Guidelines for the Preparation of an Environmental Impact Statement

for

Hope Bay Mining Ltd.'s

Phase 2 Hope Bay Belt Project

(NIRB File No. 12MN001)

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Issued by:

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GLOSSARY

This glossary is provided for the Proponent's greater certainty; the onus is on the Proponent to request clarification from the NIRB on any term it feels has not been made clear. This glossary includes terminology and definitions that are specific to Nunavut and the proposed project. Additional glossary terms can be found in the NIRB's *Guide 2: Guide to Terminology and Definitions* (NIRB, 2007).

Please note that, where possible, a reference has been provided for each of the terms below.

Commissioner's Lands	Lands administered by a municipality in Nunavut, or by the Government of Nunavut.
Country foods	The traditional diet of Inuit, including caribou, musk-ox, bears, whales, seals, birds, arctic char, shellfish and berries among other foods that are hunted, fished or gathered locally (GN, 2011).
Cumulative impacts or effects	The impact on the environment that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (Tilleman, 2005). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.
Ecosystemic	Relating to the complex of a natural community of living organisms and its environment functioning as an ecological unit in nature.
Esker	A long winding ridge of gravel, sand, etc. originally deposited by a melt water stream running under a glacier (INAC, 2007b).
Fugitive dust	Also referred to as fugitive mist or fugitive vapour. Dust, mist, or vapour containing a toxic pollutant, regulated under federal legislation that is emitted from any source other than through a stack (Tilleman, 2005).
Harvest	The reduction of wildlife into possession, and includes hunting, trapping, fishing, as defined in the *Fisheries Act*, netting, egging, picking, collecting, gathering, spearing, killing, capturing or taking by any means (GC and TFN, 1993).
Ice scour	Geological term for long, narrow ditches in a seabed, created by the collision of fast ice and pack ice and the grounding of icebergs.
Inuit	Aboriginal peoples of northern Canada and Greenland. In the context of Nunavut, for the purpose of these Guidelines, meaning those people to whom NLCA Beneficiary status is ascribed.
Inuit Owned Lands	Means (a) those lands that vest in the DIO [Designated Inuit Organization] as Inuit Owned Lands pursuant to Section 19.3.1 [of the NLCA], and (b) any lands that are vested in, acquired by or

	re-acquired by the DIO as Inuit Owned Lands from time to time pursuant to the [NLCA], so long as they maintain such status pursuant to the [NLCA] (GC and TFN, 1993).
Inuit Qaujimajatuqangit	Means the traditional, current and evolving body of Inuit values, beliefs, experience, perceptions and knowledge regarding the environment, including land, water, wildlife and people, to the extent that people are part of the environment (QIA, 2009). This definition replaces the definition in NIRB's *Guide 2: Guide to Terminology and Definitions* (NIRB, 2007)
Inuit Qaujimaningit	Encompasses Inuit Traditional Knowledge (and variations of Inuit Qaujimajatuqangit), as well as Inuit epistemology as it relates to: a) Inuit Societal Values (including the legal obligations set out in the NLCA regarding Inuit Participation, Inuit employment and training, etc. intended to assist Inuit socio-economic development); b) Inuit Knowledge (both contemporary and traditional) as it relates to environmental and ecological knowledge of a given area and based on the collective day-to-day use of Inuit hunters of that area of concern (QIA, 2009).
Local Study Area	That area where there exists the reasonable potential for immediate impacts due to project activities, ongoing normal activities, or to possible abnormal operating conditions.
Nunavummiut	Residents of Nunavut.
Nunavut Land Claims Agreement (NLCA)	The "Agreement Between the Inuit of the Settlement Area and her Majesty the Queen in Right of Canada", including its preamble and schedules, and any amendments to that agreement made pursuant to it (Tilleman, 2005).
Potentially affected communities	A community or communities with the potential to be impacted, either positively or negatively, by a proposed project or development. Such communities may be defined physical entities or comprised of dispersed populations in the area of influence of a development or project.
Precautionary principle	Where there are threats of serious or irreversible damage, lack of full scientific certainty must not be used as a reason for postponing cost-effective measures to prevent environmental degradation (UN, 1972).
Proponent	The organization, company, or department planning to undertake a proposal (Tilleman, 2005).
Reasonably foreseeable future development	Projects or activities that are currently under regulatory review or that will be submitted for regulatory review in the near future, as determined by the existence of a proposed project description,

	letter of intent, or any regulatory application filed with an authorizing agency (NIRB, 2007).
Regional Study Area	The area within which there is the potential for indirect or cumulative biophysical and socio-economic effects.
Residual Impacts	Those predicted adverse impacts that remain after mitigating measures have been applied (Tilleman, 2005).
Rock glacier	Characteristically appear as an assemblage of boulders and boulder-rich soil, but in form resemble a valley glacier or a cirque glacier. The downslope fronts may be very steep and tens of metres high. The soil material in the fronts must be strong enough to resist the high shear stresses that would otherwise cause collapse to a lower angle. Yet the surface of a rock glacier when 'active' (i.e. moving) is advancing at tens of centimetres or a metre or so per year and the movements extend to many metres depth (Williams and Smith, 1989)
Rock heave	The movement of rock as a result of freezing and thawing.
Sacred site	A place on the land created or used by Inuit spiritual leaders in the past for religious ceremonies, such as: a platform or formation leading to an "altar"; a hill, mountain, stone, boulder, river, lake, or Inukshuk designated as a sacred site; an offering place where people might plead for good fortune and well-being, often found along the coast, but also inland; a place where an unusual event might have happened, or an event that led to a death or a story of survival; a place known to Elders in legend where a significant story occurred (Ittarnisalirijiit Katimajiit, 1996).
Scoping	A process that pinpoints significant issues requiring study and analysis. This process aims to identify those components of the biophysical and/or socio-economic environment that may be impacted by the project and for which there is public concern (NIRB, 2008).
Tailings	Residue of raw material or waste separated out during the processing of crops or mineral ores. Those portions of washed or milled ore that are regarded as too poor to be treated further (Tilleman, 2005).
Talik	Permanently unfrozen ground in regions of permafrost. Usually applies to a layer that lies above the permafrost but below the active layer, often occurs below waterbodies.
Thermal stability	The degree to which something, such as permafrost, has the capacity to remain at the same temperature over time.
Traditional Knowledge (TK)	Cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by

	cultural transmission. Specific Inuit Traditional Knowledge is referred to as Inuit Qaujimajatuqangit (NIRB, 2007).
Transboundary impacts	Any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity, the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party (UN, 1991).
Valued Ecosystem Components (VECs)	Those aspects of the environment considered to be of vital importance to a particular region or community, including: a) resources that are either legally, politically, publically, or professionally recognized as important, such as parks, land selections, and historical sites; b) resources that have ecological importance; and c) resources that have social importance (NIRB, 2007).
Valued Socio-Economic Components (VSECs)	Those aspects of the socio-economic environment considered to be of vital importance to a particular region or community, including components relating to the local economy, health, demographics, traditional way of life, cultural well-being, social life, archaeological resources, existing services and infrastructure, and community and local government organizations (NIRB, 2007).

