

**Guidelines for the Preparation of an
Environmental Impact Statement
Pursuant to the
Canadian Environmental Assessment Act
for the Proposed
Josephine Cone Mine Project**

CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY



June 2012

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Josephine Cone Mine Project

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ABBREVIATIONS

ARD/ML	Acid rock drainage / metal leaching
The Act	Canadian Environmental Assessment Act
The Agency	Canadian Environmental Assessment Agency
CEPA	Canadian Environmental Protection Act
COSSARO	Committee on the Status of Species at Risk in Ontario
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Fisheries and Oceans Canada
EA	Environmental assessment
EC	Environment Canada
EIS	Environmental impact statement
EMPs	Environmental management plans
EMS	Environmental management system
HADD	Harmful, alteration, disruption or destruction of fish habitat
km	Kilometres
kV	Kilovolt
MMER	Metal Mining Effluent Regulations
MNR	Ministry of Natural Resources
MOE-EAB	Ontario Ministry of Environment – Environmental Approvals Branch
MNDM	Ontario Ministry of Northern Development and Mines
NPAG	Non-potentially acid-generating
PAG	Potentially acid-generating
PM	Particulate matter
Project	Josephine Cone Mine
Proponent	Bending Lake Iron Group Limited.
QA/QC	Quality assurance/quality control
SARA	<i>Species at Risk Act</i>
RA	Responsible Authority
TIA	Tailings impoundment area
UTM	Universal Transverse Mercator
VEC	Valued Ecosystem Component

Cover Page Photo Credit: Bending Lake Iron Group Limited

PART 1 – BACKGROUND

1 INTRODUCTION

The purpose of this document is to identify for Bending Lake Iron Group Limited (the proponent) the information requirements for the preparation of an Environmental Impact Statement (EIS) for the proposed project to be assessed under the Comprehensive Study process pursuant to the *Canadian Environmental Assessment Act* (the Act). This Guideline specifies the nature, scope and extent of the information required. The proponent will prepare and submit an EIS that: identifies the potential adverse environmental effects, including cumulative effects, of the project; identifies technically and economically feasible measures to mitigate those effects; and evaluates whether the proposed project will result in any significant adverse environmental effects.

While the EIS Guidelines provide a framework for preparing a complete EIS, it is the responsibility of the proponent to provide sufficient data and analysis on any potential environmental effects to permit proper evaluation by the Canadian Environmental Assessment Agency (the Agency), technical and regulatory agencies, Aboriginal groups and the public. The EIS Guidelines outline the minimum information requirements while providing the proponent with flexibility in selecting methods to compile data for the EIS.

In accordance with the Act, for the purposes of the comprehensive study, the Agency will be carrying out the duties of the responsible authority (RA) until the Minister of the Environment is provided with the comprehensive study report.

The proponent is required, when speaking with other government organizations, Aboriginal groups, the public and stakeholders, where appropriate, to ensure that the EIS responds adequately to any concerns raised.

The Canadian Environmental Assessment Agency (the Agency) and the Ontario Ministry of Environment – Environmental Approvals Branch (MOE-EAB) will coordinate the federal and provincial environmental assessment processes to ensure that their respective environmental assessment requirements are met in a timely and effective manner. The information requirements presented herein are intended to be complementary to the provincial environmental assessment Terms of Reference requirements that are currently being developed. The complementary nature of the information requirements will facilitate the Proponent's development of a single body of documentation that satisfies both federal and provincial environmental assessment requirements.

1.1 Proposed Project

The Proponent proposes the establishment, construction and operation of an open pit iron ore mine and ancillary activities (Josephine Cone Mine) with a 56 000 tonnes per day / 4 million tonnes per year production capacity. The mine site is located approximately 49 km southwest of Ignace, and 80 km north of Atikokan Ontario (see Figure 1).



1 Bending Lake Iron Ore Project

Figure 1: Project Location

The Project includes all activities and physical works associated with its construction, operation and decommissioning (closure and post-closure), including, but not limited to, the following activities and components:

- A tailings management area, tailings disposal, containment structures and associated material stockpiles;
- Damming and dewatering natural water bodies to accommodate mine infrastructure;
- Ore processing facilities;
- Processing plant;
- Support facilities and infrastructure, including but not limited to water supply and treatment, waste management and storage facilities;
- The decommissioning and closure of the mine and mine-related infrastructure;
- Approximately 37 km of railroad;
- Approximately 37 km of electrical power line (running in the same corridor as the railroad);
- Approximately 20 km of tailings pipeline and return water pipelines (pumping 5 million tonnes per annum of process tailings and water);
- Approximately 35 km of natural gas line of 575 gigajoule per hour; and
- A makeup water pipeline with a capacity of 348 000 m³ per year.

This information is based on the project description provided by the Proponent in February 2012 which is available on request. A Project Description Summary and these EIS Guidelines are available on the [Canadian Environmental Assessment Registry \(http://www.ceaa-acee.gc.ca/050/index-eng.cfm\)](http://www.ceaa-acee.gc.ca/050/index-eng.cfm) registry reference # 12-03-66282.

1.2 Environmental Assessment Process

Under section 5 of the *Canadian Environmental Assessment Act*, an environmental assessment is required because, for the purpose of enabling the project to be carried out in whole or in part, the following permits and authorizations may be required:

- Fisheries and Oceans Canada may take action in relation to subsection 35(2) of the *Fisheries Act*;

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- Fisheries and Oceans Canada may also take action in relation to paragraphs 36(5)(a) to (e) of the Fisheries Act, where the regulation made pursuant to those paragraphs contains a provision that limits the application of the regulation to a named site; and
- Transport Canada may take action in relation to section 5 of the *Navigable Waters Protection Act*.

Health Canada, Environment Canada, Natural Resources Canada and Aboriginal Affairs and Northern Development Canada have indicated that they possess expert information that could be useful to the environmental assessment. The Major Projects Management Office is also engaged in this Project as it is considered a Major Resource Project under the Major Resource Project Regulatory Improvement Initiative.

The Agency determined that components of the Project as proposed by the Proponent are described in the *Comprehensive Study List Regulations* of the Act, under:

- Section 16: The proposed construction, decommissioning or abandonment of a metal mine, other than a gold mine, with an ore production capacity of 3 000 t/d or more.

The comprehensive study report to be prepared by the Agency will describe the Project, the potential environmental effects of the Project and the Agency's conclusion on the likely significance of adverse environmental affects after taking into account the implementation of mitigation measures. The Minister will take into consideration the comprehensive study report and public comments filed in relation to the Project in issuing the environmental assessment decision statement. As the Project will also undergo an individual environmental assessment under the Ontario *Environmental Assessment Act*, Canada and Ontario will coordinate the federal and provincial environmental assessment processes, to the extent possible, with the Proponent as well as the Ontario Ministry of Northern Development and Mines (MNDM) which leads the provincial one window coordination process for mineral developments.

2 GUIDING PRINCIPLES

2.1 Environmental Assessment as a Planning Tool

Environmental assessment is a planning tool used to ensure that projects are considered in a careful and precautionary manner in order to avoid or mitigate the possible adverse effects of development on the environment. It also serves the purpose to encourage decision makers to take actions that promote sustainable development and thereby achieve or maintain a healthy environment and a healthy economy.

The EA of this project must therefore, in a manner consistent with the purposes above, identify its possible environmental effects; propose measures to mitigate adverse effects; and predict whether there will be likely significant adverse environmental effects after technically and economically feasible mitigation measures are implemented. The preparation and review of the EIS, as a component of the EA process, is critical in achieving this objective.

2.2 Public Participation

One of the purposes of the Act (subsection 4(1)) is to ensure opportunities for timely and meaningful public participation throughout the EA process. The Act ensures that during the comprehensive study process, the public has an opportunity to comment on the project and the conduct of the comprehensive study, the comprehensive study report and participate in the comprehensive study in addition to the previous two opportunities. The Minister of the Environment must take into account public input when issuing the environmental assessment decision statement.

Meaningful involvement in the EA takes place when all parties involved have a clear understanding of the Project as early as possible in the review process. Achieving this objective requires the Proponent to provide current information about the project to the public and especially to the communities likely to be most affected by the Project.

2.3 Aboriginal Consultation

Under the Act, an objective of the EA is to involve potentially affected Aboriginal people in order that the EA can identify any changes that the project may cause in the environment and the resulting effects of any such changes on the current use of lands and resources for traditional purposes by Aboriginal persons. The proponent must ensure that it engages with Aboriginal people that may be affected by the project and that have asserted or have established Aboriginal or treaty rights. In preparing the EIS, the proponent must ensure that Aboriginal people have access to the information that they require in respect of the project and

of how the project may impact them. The proponent is required to provide up-to-date information describing the project to the relevant Aboriginal groups, and especially to the communities likely to be most affected by the project. The proponent shall also involve Aboriginal groups in determining how best to deliver that information (e.g. the types of information required, formats, and the number of community meetings required).

When the Government of Canada contemplates conduct that may have potential adverse impacts on established or potential Aboriginal and treaty rights, it has a legal duty to consult with Aboriginal groups before making a decision to proceed with the proposed conduct. To assist the federal Crown in its consultation process, the proponent is required to describe in the EIS how the concerns respecting Aboriginal people will be addressed. That description should include a summary of discussions, the issues or concerns raised, and should consider and describe any asserted or established Aboriginal and treaty rights. The EIS must document the potential impact of the project on asserted or established Aboriginal rights, Aboriginal title and treaty rights, and the measures to prevent, mitigate, compensate or accommodate those potential effects.¹

2.4 Traditional and Local Knowledge

Section 16.1 of the Act states that “community knowledge and aboriginal traditional knowledge may be considered in conducting an EA”, and the definition of an environmental effect in the Act addresses the current use of lands and resources for traditional purposes by Aboriginal persons.

Traditional and local knowledge has an important contribution to make to an EA. Traditional and local knowledge refers to the broad base of knowledge held by individuals and by communities that may be based on teachings, personal observation and experience or passed on from one generation to another through oral and/or written traditions. This tradition is dynamic, substantive, and distinct living knowledge.

Traditional and local knowledge, in combination with other information sources is valuable in achieving a better understanding of potential effects of projects. Traditional and local knowledge may contribute to the description of the existing physical, biological, spiritual, and

¹ Some of this information may be contained in an Impact Benefit Agreement negotiated between the First Nation and the proponent. The details of such agreements are typically confidential to the signatories and as such the information may not be appropriate for inclusion in the EIS.

human environments, natural cycles, resource distribution and abundance, long and short-term trends, and the use of lands and water resources. It may also contribute to project siting and design, identification of issues, the evaluation of potential effects and their significance, the effectiveness of proposed mitigation and/or compensation, cumulative effects and the consideration of follow-up and monitoring programs and accommodation (if required).

Certain issues relevant to the review process are firmly grounded in traditional and local knowledge, such as harvesting, land use, physical, spiritual, and cultural heritage resources. Although the basis for traditional and local knowledge and science-based knowledge can differ, they may on their own or together, contribute to the understanding of these issues.

The EA shall promote and facilitate the contribution of traditional and local knowledge to the review process. It is recognized that approaches to traditional and local knowledge, customs and protocols may differ among communities and persons with respect to the use, management and protection of this knowledge. The Proponent shall incorporate into the EIS the traditional and local knowledge to which it has access or that it may reasonably be expected to acquire through appropriate due diligence, in keeping with appropriate ethical standards and without breaching obligations of confidentiality, as set out in Section 2.8 of this document. Agreement should be obtained from Aboriginal groups regarding the use, management and protection of their existing traditional knowledge information during the EA and after the EA.

The Agency will, upon receipt of findings as outlined in section 8.4 of these guidelines, consider the views of Aboriginal groups and traditional and local knowledge holders during the comprehensive study process.

2.5 Sustainable Development

Sustainable development, as defined in the Act, means development that meets the needs of the present, without compromising the ability of future generations to meet their own needs.

Projects should not unduly affect the carrying capacity of the ecosystems (and populations) with which they interact. Economic decisions need to be predicated on maintenance of ecological integrity, as healthy ecological systems provide for a healthy economy.

The EIS should consider these concerns and should incorporate the comments received during public participation and Aboriginal consultation. The EIS should also, in considering the project, (including alternative means of carrying out the project), address the relations and interactions among the various components of the ecosystems and meeting the needs of present as well as future populations. The proponent shall include in the EIS the extent to which the project contributes to sustainable development by considering the following:

- The extent to which biological diversity may be enhanced or affected by the project;
- The capacity of renewable resources that are likely to be affected by the project to meet the needs of present and future generations; and
- The extent to which the project will enjoin the long-term environmental, social, and economic viability of the community.

In addition, the proponent may consider additional sustainability objectives, as appropriate, to demonstrate the integration of sustainability.

2.6 Precautionary Approach

Under the Act, one of the purposes of federal EA is to ensure that projects are considered in a careful and precautionary manner before authorities take action in connection with them, to ensure that such projects do not cause significant adverse environmental effects. The precautionary principle encourages federal decision-makers to take a cautionary approach, or to err on the side of caution, especially where there is a large degree of uncertainty or high risk.

Principle 15 of the 1992 Rio Declaration on Environment and Development states that “Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.” In applying the precautionary approach, the proponent shall:

- demonstrate that all aspects of the project have been examined and planned in a careful and precautionary manner in order to ensure that they would not cause serious or irreversible damage to the environment, especially with respect to environmental functions and integrity, considering system tolerance and resilience, and/or the human health of current or future generations;
- outline and justify the assumptions made about the effects of all aspects of the project and the approaches to minimize these effects;
- ensure that alternative means of carrying out the project are evaluated and compared in light of risk avoidance, adaptive management capacity and preparation for surprise;
- ensure that in designing and operating the project, priority has been and would be given to strategies that avoid the creation of adverse effects;
- identify any proposed follow-up and monitoring activities, particularly in areas where scientific uncertainty exists in the prediction of effects; and
- present public views on the acceptability of all of the above.

In doing so, the proponent shall consider the guiding principles set out in the Government of Canada Framework for the Application of Precaution in Science-based Decision Making about Risk (2003).

2.7 Use of Existing Information

In preparing the EIS, the Proponent is encouraged to make use of existing information relevant to the Project. When relying on existing information to meet the requirements of various sections of the EIS Guidelines, the Proponent shall either include the information directly in the EIS or clearly direct (e.g. through cross-referencing) the reader to where they may obtain the information. When relying on existing information, the Proponent shall also comment on how the data have been applied to the Project, clearly separate factual lines of evidence from inference, and state any limitations on the inferences or conclusions that can be drawn from them according to the criteria for information quality set out in the EIS Guidelines. For instance:

- assumptions should be clearly identified and justified;
- all data, models and studies must be documented such that the analyses are transparent and reproducible;
- the uncertainty, reliability and sensitivity of models used to reach conclusions shall be indicated;
- conclusions should be substantiated; and
- the studies should be prepared using best available information and methods.

