

**Draft Guidelines for the Preparation of an  
Environmental Impact Statement  
Pursuant to the  
Canadian Environmental Assessment Act  
for the  
Hammond Reef Gold Mine Project  
CANADIAN ENVIRONMENTAL ASSESSMENT AGENCY**



**August 2011**

**This page is intentionally blank.**

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project

---

**TABLE OF CONTENTS**

<b>PART 1 – BACKGROUND .....</b>	<b>7</b>
<b>1 INTRODUCTION .....</b>	<b>7</b>
1.1 PROPOSED PROJECT .....	8
1.2 ENVIRONMENTAL ASSESSMENT PROCESS .....	9
<b>2 GUIDING PRINCIPLES.....</b>	<b>10</b>
2.1 ENVIRONMENTAL ASSESSMENT AS A PLANNING TOOL .....	10
2.2 PUBLIC PARTICIPATION .....	11
2.3 ABORIGINAL CONSULTATION .....	11
2.4 TRADITIONAL AND LOCAL KNOWLEDGE.....	12
2.5 SUSTAINABLE DEVELOPMENT.....	13
2.6 PRECAUTIONARY APPROACH.....	13
2.7 USE OF EXISTING INFORMATION .....	14
2.8 USE OF CONFIDENTIAL INFORMATION .....	14
<b>3 PREPARATION AND PRESENTATION OF THE EIS.....</b>	<b>15</b>
3.1 AGENCY GUIDANCE .....	15
3.2 STUDY STRATEGY AND METHODOLOGY.....	15
3.3 PRESENTATION AND ORGANIZATION OF THE EIS.....	16
3.4 EXECUTIVE SUMMARY .....	17
<b>PART 2: STRUCTURE AND CONTENT OF THE EIS .....</b>	<b>18</b>
<b>4 INTRODUCTION AND PROJECT BACKGROUND .....</b>	<b>18</b>
4.1 THE PROPONENT.....	18
4.2 PROJECT OVERVIEW.....	18
4.3 PROJECT LOCATION.....	18
4.4 PARTICIPANTS IN THE ENVIRONMENTAL ASSESSMENT .....	19
4.5 REGULATORY FRAMEWORK AND THE ROLE OF GOVERNMENT .....	19
<b>5 PROJECT DESCRIPTION .....</b>	<b>20</b>
5.1 NEED FOR AND PURPOSE OF THE PROJECT .....	20

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project

5.2	PROJECT SETTING .....	20
5.3	PROJECT DESCRIPTION.....	21
<b>6</b>	<b>PROJECT SCOPING.....</b>	<b>22</b>
6.1	SCOPE OF THE PROJECT .....	22
6.2	FACTORS TO BE CONSIDERED .....	22
6.3	SCOPE OF THE FACTORS .....	23
	<b>6.3.1 Determination of Valued Ecosystem Components (VECs) .....</b>	<b>23</b>
	<b>6.3.2 Spatial Boundaries.....</b>	<b>25</b>
	<b>6.3.3 Temporal Boundaries.....</b>	<b>25</b>
<b>7</b>	<b>PROJECT ALTERNATIVES .....</b>	<b>25</b>
7.1	ASSESSMENT OF ALTERNATIVES AND SELECTION OF THE PROPOSED PROJECT .....	25
7.2	ALTERNATIVES TO THE PROJECT.....	26
7.3	ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT.....	26
7.4	ASSESSMENT OF ALTERNATIVES FOR MINE WASTE DISPOSAL.....	27
<b>8</b>	<b>CONSULTATION .....</b>	<b>28</b>
8.1	PUBLIC CONSULTATION .....	28
8.2	GOVERNMENT AGENCY CONSULTATION.....	28
8.3	ABORIGINAL CONSULTATION .....	28
	<b>8.3.1 Aboriginal Traditional Knowledge .....</b>	<b>30</b>
<b>9</b>	<b>EXISTING ENVIRONMENT .....</b>	<b>30</b>
9.1	PHYSICAL AND BIOLOGICAL ENVIRONMENT.....	31
	<b>9.1.1 Geology and Geochemistry .....</b>	<b>32</b>
	<b>9.1.2 Atmospheric Environment .....</b>	<b>32</b>
	<b>9.1.3 Acoustic Environment .....</b>	<b>33</b>
	<b>9.1.4 Water Quality and Quantity.....</b>	<b>33</b>
	<b>9.1.5 Fish and Fish Habitat .....</b>	<b>35</b>
	<b>9.1.6 Terrain and Soil .....</b>	<b>36</b>
	<b>9.1.7 Vegetation .....</b>	<b>37</b>
	<b>9.1.8 Wildlife.....</b>	<b>37</b>

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project

9.2	SOCIO-ECONOMIC ENVIRONMENT .....	39
<b>9.2.1</b>	<b>Aboriginal Interest &amp; Land and Resource Use</b> .....	39
<b>9.2.2</b>	<b>Navigable Waters</b> .....	40
9.3	HUMAN HEALTH .....	40
9.4	PHYSICAL AND CULTURAL HERITAGE RESOURCES .....	40
<b>10</b>	<b>ENVIRONMENTAL EFFECTS ASSESSMENT</b> .....	<b>41</b>
10.1	ASSESSMENT METHODOLOGY .....	41
<b>10.1.1</b>	<b>Risk Assessment Framework</b> .....	41
<b>10.1.2</b>	<b>Impact Matrix</b> .....	42
<b>10.1.3</b>	<b>Mitigation Measures</b> .....	42
<b>10.1.4</b>	<b>Residual Effects</b> .....	44
<b>10.1.5</b>	<b>Determination of the Significance of Residual Effects</b> .....	44
<b>10.1.6</b>	<b>Summary of Effects Assessment</b> .....	45
10.2	PHYSICAL AND BIOLOGICAL ENVIRONMENT.....	46
<b>10.2.1</b>	<b>Atmospheric Environment</b> .....	46
<b>10.2.2</b>	<b>Acoustic Environment</b> .....	48
<b>10.2.3</b>	<b>Water Quality and Quantity</b> .....	48
10.2.3.1	Hydrology and Hydrogeology.....	48
10.2.3.2	Water Quality and Aquatic Ecology .....	52
10.2.3.3	Sediment Quality and Benthos.....	55
<b>10.2.4</b>	<b>Fish and Fish Habitat</b> .....	56
<b>10.2.5</b>	<b>Terrain and Soil</b> .....	58
<b>10.2.6</b>	<b>Vegetation</b> .....	58
<b>10.2.7</b>	<b>Wildlife</b> .....	59
10.3	SOCIO-ECONOMIC ENVIRONMENT .....	60
<b>10.3.1</b>	<b>Aboriginal Interest &amp; Land and Resource Use</b> .....	60
<b>10.3.2</b>	<b>Navigable Waters</b> .....	61
10.4	HUMAN HEALTH .....	62
10.5	PHYSICAL AND CULTURAL HERITAGE RESOURCES .....	63
10.6	EFFECTS OF THE ENVIRONMENT ON THE PROJECT .....	64