LIST OF ACRONYMS

AANDC	Aboriginal Affairs and Northern Development Canada; previously INAC
ANFO	Ammonium Nitrate and Fuel Oil
ARD	Acid Rock Drainage
ATV	All-Terrain Vehicles
CEA	Cumulative Effects Assessment
CO	Carbon Monoxide
COPC	Constituents of Potential Concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Department of Fisheries and Oceans Canada
EC	Environment Canada
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GN	Government of Nunavut
GN-CH	Government of Nunavut, Department of Culture and Heritage; previously Government of Nunavut, Department of Culture, Language, Elders and Youth or GN-CLEY
HTO	Hunters' and Trappers' Organization
IIBA	Inuit Impact and Benefit Agreement
INAC	Indian and Northern Affairs Canada; now AANDC
IOL	Inuit Owned Land
IPG	Institution of Public Government
IR	Information Request
KIA	Kitikmeot Inuit Association
LSA	Local Study Area
MB	Megabyte
ML	Metal Leaching
MSDS	Material Safety Data Sheets
NGMP	Nunavut General Monitoring Program
NIRB	Nunavut Impact Review Board
NLCA	Nunavut Land Claims Agreement
NNLP	No Net Loss Plan
NO_x	Nitrous oxides
NPC	Nunavut Planning Commission
NSA	Nunavut Settlement Area

NWB	Nunavut Water Board
NWMB	Nunavut Wildlife Management Board
OHF	Oil Handling Facility
O_3	Ozone
PAG	Potentially Acid Generating
PM	Particulate Matter
PM_{10}	Particulate Matter of 10 micrometres or less
$PM_{2.5}$	Particulate Matter of 2.5 micrometres or less
PMP	Probable Maximum Precipitation
QIA	Qikiqtani Inuit Association
RSA	Regional Study Area
SARA	Species at Risk Act
SEMC	Socio-Economic Monitoring Committee
SO_2	Sulphur dioxide
SOPEP	Shipboard Oil Pollution Emergency Plan
TDS	Total Dissolved Solids
TK	Traditional Knowledge
TSP	Total Suspended Particulate
VEC	Valued Ecosystem Component
VOC	Volatile Organic Compound
VSEC	Valued Socio-Economic Component

PART I – THE ASSESSMENT

1.0 INTRODUCTION

1.1 OBJECTIVE OF NIRB GUIDELINES

Pursuant to Section 12.5.2 of the *Nunavut Land Claims Agreement* (NLCA):

> *"When a project proposal has been referred to NIRB by the Minister for review, NIRB shall, upon soliciting any advice it considers appropriate, issue guidelines to the Proponent for the preparation of an impact statement. It is the responsibility of the Proponent to prepare an impact statement in accordance with any guidelines issued by NIRB..."* (GC and TFN, 1993)

The present Guidelines are issued for the preparation of an Environmental Impact Statement (EIS) for the Phase 2 Hope Bay Belt project (the Project) as proposed by Hope Bay Mining Ltd. (HBML or the Proponent). An EIS is a documented evaluation of the project proposal, providing detailed information regarding the proposal's environmental and socio-economic impacts (NIRB, 2006b). It includes the identification and development of mitigation measures or actions taken to lessen the actual or foreseen adverse environmental impact of a project or activity (Gregorich et al, 2001). The EIS also contains monitoring and reporting methods to verify the accuracy of the Proponent's impact predictions.

1.2 EIS GUIDELINE DEVELOPMENT

The Phase 2 Hope Bay Belt project is subject to the environmental review and related licensing and permitting processes established by the NLCA (GC and TFN, 1993). In correspondence dated May 30, 2012 the Minister of Aboriginal Affairs and Northern Development (the Minister) referred the Phase 2 Hope Bay Belt project to the Nunavut Impact Review Board (NIRB or Board) for public Review pursuant to Part 5 of Article 12 of the NLCA.

The Minister also responded to the following issues of concern identified in the NIRB's Screening Decision Report for this file:

1. *Geochemical Characterization of Waste Rock and Mitigation Measures for Potential Acid Rock Drainage and Metal Leaching* – the Minister agreed with the NIRB that the potential for acid rock generation and metal leaching should be included in the Review of the Project.

2. *Hope Bay Mining Ltd.'s Proposed Tailings Management Strategies* – The Minister agreed with the NIRB that the effectiveness of any tailings management strategy, including the adequacy of any proposed monitoring program should be included in the Review of the Project.

3. *Potential Cumulative Effects of Increasing Mineral Development in the Kitikmeot Region* – the Minister agreed with the NIRB that the potential cumulative effects should be included in the Review of the Project.

4. *Availability of Participant Funding* – In response to the NIRB request that the Minister make participant funding available during this Review, the Minister stated that while funding has been provided on a case-by-case basis in the past, there is no established participant funding for environmental assessments in Nunavut. As a result, participant funding will not be available for the Review of the Phase 2 Hope Bay Belt project proposal. The Minister also stated that he is confident that the Board's NLCA Part 5 Review process will provide sufficient and meaningful opportunities for potentially affected groups to participate in the review.

5. *Recent Announcement Regarding Care and Maintenance at Doris North* – The Minister stated that while he acknowledges the difficulties with proceeding with a review in light of the Proponent's decision to place the Doris North Project and further exploration in the Hope Bay Belt into care and maintenance, he would still expect the review to continue as long as Hope Bay Mining Ltd. is actively engaged in the review process and information request requirements can be met.

   The Minister also acknowledged capacity challenges at the NIRB in dealing with multiple project proposals, and agreed with the NIRB that it may need to assign priority status to other projects with more immediate timeframes.

The NIRB has developed these *draft* EIS Guidelines based on the information contained within the *Phase 2 Hope Bay Belt Project Proposal* submitted by the Proponent (HBML, 2011) and on the results of the NIRB's public scoping process to date. The Guidelines are intended to establish the nature and scope of the issues that the Proponent must address within its EIS.