2.8 Use of Confidential Information

The EIS that is made publicly available for comment should not contain:

- information that is sensitive or confidential (i.e., financial, commercial, scientific, locations of listed Species at Risk, technical, personal, cultural or other nature) that is treated consistently as confidential, and the person affected has not consented to the disclosure;
- information that is likely to endanger the life, liberty or security of a person through its disclosure; or
- traditional/community/aboriginal knowledge unless agreed by the knowledge holders.

The proponent should consult with the Agency regarding whether specific information requested by these guidelines should be treated as confidential.

3 PREPARATION AND PRESENTATION OF THE EIS

3.1 Agency Guidance

In preparing the EIS, the proponent is encouraged to consult relevant Agency guidance and policy on topics to be addressed, e.g. the Agency's operational policy statement: *Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative means"* under the *Canadian Environmental Assessment Act* (November 2007). Guidance material can be found on the Canadian Environmental Assessment Agency website at www.ceaa-acee.gc.ca under Guidance Materials.

3.2 Study Strategy and Methodology

The Proponent is expected to observe the intent of the EIS Guidelines and to consider the environmental effects (as defined in the Act) that are likely to arise from the Project (including situations not explicitly identified in these Guidelines), the technically and economically feasible mitigation measures that will be applied, and the significance of any residual effects. It is possible that the EIS Guidelines may include matters that, in the judgement of the Proponent, are not relevant or important to the Project. If such matters are omitted from the EIS, they shall be clearly indicated with appropriate justification so that the Agency, technical and regulatory agencies, Aboriginal groups and the public have an opportunity to comment on this judgement. Where the Agency disagrees with the Proponent's decision, it may require the Proponent to provide additional information in order for the Agency to be in a position to reach a conclusion.

In describing methods, the Proponent shall document how it used scientific, engineering, traditional and local knowledge to reach its conclusions. Assumptions shall be clearly identified and justified. All data, models and studies should be documented such that the analyses are transparent and reproducible. All data collection methods should be specified. The uncertainty, reliability and sensitivity of models used to reach conclusions should be indicated.

All significant gaps in knowledge and understanding related to key conclusions presented in the EIS should be identified. The steps to be taken by the Proponent to address these gaps should also be identified. Where the conclusions drawn from scientific and technical knowledge are inconsistent with the conclusions drawn from traditional knowledge, the EIS shall contain a balanced presentation of the issues and a statement of the Proponent's conclusions.

3.3 Presentation and Organization of the EIS

To facilitate the identification of the documents submitted and their placement in the Canadian Environmental Assessment Registry, the title page of the EIS and its related documents should contain the following information:

- project name and location;
- title of the document, including the term “Environmental Impact Statement”;
- subtitle of the document;
- name of the Proponent; and
- the date.

The EIS should be written in clear, precise language. A glossary defining technical words, acronyms and abbreviations shall be included. The Proponent shall provide charts, diagrams, tables, maps and photographs, where appropriate, to clarify the text. Perspective drawings that clearly convey the various components of the Project shall also be provided. Wherever possible, maps shall be presented in common scales and data to allow for comparison and overlay of mapped features.

For purposes of brevity and to avoid repetition, cross-referencing is preferred. The EIS may make reference to the information that has already been presented in other sections of the document, rather than repeating it. Detailed studies (including all relevant and supporting data and methodologies) shall be provided in separate appendices and shall be referenced by appendix, section and page in the text of the main document of the EIS.

The Proponent shall provide copies of the EIS for distribution, including an electronic version in an unlocked, searchable, PDF format as directed by the Agency.

The EIS shall specify the organization of the document. This should include a list of all tables, figures, and photographs referenced in the text of the EIS. A Table of Concordance, which cross references the information presented in the EIS with the information requirements identified in the EIS Guidelines, should be provided. A complete list of supporting literature and references and detailed studies should also be provided in the appendices.

3.4 Executive Summary

The EIS shall contain an Executive Summary, provided in English, French, and Ojibwe with the following:

- a concise description of all key facets of the project;

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- a succinct description of the engagement conducted with Aboriginal groups, the public, and government agencies, with a summary of the issues raised and solutions found or suggested;
- a general overview of the key effects of the Project and proposed technically and economically feasible mitigation measures; and
- the Proponent's conclusions and significance determinations from the assessment.

If appropriate, the Agency may use the Executive Summary of the EIS as the basis for the comprehensive study report.

PART 2: STRUCTURE AND CONTENT OF THE EIS

4 INTRODUCTION AND PROJECT BACKGROUND

4.1 The Proponent

The Proponent shall:

- provide contact information (e.g. name, address, phone, fax, email);
- identify itself and the name of the legal entity that would develop, manage and operate the project;
- explain corporate and management structures, as well as insurance and liability management related to the project;
- specify the mechanism used to ensure that corporate policies will be implemented and respected for the project;
- summarize key elements of its environment, health and safety management system and discuss how the system will be integrated into the project;
- a description of the Proponent's record of performance pertaining to environmental and socio-economic issues in past operations; and
- identify key personnel, contractors, and/or sub-contractors responsible for preparing the EIS.

4.2 Project Overview

The Proponent shall briefly summarize the Project, by presenting the project components, associated and ancillary works, activities, scheduling details, the timing of each phase of the project and other key features.

The intent of this overview is to provide the key components of the Project, not a detailed description, which is outlined in Section 5.3 of this document.

4.3 Project Location

The EIS shall contain a concise description of the geographical setting in which the project is proposed to take place. This description should focus on those aspects of the environment important for understanding the potential environmental effects of the project. The description should also integrate the natural and human elements of the environment in order to explain the

interrelationships between the physical and biological aspects and the people and their communities. The following information may be included:

- any existing designated environmentally sensitive areas, such as national, provincial and regional parks, ecological reserves, important bird areas, wetlands, estuaries, and habitats of provincial or federally listed species at risk and other sensitive areas;
- the current land use in the area and the relationship of the project facilities and components with any existing land use including traditional, private and crown lands;
- local communities;
- traditional Aboriginal territories, treaty lands, Indian reserve lands;
- the UTM coordinates of the project site;
- the environmental significance and value of the geographical setting in which the Project will take place and the surrounding area; and
- physical or cultural heritage resources, built heritage and cultural heritage landscapes.

The EIS shall provide an expanded description and mapping of the project location, including each of the project components.

4.4 Participants in the Environmental Assessment

Clearly identify the main participants in the EA including jurisdictions other than the federal government, Aboriginal groups, community groups, environmental organizations, etc.

4.5 Regulatory Framework and the Role of Government

To understand the context of the EA, this section should identify, for each jurisdiction, the government bodies involved in the EA as well as the EA processes. More specifically identify:

- the environmental and other specific regulatory approvals and legislation that are applicable to the Project at the federal, provincial, regional and municipal levels;
- government policies, resource management, planning or study initiatives pertinent to the Project and/or EA and discuss their implications;
- policies and guidelines of the Aboriginal groups being consulted that are pertinent to the Project and/or EA and discuss their implications;
- any Aboriginal Treaties that are pertinent to the Project and/or EA;
- any relevant Land Use Plans, Land Zoning, or Community Plans;
- the components of the Project and identify those being applied for and constructed within the duration of approvals under provincial and federal legislation; and

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- in a summary form the regional, provincial and/or national objectives, standards or guidelines that have been used by the Proponent to assist in the evaluation of any predicted environmental effects.

5 PROJECT DESCRIPTION

Relevant guidance material for sections 5.1, 5.2 and 5.3 can be found on the Agency's website at www.ceaa-acee.gc.ca under Policy & Guidance - Guidance Materials (see Operational Policy Statements).

5.1 Need for and Purpose of the Project

The Proponent shall clearly describe the rationale or need for the Project. This description shall define the problem or opportunity the Project is intending to solve or satisfy. The EIS shall identify the main function of the Project. In this context, the EIS shall present the fundamental rationale for proceeding with the development at this time within the context of regional, provincial and national economies, as well as global implications of supply and demand on metal prices and markets.

The Proponent is required to clearly describe the purpose of the Project by defining what is to be achieved by carrying out the Project. In addition, the purpose of each of the Project components and activities and their relevance to the overall project development plan shall also be discussed.

The "rationale or need for" and "purpose of" the Project shall be established from the perspective of the Proponent and provide the context for the consideration of alternatives.

5.2 Project Setting

The EIS shall include a concise description of the geographic setting in which the Project is proposed to take place and shall include site, regional and watershed maps. The following shall be considered for each map type:

- site map - shall be to an appropriate scale and show all relevant features of the mine site (e.g., tailings pond, waste rock storage area, etc.) superimposed on elevation contours and ecological land classifications;
- regional map - two shall be provided, one to 1:100 000 scale and a second to a 1:50 000 scale;
- watershed map - shall be appropriately scaled, include details of water flow direction, and show discharge and sampling locations;
- land use maps – depicting municipal boundaries, mining tenure, claims and leases, Crown land tenure, trapping, subsistence, community-use areas, private land tenure and land use designations; and
- include maps delineating, any species of interest's range in relation to the Project.

In addition to the requested maps, in order to illustrate the regional setting and clearly locate the Project within that setting, the EIS shall include site plans at the appropriate scale and photographs (as necessary).

5.3 Project Description

The EIS shall describe the Project as it is planned to proceed including a general layout of all project components including the mine site, tailings management area, and infrastructure corridor.

The EIS shall contain sufficient detail to be able to identify major mine components or structures which are likely to have a high failure consequence in each phase of the project (construction, operation decommissioning and abandonment) and where monitoring efforts will be required for the purposes of risk analysis. In describing the Project, the Proponent is encouraged to consider relevant recommendations in the Environmental Code of Practice for Metal Mines, published by Environment Canada in 2009. The recommended practices in the Code include the development and implementation of environmental management tools, the management of wastewater and mining wastes, and the prevention and control of environmental releases to air, water and land. The Code is available at <http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=CBE3CD59-1>. The description shall include a timeline for all phases of the Project and a discussion of all Project components. This information shall be provided in sufficient detail to allow the Proponent to predict potential effects and address concerns raised.

The EIS shall include an expanded description of the phases of the Project, including construction, operation and decommissioning (closure and post-closure), as described in the Project Description (February 2012) and any subsequent Project updates². The description of project phases shall include, but may not be limited to, the physical works and activities listed in section 6.1.

² The terminology “closure” and “post-closure” is used throughout the EIS Guidelines. However, it is recognized that decommissioning activities could occur at any Project phase, in an early closure scenario.

6 SCOPE OF THE ASSESSMENT

6.1 Factors to be Considered

The proponent will include a consideration of the following factors listed in paragraphs 16(1)(a) to (d) and subsection 16(2) of the Act:

1. The environmental effects of the project, including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;
2. The significance of the effects referred to in paragraph 1 above;
3. Comments from the public that are received during the review;
4. Comments from Aboriginal groups that are received during the review;
5. Measures that are technically and economically feasible and that would accommodate adverse environmental effects on potential or established Aboriginal or Treaty rights;
6. Measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project;
7. The purpose of the project;
8. Alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means;
9. The need for, and the requirements of, any follow-up program in respect of the project;
10. The capacity of renewable resources that are likely to be significantly affected by the project to meet the needs of the present and those of the future.
11. Under paragraph 16(1)(e) of the Act, the Agency is directing the proponent to include an assessment of the need for the project, and alternatives to the project.

6.2 Scope of the Factors

Scoping establishes the boundaries of the EA and focuses the assessment on relevant issues and concerns. By defining the spatial and temporal boundaries, a frame of reference for identifying and assessing the environmental effects associated with the project shall be established. Different boundaries may be appropriate for each Valued Ecosystem Component (VEC).

A description of the boundaries of the Project in a regional context showing existing and planned future land use, Aboriginal traditional territories/ Treaty lands/ Indian Reserves, current infrastructure and proposed improvements to these infrastructure, including: transportation (all modes), power distribution corridors and lines, and urban areas shall be provided.

6.3 Determination of Valued Ecosystem Components (VECs)

The EIS must explain and justify methods used to predict the effects of the project on each VEC, which includes biophysical and socio-economic components, the interactions among these components and on the relations of these components within the environment. The information presented must be substantiated. The proponent will describe how the VECs were selected and what methods were used to predict and assess the adverse environmental effects of the project on these components. The value of a component not only relates to its role in the ecosystem, but also to the value placed on it by humans. The culture and way of life of the people using the area affected by the project may themselves be considered VECs. The spatial and temporal boundaries used in the assessment may vary as appropriate, depending on the VEC.

For consultations associated with the identification of VECs, the proponent shall identify those VECs, processes, and interactions that either were identified to be of concern during any workshops or meetings held by the proponent or that the proponent considers likely to be affected by the project. In doing so, the proponent should indicate to whom these concerns are important and the reasons why, including social, economic, recreational, and aesthetic considerations. The proponent must describe any issues raised or comments noted regarding the nature and sensitivity of the area within and surrounding the project and any planned or existing land and water use in the area. The proponent must also indicate the specific geographical areas or ecosystems that are of particular concern to interested parties, and their relation to the broader regional environment and economy.

VECs that fall outside the mandate of the EA may also be included in order to assess the potential adverse impact of the project on potential or established Aboriginal and Treaty rights.

6.4 Spatial Boundaries

Clearly indicate the spatial boundaries to be used in assessing the potential adverse and beneficial environmental effects of the Project. The EIS shall contain a justification and rationale for all boundaries chosen for the project site, local and regional study area. The

boundaries of the project must encompass all project components. It is important to note that the spatial boundaries for each VEC may not be the same.

Study boundaries shall be defined taking into account (where applicable) the spatial extent of potential environmental effects, traditional and local knowledge, current and proposed land use by Aboriginal groups, ecological, technical and social and cultural considerations. These boundaries shall also indicate the range of appropriate scales at which particular baseline descriptions and the assessment of environmental effects are presented. The description of the project setting shall be presented in sufficient detail to address the relevant environmental effects of the Project.

The Proponent is advised to consult with federal and provincial governments, Aboriginal groups, and the public, to confirm the spatial boundaries used in the EIS. The EIS shall identify the proposed spatial study boundaries for the VEC groups outlined in section 6.3 and any others proposed by the Proponent.

6.5 Temporal Boundaries

The temporal boundaries of the project should span all phases of the project: construction, operation, maintenance, foreseeable modifications, and where relevant, closure, decommissioning and restoration of the sites affected by the project. Temporal boundaries shall also consider seasonal and annual variations related to VECs for all phases of the project, where appropriate.

If the full temporal boundaries are not used, the EIS shall identify the boundaries used and provide a rationale for the temporal boundaries selected.

7 PROJECT ALTERNATIVES

7.1 Assessment of Alternatives and Selection of the Proposed Project

Guidance material for sections 7.2 and 7.3 is provided in the Agency's guidance document *Addressing 'Need for', 'Purpose of', 'Alternatives to' and 'Alternative Means' under the Canadian Environmental Assessment Act* (CEAA 1998, updated 2007). The Proponent is encouraged to demonstrate how the preferred alternative contributes to sustainable development.

