, such as topography and presence of waterbodies	• CI: Limited potential effect as wildlife avoidance of PDA and transport corridor is generally expected • CI: There will be increased potential for vehicle – wildlife interactions due to the high number of waste transport vehicles required	• CI: Limited potential effect as wildlife avoidance of PDA during closure is generally expected
		Summary	**Partially preferred**	**Preferred**
		Natural Environment Performance Objectives Assessment	**Partially preferred**	**Preferred**
			• Adv: No additional onsite facilities / land disturbance will be required • Disadv: Transport of the waste to an offsite landfill will generate greater air emissions including GHG • Disadv: There will be increased potential for vehicle – wildlife interactions due to the high number of waste transport vehicles required	• Adv: Landfill would be sited on an area disturbed during operations and will not disturb additional habitat • Adv: No other effects anticipated with appropriately constructed and management to prevent potential adverse effects on the environment

Table 4.30-1: Assessment of Demolition Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Truck Non-hazardous Demolition Waste Off Site to an Existing Landfill	Alternative 2: Develop an Onsite Demolition Landfill for Non-hazardous Wastes
Social, Economic, Cultural and Built Environment				
Potential Effect on Local Residents and Recreational Users (Social Environment)	Relative potential change to property value	• The PDA is remote from private residences	• CI: No effect anticipated; there are no known residences on the mine access road	• CI: No effect anticipated; there are no known residences near the PDA
	Ability to maintain or improve income opportunities	• There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins targeted to hunters and anglers	• CI: Project closure will generate considerable regional and local, employment and business opportunities • CI: Potential income opportunity for a third-party to transport demolition waste to approved facility • CI: Facility will receive fees for waste storage	• CI: Project closure will generate considerable regional and local, employment and business opportunities • CI: No material effects specifically associated with this alternative
	Ability to maintain or provide local access	• A single all-season road provides access to the local area • There is no all-season access to the PDA	• CI: Indicator is not applicable to this alternative; not related to provision of access	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to attain or maintain provincial noise guidelines	• Average baseline sound levels are 25 dBA (nighttime) and 35 dBA (daytime) on a 1-hour LAeq and reflect the rural, undeveloped condition	• CI: No material effect as there will be a limited increase in noise emissions from transport of solid waste to offsite facility	• CI: No material effects anticipated as the related noise will be low and will occur at the same time as demolition the overall Project
	Distance from known water well supplies	• No water well supply systems are present	• CI: No effects, there are no known water wells in the Project area or on the mine access road	• CI: No effects; no water wells present in Project area
	Distance from known surface water drinking supplies	• No surface water drinking supplies are present	• CI: No effects; no surface water drinking supplies present in Project area or on the mine access road	• CI: No effects; no non-Project drinking supplies present in Project area
	Change in visual aesthetics or level of general disturbance	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• CI: No effects anticipated from waste transport	• CI: The demolition landfill will remain on the site as a vegetated raised hill • CI: Once vegetation is fully established it will be more consistent with the surrounding environment
	Potential for adverse health and safety effects	• There are no current health and safety concerns with the PDA	• CI: No effects anticipated from waste transport	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Infrastructure (Built Environment)	Maintains or provides local and regional access	• There is no all-season access to the PDA • The nearest all-season road provides access to the regional road network is located 17 km away	• CI: Indicator is not applicable to this alternative; not related to access	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or provide reliable power supply	• There is no existing power supply to the mine site and no connection to the regional grid	• CI: Indicator is not applicable to this alternative; not related to power supply	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain or provide reliable pipeline systems	• There are no existing pipelines within the PDA	• CI: Indicator is not applicable to this alternative; not related to pipeline systems	• CI: There is no difference between Alternatives 1 and 2 for this indicator
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Public Health and Safety (Social Environment)	Level and quality of air emissions	• Good air quality is present attributed to the rural setting with no significant anthropogenic sources of air emissions • Air quality is influenced by long-range transport of natural and industrial air contaminants	• CI: Emissions will be generated from transport of the waste to an offsite landfill that will not have an effect on public health	• CI: No material air quality emissions from onsite landfill operation
	Potential for effects on quality of drinking water supplies	• Surface water quality meets PWQO except for a few occasions which were irregular, generally associated with elevated suspended solids • Groundwater quality is good but has naturally elevated levels of sulphate and metals in some	• CI: No effects; no drinking supplies present in Project area or on the mine access road	• CI: No effects; no drinking supplies present in Project area