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project

---

10.7	EFFECTS OF POTENTIAL ACCIDENTS OR MALFUNCTIONS .....	65
10.8	CAPACITY OF RENEWABLE RESOURCES.....	66
10.9	CUMULATIVE ENVIRONMENTAL EFFECTS .....	66
<b>10.9.1</b>	<b>Scoping</b> .....	67
<b>10.9.2</b>	<b>Methodology for Identifying, Predicting and Assessing Cumulative Environmental Effects</b> .....	68
<b>10.9.3</b>	<b>Potential Cumulative Effects</b> .....	68
<b>10.9.4</b>	<b>Mitigation Measures</b> .....	69
<b>10.9.5</b>	<b>Determination of significance</b> .....	69
10.10	SUMMARY .....	69
<b>11</b>	<b>ECONOMIC AND SOCIAL BENEFITS OF THE PROJECT .....</b>	<b>70</b>
<b>12</b>	<b>BENEFITS TO CANADIANS .....</b>	<b>70</b>
<b>13</b>	<b>ENVIRONMENTAL MANAGEMENT.....</b>	<b>71</b>
13.1	PLANNING.....	71
<b>13.1.1</b>	<b>Decommissioning and Reclamation Plan</b> .....	71
<b>13.1.2</b>	<b>Follow-Up and Monitoring Program</b> .....	72
<b>REFERENCES</b> .....		<b>75</b>

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project

---

**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
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-EAAB	Ontario Ministry of Environment – Environmental Assessment and Approvals Branch
NPAG	Non-potentially acid-generating
PAG	Potentially acid-generating
PM	Particulate matter
Project	Hammond Reef Gold Mine Project
Proponent	Osisko Hammond Reef Gold Ltd.
QA/QC	Quality assurance/quality control
SARA	<i>Species at Risk Act</i>
TIA	Tailings impoundment area
UTM	Universal Transverse Mercator
VEC	Valued Ecosystem Component

Cover Page Photo Credit: Tom Kleinboeck

## **PART 1 – BACKGROUND**

### **1 INTRODUCTION**

The purpose of this document is to identify for Osisko Hammond Reef Gold Ltd. (the Proponent) the information requirements for the preparation of an Environmental Impact Statement (EIS) for the proposed Hammond Reef Gold Mine Project (the project) to be assessed under the Comprehensive Study process pursuant to the *Canadian Environmental Assessment Act* (the Act).

If there are provincial environmental assessment requirements for the project, the Canadian Environmental Assessment Agency (the Agency) and the Ontario Ministry of Environment – Environmental Assessment and Approvals Branch (MOE-EAAB) intend to coordinate the environmental assessment processes to the extent possible to ensure that the respective environmental assessment requirements are met in a timely and effective manner. The information requirements presented herein are intended to be complementary to any future provincial environmental assessment requirements. The complementary nature of the information requirements may facilitate the Proponent’s development of a single body of documentation that satisfies both federal and provincial environmental assessment requirements as per the *Canada-Ontario Agreement on Environmental Assessment Cooperation* (2004).

These Environmental Impact Statement Guidelines (EIS Guidelines) specify the nature, scope and extent of the information required to support the comprehensive study. The Proponent shall prepare and submit an EIS that: identifies the potential adverse environmental effects, including cumulative effects, of the project; identifies technically and economically feasible measures (and alternatives) to mitigate those effects; and evaluates whether the proposed project will result in any significant adverse environmental effects.

It is the responsibility of the Proponent to use the EIS Guidelines and any future provincial information requirements as a framework to develop a complete EIS. The Proponent also needs to provide sufficient data and analysis on any potential environmental effects to permit proper evaluation by the Agency, MOE-EAAB, technical and regulatory agencies, Aboriginal groups, the public and any other participants. The Agency expects to be in communication with the Proponent during the conduct of the comprehensive study to understand preliminary results as well as to discuss how issues may be addressed.

The EIS Guidelines outline the minimum federal information requirements while providing the Proponent with flexibility in selecting methods to compile data for the EIS. The EIS Guidelines may be amended as more information about the project and the environment becomes available.

The Proponent is encouraged, when speaking with other government organizations, Aboriginal groups, the public and stakeholders, where appropriate, to ensure that the EIS clearly documents and addresses any concerns raised or suggestions provided.

### **1.1 Proposed Project**

The Proponent proposes to develop an open-pit gold mine that is expected to operate for about 14 years with a production rate of approximately 50,000 tonnes per day. The proposed mine is located approximately 23km northeast from the Town of Atikokan in northwestern Ontario (Refer to Figure 1).

The project includes all activities and physical works associated with its construction, operation, modification, decommissioning and post closure, including, but not limited to, the following activities and components: two open pits, ore processing facility, tailings management area, waste rock stockpiles, access roads upgrades, power transmission line and substation, explosives factory and magazines, water management facilities, buildings, support and ancillary mine infrastructure and associated activities.