The Agency expects that criteria and the process to assess alternatives will be also developed and consulted on during the preparation of the provincial environmental assessment Terms of Reference (ToR). If federal guidance on alternatives assessment differs from the approach in the provincial ToR, the province, federal government and proponent will determine the most appropriate approach.

7.2 Alternatives to the Project

The EIS must include an analysis of alternatives to the Project, describing functionally different ways to meet the Project's need and achieve the Project's purpose from the perspective of the Proponent. The Proponent will:

- identify the alternatives to the project that were considered;
- develop criteria to identify the major environmental, economic and technical costs and benefits of the alternatives; and
- identify the preferred alternatives to the project based on the relative consideration of the environmental, economic and technical costs and benefits.

This analysis must be done to a level of detail which is sufficient to allow the Agency, technical and regulatory agencies, the public and Aboriginal groups to compare the Project with its alternatives.

When assessing project alternatives, the Proponent is encouraged to take into account the relations and interactions among various components of the ecosystem, including affected Aboriginal and other communities, and any adverse impacts on potential or established Aboriginal or Treaty rights. Further, the proponent is encouraged to demonstrate how the preferred alternative contributes to sustainable development.

7.3 Alternative Means of Carrying Out the Project

The EIS shall identify and describe alternative means of carrying out the project that are technically and economically feasible (paragraph 16(2)(b) of the Act) and assess the environmental effects of any such alternative means.

The Agency recommends the following procedural steps for addressing alternative means:

- identify the alternative means to carry out the project:
 - develop criteria to determine the technical and economic feasibility of the alternative means; and
 - describe each alternative means in sufficient detail.
- identify those alternative means that are technically and economically feasible:
 - identify the environmental effects of each alternative means; and
 - identify those elements of each alternative means that could produce environmental effects in sufficient detail to allow a comparison with the environmental effects of the project.
- identify the preferred means:
 - identify the preferred means based on the relative consideration of environmental effects, and of technical and economic feasibility;
 - determine and apply criteria that identify alternative means as unacceptable on the basis of significant adverse environmental effects; and
 - determine criteria to examine the environmental effects of each remaining alternative means to identify a preferred alternative.

Any potentially adverse environmental impacts of the technically and economically feasible alternatives on potential or established Aboriginal or Treaty rights should also be identified.

7.4 Assessment of Alternatives for Mine Waste Disposal

The Proponent has identified the potential need to use natural water bodies frequented by fish for the disposal of mine waste, including tailings and waste rock, and for the management of process water. Before any fish frequented natural water bodies could be used for mine waste disposal, the *Metal Mining Effluent Regulations* (MMER) would need to be amended to add the affected water bodies to Schedule 2 to designate them as Tailings Impoundment Areas (TIAs). This regulatory process would not be initiated until a detailed assessment of alternatives for mine waste disposal has been undertaken by the Proponent.

As per Section 7.3, the EIS shall include an assessment of the alternative means of carrying out the Project, which includes the disposal of mine waste. Should an MMER Schedule 2 amendment be required for the project, the Proponent is strongly encouraged to incorporate MMER requirements for an assessment of alternatives for mine waste disposal into the EIS. The Proponent needs to undertake a robust and thorough assessment of mine waste disposal alternatives, which applies methodology that is provided in Environment Canada's *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (September 2011) <http://www.ec.gc.ca/pollution/default.asp?lang=En&n=C6A98427-1> and outlined as follows:

The assessment of alternatives for mine waste disposal should objectively consider all available options for mine waste disposal, including at least one that does not impact a natural water body frequented by fish. It should qualitatively and quantitatively assess the environmental, technical and socio-economic aspects of each alternative. Both the short term impacts of each alternative and the long term risks through the closure and post-closure phases should be assessed. The assessment of alternatives for mine waste disposal needs to include all aspects of the Project that may contribute to the predicted impacts associated with the proposed TIA. The economic component of the assessment should consider the full costs of each alternative throughout the mine life cycle, from construction through post-closure, including long term maintenance and monitoring requirements, as well as costs associated with the legislated requirement for a compensation plan to offset fish habitat loss.

Conducting this robust and thorough assessment of alternatives during the EA stage would streamline the overall regulatory review process and minimize the time required to proceed with the MMER amendment process. It would also facilitate a thorough and transparent review of the assessment of alternatives as part of the EA process. In addition, the Proponent will continue to meet with concerned parties to ensure that their concerns and input are addressed in the alternatives analysis. For further guidance, the Proponent should consult Environment Canada's *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (September 2011).

8 CONSULTATION

8.1 Public Consultation

For any consultations undertaken with the general public, the Proponent shall describe the ongoing and proposed consultations and information sessions with respect to the Project at the local, regional and provincial levels, where applicable. It shall provide a summary of discussions; indicate the methods used and their relevance; locations; the persons and organizations consulted; the concerns raised; the extent to which this information was incorporated in the design of the Project as well as in the EIS; and the resultant changes. Moreover, the Proponent shall describe any outstanding issues and describe ways to address these outstanding issues. The Proponent shall also provide a description of efforts made to distribute project information and provide a description of information and materials that were distributed during the consultation process.

8.2 Government Agency Consultation

Provide all relevant information as outlined in section 8.1 above.

8.3 Aboriginal Consultation

When the Crown contemplates conduct that may have potential adverse impacts on potential or established Aboriginal or Treaty rights, it has a legal duty to consult and, where appropriate, accommodate Aboriginal groups before making a decision to proceed with the proposed conduct.

The legal duty to consult is an obligation which ultimately rests with the Crown. Throughout the course of any Crown activity, however, it is possible for the Crown to rely on existing consultation mechanisms such as environmental assessment and make use of engagement efforts carried out by a Proponent. As a matter of policy, under the direction set in the Government of Canada's *Aboriginal Consultation and Accommodation Updated Guidelines March 2011* for federal officials, the Government of Canada has been clear that information collected during other processes (such engagement carried out by a Proponent) can be used in meeting the Crown's consultation obligations, including accommodation (see Guiding Principle #7). The direction below is in keeping with the *Aboriginal Consultation and Accommodation Updated Guidelines March 2011*.

8.4 Engagement by the Proponent

The Proponent must ensure that it engages with Aboriginal groups which have potential or established Aboriginal or Treaty rights, or related interests, which could potentially be impacted by the Project. In preparing the EIS, the Proponent must ensure that Aboriginal groups, especially those most likely to be affected by the Project, have access to timely and relevant information that they require in respect of the Project and how the Project may adversely impact them.

For the Aboriginal groups as identified by CEAA, the Proponent will hold meetings and facilitate these by making key EA summary documents (baseline studies, draft/Final EIS and key findings) accessible and making plain language summaries of these documents available in English, French, and Ojibwe.

To ensure that the EIS provides the necessary information to address issues of potential concern to Aboriginal groups, the Proponent's meetings should familiarize the groups with the Project and its potential environmental effects, identify any issues of concern regarding the potential environmental effects of the Project; and identifying what actions the Proponent is proposing to take to address each issue identified, as appropriate.

The Proponent will structure the meetings with adequate time for groups to have reviewed information in advance, and to ensure there are opportunities for community members to provide oral input in the language of their choosing, and that this input is recorded. Engagement activities must be appropriate to the groups' needs and should be arranged through discussions with the groups. Meetings should be scheduled to avoid conflicts with seasonal traditional activities (e.g. hunting/trapping season, harvesting, etc).

The groups referenced above may change as more is understood about the environmental effects of the Project and/or if the Project or its components change location or alignment during the EA.

The EIS should outline for each Aboriginal group identified by the Crown:

- contact information;
- description of the consultation process on factors to be considered in the EIS;
- list of all factors suggested for inclusion in the EIS, whether or not the factors were included, and the rationale for any exclusions;
- description of the traditional territory and potential or established Aboriginal and treaty rights that are exercised in relation to the assessment area;

- potential adverse impacts to potential or established Aboriginal or Treaty rights resulting from the project;
- proposed accommodation measures to avoid or mitigate the impacts to potential or established Aboriginal or Treaty rights; and
- efforts made to solicit the above information from Aboriginal groups if the proponent is unable to obtain all the information.

8.5 Proponent's Reporting in the EIS

To facilitate the required activities outlined in the subsection above, the Proponent shall provide the Draft EIS / plain language summaries to groups with adequate time for review and input prior to the Proponent's Final EIS submission. This will ensure that Aboriginal groups, and federal and provincial governments are aware of how input has shaped the Final EIS document, and how any outstanding issues will be addressed in the future.

In the Draft and Final EIS documents, the Proponent shall summarize completed, ongoing and planned future engagement with Aboriginal groups, how the concerns raised by these groups have been or will be addressed, as well as the groups' views on how their potential or established Aboriginal or Treaty rights are potentially adversely impacted by the Project. There shall also be a summary of any outstanding issues that remain. This information will be used by the Crown to assess the potential adverse impacts of the Project on potential or established Aboriginal or Treaty rights, and the measures to avoid, eliminate or minimize those adverse impacts.

8.6 Aboriginal Traditional Knowledge

The EIS shall describe where and how Aboriginal traditional knowledge is incorporated into the assessment, including in effects prediction, and determining mitigation measures. Where Aboriginal traditional knowledge is not available or not provided in a timely manner the EIS shall describe efforts taken to obtain it. The Proponent shall ensure that adequate time is provided to gather such information.

9 EXISTING ENVIRONMENT

The EIS shall provide a baseline description of the environment, including the components of the existing environment and environmental processes, their interrelations and interactions as well as the variability in these components, processes and interactions over time scales appropriate to this EIS. The Proponent's description of the existing environment shall be in sufficient detail to permit the identification, assessment and determination of the significance of potentially adverse environmental effects that may be caused by the Project, to adequately identify and characterize the beneficial effects of the Project, and provide the data necessary to enable effective testing of predictions during the follow-up program.

The information describing the existing environment may be provided in a stand-alone chapter of the EIS or may be integrated into clearly defined sections within the effects assessment of each VEC.

The baseline description should include results from studies done prior to any physical disruption of the environment due to initial site clearing activities planned as part of the site preparation phase. The baseline description shall include characterization of environmental conditions resulting from historical and present activities in the local and regional study area (see Section 10.9 on Cumulative Effects). The EIS shall compare baseline data, in areas on which the assessment will focus, with applicable federal, provincial, municipal or other legislative requirements, standards, guidelines or objectives.

The baseline description shall include those VECs, processes and interactions that are likely to be affected by the Project. The Proponent shall also describe the nature and sensitivity of the area within and surrounding the Project. The Proponent shall also indicate the specific geographical areas or ecosystems that are of particular concern, and their relation to the broader regional environment and economy. Relevant information about the VECs is to be presented graphically to document physical and biological (e.g., home range) characteristics.

If the background data have been extrapolated or otherwise manipulated to depict environmental conditions in the study areas, modeling methods and equations shall be described and shall include calculations of margins of error and other relevant statistical information, such as confidence intervals and possible sources of error. Such information can be included in the main body of the EIS or in supporting documents that are referenced in the EIS.

9.1 Physical and Biological Environment

In describing the physical and biological environment, the Proponent shall take an ecosystem approach that considers both scientific and traditional knowledge and perspectives regarding ecosystem health and integrity. The Proponent shall consider the extent to which biological diversity (e.g. ecosystems and/or species diversity) is affected by the Project. The Proponent shall propose and present a rationale for the indicators and measures of ecosystem health, human health, and social health and integrity it uses. These shall be related to Project monitoring and follow-up measures.

For the biological environment, baseline data in the form of inventories alone is not sufficient for the purposes of the EIS. The Proponent shall consider the sensitivity/resilience of species populations, communities and their habitats, to the extent practical. As appropriate, the Proponent shall summarize pertinent historical information on the size and geographic extent of animal populations as well as density.

Habitat at regional and local scales should also be defined, as appropriate, in ecological mapping of aquatic and terrestrial vegetation types and species (e.g., ecological land classification mapping). Habitat use should be characterized by type of use (e.g., spawning, breeding, migration corridors, feeding, nursery, rearing, wintering), frequency and duration. Emphasis shall be on those species, communities and processes identified as VECs. However, the interrelations of these components and their relation to the entire ecosystem and communities of which they are a part shall be indicated. The Proponent shall address issues such as habitat, nutrient and chemical cycles, food chains, productivity, to the extent that they are appropriate to understanding the effect of the Project on ecosystem health and integrity. Range and probability of natural variation over time shall also be considered.

Proposed sources of data to be collected or referenced as part of the baseline studies to describe the environment at each of the Project site locations should be summarized. A scientific rationale will be provided where data are interpolated, taking into account the availability of any other data from proximal sources and the need to collect additional data.

9.1.1 Terrestrial and Geological Environment

The EIS shall include as appropriate:

- baseline mapping and description of landforms and landform processes and soils within the project and local and regional study areas to support the effects assessment for all terrestrial disciplines;

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- Characterize soil conditions that occur within the proposed mine development area and the proposed transmission line area;
- details of soil sample analysis completed and the quality assurance/quality control program followed;
- a summary of baseline data on the concentration of trace elements in the Mine site soils prior to project development.
- a discussion of the soils, surficial and bedrock geology of the deposit which includes geological maps and cross-sections. Where appropriate, the following geologic parameters shall be included:
 - representative lithologic descriptions including age, grain size, mineralogy, physical strength, hardness, weathering characteristics, depositional setting and correlations;
 - representative cross-sections of surficial sediment units in the local study area;
 - sedimentological characteristics of surficial units;
 - spatial distribution and thickness of lithologic units, or links to vegetation and landforms;
 - alteration styles, mineralogy, occurrence and intensity;
 - structural fabric (e.g. fractures, faults, foliation and lineations, etc.) and structural relationships;
 - history of seismic activity in the area;
 - ore mineralogy, including sulphide types, abundance, mode of occurrence, extent of previous oxidation and an estimate of relative sulphide reactivity. It should also include mineralogical information on any carbonate and aluminosilicate minerals, their relative abundance, mode of occurrence and estimate of neutralizing potential;
 - characterization of mine materials – list should include pit walls;
 - type and grade of metamorphism;
 - regional geologic framework including tectonic belt, terrain, regional metamorphism and structure; and
 - glacial deposits, sands, gravels, clays and any other unconsolidated materials.

- delineate the regional and local geological structures in the Project area that may affect the proposed infrastructure, and show their potential effect on the proposed infrastructure as well as links to acid rock drainage / metal leaching (ARD/ML) mitigation geochemistry. This includes major structural features as well as lesser local structures.

9.1.2 Geochemistry

Materials at the proposed project site that will be investigated for acid rock drainage and metal leaching (ARD/ML) potential include overburden, mine rock, potential construction material, ore and low grade ore, and tailings. Mine components of the Project that will be assessed for ARD/ML potential include the pit walls, mine rock stockpiles, low grade ore and ore stockpiles, TIA impoundments; borrow materials, plant site and roads.