Table 4.30-1: Assessment of Demolition Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Truck Non-hazardous Demolition Waste Off Site to an Existing Landfill	Alternative 2: Develop an Onsite Demolition Landfill for Non-hazardous Wastes
		samples		
	Potential for adverse electromagnetic exposure	• There is no natural electromagnetic exposure within the PDA	• CI: No effects; there are no electromagnetic emissions associated with this alternative	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to maintain safe road traffic conditions that are within FMG's control	• There is no all-season access to the PDA	• CI: Increased waste-related traffic, despite operational safeguards could increase the chance of an accident	• CI: No effects anticipated from onsite landfill
	Change in provision of health services	• Health infrastructure is present in Ear Falls, Red Lake and Sioux Lookout that provide a range of services	• CI: Indicator is not applicable to this alternative / does not affect health services	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Local Businesses and Economy (Economic Environment)	Change to local business and economic opportunities (including commercial bait harvesters and trappers)	• Hunting and trapping locations are common around lakes and take advantage of trails and resource movement patterns within the surrounding forest • There are few campgrounds, outfitters, lodges and wilderness resorts in the region and cabins	• CI: Project development will generate considerable regional and local, employment and business opportunities • CI: Potential business opportunity for a third party for transport of the waste offsite • CI: Facility will receive fees for waste storage	• CI: Project development will generate considerable regional and local, employment and business opportunities • CI: No effect; no material opportunities are associated with this management method
	Degree to which there is continued access to areas used for natural resource harvesting by tourism operators	• There is no all-season access to the PDA • Large lakes are present that allow for float plane access	• CI: Indicator is not applicable to this alternative; management method does not affect access	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Tourism and Recreation (Economic Environment)	Change to tourism and recreational opportunities	• The area contains a resource-based tourism industry, ranging from road accessible main base lodges to remote camps	• CI: Indicator is not applicable to this alternative; management method does not materially affect opportunities	• CI: No effects anticipated as landfill will be sited distant from tourism and recreational opportunities
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Regional Economy (Economic Environment)	Change to the regional economy	• Ear Falls and Red Lake are dependent on resource development and extraction • Sioux Lookout has diversified to an expanded economy	• CI: Indicator is not applicable to this alternative; management method does not affect the regional economy	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Government Services (Social Environment)	Change to the capacity of existing health, education and family support services	• Diverse government services are provided in Ear Falls, Red Lake and Sioux Lookout	• CI: This alternative relies on access to a local landfill and will affect the life of the existing facility, but can proceed only with the agreement of the operator	• CI: Indicator is not applicable to this alternative; waste management method does not affect services
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Resource Management (Social Environment)	Degree of consistency with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes • Eastern portion of the transmission line will intersect the area covered by the Cat Lake / Slate Falls Community-Based Land Use Plan, within the exiting E1C transmission line corridor	• CI: No direct or indirect effect anticipated from management method	• CI: Applicable approvals will be obtained including the Sustainable Forest Rights holder for pipeline corridor clearing and reclamation • CI: There are no known conflicts with resource management objectives that cannot be mitigated through approvals
	Summary		**Partially preferred**	**Partially preferred**
	Ability to limit the generation of unnecessary waste materials	• There are no facilities present	• CI: Indicator is not applicable; this alternative is	• CI: There is no difference between Alternatives 1