This information is based on the project description provided by the Proponent on April 8, 2011, which is available in its entirety on the Major Projects Management Office online tracker: <http://www2.mpmo-bggp.gc.ca/MPTracker/project-projet-05.aspx?pid=147>.

Figure 1: Project Location Map

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project



## 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,

- Fisheries and Oceans Canada may 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;
- Fisheries and Oceans Canada may also take action in relation to subsection 35(2) of the *Fisheries Act*;
- Natural Resources Canada may take action in relation to paragraph 7(1)(a) of the *Explosives Act*; and,
- Transport Canada may take action in relation to section 5 of the *Navigable Waters Protection Act*.

Health Canada, Environment 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 qualifies as a Major Resource Project under the Major Resource Project Regulatory Improvement Initiative.

The Department of International Trade and Foreign Affairs has an interest in the environmental assessment because the project is located within the watersheds managed by the International Rainy Lake Board of Control and the International Rainy River Water Pollution Board (Boards). These Boards were created by the International Joint Commission to protect and manage the Rainy Lake and Rainy River watershed basins.

The Agency determined that the project as proposed by the Proponent is described in paragraph 16 (c) of the *Comprehensive Study List Regulations* under the *Canadian Environmental Assessment Act*, which states,

“16. The proposed construction, decommissioning or abandonment of  
(c) a gold mine, other than a placer mine, with an ore production capacity of 600 t/d or more;...”

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 is provided with the comprehensive study report.

As the Project may also undergo an individual environmental assessment under the Ontario *Environmental Assessment Act*, the Agency intends to coordinate the federal and provincial environmental assessment processes, to the extent possible, with the Proponent, MOE-EAAB as well as the Ontario Ministry of Northern, Development, Mines and Forestry who leads the provincial one window coordination process for mineral developments.

## **2 GUIDING PRINCIPLES**

### **2.1 Environmental Assessment as a Planning Tool**

Environmental assessment (EA) 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 shall 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 (Section 4 (1)) is to ensure opportunities for timely and meaningful public participation throughout the EA process. The public will have the opportunity to comment on the project and the conduct of the comprehensive study, the Proponent's environmental impact statement and the Agency's comprehensive study report. The Minister of the Environment shall 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 proposed project as early as possible in the review process. Achieving this objective requires that the Proponent is required 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**

The Proponent must ensure that it engages with Aboriginal people that may be affected by the Project and that have asserted or 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 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) and explain the results of the EIS in a clear direct manner to make the issues comprehensible to as wide an audience as possible.

When the Crown 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. For the purposes of the federal Crown consultation, the Proponent is required to describe in the EIS how the concerns respecting Aboriginal groups shall be addressed. That description shall include a summary of discussions, the issues or concerns raised, and shall consider and describe any asserted or established Aboriginal and treaty rights. This information shall be used by the Crown to assess the potential impact of the project on asserted or established Aboriginal rights, Aboriginal and

treaty rights, and the measures to prevent, mitigate, compensate or accommodate those potential effects.<sup>1</sup>

## **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, for example, contribute to the description of the existing physical, biological and 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 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

---

<sup>1</sup> Some of this information may be contained in an Impact Benefit Agreement negotiated between Aboriginal Groups 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.

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 from Aboriginal groups regarding the use, management and protection of their existing traditional knowledge information during the EA and post-EA should be obtained.

The Agency shall consider the views of communities, Aboriginal groups and traditional and local knowledge holders during the comprehensive study review 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 and Aboriginal participation. The EIS should also, in considering the project, (including alternative means of carrying out the project), address the relationships and interactions among the various components of the ecosystems with the goal of meeting the needs of present as well as future populations.

## **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 it 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 shall 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, technical, personal, cultural or other nature), that is treated consistently as confidential, and the person affected has not consented to the disclosure; or
- information that is likely to endanger the life, liberty or security of a person through its disclosure.

### **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). This document and other guidance material can be found at [Canadian Environmental Assessment Agency - Policy & Guidance - 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, the public and any other interested party 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 datum to allow for comparison and overlay of mapped features.

Consideration should be given to having a stand-alone section for the cumulative effects assessment.

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 should also be provided.

### **3.4 Executive Summary**

The EIS shall contain an executive summary which shall include the following:

- a concise description of all key facets of the project;
- a succinct description of the consultation conducted with Aboriginal groups, the public, and government agencies, with a summary of the issues raised and solutions found and/or suggested during these consultations;
- 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 (CSR).

## **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; 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. If the project is part of a larger sequence of projects, the Proponent shall outline the larger context and present the relevant references, if available.

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, 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 main project site; and
- the environmental significance and value of the geographical setting in which the project will take place and the surrounding area.

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;
- identify government policies, resource management, planning or study initiatives pertinent to the project and/or EA and discuss their implications;
- identify policies and guidelines of the Aboriginal groups being consulted that are pertinent to the project and/or EA and discuss their implications;
- identify any Aboriginal treaties that are pertinent to the project and/or EA;
- identify any relevant Land Use Plans, Land Zoning, or Community Plans;
- identify and delineate major components of the project and identify those being applied for and constructed within the duration of approvals under provincial and federal legislation; and
- provide a summary of 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 at [Canadian Environmental Assessment Agency - 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 facilities 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**

#### Location

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, watershed, and bathymetric 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.);
- regional map - two shall be provided, one to 1:100 000 scale and a second to a 1:50000 scale;
- watershed map - shall be appropriately scaled and show discharge and sampling locations;
- bathymetric maps - shall be provided for potentially impacted and reference lakes; and
- land Use maps – depicting municipal boundaries, mining tenure, claims and leases, Crown land tenure, private land tenure and land use designations.

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 the components of the mine site, the location of the transmission line corridor, access road upgrades, and any other supporting facilities.

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 during operation and closure 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 of interested parties.