1.3 PREPARATION AND REVIEW OF THE EIS

Upon receipt of the NIRB's finalized EIS Guidelines, the Proponent is required to prepare and submit to the NIRB an EIS that meets or exceeds the requirements specified herein. The Guidelines are intended to facilitate the Proponent's creation of an EIS submission, and the NIRB has endeavoured to make this document as comprehensive as possible to identify the majority of information requirements for the entire NIRB Review process and to increase certainty and the understanding of the expectations of all parties. As the information requirements of the EIS Guidelines are intended to be as comprehensive as possible, it is recognized that some of the information requested herein may not be available for the initial EIS submission to the NIRB. When information is not available in time to submit with the initial EIS, the Proponent shall include a timeline for the provision of the requested information at a later time, either within the EIS or to the NIRB separately. Therefore, the NIRB will consider the initial EIS submission to be a draft document as the level of information requested or available may evolve throughout the review process and/or may only become available for the *final* EIS submission.

It is also the NIRB's expectation that the Proponent will focus its discussions on key issues, and will provide a level of detail appropriately weighted to the importance of the issue being analyzed.

It is the sole responsibility of the Proponent to prepare an EIS that includes sufficient baseline data and analysis for a complete assessment of the anticipated impacts of the Project. The EIS should be concise and should focus on the assessment of significant ecosystemic and socio-economic impacts. In particular, omissions in these Guidelines cannot be used to justify any inadequacies in the EIS. The EIS must be a stand-alone document that allows the reader to understand the Project and its likelihood to cause significant environmental or socio-economic effects.

The NIRB will conduct a conformity review of the material presented in the Proponent's submission of an EIS to determine whether the document conforms to these Guidelines. The guideline conformity review is focused on identifying whether any information requested in the Guidelines or in the NIRB's Minimum EIS Requirements (Appendix A) has been omitted from the EIS without justification or indication as to when such information can be expected to be received if it is not submitted with the EIS. Guideline conformity review is a presence or absence analysis rather than an evaluation of the quality of the information presented, although the NIRB may point out significant deficiencies encountered. Should any omissions be identified, the Proponent is responsible for submitting supplementary information and may be required to revise and resubmit the EIS.

Following a positive EIS Guideline conformity determination by the NIRB and acceptance of the EIS submission, the NIRB will issue formal notice of the acceptance of the Proponent's EIS to Inuit organizations, community stakeholders, Federal and Territorial regulatory agencies, technical advisors, and other interested parties for review. The technical review period involves a more detailed review of the EIS than the guideline conformity review, and is intended to analyze the quality of the information presented by the Proponent. A technical review of an EIS comprises the following:

- Determination of whether Parties agree/disagree with the conclusions in the EIS regarding the alternatives assessment, environmental impacts, proposed mitigation, significance of impacts, and monitoring measures – and reasons to support the determination;
- Determination of whether or not conclusions in the EIS are supported by the analysis – and reasons to support the determination;
- Determination of whether appropriate methodology was utilised in the EIS to develop conclusions – and reasons to support the determination, along with any proposed alternative methodologies which may be more appropriate (if applicable);
- Assessment of the quality and presentation of the information in the EIS; and
- Any comments regarding additional information which would be useful in assessing impacts – and reasons to support any comments made.

1.4 REASSESSMENT OF THE GUIDELINES

The NIRB reserves the right at any time, having given reasonable notice to the Proponent, to reassess these Guidelines and to update and amend them accordingly to allow for consideration to changes in the Project description, baseline information, relevant technological advances, or changes in the regulatory and/or regional environments.

2.0 GUIDING PRINCIPLES

2.1 THE NIRB'S IMPACT REVIEW PRINCIPLES

In accordance with the NIRB's primary objectives found in the NLCA, Section 12.2.5, the following principles should be followed in the review process, and precautionary approaches should be adopted in the preparation of the EIS:

- **An ecosystem-based approach must be adopted for the review** - In order to gain an adequate understanding of the effects of the Project, an ecosystem-based approach must be adopted to ensure that the review addresses both the direct impacts that the Project will have on the various ecosystem components, as well as the interactions that will occur between components.
- **Socio-economic issues, such as giving consideration to the potential for the Project to affect economic development within the region, must be included in the review** - Members of the community constitute a critical part of the environment, and their concerns relating to the Project need to be assessed by the NIRB. As such, adverse and beneficial effects of the Project on members of the community with respect to health, recreation, and other aspects of social well-being need to be addressed in the EIS, in order to ensure a culturally holistic understanding of the Project's effects.
- **An understanding of past and potential future environmental, economic, and social trends in the region potentially affected by the proposed Project, and how the Project will influence these trends is required** - The inclusion of a time perspective on all phases of the Project, from the early planning stages through operations and closure including post-closure and maintenance phases where appropriate. It is important to include all phases of the Project in order to provide the NIRB with a full understanding of the cumulative environmental effects in combination with other past, present and reasonably foreseeable projects.
- **The well-being of residents of Canada outside the Nunavut Settlement Area must be taken into account** – Significant transboundary biophysical and socio-economic effects directly related to this Project must be included in the EIS in order to ensure the NIRB's assessment of the well-being of Canadians outside of the NSA.

The NIRB will consider the need for, alternatives to, and alternative means of carrying out the Project in assessing the justifiability of any significant environmental and socio-economic effects identified, and in formulating its recommendations to the responsible Minister.

2.2 PUBLIC PARTICIPATION AND ENGAGEMENT

Public participation is a central objective of the NIRB's Review process. Meaningful public participation requires the review to address concerns of the general public and Nunavummiut regarding the anticipated or potential environmental effects of the Project. In preparing its EIS, the Proponent is required to engage potentially affected communities, its residents, Inuit Organizations, Aboriginal groups, and other governments or other organizations, including where relevant, adjacent jurisdictions outside of the NSA. The Proponent should refer to the NIRB's *Guide 6b: A Proponent's Guide to Conducting Public Consultation for the NIRB*

Environmental Assessment Process (NIRB, 2006a) when preparing to consult with the general public. Public participation and engagement is required when:

- Identifying current and historical patterns of land and resource use;
- Acquiring traditional knowledge (TK);
- Identifying VECs and VSECs;
- Evaluating the significance of potential impacts;
- Deciding upon mitigating measures; and
- Identifying and implementing monitoring measures, including post-project audits.

Another objective of the NIRB review process is to involve potentially affected Nunavummiut to address concerns regarding any changes that the Project may cause in the environment and the resulting effects of any such changes on the traditional and contemporary use of land/ice and resources. The Proponent must ensure that Nunavummiut have the information that they require in respect to the Project and on how the Project may impact them.