The EA documentation should include:

- Description of the chronology of ARD/ML investigations and the design of an ARD/ML characterization program, including the geological and mine plan context for the additional work.
- Predictions of the ARD/ML potential of all materials (bedrock and surficial) including existing mine rock and existing tailings, to be disturbed or created (i.e. tailings) during all phases (construction, operational, and post-closure) of the proposed Project. This will include a discussion of the estimation of risk for the onset of ARD for each lithological/alteration/waste management unit and mine component, metal leaching under acidic, near-neutral and alkaline pH and the predicted drainage chemistry for each mine component, including the types and concentrations of major trace elements;
- A comprehensive discussion of the geology of the deposit and its relationship to ARD/ML potential for all of the lithological units which will be disturbed during the mine development. Where applicable, for each lithological unit how its origin, field occurrence, alteration, relationship to other lithological units, as well as the mineralogy, textures, structures, mine sequencing and materials handling plans affects the potential for ARD/ML will be explained;
- A description of all the static and kinetic test work conducted to date. This includes the rationale, advantages and disadvantages of, detailed description, the sample selections and the methodology for all test work;
- Population assessments for each lithological/alteration/waste management unit. Populations have been assessed in terms of vertical and horizontal distribution and

sampling biases to ensure that a waste management unit is properly characterized over its range of variability;

- Raw baseline and predictive data from the ARD/ML assessment program that is properly identified and clearly tabulated, with sample calculations, clear interpretations and conclusions for all data. Tabulated data should include the number of samples of each lithological/alteration/waste management unit, with minimum, maximum, mean, median, standard deviation, and 10th and 90th percentile values as appropriate;
- Clear, concise cross-sections which relate the ARD/ML assessment (static/kinetic sample locations and results), geology and development plans;
- Graphical representation of the information collected from the static and kinetic test work. When possible, data presented will include the number of samples of each lithological/alteration/waste management unit and other statistical information, such as minimum, median, maximum, and 10th and 90th percentile values; and
- Delineation of source terms, methods and assumptions utilized in the geochemical modeling.
- longer term kinetic testing to evaluate rates of acid generation (if any) and metal leaching.

9.1.3 Atmospheric Environment and Acoustic Environment

The EIS shall describe the atmospheric and acoustic environment of the Project locations with sufficient detail to predict the likely effects of the Project. Baseline data will be collected, as appropriate, to describe the project site, local and regional study areas. Data used in the description shall be thoroughly discussed, including an analysis of how representative data is of condition at the Project locations. Its use would be qualified with an understanding of local and regional variability and the geographic locations of any on-site and off-site meteorological stations.

9.1.3.1 Air Quality

The EIS shall describe current ambient air quality at the project site, local and regional study areas and include information on its source(s), geographic extent and temporal variations. Ambient air monitoring shall include PM (total PM, PM₁₀ and PM_{2.5}), NO_x, SO_x, volatile organic compounds, CO, and other contaminants as appropriate.

9.1.3.2 Greenhouse Gases and Dustfall

The EIS shall describe current ambient greenhouse gas and dust emission levels at the project site and in the local study area, and include information on its source(s), geographic extent and temporal variations.

9.1.3.3 Acoustic Environment

The EIS shall describe current ambient noise levels at the project site and in the local study area, and include information on its source(s), geographic extent and temporal variations.

9.1.3.4 Climate and Meteorology

The EIS shall also provide a description of seasonal variations in weather conditions within the above-noted study areas, to allow the assessment of effects on the Project. Meteorological information provided can include air temperature, relative humidity, evaporation, precipitation, wind speed and direction, atmospheric pressure, and describe the occurrence of weather phenomena including events such as tornadoes, lightning, temperature inversions and fog. Special consideration shall be given in the analysis of extreme and rare meteorological phenomena.

The influence of regional topography or other features that could affect weather conditions in the study areas shall be described.

The following documents shall be used for guidance in establishing and operating any meteorological stations that may be established:

- *Environment Canada AES, 2004. MSC Guidelines for Cooperative Climatological Autostations, Version 3.0 Meteorological Service of Canada, September 2004.*
- *World Meteorological Organization, 2006. Guide to Meteorological Instruments and Methods of Observation. Preliminary seventh edition. WMO-No.8. Secretariat of the World Meteorological Organization, Geneva Switzerland.*

The baseline climate data collected can be used to assist in the air quality dispersion assessment and to assist in the hydrology and water management work.

9.1.4 Water Quality and Quantity

9.1.4.1 Surface Water

The EIS shall describe surface water quality and hydrology at the project site, local and regional study areas. Where appropriate, maps and figures shall be provided. The description shall include:

- delineation of drainage basins at the appropriate scales;
- a description of hydrological data such as water levels and flow rates collected over the years;
- a description of hydrological regimes, including monthly, seasonal fluctuations and year-to-year variability of all surface waters and assess normal flow, flooding, and drought properties of lakes and streams;
- a description of the interactions between surface water and groundwater flow systems;
- a description of all surface water sources used for drinking water in the area;
- a description of water quality sampling protocols and analytical methods, and provide maps and figures where appropriate;
- a summary of the collected water quality data that includes concentrations of relevant parameters in relation to established guidelines, (e.g., PWQO and CCME criteria for the protection of freshwater aquatic life, and spatial and temporal trends); and
- a full metal scan including all MMER parameters (Al, As, Cd, Cu, Fe, Hg, Mo, Ni, Pb, Zn, CN, NH₃, NO₃⁻, radium₂₂₆, total suspended solids, hardness, alkalinity, temperature, dissolved oxygen, pH and conductivity) as required under both Schedule 4 of the MMER for deleterious substances and effluent characterization.

9.1.4.2 Groundwater

This section of the EIS shall describe hydrogeology at the project site, local and regional study areas. The description shall characterize the physical and geochemical properties of hydrogeological units such as aquitards and aquifers, delineate regional and local groundwater flow patterns, identify recharge and discharge areas, and identify groundwater interaction with surface waters.

The EIS should also provide a description of baseline ground water quality at the project site and local study area and include:

- an inventory and analysis of information on the groundwater resource in the area;
- any published reports, geologic maps, well record data and quality assurance/quality control (QA/QC) procedures;
- a description of any local and regional potable groundwater supplies, including their current use and potential for future use;

- maps showing groundwater divides and spring discharges, with Project facilities overlain;
- a review of the physical geography and the geology of the area as it pertains to local and regional groundwater flow systems and aquifer/aquitard systems in the mine area;
- hydrogeologic maps and cross-sections for the mine area to outline the extent of aquifers, including fracture zones of bedrock, locations of wells, springs, potentiometric contours, and flow direction;
- a description of water quality sampling protocols and analytical methods with maps and figures outlining sample locations, where appropriate;
- a summary of the collected groundwater quality data;
- baseline analysis of groundwater quality within the regional and local study area. This includes determining natural groundwater types and measuring concentrations of major constituents as well as minor and trace components. Ensure that particular attention is given to components that would be, from an environmental point of view, potentially of interest in the course of mining operations. This analysis should be performed on surficial and bedrock aquifers; and
- presentation of a pre-development water balance

9.1.5 Aquatic Environment

This section of the EIS shall describe the aquatic environment at the project site and in the local and regional study areas.

9.1.5.1 Sediment Quality and Benthos

The description of the existing aquatic environment shall include information on benthic invertebrate communities, including sediment quality, characterization of the community diversity and abundance. The baseline sediment data gathered shall be sufficient to support the development of biological monitoring programs and shall assess variation relative to historical data. The Proponent should give due consideration to sample benthic invertebrate communities, including sediment quality in areas identified as potential final discharge locations. Baseline sampling will include total benthic invertebrate density, evenness index, taxa richness and similarity index.

9.1.5.2 Fish and Fish Habitat

The baseline data collected and reported in the EIS should:

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- contribute to the development of mitigation measures and compensation plans for the Project;
- contribute to the development of a conceptual reclamation and closure plan for the Project;
- provide the necessary baseline data in support of on-going monitoring programs to assess the effectiveness of mitigation measures and the compensation plans; and
- provide the necessary baseline data in support of the assessment of effects on the recreational, commercial and Aboriginal fisheries and their habitats.

The Proponent shall consider pertinent acts, policies, guidelines, MNR management plans and directives relating to fish protection and management in developing the Project and conducting the EA in relation to fish and fish habitat.

The EIS shall include:

- scientifically defensible baseline data that characterizes fish habitat, fish habitat use and fish community, within each waterbody and their inter-connecting channel(s) in the context of the local and regional sub-watershed areas. This should include, as appropriate to the circumstances:
 - the characterization of fish habitat use as spawning, rearing/nursery, feeding, migratory corridor and over wintering/summer refuge;
 - a quantification of habitat by watercourse reach and/or type within the local watershed, including measures such as direction of flow, length of stream, surface area and/or mean bank full width, depths, monthly/seasonal/annual discharge volumes/velocities and natural or anthropogenic barriers to fish passage;
 - for each potentially affected lake, measures of; total surface area, water elevation above mean sea level, shoal area, surface area of submerged and emergent aquatic vegetation, maximum and mean depths and water quality parameters (e.g., profiles of water temperature, turbidity, pH, dissolved oxygen).
- distribution, abundance and characterization of fish by species and life stages³;

³ The Proponent is encouraged to contact Environmental Canada for specific recommendations regarding the collection of fish baseline endpoints in relation to the *Metal Mining Effluent Regulations* (MMER).

- characterization of existing metal levels (including mercury) in fish muscle in areas that may be impacted by site dewatering, effluent or seepage from the Project; and
- the results of fish and fish habitat surveys along existing roads and the proposed infrastructure corridor.

The adequacy of aquatic baseline data for each water body should be evaluated based on, but not limited to, such factors as:

- use of appropriate and varied gear type(s);
- adequacy of sampling effort, across all seasons and over multiple years; and
- distribution of sampling effort both temporally and geographically for different habitat types within each water body.

When making a determination of presence or absence of fin fish in water bodies within the Project area, the Proponent should follow the methodologies and guiding principles presented in Portt et al. (2008) as a starting point for the development of the fish assessment. Any variation from those methods should be scientifically justified and references provided.

9.1.6 Vegetation

The EIS shall characterize the baseline vegetative communities within the area potentially affected by the Project. In particular, the EIS shall include information on the following key communities, species groups or ecosystems that have intrinsic Aboriginal, ecological or social value:

- forests (e.g. species composition, age, forest unit, volume) including information for all lands to be cleared;
- wetland (muskeg and non-peatland) ecosystems;
- riparian ecosystems; and
- plant species and ecological communities of conservation concern (i.e., COSEWIC and COSSARO-listed species, species listed under the *Species at Risk Act* and/or *Endangered Species Act* and their habitats).

9.1.7 Wildlife

The EIS shall describe and identify the following elements within the local and regional study areas potentially affected by the Project:

- the terrestrial species and their habitat at the site;

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- any species of conservation concern (i.e., COSEWIC and COSSARO-listed species, species listed under the *Species at Risk Act* and/or *Endangered Species Act* and their habitats) and their associated habitat (general, regulated or critical habitat as identified under SARA-if applicable);
- any wildlife corridors and physical barriers to movement; and
- all protected and conservation areas established by federal, provincial and municipal jurisdictions (e.g., wilderness areas, parks, sites of historical or ecological significance, nature reserves, federal migratory bird sanctuaries or National Wildlife Areas and wildlife management areas).

The methods and results of wildlife surveys conducted during the seasons and during times of day which facilitate detection of the target species or species groups will be summarized in the EIS (with further detail provided in accompanying appendices). The following shall be provided:

- identification of species of conservation concern that may occur at any point throughout the year in the Project area;
- the relative abundance, distribution and habitat use of wildlife species of conservation concern, including detailed description of the methodology (survey description, timing, etc.) for each species of conservation concern identified;
- identification of ungulate species occurring in the Project area;
- the results of winter aerial surveys to collect data on the relative abundance and distribution of moose, and white-tail deer by season (winter, summer) will be provided and used in conjunction with other data sources (e.g., provincial government surveys and mapping) to verify the habitat mapping and provide a baseline from which to predict and mitigate effects;
- information on the level of use of the mine site area by large carnivores such as wolverine, black bears and wolves;
- information on furbearer, small mammal, reptile and amphibian species known and potentially occurring in the mine site area;
- The relative abundance of furbearer species in the area will be described;
- information on raptors and raptor habitat in the mine site area, and their abundance;

- information on the relative abundance, distribution and density of migratory birds, including:
 - breeding, migration, staging and stopover as well as wintering populations; and
 - available data from Environment Canada and Ontario Ministry of Natural Resources;
- results of the baseline surveys and desktop analysis to predict the anticipated effects on migratory birds; and
- results of the reconnaissance amphibian and amphibian habitat inventory.

Species at Risk

The EIS shall describe and identify any biological species of conservation status at a federal, provincial, (i.e., COSEWIC and COSSARO-listed species, species listed under the *Species at Risk Act* and/or *Endangered Species Act* and their habitats) as well as species of conservation concern at an appropriate scale (i.e., regional or local level and their critical habitats, as outlined in the sections above).

The methods and results of wildlife surveys conducted during the seasons and during times of day which facilitate detection of the target species or species groups will be summarized in the EIS (with further detail provided in accompanying appendices). This includes information pertaining to species of conservation concern that may occur at any point throughout the year in the Project area; including their conservation status relative abundance, distribution and habitat use.

9.2 Socio-Economic Environment

9.2.1 Aboriginal Interest & Land and Resource Use

The EIS shall describe land use in the local and regional study areas. The Proponent shall identify past, current and any known planned land use(s) of the study areas or beyond, that may be impacted by the Project. Non-aboriginal activities should also be described and considered as outlined below if any exist within the study area.

9.2.2 Aboriginal Interests and Current Use of Lands and Resources by Aboriginal Persons

Traditional activities carried out by Aboriginal groups shall be described. Where data are available the Proponent shall provide information that would include a description of traditional dietary habits and dependence on country foods and harvesting for other purposes,

including harvesting of plants for medicinal purposes. The analysis should focus on the identification of potential adverse effects of the Project on the ability of future generations of Aboriginal people to pursue traditional activities.

The EIS shall include:

- An identification of the lands, waters and resources of specific social, economic, archaeological, cultural or spiritual value to Aboriginal people, in relation to potential or established Aboriginal or Treaty rights and related interests on which adverse environmental effects could occur.
- Where available, information concerning traditional activities, including activities for food, social, ceremonial and other cultural purposes, in relation to such lands, waters and resources with a focus on the current use of lands, waters and resources for traditional purposes.
- Note: traditional land use may include areas where traditional activities such as camping, recreation, travel on traditional routes and gathering of country foods (hunting, fishing, trapping, planting and harvesting) are conducted. Spiritual sites should also be considered as a traditional use activity of importance to Aboriginal people.