Table 4.30-1: Assessment of Demolition Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Truck Non-hazardous Demolition Waste Off Site to an Existing Landfill	Alternative 2: Develop an Onsite Demolition Landfill for Non-hazardous Wastes
Potential Effect on Waste Materials (Built Environment)			related to waste management	and 2 for this indicator
	Potential for material to be recycled / re-used	• There are no facilities present	• CI: Indicator is not applicable; this alternative is related to waste management	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Heritage Resources (Cultural Environment)	Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance of cultural heritage resources	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• CI: No effects anticipated; camps are distant from waste management activities	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Isolates a built heritage resource or heritage attribute from its surrounding environment, context or a significant relationship	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• CI: No effects anticipated; camps are distant from waste management activities	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Results in direct or indirect obstruction of significant views or vistas within, from or of built heritage resources or cultural heritage landscapes; shadows that materially alter the heritage resource	• Eight camps generally less than 50 years old are present locally, but remote from the PDA • The local Springpole Lake to Birch Lake Travel Route cultural heritage landscape, a trade route dating to the 1700s has cultural heritage value	• CI: No effects anticipated; camps are distant from waste management activities	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Avoids damage or disturbance to known archaeological resources	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• CI: Indicator is not applicable to this alternative management method does not affect archaeological resources	• CI: No effect; landfill will be sited on existing disturbed lands
	Avoids land disturbances (such as a change in grade that alters soils and drainage patterns that adversely affect an archaeological resource)	• There are no areas of archaeological potential within the PDA • Pictographs sites have been identified on the north side of the southeast arm of Springpole Lake	• CI: Indicator is not applicable to this alternative management method does not cause land disturbances	• CI: No effect; landfill will be sited on existing disturbed lands
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Indigenous Communities (Cultural Environment)	Maintains or improves Indigenous community conditions (subject to the limitations of Company capacity and community members' personal choice)	• Nearest First Nation Reserve from the mine site is located approximately 40 to 45 km from the mine site portion of the PDA	• CI: No anticipated travel through a Reserve to access offsite landfill	• CI: No potential for effects; the Reserve is distant from Project site
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Spiritual and Ceremonial Sites (Cultural Environment)	Avoids damage or disturbance to known spiritual and ceremonial sites; or implement other forms of protection / preservation supported by local Indigenous communities	• There are no known spiritual, ceremonial, cultural heritage and archaeological sites within the PDA	• CI: No potential for effects; no site located within the PDA	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Summary		**Partially preferred**	**Partially preferred**
Potential Effect on Traditional Land Use (Cultural Environment)	Ability to maintain access to traditional lands for current traditional land uses, including hunting, fishing, trapping, plant harvesting and cultural practices	• Hunting and trapping locations are present particularly around lakes, taking advantage of trails and resource movement patterns • Hunting, trapping or harvesting activities within the area surrounding the PDA, and a trapline intersects the PDA.	• CI: This alternative has limited potential to effect access to traditional lands, which will continue until waste management ceases	• CI: Landfill will be sited on existing disturbed lands, and no additional effect to access to traditional lands is expected
	Summary		**Partially preferred**	**Partially preferred**

Table 4.30-1: Assessment of Demolition Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Truck Non-hazardous Demolition Waste Off Site to an Existing Landfill	Alternative 2: Develop an Onsite Demolition Landfill for Non-hazardous Wastes
		Social, Economic, Cultural and Built Environment Performance Objective Assessment	**Partially preferred**	**Partially preferred**
			• Adv: Potential business opportunity for a third party for transport of solid waste to approved facility • Disadv: Relies on access to a local landfill and will affect the life of the existing facility, but can proceed only with the agreement of the operator • Disadv: Potential effects from solid waste transport off site and potential for increased traffic interactions	• Adv: Will not disturb areas outside the PDA (no increased traffic) • Disadv: No material opportunities are associated with this management method
Technical Objectives				
Ability to Service Site	Prevalence and effectiveness of technology for use in similar circumstances	• There are no facilities present	• CI: Proven and effective technology	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Degree to which new technology is supported by investigations or testing	• There are no facilities present	• CI: Indicator is not applicable to this alternative; transport commonly used	• CI: There is no difference between Alternatives 1 and 2 for this indicator
	Ability to consistently meet Project needs	• There are no facilities including supporting infrastructure present	• CI: Dependence on third party operator to remove hazardous waste from site • CI: Disruption could occur with weather disruption of travel or road access	• CI: This alternative will be best able to consistently meet Project needs; ability to service site is within FMG control
	Availability of necessary infrastructure for component	• There are no facilities including supporting infrastructure present	• CI: A landfill (with capacity) to support the Project could be located a significant distance away from the PDA	• CI: No effects anticipated
		Summary	**Partially preferred**	**Preferred**
Cost Effectiveness	Potential effect on project financing resulting from investor attractiveness or risk	• There are no facilities present	• CI: Operated by a third party with liability presumed to be held by that party • CI: Existing offsite landfill may not be available or may require expansion, which may be requested to be funded partly or in whole by FMG • CI: Risk of closure delay or other issues given that the landfill is operated by a third party	• CI: Potential risk of liability at closure, which will require long-term management and monitoring • CI: As the onsite landfill would be under the control of FMG, it presents limited risk that a lack of capacity could be present when needed at closure
	Degree to which alternative provides a competitive or acceptable return on investment	• There are no facilities present	• CI: Comparatively higher operating cost compared to an onsite demolition landfill • CI: Facilitates a competitive return on investment	• CI: Significantly lower operating cost due to reduced cost of transport and tipping fees • CI: Facilitates a competitive return on investment
	Degree to which alternative provides financial risk	• There are no facilities present	• CI: No effects anticipated unless a clause is added to contract with landfill regarding waste liability	• CI: Potential risk of liability at closure, which will require long-term management and monitoring
		Summary	**Partially preferred**	**Preferred**
		Technical Performance Objective Assessment	**Partially preferred**	**Preferred**
			• Adv: Long-term liability and monitoring is held by others • Disadv: Concern regarding availability of a landfill that will accept industrial waste and has sufficient capacity within a reasonable distance	• Adv: Can reliably support the Project for non-hazardous demolition wastes • Adv: Significantly lower operating cost due to reduced cost of transport and tipping fees • Disadv: Higher longer-term monitoring costs but provides a competitive return on investment