The EIS shall include an expanded description of the phases of the Project, including site preparation, construction, operation, modification, decommissioning, closure and post-closure, as described in the Hammond Reef Gold Mine Project – Project Description (April 2011) and any subsequent Project updates<sup>2</sup>. The description of project phases shall include, but not be limited to, the physical works and activities listed in section 6.1.

---

<sup>2</sup> 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 PROJECT SCOPING**

### **6.1 Scope of the Project**

Osisko Hammond Reef Gold Ltd. proposes to develop an open-pit gold mine that is expected to operate for about 14 years with a production rate of approximately 50,000 tonnes per day. It is located approximately 23km northeast from the Town of Atikokan in northwestern Ontario. This Project involves the physical works and activities outlined below, but are not limited to:

- the construction and operation of an open pit gold mine and associated material stockpiles, tailings management area;
- the construction and operation of an ore processing facility, including tailings management area and transfer facilities;
- the construction and operation of support facilities and infrastructure at the mine site, including water supply and treatment, waste management, and storage facilities;
- the construction and operation of ancillary facilities and buildings, such as administrative offices, service buildings, fuel storage, explosives storage, etc.;
- the construction of a new 230kV transmission line of approximately 30km in length;
- upgrades to existing roads to allow access to the mine site; and,
- the decommissioning, closure and reclamation of the mine and mine-related infrastructure.

The scope of project shall include all components of the Project as proposed by the Proponent.

### **6.2 Factors to be Considered**

The environmental assessment includes 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 with an impact on potential or established Aboriginal and 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;

As well, three additional factors are required pursuant to paragraph 16(1)(e) of the Act:

11. The need for the project;
12. Alternatives to the project; and,
13. Benefits to Canadians (see section 12).

### **6.3 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 proposed 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.

#### **6.3.1 Determination of Valued Ecosystem Components (VECs)**

The EIS shall explain and justify methods used to predict the effects of the project on all components of the environment, including biophysical and socio-economic components, the interactions among these components and on the relations of these components within the

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project

---

environment. After considering all potential interactions between the components of the project and the environment, the assessment should focus on those which are likely to be measurable. The information presented shall be substantiated. The Proponent shall 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.

The VECs that will be assessed in the EIS will include the following components or features within them which are indicative of the important effects for the whole component:

- geology and geochemistry;
- atmospheric environment;
- acoustic environment;
- water quality and quantity, including surface and groundwater;
- fish and fish habitat, and aquatic ecosystems including benthos and sediment quality;
- terrain and soils;
- vegetation, including country food (e.g. wild game, berries, plants);
- wildlife and wildlife habitat; including avifauna, federally and provincially listed species at risk;
- socio-economic environment;
- current use of lands and resources for traditional purposes by Aboriginal persons;
- navigable waters;
- human health; and
- physical and cultural heritage.

Proposals to modify this list of VECs in the EIS may be made, following consultations with the public, Aboriginal groups, federal and provincial government departments and relevant stakeholders.

### **6.3.2 Spatial Boundaries**

Clearly indicate the spatial boundaries to be used in assessing the potential adverse and beneficial environmental effects of the proposed project. The EIS shall contain a justification and rationale for all boundaries chosen. 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 departments and agencies, local government and Aboriginal groups, taking into account public comments, 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 6.3.1 and any others proposed by the Proponent.

The EIS shall contain a justification and rationale for all boundaries and scales chosen.

### **6.3.3 Temporal Boundaries**

The temporal boundaries of the project should span all phases of the project: construction, operation, 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**

The EIS shall include an analysis of alternative means of carrying out the Project that are technically and economically feasible and the environment effects of any alternatives means. Further, the EIS shall include a consideration of the alternatives to the Project. For further guidance, the Proponent is referred to the Canadian Environmental Assessment Agency guidance document *Addressing 'Need for', 'Purpose of', 'Alternatives to' and 'Alternative Means' under the Canadian Environmental Assessment Act (CEAA 1998)*. The Proponent is

encouraged to demonstrate how the preferred alternative contributes to sustainable development.

## **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 proposed 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 and 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;
  - describe each alternative means in sufficient detail; and
- identify those alternative means that are technically and economically feasible.
  - identify the environmental effects of each alternative means.

- 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 and Treaty rights should also be identified.

#### **7.4 Assessment of Alternatives for Mine Waste Disposal**

With respect to the assessment of alternative means of disposing of mine waste, the following guidance is intended to assist the Proponent in developing a robust assessment of alternatives. The Proponent is strongly encouraged to utilize the methodology provided by Environment Canada, outlined below, to conduct a robust and thorough assessment of alternatives for mine waste disposal. The Proponent will also continue to meet with involved parties to ensure that their concerns and input are addressed in the alternatives analysis.

The Proponent has identified the 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. If the Project receives the required approvals through the EA process, the Metal Mining Effluent Regulation (MMER) would need to be amended to add these water bodies to Schedule 2 to designate them as Tailings Impoundment Areas (TIAs) before the water bodies can be used for mine waste disposal. 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 also include an assessment of the alternative means of carrying out the Project, which includes the disposal of mine waste.

It is strongly recommended that the Proponent undertake the assessment of alternatives for mine waste disposal as a component of the EIS to streamline the overall regulatory review process and minimize the time required to proceed with the MMER amendment process. This will also facilitate a thorough, transparent review of the assessment of alternatives as part of the EA process.

The assessment of alternatives for mine waste disposal should objectively consider all available options for mine waste disposal, including one that does not impact a natural water body frequented by fish. This assessment 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 for mine waste alternatives 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.

For further guidance, the Proponent should consult Environment Canada's *Guidelines for the Assessment of Alternatives for Mine Waste Disposal* (March 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**

For any consultations undertaken with Aboriginal groups provide all relevant information as outlined in section 8.1 above.

The Proponent shall actively solicit Aboriginal concerns during the course of the EA. The Crown and Proponent shall examine opportunities to mitigate the environmental effects of the project on Aboriginal groups' current use of lands and resources for traditional purposes and other Aboriginal interests considered under the *Canadian Environmental Assessment Act*. The Crown and Proponent shall also consider the potential need to take further actions to accommodate Aboriginal groups for adverse environmental impacts to potential or established Aboriginal and treaty rights caused by the proposed federal conduct and associated proposed Project.