9.2.3 Fishing

The EIS shall describe the commercial, recreational and subsistence, lake and stream fisheries that may be affected by the Project, including water body use and the importance of the water body in a regional and provincial context.

9.2.4 Outdoor Recreation and Tourism

The EIS shall include an estimation of the current access and demand for the recreational and tourism industry (e.g., fishing, hiking, parks, kayaking, and cottages) within the study areas. Commercial recreation tenures and activities located in the Project area shall be identified.

9.2.5 Hunting, Trapping and Guiding

Where data are publicly available or available through traditional knowledge studies, estimates of the current and projected value of the hunting, trapping and guiding industry for the study areas shall be provided. The number of trapping and guiding territories in the Project area shall be provided.

9.2.6 Navigable Waters

The EIS must identify all waterways and water bodies that will be directly and/or indirectly affected by components of the Project, including representative width, depth, gradient, and flow. Photographs taken upstream, downstream and across all potentially affected waterways shall be included in the EIS.

Any known navigational use of the watercourse or water body shall be identified. The EIS shall provide information on current and/or historic usage of all waterways and water bodies that will be directly and/or indirectly affected by the Project development plan, including current Aboriginal uses, where available (including portages, historic travel routes and campment areas, where appropriate).

9.2.7 Human and Ecological Health

The Proponent shall use a broad definition in describing the aspects of human and ecological health. The Proponent is encouraged to include all baseline information relevant to human health in one section of the EIS. It is advised that the Proponent refers to Health Canada's *Useful Information for Environmental Assessments* document in order to include the appropriate baseline information relevant to human health. This document can be obtained at http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/environ_assess-eval/index-eng.php

9.2.8 Physical and Cultural Heritage Resources

The EIS shall identify any terrestrial and aquatic areas containing features of historical, archaeological, paleontological, architectural or cultural importance. A description of the nature of the features located in those areas shall be provided.

10 ENVIRONMENTAL EFFECTS ASSESSMENT

10.1 Assessment Methodology⁴

Potential effects from all components of the project shall be discussed. The Proponent shall determine the Project's effects during construction, operation, and decommissioning (closure and post-closure) of sites and facilities associated with the project, and describe these effects using appropriate criteria. In predicting and assessing the Project's effects, the Proponent shall indicate important details and clearly state the elements and functions of the environment that may be affected, specifying the location, extent and duration of these effects and their overall impact.

In undertaking the environmental effects assessment, the Proponent shall use best available information and methods. All conclusions shall be substantiated. Predictions shall be based on clearly stated assumptions. The Proponent shall describe how it has tested each assumption. With respect to quantitative models and predictions, the Proponent shall discuss the assumptions that underlie the model, the quality of the data and the degree of certainty of the predictions obtained.

The assessment of the effects of each of the components and activities, in all phases, shall be based on a comparison of the biophysical and human environments between the predicted future conditions with the Project and the measured baseline environment. The assessment shall predict the environmental effects of the Project, the technically and economically feasible mitigation measures proposed to be implemented and an assessment of the effectiveness of those measures. Where mitigation measures are proposed to be implemented for which there is little experience or for which there is some question as to their effectiveness, the potential risks and effects to the environment should those measures not be effective shall be clearly and concisely described.

The consideration of views from the public and Aboriginal groups, including any perceived changes attributed to the Project, shall be recognized and addressed in the assessment method.

10.1.1 Risk Assessment Framework

Where appropriate, the Proponent is expected to employ standard ecological risk assessment frameworks that categorize the levels of detail and quality of the data required for the assessment. These tiers are as follows:

⁴ Given that all requirements of *CEAA* are met, this is a recommended methodology which may be adapted to facilitate harmonizing the EIS guideline with the requirements of another jurisdiction.

- Tier 1: Qualitative (expert opinion, including traditional and local knowledge, literature review, and existing site information);
- Tier 2: Semi-quantitative (measured site-specific data and existing site information);
and
- Tier 3: Quantitative (recent field surveys and detailed quantitative methods).

Thus, if the Tier 2 assessment still indicates a potential for effects to VECs, a Tier 3 assessment would need to be conducted to reduce the level of uncertainty. If the risk characterization component is uncertain this may necessitate the probabilistic modelling of the population level consequences of the Project.

10.1.2 Impact Matrix

An impact matrix methodology in combination with identification of VECs should be used to evaluate various social and environmental effects of the Project, as well as the impact of environmental effects on potential or established Aboriginal or Treaty rights. The assessment should include the following general steps:

1. identification of the activities and components of the project;
2. predicting/evaluating the likely environmental effects on identified valued ecosystem components;
3. identification of technically and economically feasible mitigation measures for any significant adverse environmental effects;
4. determination of any residual adverse environmental effects;
5. ranking of each residual adverse environmental effect based on various criteria; and
6. determination of the potential significance of any residual environmental effect following the implementation of mitigation.

10.1.3 Mitigation Measures

Under the Act, mitigation is defined as the elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means. Every comprehensive study conducted under the Act shall consider measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the project.

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As a first step, the Proponent is encouraged to use an approach based on the avoidance and reduction of the effects at the source. Such an approach may include the modification of the design of the Project or relocation of project components.

The Proponent shall describe the standard and project-specific mitigation practices, policies and commitments that constitute technically and economically feasible mitigation measures and that will be applied. The Proponent shall then describe its environmental protection plan and its environmental management system, through which it will deliver this plan. The plan shall provide an overall perspective on how potentially adverse effects would be minimized and managed over time. As well, the Proponent shall describe its commitments, policies and arrangements directed at promoting beneficial or mitigating adverse socioeconomic effects. The Proponent shall discuss the mechanisms it would use to require its contractors and sub-contractors to comply with these commitments and policies and with auditing and enforcement programs.

The EIS shall specify the actions, works, minimal disturbance footprint techniques, best available technology, corrective measures or additions planned during the Project's various phases (construction, operation, modification, decommissioning, post-closure or other undertaking related to the project) to eliminate or reduce the significance of adverse effects. The impact statement shall also present an assessment of the effectiveness of the proposed technically and economically feasible mitigation measures. The reasons for determining if the mitigation measure reduces the significance of an adverse effect shall be made explicit.

The Proponent shall indicate what other technically and economically feasible mitigation measures were considered, including the various components of mitigation, and explain why they were rejected. Trade-offs between cost savings and effectiveness of the various forms of mitigation shall be justified. The Proponent shall identify who is responsible for the implementation of these measures and the system of accountability.

For certain VECs, where adverse residual effects are anticipated and are unavoidable, the Proponent shall implement compensation measures. These measures shall apply both to the biophysical environment and the human environment. The choice of measures is made in cooperation with the users and relevant authorities. Any compensation measures put in place for the Project, including those provided under agreement, shall be described.

With respect to the fish population, fish habitat, the productive capacity of lakes and the fishery they support, the EIS shall include a conceptual fish and fish habitat compensation plan. It is expected that this proposed plan will undergo Aboriginal, public and regulatory agency

scrutiny and review before being finalized and implemented.⁵ Aboriginal traditional knowledge may also be considered, as appropriate, in the development of the mitigation and compensation plans. A *Practitioner's Guide to Habitat Compensation* is available at: <http://www.dfo-mpo.gc.ca/habitat/role/141/1415/14155/compensation/index-eng.asp> to provide additional details about what information the proponent will need to consider in developing the compensation plan.

For species at risk defined by the federal *Species at Risk Act*, pursuant to subsection 79(1) of that Act, RAs under the Act shall notify the appropriate federal Minister if any listed wildlife species, its critical habitat or the residences of individuals of that species may be adversely impacted by the Project. Pursuant to subsection 79(2) of the *Species at Risk Act*, if the Project is carried out, RAs shall also ensure that measures are taken to avoid or lessen those effects and to monitor them. These measures shall be taken in a way that is consistent with any applicable recovery strategy and action plans. Therefore, the Proponent shall include information in the EIS that will allow the Agency and the RAs to meet this requirement.

In addition, the Proponent shall identify the extent to which technology innovations will help mitigate environmental effects. Where possible, it shall provide detailed information on the nature of these measures, their implementation, and their management and on whether follow-up will be required.

10.1.4 Residual Effects

After having established the technically and economically feasible mitigation measures, the EIS should present any residual effects of the Project on the biophysical and human environments after these mitigation measures have been taken into account. The residual effects, even if very small or deemed insignificant should be described.

The EIS shall include a summary (see section 10.9.5) of the Project's residual effects so that the reader clearly understands the real consequences of the Project, the degree to which effects can be mitigated and which effects cannot be mitigated or compensated.

10.1.5 Determination of the Significance of Residual Effects

Relevant guidance material for this section can be found on the Canadian Environmental Assessment Agency's website at www.ceaa-acee.gc.ca under - Policy & Guidance - Guidance

⁵ The proponent should note that the finalized fish habitat compensation plan is not necessary to finalize the EIS.

Materials (see Reference Guide: *Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects* (November 1994)).

The EIS shall identify the criteria used to assign significance ratings to any predicted adverse effects. The EIS shall contain a detailed analysis of the significance of the potential residual adverse environmental effects it predicts. It shall contain clear and sufficient information to enable the Agency, technical and regulatory agencies, Aboriginal groups and the public to understand and review the Proponent's judgment of the significance of effects. The Proponent shall define the terms used to describe the level of significance.

The following elements should be used in determining the significance of residual effects:

- magnitude;
- geographic extent;
- timing, duration and frequency;
- reversibility;
- ecological and social context; and
- existence of environmental standards, guidelines or objectives for assessing the impact.

The EIS shall clearly explain the method and definitions used to describe the level of the adverse effect for each of the above categories and how these levels were combined to produce an overall conclusion on the likely significance of adverse effects for each VEC. This method shall be transparent and reproducible.

In assessing significance against these criteria, the EIS shall, where possible, employ relevant existing regulatory documents, environmental standards, guidelines, or objectives such as prescribed maximum levels of emissions or discharges of specific hazardous agents into the environment or maximum acceptable levels of specific hazardous agents in the environment. The EIS should contain a section which explains the assumptions, definitions and limits to the criteria mentioned above in order to maintain consistency between the effects on each VEC.

The analysis of the significance of the effects shall contain sufficient information to allow the Agency, technical and regulatory agencies, Aboriginal groups and the public to understand and evaluate the reasoning of the Proponent. The Proponent shall provide a summary of the regional, provincial, Aboriginal or national objectives, standards or guidelines that have been used to assist in the evaluation of the significance of environmental effect.

If significant adverse effects are identified, the Proponent shall determine the probability (likelihood) that they will occur. The Proponent shall also address the degree of scientific

uncertainty related to the data and methods used within the framework of its environmental analysis.

10.1.6 Summary of Effects Assessment

For all key valued ecosystem components that were assessed, the Proponent shall provide in a table format, a summary of the following key information:

- a concise summary of the Project's effects;
- a summary of mitigation and compensation measures;
- a brief description of any potential residual effects;
- a brief description of cumulative effects; and
- a determination of the significance of residual effects.

10.2 Physical and Biological Environment

In conducting the effects assessment on the physical and biological environment, the Proponent shall give consideration to the guidance provided in the following sections.

10.2.1 Terrestrial and Geological Environment

The EA documentation should identify potential effects on terrain and soils during all phases of the Project. The EA documentation should provide terrain and soils information that will:

- Provide a commitment to preserve, store and reuse soil (including humus layers and organic soils), as applicable for site rehabilitation; and
- Outline a conceptual soil erosion and sedimentation plan for the mine site and mine site area access roads.

The EIS shall identify potential effects on terrain and soil during all phases of the Project. The EIS shall provide a terrain and soils survey that shall:

- outline a conceptual soil erosion and sedimentation plan for the mine site and access road upgrades; and
- include details of soil sample analysis completed and the QA/QC program followed.

Based on the results of the terrain and soils survey, the EIS shall include an assessment of terrain stability. The information collected from the terrain and soil survey and mapping shall be used in the soil salvage and soil erosion control assessments and preparation of the closure plan.

In order to facilitate determination of soil salvage requirements, the rooting depth, soil horizon and depth to growth impediments shall be compiled in a tabular form for each profile in each soil management unit. Typical or representative soil profile descriptions shall be appended to the soil survey report.

The terrain and soil survey shall be carried out following standard provincial and federal systems. In describing the survey the EIS shall reference *The Canadian System of Soil Classification* (Agriculture and Agri-food Canada, 1998), if applicable.

Typical soil profiles should be used to determine soil salvage opportunities available to support site rehabilitation at closure.

- Characterize soil conditions as a result of the proposed mine development; and
- Summarize the potential effects on the concentration of trace elements in site soils as a result of Project development;

10.2.2 Geochemistry

The baseline geochemistry data collected as per Section 9 will be used along with historical site databases, potential additional studies (as detailed below) and experience to assess the risk of potential leachate risks and determine mitigation requirements for the project. Therefore, additional information could be provided on the following as appropriate:

- Mine rock, tailings and low grade ore characterization, volumes, segregation/disposal methods, mitigation/management plans, contingency plans, operational and post-closure monitoring and maintenance plans;
- Assessment of the feasibility to successfully segregate potentially acid-generating (PAG) and Non Acid Generating (NAG) waste materials during operations, proposed geochemical segregation criteria and identification of operational methods that will be required to achieve geochemical characterization during operations (i.e. geochemical surrogates, on site lab, procedures needed etc);
- Sensitivity analysis to assess the effects of imperfect segregation of waste rock;
- Estimates of potential lag time to ARD/ML onset for PAG materials (including various waste rock, tailings, low grade ore) and ability to fully saturate appropriate PAG materials during operation and post-closure based on historical site experience and other acceptable methods;

- Pit water chemistry, historical, existing, during operation, post-closure and pit closure management measures (e.g. flooding). This will include geochemical modeling of pit water quality in the post-closure period;
- Surface and seepage water quality from the mine rock stockpiles, TIA, other stockpiles and other infrastructure during operation and post-closure; and
- ARD/ML prevention/management strategies under a temporary or early closure scenario, including low grade ore.

In developing the proposed Project and conducting the EA, related to ARD/ML, pertinent acts, policies, guidelines and directives will be considered. In particular, the following manual produced by the Mine Environment Neutral Drainage (MEND) Program is a recommended reference for use in ARD/ML prediction:

- MEND Report 1.20.1, “Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials”, Version 0 - December 2009.

10.2.3 Atmospheric Environment and Acoustic Environment

The baseline climate data collected as per Section 9 should be used to assist in the air quality dispersion assessment and to assist in the hydrology and water management work.

10.2.3.1 Air Quality

The EIS shall identify potential effects on air quality associated with all project components at all project phases, including point and mobile sources. Examples include heavy and light-duty vehicle exhaust, fugitive particulate matter and particulate from blasting, processing plant emissions and ore concentrate transportation. Measures considered minimizing the release of air dust from both process and fugitive emissions exposed tailings beaches, and other sources, during closure and post-closure phases, particulate exhaust fumes and other air contaminants, will be included in the assessment in the form of Best Management Practices (or Plans).