Meaningful involvement in the environmental impact assessment process takes place when all parties involved have a clear understanding of the proposed project as early as possible. The NIRB Review process requires the development of a public participation and awareness program to initiate engagement of the public during the initial stages of the Review, and to facilitate meaningful consultation with those communities potentially affected by a proposed project.

The Proponent must provide the highlights of any public engagement within the EIS, including the methods used, the results, and the ways in which the Proponent intends to address the concerns identified.

2.3 TRADITIONAL KNOWLEDGE

A growing number of researchers are calling on government regulatory agencies to integrate local or traditional knowledge with "scientific" knowledge in a number of resource areas (Davis and Wagner, 2003). As noted by Berkes *et al*., (2000), this is partly due to a recognition that such knowledge can contribute to the conservation of biodiversity (Gadgil *et al*., 1993), rare species (Colding, 1998), protected areas (Johannes, 1998), ecological processes (Alcorn, 1989), and to sustainable resource use in general (Schmink *et al*., 1992; Berkes, 1999). The incorporation of traditional knowledge into regulatory frameworks may also reflect a widespread concern regarding the social and economic sustainability of natural resource based livelihoods throughout the world (Blaikie and Brookfield, 1987; McGoodwin, 1990; Meadows *et al*., 1992; WCED, 1987).

The term Inuit Qaujimajatuqangit refers to Inuit "Traditional Knowledge" (TK); while Inuit Qaujimaningit refers to Inuit TK as well as Inuit epistemology without reference to temporality (QIA, 2009). In this document, TK or Inuit TK broadly refers to Inuit Qaujimaningit and is meant to encompass local and community based knowledge, ecological knowledge (both traditional and contemporary), which is rooted in the daily life of Inuit people, and has an important contribution to make to an environmental assessment (Stevenson, 1996).

This knowledge represents experience acquired over thousands of years of direct human contact with the environment (Berkes, 1993) and is rooted in personal observation, collective experience and oral transmission over many generations. TK relates to factual information on such matters as ecosystem function, social and economic well-being, and explanations of these facts and causal relations among them. It plays a significant role in the EIS development in term of acquisition of adequate baseline information, identification of key issues, prediction of the effects, and assessment of their significance, all of which are essential to the EIS and its review. Recognizing TK as an indispensable element both as baseline information and as an Inuit lens through which impact analyses can be better understood can contributes to more active and meaningful community engagement.

TK can be obtained with the cooperation of other concerned parties. Peer-referenced, systematic identification of local TK experts assures that those considered most knowledgeable within either the local community, social group, or livelihood fraternity will be revealed and potentially included in work dedicated to documenting the local ecological knowledge system (Davis and Wagner, 2003). The Proponent must incorporate into the EIS the TK to which it has access or the TK that it may reasonably be expected to acquire through appropriate due diligence, in keeping with appropriate ethical standards and without breaching obligations of confidentiality.

2.4 PRECAUTIONARY PRINCIPLE

One of the purposes of environmental assessment is to ensure that projects are considered in a careful and precautionary manner before authorities take action in connection with them, in order to ensure that such projects do not cause significant adverse environmental effects. Principle 15 of the 1992 Rio Declaration on Environment and Development states that *"[w]here there are threats of serious or irreversible damage; lack of full scientific certainty must not be used as a reason for postponing cost-effective measures to prevent environmental degradation"* (UNCED, 1992). This precautionary principle has since been incorporated into several pieces of Canadian legislation, including the *Canadian Environmental Protection Act* (Government of Canada, 1999a), the *Oceans Act* (Government of Canada, 1996), and the *Canada National Marine Areas Conservation Act* (Government of Canada, 2002a). In applying a precautionary approach to its planned undertakings, the Proponent must:

- Demonstrate that the proposed Project is examined in a manner consistent with the precautionary principle in order to ensure that they do not cause serious or irreversible damage to the environment;
- Outline the assumptions made about the effects of the proposed Project and the approaches to minimize these effects, including assumptions that are developed where scientific uncertainty exists;
- Identify any follow-up and monitoring activities planned, particularly in areas where scientific uncertainty exists in the prediction of effects; and
- Present public views on the acceptability of these effects.

2.5 SUSTAINABLE DEVELOPMENT

Sustainable development is defined as development that "*meets the needs of the present without compromising the ability of future generations to meet their own needs*" (UN, 1987). The central

task of environmental impact assessment is to contribute to sustainable development by safeguarding the sustainability of VECs in the face of development that might compromise that sustainability (Duinker and Greig, 2006). Promotion of the principle of sustainable development is fundamental to the NIRB's primary objectives laid out in Section 12.2.5 of the NLCA:

> *In carrying out its functions, the primary objectives of NIRB shall be at all times to protect and promote the existing and future well-being of the residents and communities of the Nunavut Settlement Area, and to protect the ecosystemic integrity of the Nunavut Settlement Area. NIRB shall take into account the well-being of residents of Canada outside the Nunavut Settlement Area.*

The EIS Guidelines are based upon three factors that the NIRB considers directly associated with sustainable development. These factors are:

1) The extent to which biological diversity is affected by the Project;
2) The capacity of renewable and non-renewable resources that are likely to be significantly affected by the Project to meet the needs of the present and those of future generations; and
3) The "precautionary principle" defined as: where there are threats of serious or irreversible damage; lack of full scientific certainty must not be used as a reason for postponing cost-effective measures to prevent environmental degradation (UNCED, 1992).

The NIRB interprets progress towards sustainable development as meeting the following goals where possible:

1) Preservation of ecosystem integrity, including the capability of natural systems (local and regional) to maintain their structure and functions and to support biological diversity;
2) Respect for intergenerational equity. That is, the right of future generations to the sustainable use of renewable and non-renewable resources depends on our commitment to those resources today; and
3) The attainment of durable social and economic benefits, particularly in Nunavut.

The Proponent's EIS should clearly demonstrate how the Project meets these three goals.

3.0 SCOPE OF THE NIRB ASSESSMENT

The scope of the NIRB's assessment for the project proposal is based on the requirements of Sections 12.5.2 (items a – j) and 12.5.5 (items a – h) of the NLCA as listed below, the NIRB's Minimum EIS Requirements (Appendix A), the project proposal submitted by the Proponent and any direction provided by the Minister to the NIRB pursuant to Section 12.5.1 of the NLCA. A copy of the final Scope for the NIRB's assessment of the Phase 2 Hope Bay Belt project proposal is available in Appendix B to the current Guidelines.