For the purpose of developing the EIS, the Proponent shall continue to consult with Aboriginal groups with respect to their perspectives and opinions about the Project and the potential effects of the Project on their Aboriginal interests.

The EIS shall include a summary of the consultations undertaken with Aboriginal people and groups prior to the submission of the EIS. The Proponent shall also explain the results of the EIS in a clear and direct manner to make the issues understandable to as wide an audience as possible.

For the purposes of facilitating federal Crown Consultations, the Proponent is required to describe in the EIS how the concerns respecting Aboriginal groups will be addressed. That description shall include a summary of discussions, the issues or concerns raised, and shall consider and describe any asserted or established Aboriginal and treaty rights. The EIS shall document the potential environmental effects of the Project on asserted or established Aboriginal and treaty rights, and the measures to prevent or mitigate those potential effects.

The EIS shall:

- describe consultations undertaken prior to the submission of the EIS, the methods used and their rationales, perspectives and opinions expressed about the Project, issues raised and the ways in which the Proponent has responded to these issues;
- outline a proposal for a consultation process with Aboriginal groups which the Proponent, intends to carry out for the purposes of the review of the EIS.

In preparing the EIS, the Proponent shall ensure that Aboriginal groups have access to the information that they require in respect of the Project and of how the Project may impact them. The Proponent shall provide copies of the EIS to Aboriginal groups for information and consultation purposes and during the EIS review stage.

The Proponent shall consult with Aboriginal groups in accordance with the consultation process outlined in the EIS. A summary of the completed, ongoing and future consultation with

Aboriginal people and groups shall be provided. This summary shall include information from each group respecting concerns related to the project and which asserted or established Aboriginal and treaty rights are potentially affected by the Project and how such rights may be affected. It shall also include a description of how the concerns of groups and/or potential impacts to asserted or established Aboriginal and treaty rights have been considered and/or addressed. There shall also be a summary of any outstanding issues that remain.

The EIS shall include a list and discussion of key issues identified throughout the engagement and consultation activities with Aboriginal groups. Information on each issue shall be included in a Table of Concordance which in turn shall clearly indicate which section of the EIS includes a discussion of the issue.

### **8.3.1 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.

## **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 Cumulative Effects section). 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. 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.

### **9.1.1 Geology and Geochemistry**

The EIS shall provide the following:

- 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, colour, grain size, mineralogy, physical strength, hardness, weathering characteristics, depositional setting and correlations;
  - 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;
  - type and grade of metamorphism; and
  - regional geologic framework including tectonic belt, terrain, regional metamorphism and structure.
- 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 ARD/ML mitigation geochemistry. This includes major structural features as well as lesser local structures.

This information shall be used by the Proponent to assist in developing the surface and groundwater quality predictions for the Project.

### **9.1.2 Atmospheric Environment**

The EIS shall describe the climate and meteorological conditions at the site, local and regional study areas. Any off-site data used in the description shall be thoroughly discussed, including an analysis of how representative data is of conditions at the Project site. 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.

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 should include air temperature, relative humidity, evaporation, precipitation, wind speed and direction, atmospheric pressure, solar radiation, 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.

### **9.1.3 Acoustic Environment**

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

### **9.1.4 Water Quality and Quantity**

#### *Surface Water*

The EIS shall describe surface water quality and hydrology at the 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; and,
- a description of existing downstream water users and agreements in place under the International Joint Commission

### *Groundwater*

This section of the EIS shall describe hydrogeology at the 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 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; and
- 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.

### *Benthic Invertebrates*

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<sup>3</sup>. The Proponent should give due consideration to sample benthic invertebrate

---

<sup>3</sup> The Proponent is encouraged to contact Environmental Canada for specific recommendations regarding the collection of benthic invertebrate community baseline endpoints in relation to the *Metal Mining Effluent Regulations* (MMER)

communities, including sediment quality in areas identified as potential final discharge locations.

#### **9.1.5 Fish and Fish Habitat**

The baseline data collected and reported in the EIS should:

- contribute to the development of mitigation measures and compensation plans for the proposed Project;
- contribute to the development of a conceptual reclamation and closure plan for the proposed 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, chlorophyll a),

- distribution, abundance and characterization of fish by species and life stages<sup>4</sup>;
- characterization of existing metal levels in fish muscle and liver in areas that may be impacted by effluent or seepage from the mine; and
- the results of fish and fish habitat surveys along existing roads and the transmission line right of way.

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). Any variation from those methods should be scientifically justified and references provided.

#### **9.1.6 Terrain and Soil**

The EIS shall include:

- baseline mapping and description of landforms and landform processes and soils within the local and regional Project area, including the transmission line corridor, to support the effects assessment for all terrestrial disciplines;
- map soil depth by horizon within the mine site area to support soil salvage and reclamation efforts;
- details of soil sample analysis completed and the quality assurance/quality control program followed; and
- summarize baseline data on the concentration of trace elements in site soils prior to Project development.

---

<sup>4</sup> 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)

### **9.1.7 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 ecological or social value:

- forests;
- wetland ecosystems;
- riparian ecosystems; and,
- plant species and ecological communities of conservation concern.

### **9.1.8 Wildlife**

The EIS shall describe and identify:

- the terrestrial species and their habitat at the site and within the local and regional study areas;
- any species of conservation concern and their associated habitat (general, regulated or critical);
- any wildlife corridors and physical barriers to movement that exist within the Project area;
- 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 and wildlife management areas).