The analysis shall include the following:

- an assessment of emissions and short-term air quality impacts from site preparation and construction-related activities;
- a prioritized list of significant sources of fugitive dust emissions from the transportation of ore, mine rock and overburden; and
- a source emissions inventory table for the mine site describing the source, operating period, pollution control equipment if any, stack dimensions (if available), contaminants and predicted concentrations.

The EIS shall also include an atmospheric dispersion assessment of the following compounds as appropriate:

- Sulphur Oxides (SO_x);
- Nitrogen Oxides (NO_x) including a discussion of the proportion of NO₂ at the receptor;
- Particulate Matter (PM) including total PM, PM₁₀, and PM_{2.5} with a discussion of both primary and secondary particulate matter (secondary PM) formation and the fraction of PM that is from diesel emissions, Carbon Monoxide (CO);
- Volatile Organic Compounds (VOCs), Ammonia (NH₃) and other air pollutants on the *List of Toxic Substances in Schedule 1 of the Canadian Environmental Protection Act, 1999* (CEPA Registry, 1999); and
- other contaminants as appropriate.

The dispersion modelling assessment shall include:

- the worst-case dispersion modelling results (including mapping) and noting the location of key and sensitive receptors;
- combined predicted cumulative air quality concentrations during the various project phases with suitably conservative estimates of background concentrations to arrive at the worst-case cumulative air quality concentrations;
- predicted cumulative air quality concentrations compared with the National Ambient Air Quality Objectives (NAAQO) and Canada-Wide Standards (CWS) for air quality and any applicable provincial ambient air quality criteria; and
- deposition per area per unit time and expected metals concentration.

The air dispersion modelling assessment will provide data to other technical disciplines to allow for the assessment of impacts on biological receptors such as vegetation, fish, wildlife and human health. This assessment will be documented in a separate Technical Study Document and summarized within the EIS, as appropriate. The dispersion modelling assessment will not include predictions of ground-level ozone (O₃) formation as this process is not a significant concern in the project context.

The EIS shall also include a discussion of measures considered to minimize the release of greenhouse gases (both emissions and fugitive, particulate exhaust fumes and other air contaminants).

With respect to Greenhouse Gases (GHGs), the EIS shall:

- discuss the analytical techniques and relevant policies considered in the EA; and

- list and estimate the emissions of GHGs predicted for all relevant Project sources and compare to other similar mining projects.

Additional guidance can be obtained from *Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners* (CEAA 2003).

The EIS shall propose mitigation measures for all potential air contaminants.

10.2.3.2 Acoustic Environment

The EIS shall assess the potential for noise effects resulting from the Project. The EIS shall:

- identify and quantify potential noise sources including reference to construction and operational phases as well as to noise associated with increased road traffic;
- identify potential receptors and describe the proximity of identified receptors to Project operations;
- include a map illustrating estimated noise levels from the Project at receptors in the study area; and
- describe mitigation and noise management measures including the conditions for mitigation and evaluate Project compliance with appropriate noise guidelines. The Proponent should refer to Health Canada's document *Useful Information for Environmental Assessments* for more details on assessing potential noise impacts from the Project and applicable provincial publications on noise guidelines.

10.2.4 Water Quality and Quantity

10.2.4.1 Surface Water

Utilizing the results of the baseline data, the EIS shall:

- assist in the development of the site water balance;
- document effluent, surface drainage, seepage and sediment control works;
- determine water supply and source requirements;
- assess impacts on fish and fish habitat due to modification of stream flows and lake levels; and
- assist in the development of water quality predictions and mitigation requirements.

The EIS shall:

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- provide an assessment of changes to the hydrologic regime resulting from the Project construction (deforestation, removal of overburden, dewatering, increased drainage, etc.), operation, modification, decommissioning and post-closure, with a focus on lakes/ponds and streams that relate to existing fish, fish habitat and proposed fish compensation plans;
- include details about changes in the magnitude of stream flow, timing and duration for normal, dry and wet hydrologic conditions;
- include details about changes in overall water chemistry to impacted waterbodies from all sources of effluent, surface drainage, and seepage from the mine operations area⁶; include maps that show future basins delineation, drainage direction, proposed diversions channels and surface drainage and seepage collection management features; and
- include consideration of the effects of climate change and variability on the future flow regime and water balance assessment, hydrology, such as peak flow rates and the location of ice jams that could affect the environment or Project infrastructure.

With respect to the water balance for the Project the EIS shall include:

- a detailed water balance for the mine operations area including the mill, open pits, TIAs waste rock dumps, overburden stockpiles and any other associated infrastructure, during operation, closure and post-closure phases of the Project, for a range of hydrological conditions;
 - the water balance model shall evaluate the average precipitation scenario as well as a full range of possible wet and dry scenarios. The possible effects of each different precipitation sequence on mine water management activities shall be tracked, and the results presented in terms of probabilities of occurrence;

⁶ “operations area” means all the land and works that are used or have been used in conjunction with a hydrometallurgical, milling or mining activity, including:

- a. open pits, underground mines, heap leaching areas, solution mines, buildings, ore storage areas and waste rock dumps;
- b. tailings impoundment areas, lagoons and treatment ponds; and
- c. cleared or disturbed areas that are adjacent to the land and works that are not included in paragraph (a) or (b).

- the predicted water balance for each year of the mine life and all inflows and outflows (which includes seepage) shall be provided in tabular format. Appropriate return periods shall be defined and methodologies for the evaluation of wet, dry and expected scenarios shall be discussed.

With respect to water management, the EIS shall:

- predict the surface run-off coefficient and rate of run-off for the different areas of the mine operations area and describe contingency plans for extreme run-off events and drought conditions;
- provide detailed assessment and prediction for all site water diversions;
- recommend measures for dealing with water inflows to the open pits during operation;
- profile the open pits and show levels to which flooding can be achieved after closure based on hydrology and the pit design and contours and provide predictions with respect to flooding rates and ultimate water levels for the open pits after closure;
- provide the conceptual design features of all collector and diversion ditches, culverts, bridges, and water storage facilities. Cross-sections of the ditches and water storage facilities shall be provided and include the run-off flow return period to which the works can convey all flows, and to which the works can withstand flows without significant damage;
- include an assessment and prediction for all site water diversions including volumes, discharge structures and locations, and potential effects on the receiving environment hydrology;
- provide the conceptual design features and strategies for the collection, treatment, flow measurement and monitoring for effluent and surface drainage derived within the mine operations area [add footnote] (all structures including sediment ponds, surface drainage collection features etc.); and
- identify, map and characterize any faults located in the open pits and the extent of the faults beyond the confines of the open pits. Include an assessment of the hydraulic connection between the open pits and the adjacent water courses.

10.2.4.2 Groundwater

The EIS shall:

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- provide a qualitative and quantitative groundwater assessment to determine how the Project and related facilities and activities will impact: the local hydrogeological and groundwater units, groundwater flows, groundwater-surface water interactions, quality and quantity during: site preparation, construction, open pit development, TIA and process water pond development, operations, decommissioning (closure), and post closure care. The assessment shall describe the duration, frequency, magnitude and spatial extent of any effects and residual effects, outline the need for mitigation and/or monitoring measures, and assist with ARD/ML prediction work;
- provide results of the hydrogeological assessment that determines: groundwater seepage location, rates, seepage quality, and direction into or from: the open pits, mine rock stockpiles and other stockpiles, TIA facilities, primary sedimentation pond and process water pond; and from the pits during future overflow;
- provide detailed drawings and/or figures showing groundwater contours (piezometric surfaces) to determine/illustrate projected seepage conditions for the applicable project features (e.g. open pits, mine rock stockpiles, TIA, dams, primary sedimentation pond, process water pond);
- provide an assessment of the effects/impacts of groundwater seepage within the project area on surface stream flows, surface water quality, fish and fish habitat;
- provide a discussion of the potential for off-site migration of impacted groundwater, and an analysis of contaminant attenuation capacities within the hydrogeological units within the project area;
- provide a description of any proposed mitigation, flow measurement, and monitoring strategies for groundwater seepage (including seepage collection structures, e.g. ditches, interception wells, etc.) within the mine operations area;
- include a determination of the expected location and rates of seepage from the TIAs and mine rock stockpiles, characterize the seepage quality, and define any proposed mitigation strategies. Potential seepage to other waterbodies shall be emphasized and assessed for potential impacts to fish and fish habitat. Detailed drawings and/or figures showing equipotential contours to determine/illustrate projected seepage conditions for the dams, ore storage, and mine rock stockpiles, as applicable, shall be provided;
- provide the rationale for selection of an appropriate groundwater flow model; a detailed conceptual model; a description of model calibration; validation and verification; and a sensitivity analysis. It is recommended that the modeling also evaluate potential risks to

surface water quality and quantity resulting directly from any project-related changes to groundwater quality or quantity, and vice-versa;

- provide the results of a groundwater flow model of the local catchment for the post closure period incorporating all major permanent mine components, including the open pits, TIAs, and mine rock stockpiles;
- include the lithology for all wells from which data was collected to be used in the EIS;
- make available all relevant base map files and calibration data sets that have been used in the hydrogeological assessment;
- include recommendations regarding appropriate monitoring well locations to detect seepage from the various Project facilities, appropriate requirements for well purging prior to sampling, and appropriate frequency of sampling of monitoring wells;
- include an analysis of the potential for sulphide oxidation within surficial and bedrock units as a result of groundwater drawdown within the project area;
- demonstrate how, and if the withdrawal of groundwater during project development (i.e. construction, operations, modifications, decommissioning and post-closure), or the creation of physical changes to the aquifers within the project area, shall affect the availability of groundwater for applicable users (e.g. mine site facility operations, on-site drinking water systems) or baseflows in surface water (surface watercourses), thereby causing surface water impacts;
- include a Water Management Plan for all dams, including flows and levels during construction, operation, closure and post-closure. The assessment shall include diversions and impacts to aquatic systems from increased and decreased surface flows; and
- include effects of surface infiltration on groundwater flows that may affect discharges into streams and lakes.

10.2.5 Aquatic Environment

In conducting the effects assessment for the aquatic environment, the EIS shall include the following:

- details about changes in overall water chemistry to impacted waterbodies from all sources of effluent, surface drainage, and seepage, where relevant, from all project components at all stages;

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- graphical presentation of key variables and stream flows over time for key sites to illustrate patterns and variability;
- the entire range of data in addition to mean values, because extreme events that have serious environmental consequences can be lost when using only mean values; and
- all of the data in an appendix, including summaries of the maximum, minimum, mean or median, standard deviation and coefficient of variation for each site.

The EIS shall integrate results of the ARD/ML prediction work and surface hydrology and water balance information to develop water quality predictions for input into the impact assessment work. The EIS shall include the following:

- information describing how current baseline and ongoing surface and groundwater quality and flow rates are anticipated to be altered by individual mine components. Information shall focus particularly on the open pits, ore stock piles, waste rock piles, TIA/waste rock impoundments, and roads;
- an assessment and prediction of water quality for major mine components (waste rock stockpiles, open pits, low grade ore stockpiles, etc.) and all site water discharges, including groundwater discharge points in lakes and streams, for the different phases of the Project (i.e. construction, operation, modification, decommissioning, post-closure). This assessment shall include volumes, water quality, discharge structures and location, potential effects on the receiving environment from all cumulative site water discharges and the description of any mitigation strategies and/or treatment processes;
- a description of contingency plans if there are significant uncertainties or risks associated with the predicted water quality, and for dealing with excessive run-off events and drought conditions if necessary;
- strategies for management, flow measurement, and water quality monitoring of surface drainage from the mine operations area (as defined by the MMER), including mitigation strategies to separate contact water from non-contact water and how to prevent erosion and sediment discharge during the construction, operational and closure and post-closure phases;
- details on additional water requirements (if applicable) necessary to maintain full saturation of the PAG material. If exposure is expected, the results of kinetic test work shall be provided to assist in the determination of an acceptable exposure period;
- description of sampling program; and

- information on water treatment facility and treatment process.

The ARD/ML prediction information shall be used to predict water quality for effects assessment and to determine mitigation requirements for the Project. Additional information shall be provided on the following:

- the type and method used for the ARD/ML prediction and possible mitigation measures;

In conducting the effects assessment on surface water quality, the Proponent shall consider the following:

- effluent, surface drainage and seepage characterization and quality predictions. Predicted effluent quality should be directly compared to toxicity data, where available;
- waste discharge, surface drainage and seepage flows, concentrations, and loadings shall be predicted using data from various sources, which include:
 - quantity and quality of groundwater and surface drainage from the mine operations area as defined by the MMER;
 - if any lakes are to be drained, quantity and quality of water to be released from those lakes into the receiving water;
 - quantity and quality of tailings pore water from milling process tests;
 - quantity and quality of leachate from samples of tailings, waste rock, and ore;
 - quantity and quality of effluent, surface drainage and seepage to be released from the mine operations area as defined by MMER into all receiving waters; and
 - quantity and quality of humidity cell or column test liquid from acid rock testing;
- use of the predicted waste loads in a mass balance model of the mine area to predict the resulting receiving water quality under normal (construction, operation, modification, closure, post-closure) and storm conditions (e.g., 1-in-10 year flood and low flows);
 - the EIS shall include predictions of waste loads and water quality on a month by month basis for the critical years of mine site development (critical years are those years when worst-case contaminant loads are expected such as during construction, years when significant construction events or water use change occur, milestone years of operation, and at closure);

- assessment of the spatial extent of effects downstream of the Project (e.g., effluent dilution modeling) down to a magnitude that is indistinguishable from natural variability (e.g. baseline plus or minus 2 standard deviations, if outside 95% of measured results or some other, well-rationalized criterion); and
- assessment of the environmental effect of the predicted waste loads and receiving water quality under worst case conditions, and assess the environmental effect of the resulting water quality on aquatic organisms using federal and/or provincial water quality objectives.

10.2.5.1 Sediment Quality and Benthos

In assessment the effects of the Project on sediment quality, the EIS shall:

- discuss how potential changes related to construction, operation, closure and post closure may affect toxicity and physical habitat requirements (e.g., particle size) for benthos and fish eggs, utilizing sediment quality baseline data;
- identify sediment parameters that may be present at elevated levels, in comparison to applicable federal and provincial sediment quality guidelines, and, if necessary, use this information to propose site-specific sediment quality objectives.

10.2.5.2 Fish and Fish Habitat

The EIS shall identify potential effects on fish and fish habitat during all phases of the Project. Mitigation strategies for avoiding the harmful alteration, disruption and destruction (HADD) of fish and fish habitat and a compensation plan for unavoidable losses, based on Fisheries and Oceans Canada's policy for the Management of Fish Habitat and the related principle of no net loss of the productive capacity of fish habitat shall be included.