3.1 NLCA – SECTIONS 12.5.2 AND 12.5.5

Where appropriate, the EIS shall contain information with respect to the following as per Section 12.5.2 of the NLCA:

a) *Project description, including the purpose and need for the Project;*
b) *Anticipated ecosystemic and socio-economic impacts of the Project;*
c) *Anticipated effects of the environment on the Project;*
d) *Steps which the Proponent proposes to take including any contingency plans, to avoid and mitigate adverse impacts;*
e) *Steps which the Proponent proposes to take to optimize benefits of the Project, with specific consideration being given to expressed community and regional preferences as to benefits;*
f) *Steps which the Proponent proposes to take to compensate interests adversely affected by the Project;*
g) *The monitoring program that the Proponent proposes to establish with respect to ecosystemic and socio-economic impacts;*
h) *The interests in land and waters which the Proponent has secured, or seeks to secure;*
i) *Options for implementing the proposal; and*
j) *Any other matters that NIRB considers relevant.*

Furthermore, when reviewing any project proposal, Section 12.5.5 of the NLCA requires the NIRB to take into account all matters that are relevant to its mandate, including the following:

a) *Whether the project would enhance and protect the existing and future well-being of the residents and communities of the Nunavut Settlement Area, taking into account the interests of other Canadians;*
b) *Whether the project would unduly prejudice the ecosystemic integrity of the Nunavut Settlement Area;*
c) *Whether the proposal reflects the priorities and values of the residents of the Nunavut Settlement Area;*
d) *Steps which the proponent proposed to take to avoid and mitigate adverse impacts;*
e) *Steps which the Proponent proposes to take, or that should be taken, to compensate interests adversely affected by the project;*
f) *Posting of performance bonds;*
g) *The monitoring program that the Proponent proposes to establish, or that should be established for ecosystemic and socio-economic impacts; and*
h) *Steps which the Proponent proposes to take, or that should be taken, to restore ecosystemic integrity following project abandonment.*

PART II – THE ENVIRONMENTAL IMPACT STATEMENT

4.0 GUIDANCE ON THE PRESENTATION OF THE ENVIRONMENTAL IMPACT STATEMENT

4.1 PRESENTATION

The Proponent shall provide an EIS that is complete and which provides sufficient information to identify, describe and determine the significance of potential impacts to the ecosystemic and socio-economic environments that could arise from the Project. The EIS should include scientific works, subject-specific studies and all other sources of information covering all aspects of the Project in regards to ecosystemic and socio-economic perspectives.

For clarity and ease of reference, the EIS should be presented in the same order as the EIS Guidelines. However, the NIRB recognizes that flexibility in the arrangement of the document may be required and the Proponent is encouraged to use its judgment and best practices in designing a document that is arranged and formatted to facilitate ease of reviewing while ensuring that all the information requested in these Guidelines are provided. In the interest of brevity, the EIS should make reference to, rather than repeat, information that may be presented in other sections of the document. An index of the EIS document is also required and must provide a reference to the locations of required information by volume, section, sub-section, and page number.

The EIS shall be made available to the NIRB electronically on searchable CD-ROM and/or memory stick, as well as in hard copy. If the Proponent chooses to submit the EIS via memory stick only, it shall be responsible to provide CD-ROM versions of the EIS if requested by the NIRB or parties. The Proponent shall be responsible for the delivery of the EIS to regulators and relevant authorities in print copy and/or electronic versions. As the NIRB is required to make the EIS available to the public for review, for purposes of uploading and distribution, individual file sizes should be no larger than 5 MB in size (using only low resolution images). If the Proponent determines that certain files are better presented with larger resolution, then these files should be submitted to the NIRB; however it should be noted that these files may only be distributed by the NIRB to the public upon request. Where certain volumes or sections of the EIS may exceed the 5 MB limit file size, the Proponent is required to break these files into manageable sizes for submission to the NIRB, in a manner that facilitates parties' ease of navigation of such files.

4.2 CONFORMITY

The Proponent is expected to observe the intent of these Guidelines and to identify all significant environmental effects that are likely to arise from the Project (including situations not explicitly identified in these Guidelines), the mitigation measures that would be applied and the significance of any residual effects, which will then lead to the preparation of an EIS. Specific issues or directions described in the Guidelines must be easily identifiable in the EIS. In accordance with the NIRB's *Guide 7: Guide to the Preparation of Environmental Impact Statements* (NIRB, 2006b), or any subsequent replacement that may be in force at the time the

Proponent is preparing the EIS, the EIS shall contain a concordance table directing reviewers to the location (volume/document, section, sub-section, and page number) where specific information addressing the Guidelines and the NIRB's Minimum EIS Requirements may be found. For each item, the Proponent is also requested to provide a reference to the appropriate EIS Guideline section for the ease of parties' review. This concordance table shall further include an indication of what information, details, or data that the Proponent has deferred from its current submission and which it plans to include in the Final EIS. Where the Proponent is unable to provide information until submission of a Final EIS, it shall further provide within the concordance table, its rationale for deferring the inclusion of such information.

The Proponent is cautioned that any significant deviation from these Guidelines may result in a negative conformity decision and subsequent requirements for revision. It is possible that the EIS Guidelines include matters that, in the judgement of the Proponent, are not relevant or significant to the Project. If that definition of such matters results in omissions from the EIS, those instances must be clearly indicated and the Proponent should explain and justify its reasoning for each omission identified, so that the public and other interested parties have an opportunity to comment on this judgement. Where any differences in direction are encountered between the NIRB's most recent guidance on the preparation of EIS documentation (*Guide 7* (NIRB, 2006b) or any subsequent replacement Guide in force at the time the EIS is being prepared) and the EIS Guidelines issued pursuant to the NLCA Section 12.5.2, the Proponent may be required to provide the additional information. The Proponent is advised to consult with the NIRB on any direction presented within these Guidelines on which it plans significant deviation.

4.3 LENGTH

In accordance with the NIRB's *Guide 7* (NIRB, 2006b), the Proponent's EIS Main Document (*i.e.*, Volume I) shall be concise and not exceed 150 pages without permission from the NIRB. The 150 page limit shall not include: the Title Page, Executive Summary, Popular Summary, Glossary, Table of Contents, Concordance Table, Consultants and Organizations, Appendix, and References. To ensure the main document within the EIS report remains manageable for reviewers, communities, and the general public, any data of a detailed nature shall be contained in separate volumes as appendices and technical reports submitted in support of the main document. The Proponent must also submit a list of all documents, supporting maps, figures, documents, and tables used as reference materials throughout the EIS.