Table 4.30-1: Assessment of Demolition Waste (non-hazardous) Management Alternatives

Criteria	Indicators	Baseline Conditions / Do Nothing[1]	Alternative 1: Truck Non-hazardous Demolition Waste Off Site to an Existing Landfill	Alternative 2: Develop an Onsite Demolition Landfill for Non-hazardous Wastes
Amenability to Reclamation (Closure Phase)				
Potential Effect on Future Public Safety and Security	Ability to avoid safety and security risks to the general public	• There are no facilities including supporting infrastructure present	• Cl: Increased waste-related traffic, despite operational safeguards could increase the chance of an accident	• Cl: Landfill will be closed in accordance with regulatory requirements; no material effects anticipated
		Summary	**Partially preferred**	**Partially preferred**
Potential Effect on Future Land / Land Use	Degree to which pre-development passive drainage systems will be restored	• Drainage systems follow the natural topography which can be characterized as moderately rugged	• Cl: Indicator is not applicable to this alternative	• Cl: Raised area associated with the landfill may alter the drainage pattern however passive drainage will re-commence after area is reclaimed
	Ability to provide habitats for vegetation and wildlife species, including SAR	• SAR habitat is present in the PDA, LSA and RSA • Protected Category 1 and 2 Caribou (Boreal population) habitat is present locally and within the PDA	• Cl: Indicator is not applicable to this alternative	• Cl: No effects anticipated as landfill would be sited in an area disturbed by Project operations • Cl: Area will be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife
	Ability to provide productive land uses consistent with existing land use and resource management plans	• Situated within General Use Area G2514 which allows mining-related land use activities • Located within the Trout Lake Forest Management area and is subject to the Trout Lake Forest Management Plan • Springpole Lake and Birch Lake are listed as naturally reproducing Lake Trout lakes	• Cl: Indicator is not applicable to this alternative	• Cl: There are no known conflicts with resource management objectives that cannot be mitigated through approvals
	Provide for an aesthetically pleasing site	• The existing landscape at, and around the PDA is typical of the northern Ontario landscape • Viewscapes are considered to have low viewer sensitivity, with infrequent viewers for brief time periods	• Cl: Indicator is not applicable to this alternative	• Cl: The demolition landfill will remain on the site as a vegetated raised hill • Cl: Once vegetation is fully established it will be more consistent with the surrounding environment
		Summary	**Partially preferred**	**Partially preferred**
		Amenability to Reclamation Performance Objective Assessment	**Partially preferred**	**Partially preferred**
			• Adv: No material effects anticipated; alternative would not be under the care and control of FMG	• Adv: Limited area disturbed to be rehabilitated at closure consistent with the Closure Plan and anticipated to be supportive of local wildlife • Disadv: Landfilled waste will be present although landfill will be closed in accordance with regulatory requirements
		OVERALL ASSESSMENT OF ALTERNATIVE	**PARTIALLY PREFERRED**	**PREFERRED (SELECTED ALTERNATIVE)**
			Transport of demolition waste is has not been selected as there is no environmental advantage to transporting the waste to another location for permanent storage. There are offsite effects from solid waste transport off site and potential for increased traffic interactions.	The preferred and selected alternative for the final EIS/EA, is to store the non-hazardous demolition waste in an approved onsite landfill, assuming a suitable location can be identified, and pending the results of regulatory guidance, and ongoing consultation and engagement activities.