The 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 will be identified and information on relative abundance, distribution and habitat use of these species;
- identification of ungulate species occurring in the proposed mine development area and along the transmission corridor;
- the results of aerial surveys to collect data on the relative abundance and distribution of moose, white-tail deer and woodland caribou 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;

- 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;
- information on the level of use of the mine site area by large carnivores such as black bears and wolves;
- information on furbearer and small mammal species known and potentially occurring in the proposed mine development area.
- The relative abundance of furbearer species in the area will be described;
- information on raptors and raptor habitat in the proposed 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 results of 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, regional or local level and their critical habitats, as outlined in the sections above.

The 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 (i.e., COSEWIC-listed species, species listed under the Species at Risk Act and/or the Endangered Species Act, 2007) 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.

#### *Aboriginal Interest 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 should 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 asserted and established Aboriginal and treaty rights 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, 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.

#### *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.

#### *Outdoor Recreation and Tourism*

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

#### *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.

#### **9.2.2 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.

#### **9.3 Human Health**

The Proponent shall use a broad definition of human health in describing the aspects of human health. The Proponent is encouraged to include all baseline information relevant to human health in one section of the EIS.

#### **9.4 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 Methodology<sup>5</sup>**

Potential effects from all components of the project shall be discussed. The Proponent shall indicate the project's effects during construction, operation, foreseeable modifications, 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 predicted future conditions without the project. The assessment shall reveal 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 should 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:

---

<sup>5</sup> 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 proposed project.

An accepted approach to population-level ecological risk assessment and its use in environmental decision-making has been developed through recent scientific work. This approach includes a determination of when a population-level risk assessment is warranted (Tier 1 and Tier 2 assessments), the consideration of exit criteria, and a determination of the value of the assessment (Barnthouse *et al.*, 2008).

#### **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 proposed project, as well as the impact of environmental effects on asserted and established Aboriginal and 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 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.

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 mitigation practices, policies and commitments that constitute technically and economically feasible mitigation measures and that will be applied as part of standard practice regardless of location. 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.

For species at risk defined by the federal *Species at Risk Act*, pursuant to subsection 79(1) of that Act, RAs under the *Canadian Environmental Assessment 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, (performing the duties of the RA) 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) 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 at [Canadian Environmental Assessment Agency - Policy & Guidance - Guidance Materials](#) (see Procedural Guides).

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.

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.

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

#### **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 Atmospheric Environment**

The baseline climate data collected as per Section 9.1.1.2 should be used to assist in the air quality dispersion assessment and to assist in the hydrology and water management work.

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 Co operative Climatological Autostations, Version 3.0 Meteorological Service of Canada, September 2004; and
- 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.

#### *Criteria Air Contaminants*

The EIS shall identify potential effects on air quality associated with all Project phases, including point and mobile sources. Examples include heavy and light-duty vehicle exhaust, fugitive particulate matter, emissions from the diesel fuel generator and particulate from blasting and ore concentrate transportation.

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 should also include a discussion of the following:

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project

---

- measures considered to minimize the release of greenhouse gasses and air contaminants (dust - both emissions and fugitive, particulate exhaust fumes and other air contaminants);
- atmospheric dispersion of emissions with emphasis on PM2.5 and PM10 on a local and regional scale;
- all air emissions including Sulphur Oxides (SO<sub>x</sub>), Nitrogen Oxides (NO<sub>x</sub>), Particulate Matter (PM) including total PM, PM10, and PM2.5, Volatile Organic Compounds (VOCs), Carbon Monoxide (CO), Ammonia (NH<sub>3</sub>), ground-level ozone (O<sub>3</sub>), and secondary particulate matter (secondary PM); air pollutants on the *List of Toxic Substances in Schedule 1* of the *Canadian Environmental Protection Act, 1999* (CEPA Registry, 1999); diesel PM; and other contaminants as appropriate;
- the worst-case dispersion modeling results (including mapping) and noting the location of key and sensitive receptors;
- combined predicted cumulative AQ concentrations during the various project phases with suitably conservative estimates of background concentrations to arrive at the worst-case cumulative AQ concentrations;
- predicted cumulative AQ concentrations compared with the NAAQO and CWS for AQ and any applicable provincial ambient AQ criteria; and
- impact on biological receptors such as vegetation, fish, wildlife and human health; and

#### *Dustfall*

The EIS documentation relating to dustfall shall consider:

- data for mass of dustfall per area per unit time and expected metals concentration in the dustfall; and
- measures to mitigate dustfall by exposed tailings beaches, and other sources, during closure and post-closure phases, including the likelihood of establishing and maintaining native plant cover on tailings and other surfaces.

#### *Greenhouse Gases*

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

- discuss the analytical techniques and relevant policies considered in the EA;
- list and estimate the emissions of GHGs predicted for all relevant Project sources and compare to other similar mining projects;

- discuss possible changes in the climate;
- identify mitigation measures considered to control Project GHG emissions; and
- discuss the sensitivity of the Project to changes in specific climate and related environmental parameters, including total annual rainfall, total annual snowfall, frequency and/or severity of precipitation extremes, lake levels and stream flow.

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

#### *Light Pollution*

The EIS shall identify potential effects on the environment resulting from artificial light pollution at the mine site, and shall provide a description of management measures to mitigate any such effects.

### **10.2.2 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 including identification and description of whether particular receptors may have a heightened sensitivity to noise exposure or expectation of peace and quiet;
- 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.

### **10.2.3 Water Quality and Quantity**

#### **10.2.3.1 Hydrology and Hydrogeology**

##### *Surface Water*

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

- assist in the development of the site water balance;

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project

---

- document run-off and sediment control works;
- determine water supply 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:

- provide an assessment of changes to the hydrologic regime resulting from site construction (deforestation, removal of overburden, dewatering, increased drainage, etc.), operation, modification, decommissioning and post-closure, with a focus on lakes and streams that relate to existing fish, fish habitat and proposed fish compensation plans;
- include details about changes in lake levels and 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 run-off and effluent discharges from the site;
- include maps that show future basins delineation, drainage direction, proposed diversions channels and runoff 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 mill, open pits, TIAs 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;
  - the predicted water balance for each year of the mine life and all inflows and outflows 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 site, 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 (including sediment ponds and seepage collection ponds). 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; 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.