4.4 FORMAT

The EIS shall have sections numbered and be presented in a fully functional PDF format which supports electronic linkages between the Table of Contents and associated sections within the EIS document(s), where possible. Subject to any other instructions given by the NIRB, the following format shall be adopted, based on the most recent guidance on the preparation of EIS documentation (*Guide 7* (NIRB, 2006b) or any subsequent replacement Guide in force at the time the EIS is being prepared) and adapted as much as possible to the specific circumstances of the Project. For ease of reference, the digital EIS document must be fully indexed and searchable using keywords, and shall contain the following:

- Cover sheet with project description;

- Executive summary (in English, Inuinnaqtun and Inuktitut);
- Plain language summary/popular summary (in English, Inuinnaqtun and Inuktitut);
- Glossary (in English, Inuinnaqtun and Inuktitut);
- Table of Contents;
- Concordance table which lists each of the Guideline requirements and the associated location of each within the EIS;
- Purpose of, and need for, the Project;
- Detailed Project description including potential future development;
- Alternatives considered in the development of the Project proposal;
- Discussion of the public consultation initiatives with the communities potentially affected by the Project. Provide the results of the public consultation, as well as evidence that community concerns were addressed in the planning of the Project activities;
- Baseline information and studies of the existing ecosystem and socio-economic environment;
- Anticipated ecosystemic and socio-economic impacts of the Project proposal, including potential impacts on the VECs and VSECs (and as identified through the public consultation process);
- Anticipated effects of the environment on the Project;
- Anticipated cumulative effects of the Project on the region/regions;
- Anticipated transboundary effects;
- Anticipated accidents and malfunctions, and potential effects on the environment, include contingency plans and mitigation measures;
- Steps which the Proponent proposes to take to avoid and/or mitigate adverse impacts, including contingency plans (spills, fires, floods, etc.) and adaptive management strategies;
- Statement of residual impacts and significance;
- Steps which the Proponent intends to undertake in order to restore the area affected by the Project activities during operation and upon project closure, reclamation and relinquishment of leased land to original landowners;
- Steps which the Proponent proposes to take to optimize benefits of the Project, with specific consideration being given to expressed community and regional interests;
- The monitoring program that the Proponent proposes to establish;
- The interests in lands and waters which the Proponent has secured, or seeks to secure;
- List of permits, licences and authorizations required to undertake the Project proposal;
- List of consultants or individuals who assisted in preparation of the EIS;
- List of agencies, organizations, and persons to whom copies of the EIS will be sent;
- Index; and
- Supporting documentation and appendices, including a commitments table that summarizes the proposed mitigation and other company commitments with cross reference to environmental issues or potential impacts.

4.5 DATA PRESENTATION

Wherever appropriate and useful to clarify the text, the Proponent shall provide charts, diagrams, photographs, and maps (each of which clearly defines land ownership, provides a scale and indicates a north arrow) within the EIS document. Specifically, the Proponent shall include maps or diagrams showing all project related infrastructure and/or activities (e.g., RSA, LSA, camp sites, drilling activities, dock sites, fuel storage and laydown areas, mine site and infrastructure, transportation routes including ground transport, marine shipping and air transport, borrow pits and quarry sites, etc.). It is recommended that maps be scaled appropriately to best present materials and where feasible, to be of a common scale and projection to facilitate comparison. All charts, diagrams, photographs, and maps must be clearly referenced in the text of the EIS, especially where these may be included in a separate volume to the main EIS document.

4.6 SUMMARIES

4.6.1 Executive Summary (in English, Inuinnaqtun and Inuktitut)

The Proponent shall prepare an Executive Summary that describes the key Project elements and key findings of the EIS, with particular reference to the overall conclusions of the assessment, and a clear rationale relating those conclusions to the predicted impacts and the measures proposed to address them. The Executive Summary shall focus on items of known or expected public concern and the significant potential impacts of the Project and the methods proposed to address them. It shall also address outstanding issues and the strategies proposed to address them. The Executive Summary shall form part of the EIS, but it shall also be made available as a stand-alone document and must be provided in English, Inuinnaqtun and Inuktitut.

4.6.2 Popular Summary (in English, Inuinnaqtun and Inuktitut)

The Popular Summary shall have the same general structure and objectives as the Executive Summary, but is to be written in non-technical language and include such things as a glossary and additional explanatory text to assist non-specialists in appreciating the content of the EIS as a whole. Maps indicating major project components including shipping and ground transportation route(s), as well as the potentially affected communities shall be included, and the summary is to be provided in English, Inuinnaqtun and Inuktitut. The Popular Summary shall form part of the EIS, but it shall also be made available as a stand-alone document.

4.7 TRANSLATION

In addition to the Executive Summary, Popular Summary and Glossary being presented in English, Inuinnaqtun and Inuktitut within the EIS, the summary for each thematic volume shall also be translated into Inuinnaqtun and Inuktitut. If these summaries are included in a separate binder, this binder must be referenced within the EIS and be compiled for ease of reference. Maps shall indicate common and accepted place-names usually referred to by the local populations in their own language(s), in addition to official toponyms, especially where traditional Inuit place-names have been made official through the process outlined in Section 33.9 of the NLCA.

5.0 INTRODUCTION

5.1 PROPONENT INFORMATION

The Proponent shall identify itself and explain current and proposed ownership of rights and interests in the Project, operational arrangements, and corporate and management structures. It shall specify the mechanisms used to ensure that corporate policies are respected. The Proponent shall present its environmental policy and shall specify how it applies to all businesses for which the Proponent has an operating responsibility (i.e., employees, contractors, subcontractors and suppliers), as well as describe its environmental reporting systems. Furthermore, the Proponent shall provide complete contact information, including telephone and fax numbers, postal and email addresses, and shall include, where necessary, separate addresses for corporate and operations (or other relevant) offices.

The Proponent shall describe its past and/or present experience in the activities being proposed for the Project (e.g., exploration, open pit and underground mining, transportation networks involving air shipping, marine shipping, and winter and all-weather road components, etc.). The Proponent should pay particular reference to:

- Its record of compliance with governmental policies and regulations pertaining to environmental and socio-economic issues in past operations;
- Operation safety, major accidents, spills and emergencies, and corresponding responses;
- Its record in honouring commitments on environmental and socio-economic matters in the event of planned or premature Project closure, whether temporary or permanent, or due to change of ownership;
- Relations with Aboriginal peoples, including prior experience with any Impact and Benefits Agreements if appropriate;
- Operations in Arctic and Sub-arctic regions;
- Its record in incorporating environmental and socio-economic considerations into construction, operations, maintenance, temporary closure (care & maintenance), final closure (decommission & reclamation), and post-closure; and
- Corrective actions undertaken in the past, distinguishing between those taken voluntarily and those taken at the insistence of a third party.