The potential effects and planned mitigative strategies for avoiding HADDs and developing a compensation plan for unavoidable losses shall be identified for the following at a minimum:

- footprint of development;
- infrastructure development;
- dewatering activities;
- flow changes from water management and diversions; and
- compensation activities.

The analysis of potential effects shall consider:

- productive capacity of aquatic systems. This shall include a comparison to other similar habitat or ecosystems in the region and the province, including consideration of existing information on parameters such as fish density, biomass or productivity, biomass and diversity and water quality parameters such as nutrients, pH, dissolved oxygen, or temperature to the extent that they are available;
- Capacity of habitat (e.g., quantity and quality) to support all life history requirements of fish species. This shall consider the availability of suitable habitat and the habitat requirements (physical and water quality) of fish species present,
- all water bodies that may experience changes to Aboriginal, commercial and/or recreational fisheries resources;
- habitat loss or alteration, including aquatic vegetation and sensitive areas such as spawning grounds, nursery/rearing areas, feeding areas, summer/winter refuges and migration corridors;
- species of cultural, spiritual or traditional use important to Aboriginal people and groups;
- potential for changes in migratory fish behaviour as a result of changes in water quality and quantity; and
- mortality of fish.

The EIS shall outline separate Fish and Fish Habitat Mitigation and Compensation Plans for sub-section 35(2) authorization(s) under the *Fisheries Act* for the Harmful Alteration, Disruption or Destruction of fish habitat, and under the MMER Schedule 2 requirements for the deposit of deleterious mine waste in natural water bodies frequented by fish. Sufficient detail shall be provided in each compensation plan to demonstrate that no net loss of productive capacity of fish habitat can be achieved and that plan measures are technically, economically and biologically feasible. It is anticipated that final details for all compensation plan elements will be provided as appropriate once there are agreed upon plans and sub-section 35(2) authorization(s) under the *Fisheries Act* is/are requested, and when MMER approval is sought.

In developing these plans consideration shall be given to the following:

- the extent to which mitigation measures considered for routine Project construction, operation and closure related activities developed and guided by Best Management Practices, Operational Policy Guidance and Project specific Environmental

Management Plans will reduce or eliminate potential adverse effects of the Project on fish and fish habitat during all phases of the Project;

- appropriate conceptual compensation measures to offset unavoidable losses where it is anticipated that mitigation measures will likely not meet the goal of maintaining or enhancing the productive capacity of fish and fish habitat. These measures shall be developed in accordance with DFO's *Policy for the Management of Fish Habitat (1986)*, *Practitioners Guide to Habitat Compensation* (<http://www.dfo-mpo.gc.ca/habitat/role/141/1415/14155/compensation/index-eng.asp>), and provincial policies, guidelines, and Aboriginal, commercial and/or recreational fisheries management objectives; and
- time delays between loss of habitat productive capacity and when replacement habitat is created and becomes functional as well as uncertainty in whether the replacement habitat is likely to function as intended.

The objective is to achieve No Net Loss of productive capacity of fish and fish habitat supporting Canada's Aboriginal, commercial and/or recreational fisheries resources, taking into account the implementation of any appropriate mitigation and/or compensation measures. Important factors that shall be considered include:

- the capacity of the habitat to support healthy fish communities;
- the actual or potential direct and indirect contribution to sustaining the nation's Aboriginal, recreational and/or commercial fisheries resources consistent with local fisheries management objectives; and
- the extent to which compensation measures are demonstrated to be biologically sound, reasonable, and based upon practical and proven techniques.

Metal Levels in Fish

The EIS shall provide details of predicted metal levels (including mercury) in fish. Using the baseline data on metal levels in fish muscle that may be impacted by site dewatering, effluent or seepage from the Project, the EIS shall evaluate the predicted changes in metal levels due to the Project.

10.2.6 Vegetation

The EIS shall identify potential effects on vegetation during all phases and on all the components of the Project. The Proponent shall develop appropriate mapping products to assist in assessing the effects of the Project on key vegetative communities, and identifying

rare ecosystems and species at risk. The EIS shall include a detailed assessment of key indicator communities, species groups or ecosystems representative of overall ecosystem condition and are sensitive to Project activities.

The EIS shall:

- assess the potential effects of the Project on vegetation, including species known to be important to Aboriginal people and groups;
- document ambient concentrations of trace elements in wetland and upland vegetation to determine the potential for contamination of vegetation that may be consumed by wildlife or people;
- develop mitigation measures to minimize or eliminate Project effects on vegetation, ecosystem function and wildlife habitat; and
- Assess project effects on upland and wetland ecosystem functions, with particular attention to effects on peatlands under predicted climate change scenarios.

10.2.7 Wildlife

The EIS shall identify potential effects on wildlife during all phases and on all the components of the Project. The EIS shall include:

- the identification and assessment of the potential effects of the Project on ungulates, large carnivores, furbearers, small mammals, raptors, waterfowl and other birds, reptiles, and amphibians that may be affected by the Project with particular attention to riparian, wetland, cliff and forest ecotone habitats, where applicable;
- a summary of the amount and type of wildlife habitat potentially impacted by the Project and a comparison to the amount of habitat available in the larger landscape. These summaries will include wildlife habitat suitability interpretations for ungulates, black bear, migratory birds and species of conservation concern that are known or likely to occur in the Project area;
- identification of mitigation measures to minimize or eliminate any adverse effects on wildlife, including wildlife habitat, particularly in the vicinity of wetland, lake and riparian habitats and on migratory corridors; and
- an evaluation of the effect of the Project on wildlife toxicity and mortality risk and movement patterns.

Species at Risk

The EIS shall address issues related to species at risk for the areas potentially affected by the Project. This shall include the identification and assessment of the potential effects of the Project on wildlife species of conservation concern (i.e., COSEWIC and COSSARO-listed species, species listed under the *Species at Risk Act* and/or *Endangered Species Act* and their habitats). This assessment shall determine whether the project is likely to 'kill', 'harm', or 'harass' an individual member of a protected species and its ability to carry out its life processes. A discussion on the likelihood of the Project to 'damage' or 'destroy' a protected habitat of a species at risk shall also be included.

10.3 Socio-Economic Environment

10.3.1 Aboriginal Interests & Land and Resource Use

Aboriginal Interests and Current Use of Lands and Resources by Aboriginal Persons

The EIS shall provide information regarding the effects of the Project on potential or established Aboriginal or Treaty rights and related interests. Based on information provided by Aboriginal groups, or, if Aboriginal groups do not provide this information, on available information from other sources, the Proponent shall identify:

- any potential social and/or economic effects to Aboriginal groups that may arise as a result of environmental effects of the Project on a group by group basis;
- any potential environmental effects on current and proposed uses of land and resources by Aboriginal persons for traditional purposes including, but not limited to, hunting, fishing, trapping, cultural and other traditional uses of the land (e.g. collection of medicinal plants, use of sacred sites);
- any environmental effects which have effects on lifestyle, culture and quality of life of Aboriginal groups;
- measures to avoid, mitigate, compensate or accommodate environmental effects which may limit the current use of lands and resources for traditional purposes;
- any environmental effects of the Project which result in effects on heritage and archaeological resources in the Project area that are of importance or concern to Aboriginal groups; and
- the residual impacts of any effects identified above on potential or established Aboriginal or Treaty rights and related interests.

10.3.2 Outdoor Recreation and Tourism

The EIS shall assess the potential environmental effects of the Project, including both onsite and offsite components on other regional economic activities recreation and tourism. With respect to outdoor recreation and tourism, the EIS shall:

- identify commercial recreation tenures and activities affected by the Project;
- identify areas that have high wilderness recreational value affected by the Project; and
- assess the importance of the areas affected, relative to regional use by residents and visitors.

10.3.3 Fishing

With respect to fishing, the EIS shall provide an assessment of the effects of Project development on the commercial, recreational, and subsistence lake and stream fisheries affected by the Project, and present mitigation and/or compensation plans.

10.3.4 Hunting, Trapping and Guiding

With respect to hunting, trapping and guiding, the EIS shall:

- identify the number of trapping and guiding territories affected by the Project and describe the nature of the effect in terms of the specific trapline and guiding area affected;
- assess the importance of the areas affected relative to overall area traplines and guiding territories and, to the extent possible, quantify the effect on guide outfitters and trappers;
- propose mitigation measures for diminished wildlife and wilderness values of the guide outfitter territories and registered traplines affected, where appropriate; and
- identify potential effects on recreational hunting opportunities in the immediate and adjacent areas.

10.3.5 Navigable Waters

In order to complete an assessment of the potential effects of the Project on navigable waters, the EIS shall:

- identify any Project components that will affect waterways and water bodies, including a description of any activities (e.g., dredging, alteration of water bed and/or water banks) that may affect waterways and water bodies;

- identify if there are existing works that were not previously authorized under the *Navigable Waters Protection Act* to be modified on a watercourse or water body.
- describe any ancillary and temporary works (e.g., cofferdams, detours, fencing, or temporary bridges) including approximate dimensions;
- describe the anticipated direct and/or indirect effects on the waterways and water bodies, including, but not limited to, changes in water level and flow;
- describe how the use of waterways may be affected either directly or indirectly by the Project development plan, including current Aboriginal uses; and
- propose mitigation measures to avoid affecting navigation, if applicable.

It is anticipated that upon receipt of the above information, the Navigable Waters Protection Division of Transport Canada will make a determination of the navigability of any waterways or water bodies and appropriate measures or approvals that would be required.

10.3.6 Human Health

The EIS shall include consideration of the potential effects of all project phases (i.e. construction, operation, and decommissioning) when assessing impacts to human health. The EIS shall examine the potential effects of the Project on human health, specifically related to potential chemical releases to the environment. The assessment shall involve both quantitative and qualitative risk assessment methods which shall be detailed and include consideration of the following:

- water supply and watersheds, including the effect on water supply and quality for local residents, communities of the Project, as well as potential site and potential health risks from discharges (if any). Any water designated for drinking and recreation shall be assessed for potential contamination and shall meet the *Guidelines for Canadian Drinking Water Quality* and *Guidelines for Canadian Recreational Water Quality*. Use of drinking water treatment systems or drinking water alternatives as appropriate shall be discussed;
- the effect of the Project on air quality around the project site and in the broader local and regional study area, including predicted air emissions and health risks from emissions from point and mobile sources (e.g. dust generated at the mine including from blasting activities, traffic related to the mine). This would include a comparison of predicted project-related changes in ambient air quality to applicable air quality benchmarks relevant to human health (Canada Wide Standards, National Ambient Air Quality Objectives, provincial regulations, etc.). Note that air quality criteria and

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standards should not be considered as “thresholds” below which health effects do not occur;

- the expected duration of noise due to construction, operation and/or decommissioning activities and an evaluation of the severity of predicted changes in noise levels and how they may affect human health;
- mitigation measures and monitoring of air quality, water quality, noise, and country foods, as appropriate; and
- risks to human health from current consumption by Aboriginal people, hunters/trappers, and recreational fishermen/women of country foods exposed to, but not limited to:
 - pesticides/herbicides used for the Project at all project phases;
 - metal contaminated dust;
 - seepage;
 - runoff or effluent discharges from the Mine Site (if any);
 - impounded water at the Mine Site;
 - metal contaminated vegetation growing within the projected dust fall area surrounding project operations; and
 - soils contaminated by metals.

Key components of the Human Health Risk Assessment process include the identification of likely Project-human interactions (pathways), contaminants of potential concerns (COPC), human receptors and assessment criteria. As such, the Human Health Risk Assessment shall include, but not limited to:

- predicted sources, quantities and points of release from the Project emissions and effluents containing COPCs;
- selection process for COPCs;
- identification of pathways to human receptors;
- identification and characterization of human receptors (workers and the public). Maps to delineate their locations and the distances of communities, residences, temporary/seasonal residences, etc. to key Project components and related infrastructure; and

- criteria used to determine significant of impact (e.g. exposure relative to lifetime cancer risk limit).

The Proponent should refer to Health Canada's document *Useful Information for Environmental Assessments* for more details on assessing human health in the EIS. This document can be obtained at http://www.hc-sc.gc.ca/ewh-sem/pub/eval/enviro_n assess-eval/index-eng.php

10.3.7 Physical and Cultural Heritage Resources

Physical and cultural heritage resources shall be considered in the EIS. According to the Agency's guidance document *Assessing Environmental Effects on Physical and Cultural Heritage Resources* (April 1996), a cultural heritage resource is a human work or a place that gives evidence of human activity or has spiritual or cultural meaning, and that has historic value. Cultural heritage resources are distinguished from other resources by virtue of the historic value placed on them through their association with an aspect(s) of human history. This interpretation of cultural resources can be applied to a wide range of resources, including, cultural landscapes and landscape features, archaeological sites, structures, engineering works, artefacts and associated records.

When undertaking the effects assessment on cultural and heritage resources, the Proponent shall follow the Guiding Principles outlined earlier in these Guidelines. The EIS shall assess the potential effects of onsite and offsite components of the entire Project, and their respective associated, supporting and/or ancillary facilities/infrastructure on archaeological and heritage resources. The EIS shall include:

- an archaeological impact assessment of the project sites (see above); and
- proposed measures to mitigate effects, including, but not limited to the following:
 - a reference to those archaeological sites which can be avoided by project design modifications;
 - a discussion of the process used to select an impact management action from among various possible alternative actions for any specific site;
 - justification for not recommending site-specific action;
 - recommended strategies to avoid and protect identified archaeological resources. Where circumstances do not allow a site to be protected, an excavation strategy will be developed and implemented before construction begins; and

- recommendations or a tentative schedule for conducting surveillance and/or monitoring during project implementation.

10.4 Effects of the Environment on the Project

The definition of an ‘environmental effect’ under the Act includes any change to the project that may be caused by the environment. Therefore the EIS shall take into account how local conditions and natural hazards, such as severe and/or extreme weather conditions and external events (e.g. flooding, ice jams, rock slides, landslides, fire, drought, low snowfall during winter, outflow conditions and seismic events) could adversely affect the Project. These events should be considered in different probability patterns (i.e., 5 year flood vs. 100 year flood).

Longer-term effects of climate change shall also be discussed up to and during the projected post-closure phase of the Project. This discussion should include a description of climate data used.

The sensitivity of the Project to long-term climate variability and effects shall be identified and discussed. The Agency’s Procedural Guide, *Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners* (2003), provides guidance for incorporating climate change considerations in an EA.

The EIS shall provide details of a number of planning, design and construction strategies intended to minimize the potential environmental effects of the environment on the Project.

10.5 Effects of Potential Accidents or Malfunctions

The Proponent shall identify the probability of potential accidents and malfunctions related to the Project, including an explanation of how those events were identified, prevention practices to reduce the risk of potential accidents and malfunctions from occurring, potential consequences (including the environmental effects), the worst case scenarios and the effects of these scenarios.