Notes:
(1) The Project site is an active mineral exploration area. Limited exploration-related facilities and infrastructure components are present including a small exploration camp, office, storage facilities and yard areas.
Adv = advantage; Cl = closure phase; dBA = A weighted decibels; Disadv = disadvantage; ESA = *Endangered Species Act*; LAeq = The A-weighted, equivalent continuous sound level in decibels having the same total sound energy as the fluctuating level measured ; LSA = Local Study Area; RSA = Regional Study Area; SARA = *Species at Risk Act*.

4.31 Summary of Alternatives Assessment and Selected Alternatives

The assessment of alternatives completed in Section 4 is intended to provide sufficient information to support an understanding of the rationale for the Project design. Alternative assessment tables using the selected performance objectives, criteria and indicators are provided where viable alternatives have been identified. The selected alternatives which have become part of the Project design are summarized in Table 4.31-1. These alternatives were carried forward into Section 5 (Project Description) of the final EIS/EA.

Table 4.31-1: Summary of Selected Alternatives by Project Component

Project Component	Selected Alternative	Project Description Section
Mining	Open pit mining in dewatered basin constrained by dikes	5.6
	Re-filling of the dewatered basin with water at closure and reconnection to Springpole Lake	5.19.3
Mine rock and tailings storage	CDF located west of the dewatered open pit basin for co-disposal of PAG mine rock and NAG thickened tailings (north cell), with an integrated conventional slurry tailings cell to store PAG thickened tailings and manage contact water (south cell)	5.9
	The north cell will be reclaimed with a cover of NAG tailings while the south cell will have a low permeability cover; both will be covered with a growth medium (mainly overburden), and revegetated	5.19.3
Ore storage	Two ore stockpiles located immediately adjacent and north of the process plant and southwest of the process plant; fully processed during operations	5.7.3
Ore processing methods	In-plant cyanide destruction to treat process effluent and tailings	5.8.2
Water management and treatment facilities	Fresh water will be taken from Birch Lake as needed for industrial uses and for domestic uses	5.11.4
	CWSP location in the centre of the site	5.11.3
	Treated effluent will be discharged to the southeast arm of Springpole Lake	5.11.7
Site access	New all-season road northwest from the end of the Wenasaga Road to site	5.16.1
	New airstrip co-located with the mine access road	5.16.2
	Workforce transported by bus to site from a central location, supplemented by private vehicle	
Domestic sewage	Domestic sewage treated in a package sewage treatment plant located on site	
Solid waste	Non-hazardous and hazardous solid waste transported to an approved facility off site during the construction, operations and decommissioning and closure phase; demolition wastes will be stored in an onsite landfill	5.19.3.7
Power supply	230 kV transmission line connecting to the regional electrical grid; diesel generators will provide power until grid connection is available and after it is decommissioned, as well providing a contingency power supply for disruptions	
	Transmission line routed to follow primarily along the mine access road and Wenasaga Road, parallelling the existing E1C transmission line part way, but diverting south and then east to avoid the Slate Falls Nation Reserve, near the Slate Falls Road (pending feedback from ongoing consultation)	
Explosives handling and storage	Anticipated to be managed by a third party with an onsite explosive manufacturing facility as well as onsite storage	5.6.7
Aggregate sources	Three potential locations identified to support the Project have been carried forward, pending further field investigations	5.15

4.32 References

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