The Proponent shall identify and describe any obligations or requirements that it must meet to post a bond or other forms of financial security to ensure payment of compensation in the event of accidents that directly or indirectly result in major damage by the Project to the environment, as well as to cover the cost of planned or premature closure, whether temporary or permanent. The Proponent shall provide information on the current status of Project financing, and financial preparedness to meet the requirements for reclamation and security should the Project proceed.

If the Proponent does not have prior experience in exploration, mining, or transportation networks, particularly within this region, discussion should include how the experience will be obtained (e.g., other northern projects) and it shall explain the safeguards that it intends to put in place to compensate for a lack of experience.

5.2 REGULATORY REGIME

The Proponent shall present its understanding of the applicable regulatory regime by identifying the requirements of all relevant federal, territorial, and local environmental and socio-economic standards, laws, regulations, policies, guidelines and fiscal regimes relating to Project approval, construction, operations, maintenance and monitoring, temporary closure (care & maintenance), final closure (decommission & reclamation), and post-closure activities. This section should also explain how the requirements would be met and what specific governmental permits and approvals would be required. A list of currently held and required permits and licences, including dates of issue and expiry (as applicable), shall be appended. Requirements imposed by Article 12 of the NLCA may be excluded from this discussion.

5.3 REGIONAL CONTEXT

The Proponent shall describe in general terms the regional biophysical and socio-economic environments of the Kitikmeot Region and Nunavut as a whole, including: ecological land classifications, ecological processes and relationships, the location of other base and precious metal finds and other existing and potential developments, and current and future land use plans.

5.4 LAND TENURE

The Proponent shall delineate on a map of suitable scale the legal boundaries of any areas to which it will acquire rights through lease or other tenure arrangements, including Crown land, Inuit Owned Land, and Commissioner's land. It shall further describe those areas by providing such information including, but not limited to, file numbers, start and end dates, fees, name of right holder and any post-authorization amendments and/or renewals. Ongoing exploration activities should be discussed wherever applicable to the discussion of Project land tenure.

5.5 ANALYSIS OF NEED AND PURPOSE OF THE PROJECT

The following points must be addressed in discussing the need for and purpose of the Project:

- General feasibility from an economic perspective, including how this Project will benefit communities in Nunavut, either directly or indirectly;
- An assessment of the longer term strategic implications of the Project, and how it may affect or lend to transportation networks (existing and proposed) in Nunavut;
- Identification of past, current and potential future users of the local study area (LSA), regional study area (RSA), and project infrastructure, including commercial, government, public, and private; and
- An analysis of the overall net benefit of the Project in terms of Nunavut and of Canada as a whole, which includes considerations that are not related to economics.

Discussions addressing the above points shall be supported by an analysis of the positive and negative social and economic effects on existing industries, markets, and communities over the life of the Project. This analysis should also indicate the distribution and magnitude of benefits and/or losses to specific socio-economic groups in the relevant study area.

6.0 PROJECT COMPONENTS AND ACTIVITIES

The following sections contain explicit discussion requirements for the Project components and all activities associated with each project component through the life of the Project.

6.1 PROJECT DESIGN

General Project design issues discussed in the EIS shall include:

- An explanation of how the biophysical environment has influenced the design of the Project. This should include consideration of relevant geographical, geological, meteorological, hydrological, hydrogeological and oceanographic conditions;
- A discussion on how the potential of climate change based on current knowledge and its effects on the physical environment (e.g. hydrological regime, permafrost, coastal processes) has influenced the design, planning and management of the Project components and activities. Identification of Project sensitivity to changes in specific climate-related parameters should also be included;;
- A discussion of how design, engineering, and management plans will maintain/enhance the existing eco-systemic integrity, focusing on various wildlife habitats, including freshwater habitat, marine habitat, and terrestrial habitat;
- A discussion of how the Proponent has applied the precautionary principle in its Project planning, design and management;
- A discussion of how potential impacts to workers and the public under both normal operations and potential accident and malfunction situations have influenced the design of the Project;
- How potential impacts to wildlife (e.g., caribou, polar bear and peregrine falcons) have influenced the design of the Project, indicating methods designed to minimize impacts to wildlife, including the geographical location of project components. Special attention should be paid to the influence of peregrine falcon habitat on the selection of borrow pits and quarry sites (where applicable);
- How regional socio-economic conditions have influenced the Project design. For example, how local preferences and labour capacity, have influenced the design of work rotations, pace of construction, employment policy, etc.;
- How the distribution of archaeological resources, sacred sites, and soapstone quarries have influenced project design;
- How current land use activities (such as harvesting, camping, and tourism) and protected areas (i.e., Bird and Wildlife Sanctuaries) have influenced project design;
- How public consultation and TK have influenced the planning and design of the Project; and
- The considerations for future development.

All assumptions underlying design features which are relevant to environmental assessment should be explicitly identified.

6.2 PROJECT PHASES

The Proponent is required to present an overall development plan describing the Project development phases (site preparation, construction, operation, maintenance, any potential modifications, temporary closure, final closure, and post-closure), relevant timeframes, works and undertakings associated with each of these phases. The plan must include consideration for temporary closure, or care and maintenance in the possibility that operations are unexpectedly suspended. The Proponent should also identify all associated monitoring and/or mitigation plans to be implemented in each of the development phases to eliminate or minimize adverse effects that might occur at various project stages for each Project element.

6.3 FUTURE DEVELOPMENT

The Proponent shall describe its plans for development of the Project, and shall further, evaluate any foreseeable expansions of the current Project, the needs of required infrastructure, and associated eco-systematic and socio-economic impacts. The Proponent shall also evaluate the potential for development of additional ore deposits in the Project area in accordance with previous and current exploration activities. Such an evaluation should be based on the Proponent's business and strategic plans for the Project, other predictions and the comparable development realized by projects of a similar nature.

In addition, the Proponent shall discuss how their foreseeable future developments scenarios pertaining to the Hope Bay Belt have been taken into consideration when designing the infrastructure and ancillary utilities for the Phase 2 Project. The Proponent's assessment of cumulative impacts of the Project shall also include their future development scenarios as outlined above.

6.4 ALTERNATIVES

The EIS shall include an explicit analysis of all alternative means of carrying out the Project components or activities, including a "no-go" alternative, the identification and application of criteria used to determine the technical feasibility and economic viability of the alternatives to the Project (e.g., transportation, natural, social, economic and cultural environment). This analysis must be done to a level of detail which is sufficient to allow the NIRB and the public to compare the Project with the alternatives in terms of the economic and environmental costs, as well as the social and economic impacts and/or benefits. The Proponent must include reasons for selection of the Project as the preferred alternative, and the reasons for the rejection of other alternatives. This reasoning should outline the environmental and social impacts and benefits in addition to the economic costs of non-viable or rejected alternatives. Through the course of its alternative assessment, if the preferred option changes, the Proponent should consult with the NIRB to determine whether this proposed change would result in a change to the scope of the Project as filed with the Board.