#### *Groundwater*

The EIS shall:

- 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, 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;

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project

---

- 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 strategies for groundwater seepage within the project 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 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.

#### **10.2.3.2 Water Quality and Aquatic Ecology**

In conducting the effects assessment for water quality and aquatic ecology, the EIS shall include the following:

- graphical presentation of key variables and stream flows over time for key sites to illustrate patterns and variability;
- power and confidence calculations for key variables at key sites once the effects have been predicted to guide future monitoring. Key variables are those that the impact assessment indicate may contribute to degraded water quality, and key sites are those sites where the discharge of key variables might take place;
- 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. For example, high levels of metals or acidity may occur briefly during the first flush of spring freshet, but could wipe out large numbers of sensitive aquatic organisms present in the receiving waters at that time of the year; 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:

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project

---

- 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;
- 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 of surface run-off from the various mine components, 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; and
- As well, it has been noted that in the project scope description that the excess water in the tailings impoundment will be treated at the water treatment facility (WTF). The EIS should include details on the WTF (i.e. type of treatment) and request preparation of a sludge management plan in the eventuality that neutralization sludge is produced.

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;
- waste rock, tailings and low grade ore characterization, volumes, segregation/disposal method mitigation/management plans, contingency plans, operational and post-closure monitoring and maintenance plans;

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project

---

- assessment of the feasibility to successfully segregate potentially-acid generating (PAG) and non-potentially acid generating (NPAG) 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 PAG materials during operation and post-closure;
- pit water chemistry during operation and post-closure, and pit closure management measures (e.g. flooding). This shall include geochemical modeling of pit water quality in the post-closure period;
- surface and seepage water quality from the waste rock dumps, tailings/waste rock impoundment facility, 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.

The EIS shall also assess the environmental effects on surface water quality from increased sedimentation resulting from erosion associated with timber harvesting along the proposed transmission line corridor.

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

- effluent characterization and quality predictions. Predicted effluent quality should be directly compared to toxicity data, where available;
- waste discharge 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 area to be mined,
  - 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 to be released from the site into the 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 worst case 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.

### **10.2.3.3 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; and
- invertebrate species.

#### **10.2.4 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 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 consideration of a comparison with other similar habitat or ecosystems in the region and the province and a variety of other parameters such as fish density, biomass or productivity, biomass and diversity and water quality parameters such as nutrients, pH, dissolved oxygen, or temperature;
- 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, 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 level of productive capacity;
- 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 existing and predicted metal levels in fish. Using the baseline data on metal levels in fish muscle and liver in areas that may be impacted by effluent or seepage from the mine, the EIS shall evaluate the predicted changes in metal levels due to the Project.

#### **10.2.5 Terrain and Soil**

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 baseline and monitoring program to assess trace element uptake in soils at mine closure, and where possible, during the mine life;
- 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).

#### **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; and
- develop mitigation measures to minimize or eliminate Project effects on vegetation, ecosystem function and wildlife habitat.

With respect to the proposed transmission line, the EIS shall include a discussion of the following issues:

- the potential effects of invasive vegetation within the corridor and proposed methods of controlling invasive or undesired vegetation; and
- whether the proposed corridor will be seeded.

#### **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. These summaries will include wildlife habitat suitability interpretations for ungulates, black bear 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, and to reduce potential bird loss resulting from collisions with the transmission line, 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 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, including the transmission line corridor. This shall include the identification and assessment of the potential effects of the Project on wildlife species of conservation concern (i.e., COSEWIC-listed species, species listed under the *Species at Risk Act* and/or *Endangered Species Act* and their habitats).

## **10.3 Socio-Economic Environment**

### **10.3.1 Aboriginal Interest & Land and Resource Use**

#### *Aboriginal Interest and Current Use of Lands and Resources by Aboriginal Persons*

The EIS shall provide information regarding the effects of the Project on Aboriginal groups' interests and on asserted or established Aboriginal and treaty rights. 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 asserted or established Aboriginal and treaty rights.

#### *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 identified, such as 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.

#### *Fishing*

With respect to fishing, the EIS shall provide an assessment of the effects of Project development on the commercial and/or recreational lake and stream fisheries affected by the Project, and present mitigation and/or compensation plans. This assessment should provide results of visitor and creel surveys conducted to examine lake and streams use, catch success, and the importance of the lake and streams in a regional and provincial context.

#### *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.

### **10.3.2 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; and
- 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.

#### **10.4 Human Health**

The EIS shall include consideration of the potential effects of all Project phases (i.e. construction, operation, modification, 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 and the mine site, 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 mine site and in the broader 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 standards should not be considered as “thresholds” below which health effects do not occur.

- mitigation measures and monitoring of air quality, water quality and country foods as appropriate;
- 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 at the mine site or along the transmission line corridor,
  - 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.

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-semt/pubs/eval/environ\\_assess-eval/index-eng.php](http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/environ_assess-eval/index-eng.php)

## **10.5 Physical and Cultural Heritage Resources**

Physical and cultural heritage resources shall be considered in the EIS. According to Canadian Environmental Assessment Agency guidance document *Reference Guide: 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, artifacts 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 on site and off site components of the Project on archaeological and heritage resources. The EIS shall include:

- an archaeological impact assessment of the Project site, including the transmission line corridor; 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;
  - archaeological compensation recommendations; and
  - recommendations or a tentative schedule for conducting surveillance and/or monitoring during Project implementation.

#### **10.6 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). The EIS shall include other considerations in relation to the assessment of the effects of the environment including any downstream water users that have water use agreements already in place and water quantity/availability for long term tailings management. 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 Canadian Environmental Assessment Agency Procedural Guide, *Incorporating*

*Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners* (2003), provides guidance for incorporating climate change considerations in an EA.