The geographical and temporal boundaries for the assessment of malfunctions and accidents may be different than those in the scope of factors for each VEC. This shall include an identification of the magnitude of an accident and/or malfunction, including the quantity, mechanism, rate, form and characteristics of the contaminants and other materials likely to be released into the environment during the accident and malfunction events.

The EIS shall also describe the safeguards that have been established to protect against such occurrences and the contingency/emergency response procedures in place if an accident and/or malfunction does occur.

The assessment of the environmental effects of potential accidents, malfunctions and unplanned events may include, but is not limited to those considerations associated with the following project activities or eventualities:

- the transport of goods which are potentially harmful to the environment, to and from the Project site;
- waste management and disposal (solid and liquid);
- handling and use of chemicals on-site;
- evaluation of worst case scenarios;
- premature closure of the Project during any phase;
- controlled and uncontrolled discharges (surface water and groundwater); and
- any other project component or system that has the potential, through accident or malfunction, to adversely affect the natural environment.

Detailed contingency and response plans should be presented. Information on Federal *Environmental Emergency Regulations* under Part 8 of CEPA is available at: <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2003-307/index.html> and link to the Environment Canada, Environmental Emergencies Section <http://www.ec.gc.ca/ee-ue/default.asp?lang=En&n=E3A506F8-1> for additional information.

10.6 Capacity of Renewable Resources

The EIS shall describe the effects of the project on the capacity of renewable resources to meet the needs of the present and those of the future. The EIS shall identify those resources likely to be significantly affected by the Project, and describe how the Project could affect their sustainable use. The EIS shall also identify and describe any criteria used in considering sustainable use. Sustainable use may be based on a range of ecological considerations, such as:

- integrity of the ecosystem;
- productive capacity of the resource;
- carrying capacity of the ecosystem;
- assimilative capacity of the ecosystem;
- resilience of the affected ecosystems to respond to internal and external changes; and
- cumulative environmental effects with other projects.

10.7 Cumulative Environmental Effects

The Proponent shall identify and assess the cumulative environmental effects of the Project in combination with other past, present or future projects that are “certain” or “reasonably foreseeable” projects or activities within the study areas as described in the Agency's guidance *Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act* (2007). If applicable, this may include: future mines, transportation alternatives (road vs. rail corridors), hydroelectric generation, transmission, forestry, and any other projects or activities.

Cumulative effects may result if:

- implementation of the project being studied caused direct residual negative effects on the environmental components, taking into account the application of technically and economically feasible mitigation measures; and/or
- the same environmental components are affected by other past, present or reasonably foreseeable future projects or activities.

Environmental components that would not have an adverse effect from the Project can be omitted from the cumulative effects assessment. A cumulative effect on an environmental component may be important even if the assessment of the Project's effects on this component reveals that the effects of the Project are minor.

The EIS shall describe the analysis of the total cumulative effect on a VEC over the life of the Project, including the incremental contribution of all current and proposed projects or activities, in addition to that of the Project. The EIS shall include different forms of effects (e.g. synergistic, additive, induced, spatial or temporal) and identify impact pathways and trends.

The Act (S. 16(2)) also allows for the consideration of information from relevant regional studies of environmental effects from possible future projects, where available.

10.7.1 Scoping of Cumulative Environmental Effects

The EIS shall identify other developments and activities that will be considered in the assessment of cumulative environmental effects, as well as document the sources of information used to arrive at this identification. A rationale should be provided for any components or other projects that will not be included in this analysis. This section should also define the spatial and temporal boundaries upon which cumulative environmental effects will be identified, predicted and evaluated.

The EIS shall identify and justify the environmental components that will constitute the focus of the cumulative effects assessment. The Proponent's assessment should emphasize the cumulative effects on the VEC most likely to be affected by any components of the Project.

The EIS shall identify and justify the spatial and temporal boundaries for the cumulative effects assessment for each VEC selected. The boundaries for the cumulative effects assessments will generally be different for different effects considered. These cumulative effects boundaries will also generally be larger than the boundaries for the corresponding direct project effects assessment. The final choice of VECs and the appropriate boundaries selected to assess the cumulative effects for each VEC shall be determined in consultation with the public, Aboriginal groups, federal and provincial governments.

If the Project is likely to result in improved infrastructure in the area or may facilitate access into the area, the Proponent shall evaluate the likelihood of further development in the area that could result in increase cumulative effects on the same valued ecosystem components.

10.7.2 Methodology for Identifying, Predicting and Assessing Cumulative Environmental Effects

The EIS should describe the detailed methodology used to determine the environmental effects of these other developments and activities. The methods used to combine the project effects with those of other foreseeable developments and activities, and the methods used to determine the significance of those combined effects, shall also be described. The rationale for choosing selected baseline conditions against which cumulative environmental effects are assessed shall also be explained.

10.7.3 Potential Cumulative Effects

The EIS shall identify the sources of potential cumulative effects. The EIS shall specify other projects or activities that have been or will be carried out that could cause effects on each selected VEC within the boundaries defined, and whose effects would act in combination with the residual effects of the Project.

The objective is *not* to identify two classes of environmental effects. Instead, the EIS should identify a *single* set of environmental effects that take into account the aggregate effect of the Project in the context of other foreseeable developments and activities acting upon the environment.

10.7.4 Mitigation Measures

The EIS shall identify technically and economically feasible measures that will mitigate any significant adverse cumulative environmental effects. The Proponent shall assess the

effectiveness of the mitigation measures. In cases where mitigation measures exist that are beyond the scope of the Proponent's responsibility that could be effectively applied to mitigate the effects, the Proponent shall identify these effects and the parties that have the authority to act. In such cases, the Proponent shall summarize the discussions that took place with the other parties in order to implement the necessary measures over the long term.

10.7.5 Determination of Significance

The Proponent shall determine the significance of the residual cumulative environmental effects that remain after mitigation has been implemented for each cumulative effect (refer to Section 10.1.1.5).

10.8 Interaction Matrix

The proponent is encouraged to utilize an interaction matrix describing the interaction of VECs with project components to aid as a visual summary such as the example below.

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Interaction Matrix																																																																
Purpose -- Identify where Valued Ecosystem Components interact with Project Activities																																																																
Valued Ecosystem Components																																																																
Physical									Biophysical							Health			Socio-economic																																													
Atmospheric Environment		Ground water		Surface Water					Aquatic Biology		Terrestrial			Terrestrial Environment		ESA / SARA	Human Health		Aboriginal Interest		Land and Resource Use		Physical and Cultural Heritage		Possible Effects of Environment on Project																																							
Air Quality (Chemical, Dust)		Noise		Greenhouse Gas emissions		Water Quality (Chemical / Thermal)		Flow or Water Table Elevation			Water Quality (Chemical / Thermal)		Drainage or Stream / Lake Level		Shoreline or Basin Alteration		Sediments		Aquatic Biota		Aquatic Habitat		Geology		Soil Quality (Chemical / Physical)		Vegetation Communities / Habitat		Wildlife Species		Vegetation Species		Species at Risk		Chemical Exposure to Public		Risk to Safety and Health		Occupational Health and Safety		Land		Resources/Country Food		Recreation		Navigation		Forestry / Other Activities		Archaeology / Palaeontology		Viewscape		Scientific / Historic		Seismic / Volcanic Activity		Other Geomorphology Processes ⁴		Weather Events / Hazards		Climate Change	
Project-Specific Physical Works and Activities																																																																
Construction																																																																
Site Clearing and site preparation																																																																
Mine infrastructure																																																																
Open Pit																																																																
Dewatering																																																																
Tailings Management Area(s)																																																																

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Power line																									
Natural gas transmission																									
Railroad																									
*Insert any other appropriate works/activities																									
Operation																									
Open pit activities																									
Overburden and waste rock management																									
Ore processing																									
Mill effluent and tailings management																									
Water supply																									
Drainage works																									
Aggregate / stockpiles																									
Fuel and materials management																									
Explosives (manufacturing, handling and storage)																									

10.9 Summary

For all key VECs that were assessed, the EIS should contain a table summarizing the following key information:

- concise summary of potential adverse environmental effects;
- summary of proposed mitigation and compensation measures;
- a brief description of potential residual effects;
- a brief description of potential cumulative effects;
- any applicable standards or guidelines;
- comments from the public and responses;
- comments from Aboriginal groups and individuals and responses; and
- relationship of the VEC to an Aboriginal group's potential or established Aboriginal and Treaty right.

11 ECONOMIC AND SOCIAL BENEFITS OF THE PROJECT

Information on the predicted economic and social benefits of the Project should be presented. This information will be considered by the Agency and regulatory agencies in assessing the justifiability of any significant adverse environmental effects, if necessary.

12 BENEFITS TO CANADIANS

The Proponent shall describe how the EA process for the Project provided a benefit to Canadians. Factors to be considered include, but are not limited to:

- Maximized environmental benefits;
 - What were the environmental benefits created as a result of the Project going through the EA process? (e.g., Will the Project reduce habitat fragmentation of a species at risk?);
- Contribution of the EA to support sustainable development;
 - Describe how the EA process for the Project contributed to the concept of sustainable development for a healthy environment and economy;
- Aboriginal consultation and public participation;
 - How did Aboriginal consultation and public participation in the EA influence the Project design and the environmental effects analysis?;
- Technological innovations;
 - Were there any new technologies developed to address environmental impacts that could be used for other projects?;
- Increases in scientific knowledge;
 - Describe any new scientific information collected through the EA that could benefit the assessment of other projects; and
- Community and social benefits;
 - Describe any changes in Project design that resulted in benefits to communities and/or social benefits (e.g., enhanced access to wilderness areas for recreation).

13 ENVIRONMENTAL MANAGEMENT

13.1 Planning

The purpose of the environmental management plans (EMPs) is to ensure that proper measures and controls are in place in order to decrease the potential for environmental degradation during all phases of project development, and to provide clearly defined action plans and emergency response procedures to account for human and environmental health and safety. Furthermore, analysis of the data obtained as a result of enacting the EMPs can be used to confirm any project specific assumptions and make corrective plans where necessary. The EMPs will serve to provide guidance on specific actions and activities that will be implemented to decrease the potential for environmental degradation during construction and operation, and to clearly define the Proponent's ongoing environmental commitment.

The EIS shall describe the proposed EMPs for all stages of the Project and include a commitment by the Proponent to implement the EMPs should the Project proceed. The finalization of detailed EMPs will occur through discussions with federal and provincial government agencies, Aboriginal groups and the public. This may occur after the environmental assessment but shall be consistent with the information presented in the EIS.

Pertinent legislation, regulations, industry standards, documents and legislative guides shall be used in the development of the EMPs.

13.1.1 Decommissioning and Reclamation Plan

The EIS shall provide the preliminary outline of a progressive decommissioning and reclamation plan for any components associated with the Project. This shall include ownership, transfer and control of the different project components as well as the responsibility for monitoring and maintaining the integrity of some of the structures. The full preparation and submission of the plan to appropriate authorities will occur prior to the decommissioning of the temporary components of the Project. The plan would serve to provide guidance on specific actions and activities to be implemented to decrease the potential for environmental degradation in the long-term during decommissioning and abandonment activities for temporary facilities, and to clearly define the Proponent's ongoing environmental commitments.

13.1.2 Follow-Up and Monitoring Program

Under section 38(2) of the Act, all comprehensive studies are required to have a follow-up program. The purpose of a follow-up program is to verify the accuracy of the EA and to determine the effectiveness of the measures implemented to mitigate the adverse

environmental effects of the Project. The EIS should describe the proposed follow-up program plan in sufficient detail to allow independent judgment as to the likelihood that it will deliver the type, quantity and quality of information required to reliably verify predicted effects (or absence of them), and to confirm both the EA assumptions and the effectiveness of mitigation.

The follow-up program shall be designed to incorporate baseline data, compliance data (such as established benchmarks, regulatory documents, standards or guidelines) and real time data (such as observed data gathered in the field). The Proponent shall describe the compliance reporting methods to be used, including reporting frequency, methods and format.

Environmental assessment effects predictions, assumptions and mitigation actions that are to be tested in the follow-up monitoring program shall be converted into field-testable monitoring objectives. The monitoring design shall include a statistical evaluation of the adequacy of existing baseline data to provide a benchmark against which to test for project effects, and the need for any additional pre-construction or pre-operational monitoring to establish a firmer project baseline.

The follow-up program shall include a schedule indicating the frequency and duration of effects monitoring. This schedule is to be developed after an evaluation of the length of time needed to detect effects given estimated baseline variability, likely magnitude of environmental effect and desired level of statistical confidence in the results (Type 1 and Type 2 errors).

The description of the follow-up program shall include any contingency procedures/plans or other adaptive management provisions as a means of addressing unforeseen effects or for correcting exceedances as required to comply or to conform to benchmarks, regulatory standards or guidelines.

The EIS shall provide the following:

- a discussion of the proposed follow-up program and its objectives;
- a description of the main components of the program and each monitoring activity under that component;
- a discussion of the objectives the monitoring activity is fulfilling (i.e. confirmation of mitigation, confirmation of assumptions; verification of predicted effects);
- the structure of the program;
- a schedule for the finalization and implementation of the follow-up program;
- a description of the roles and responsibilities for the program and its review process, by both peers, Aboriginal groups, and the public;
- possible involvement of independent researchers;

- the sources of funding for the program; and
- information management and reporting.

Follow-up programs provide an excellent opportunity to monitor the implementation of commitments made as part of the Aboriginal consultation process. RAs may have included conditions in authorizations, permits, contracts, leases or other binding documents that relate to specific mitigation and follow-up measures meant to accommodate adverse impacts to Aboriginal rights.

An Aboriginal consultation and public participation process can be incorporated into the EA follow-up program and can be used to:

- verify predictions of environmental effects identified in the EA and residual impacts that could not be accommodated on Aboriginal rights;
- determine the effectiveness of mitigation measures as they relate to environmental effects and accommodation measures in order to modify or implement new measures where required;
- support the implementation of adaptive management measures to address previously unanticipated adverse environmental effects or unanticipated adverse impacts to Aboriginal rights; and
- provide information on environmental effects and mitigation and accommodation measures/impacts on Aboriginal rights that can be used to improve and/or support future EAs and Aboriginal Crown consultation processes, including cumulative environmental effects assessments.

14 TABLE OF COMMITMENTS

The EIS shall summarize the Proponent's key commitments in implementing mitigations, contingency plans, monitoring, taking corrective actions, reclaiming the site and providing offsets for unavoidable project effects. The summary of commitments shall include:

- a summary of all significant management commitments;
- any applicable standards, legislation and/or policies;
- a discussion of any special management practices or design feature commitments; and
- a table summarizing the timing and responsibility for each of the actions for which a commitment has been made.

15 ASSESSMENT SUMMARY AND CONCLUSION

This section of the report shall summarize the overall findings with emphasis on the main environmental issues identified.

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