From a geohazard perspective, glaciolacustrine deposits draping till and glaciofluvial outwash deposits that occur in the area of the project may be prone to landslides if disturbed by natural processes or anthropogenic activities. Debris slides and debris flows could potentially run out into small lake basins, locally impacting wetlands, streams, ecosystems and infrastructure. As such these should be discussed. Terrain stability analysis, including rigorous surficial geology mapping should be undertaken as part of the environmental effects assessment.

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.

### **10.7 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, 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 (e.g. accidental explosion, tailings dam failure, etc.);

- 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.

### **10.8 Capacity of Renewable Resources**

The EIS shall include an assessment of 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. 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.

### **10.9 Cumulative Environmental Effects**

The Proponent shall identify and assess the cumulative environmental effects of the Project, including on site and off site components, in combination with other past, present or reasonably foreseeable projects and/or activities within the study areas. The approach and methods used to identify and assess cumulative effects shall be explained. The Canadian Environmental Assessment Agency's Operational Policy Statement OPSEPO/ 2- 2007, *Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act*, and the *Cumulative Effects Assessment Practitioner's Guide* (CEAA 1999) provide further guidance for conducting cumulative effects assessment.

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 actions (projects or activities).

Environmental components that would not have an adverse effect from the project can, therefore, be omitted from the cumulative effects assessment. A cumulative effect on an environmental component may, however, 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 and 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)) allows for the consideration of information from relevant regional studies of environmental effects from possible future projects.

The Proponent should also give consideration to developing the cumulative effects assessment as a stand alone document.

### **10.9.1 Scoping**

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 main valued ecosystem components (VEC) that could potentially be most affected by any components of the project. To this end, the Proponent shall consider, without limiting itself thereto, the following components likely to be affected by the Project:

- fish and fish habitat;
- sediment and benthos;
- aquatic resources/ecosystems/watersheds;
- groundwater and surface water resources;

- key valued wildlife species, such as provincially or federally listed species at risk and Bird Conservation Region priority species; and
- asserted or established Aboriginal and treaty rights.

The EIS shall identify and justify the spatial and temporal boundaries for the cumulative effect 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 project effects.

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 government departments and relevant stakeholders.

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

### **10.9.2 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 Proponent's project effects with those of other foreseeable developments and activities, and the methods used to determine the significance of those combined effects, should also be described. The rationale for choosing selected baseline conditions against which cumulative environmental effects are assessed should also be explained.

### **10.9.3 Potential Cumulative Effects**

The EIS shall identify the sources of potential cumulative effects. 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.

#### **10.9.4 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 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.

#### **10.9.5 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).

#### **10.10 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;
- relationship of the VEC to an Aboriginal group's potential or established Aboriginal and Treaty right;
- a table of proposed commitments, summarizing the timing and responsibility of each of the actions for which a commitment (including special management practices or design features) has been made by the Proponent.

## **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 technical 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 proposed 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? etc.)
- 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.
- 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 consultation with federal and provincial government agencies, Aboriginal groups, the public and other stakeholders. 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. For permanent facilities, a conceptual discussion on how decommissioning may occur shall be provided.

### **13.1.2 Follow-Up and Monitoring Program**

A follow-up program is designed 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.

## REFERENCES

- Barnthouse, L.W., W. R. Munns Jr. and M. T. Sorensen. 2008. "Population-Level Ecological Risk Assessment". CRC Taylor and Francis, NY. Society of Environmental Toxicology and Chemistry.
- Canada. 2003. A Framework for the Application of Precaution in Science-based Decision Making About Risk. Accessed January 15, 2009. <http://www.pco-bcp.gc.ca/docs/information/Publications/precaution/Precaution-eng.pdf>
- Canadian Environmental Assessment Agency. Operational Policy Statement. 2007. Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative Means" under the *Canadian Environmental Assessment Act*. [Canadian Environmental Assessment Agency - Policy & Guidance - Operational Policy Statement - Addressing "Need for", "Purpose of", "Alternatives to" and "Alternative Means" under the CEA Act](#)
- Canadian Environmental Assessment Agency. Operational Policy Statement. 2007. Addressing Cumulative Environmental Effects under the *Canadian Environmental Assessment Act*. [Canadian Environmental Assessment Agency - Policy & Guidance - Operational Policy Statement - Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act](#)
- Canadian Environmental Assessment Agency. Procedural Guide. 2003. "Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners", prepared by: The Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment. [Canadian Environmental Assessment Agency - Policy & Guidance - Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners](#)
- Canadian Environmental Assessment Agency, Reference Guide 1994: Addressing Cumulative Environmental Effects. [Canadian Environmental Assessment Agency - Policy & Guidance - The Responsible Authority's Guide](#)
- Canadian Environmental Assessment Agency. Procedural Guide. 1999 "Cumulative Effects Assessment Practitioners Guide", Hegmann, G., C. Cocklin, R. Creasey, S. Dupuis, A. Kennedy, L. Kingsley, W. Ross, H. Spaling and D. Stalker. Prepared by: The Cumulative Effects Assessment Working Group and AXYS Environmental Consulting Ltd. <http://dsp-psd.pwgsc.gc.ca/Collection/En106-44-1999E.pdf>

Draft Environmental Impact Statement Guidelines  
Hammond Reef Gold Mine Project

---

Canadian Environmental Assessment Agency and the Ontario Ministry of Environment. 2011. Draft Guidelines for the Preparation of an Environmental Impact Statement for the Marathon Platinum Group Metals and Copper Mine Project.

Environment Canada. 2009. Environmental Code of Practice for Metal Mines.

Environment Canada. 2011. Guidelines for the Assessment of Alternatives for Mine Waste Disposal.

Government of Newfoundland and Labrador and the Government of Canada. 2011. Environmental Impact Statement Draft Guidelines and Scoping Document Labrador-Island Transmission Link Nalcor Energy.

Portt, C.B., Coker G.A., Mandrak N.E., Ming D.L. 2008. Protocol for the Detection of Fish Species at Risk in Ontario Great Lakes Area (OGLA). Fisheries and Oceans Canada. Canadian Science Advisory Secretariat.