The EIS shall present alternatives for all Project components. The Proponent is encouraged to refer to *Environment Canada's Guidelines for the Assessment of Alternatives for Mine Waste*

Disposal (September 2011), when assessing and presenting alternatives for mine waste management, including tailings and waste rock storage options, with a focus on the following:

- Options proposed for the transportation of supplies from the south to the Project site, including to Roberts Bay, for both air and shipping;
- The location of tank farm(s) and storage facilities on site;
- Options for proposed airstrips;
- Options for quarry sites;
- Options for water sources;
- Access to all identified ore deposits by underground or open pit methods and include potential infrastructure layouts;
- Alternative road access to all identified ore deposits for transportation or ore and equipment required at each deposit;
- Alternatives for processing the ore;
- Alternatives for cyanide;
- Alternatives for tailings storage;
- Alternatives to diesel power generation, including solar energy, wind energy, hydro and geothermal energy, etc.;
- Closure and reclamation options;
- Mine waste management and disposal;
- Waste rock storage/disposal alternatives;
- Methods for site water treatment (i.e., mill, sewage, tailings, stormwater, etc.); and
- Methods for mine de-watering.

In its assessment of the economic viability for each alternative option, the Proponent shall give due consideration to the vulnerability of the arctic ecosystem, as well as the potential for extension of the life of the Project. The criteria used to evaluate alternative means should reflect the potential concern for both the short-term (during construction and operations) and long-term (after decommissioning and reclamation), physical/chemical stability and environmental impacts of the Project. The potential for impacts from each alternative under consideration should also be discussed within the context of potential interactions with other past, present and reasonably foreseeable developments in the RSA (i.e. cumulative effects), in accordance with Section 7.11. The potential cumulative effects for each alternative should be presented in enough detail so as to be comparable with the assessment for the identified "preferred alternative".

Furthermore, as indicated in the public consultation section (Section 7.1), public opinions and preferences shall also be taken into consideration as a criterion in the assessment for all of the alternative options. Therefore, the alternative analyses shall include a discussion on how public consultation has influenced Project design and planning, and how public preferences have been considered by the Proponent in determining the preferred project alternatives.

6.5 ECONOMIC AND OPERATING ENVIRONMENT

In order to understand the proposed Project within the context of the economic operating environment, the EIS shall include a description of the various economic components of the Project and its interactions with the over-arching economic and governing environments, including:

- Non-confidential information pertaining to the potential taxation revenue to be contributed to the Federal and Territorial governments as well as anticipated royalties to be paid to NTI;
- Estimates of initial property value as well as projections that incorporate the Proponent's expected timeline for expansions (i.e., tank farms, plans, additional mines, etc.);
- Potential employment available directly through the Project in terms of available labour and employment rates within the project RSA;
- Evaluation of the positive impacts that may result from increasing revenues accruing through taxes to governments as resulting from the Project;
- An annual and project-life total estimate of the volume of fuel that is expected to be sourced from the GN and/or from other sources;
- An estimate of total payroll tax to be paid each year and associated cost of living tax credit, taking into account:
    - Total remuneration per year paid to employees;
    - An estimate of the number of employees (number of individuals and number of full-time equivalents);
    - Average wages paid to employees;
    - Expected number of Project employees who will file taxes in the territory;
- An estimate of annual personal income tax based on:
    - Expected number of employees who will file taxes in Nunavut;
    - Estimated salaries for these employee;
- An estimate of corporate income tax including:
    - Estimates of commodity prices and production;
    - Estimated number of years of production before initial corporate income tax payment;
    - Explanation of how the Proponent expects to allocate its corporate taxable income to permanent establishments in Nunavut;
- Capital costs, estimated operating costs, and the total expected revenues (using a range of market values);
- The number of person years of work, broken down by Project life cycle stage including the number and types of jobs and required skills (using a recognized classification system) including training requirements for each position as well as an estimate of jobs created indirectly by the Project (i.e., local business and supply contracting);
- Information on benefits that might be expected by employees and whether these benefits will extend to contractor employees (e.g., training, skill enhancement, cultural support, wellness programs);

- Contracting and procurement information including, an estimate of the number and types of jobs that will be done by contractors and what, if any, the contractor obligations to employees will be;
- Employee housing, including number of employees expected to be residing onsite or in workers' camp(s), on-site services and facilities for workers, transportation to/from work and proposed work schedule;
- Discussion of the commuting arrangements for locally hired employees, and how the Proponent plans to support the fly-in/fly-out workforce with in-community liaison workers;
- Outline the scope, progress, and potential success of the development of an Inuit Impact and Benefit Agreement (IIBA) with the Kitikmeot Inuit Association. Discussion of potential IIBA negotiations should consider all potentially impacted communities within the RSA;
- For issues within the IIBA that are not made public, the Proponent should outline how they will facilitate cooperation while maintaining any confidentiality; and
- Any issues related to compensation required as a result of the Project.

While some details relating to tax estimates and corporate profits are highly sensitive and it is recognized that certain information may be confidential and not be publicly available, the Proponent is encouraged to engage with the GN in order to share what information it can as it relates to the mechanics behind its corporate tax estimates (e.g. forecasts of commodity prices, assumptions regarding profits, etc.). The NIRB requests that information which may be available in other areas of the EIS be clarified as to the Proponent's estimation of any related tax impacts for clarity and ease of analysis.

With respect to overall operating environment, many governance structures or other social components relating to community and territorial leadership can come to bear upon an operator such as HBML. It is important to understand the Project in terms of the environment in which it operates. The Proponent shall therefore provide the following as it relates to governance and leadership in terms of the Project development:

- A description of the current social and governmental regimes in the Project region, structure and functions of the governments, Inuit organizations, other co-management organizations and interactions among those organizations;
- Discussion of how potential conflict of interest will be managed in current governance regime during Project development;
- Discussion of how Project planning meets the needs of regional economic development plans (community wellness initiatives, Hamlet programs, housing etc.), where applicable, and which are managed by Federal and territorial governments agencies and Inuit organizations;
- A description of the Proponent's understanding on the roles that governments play in the process of the Project development, and associated requirements and obligations for proponents by policies and regulations;

- A description of the roles of the various parties in socio-economic monitoring programs and the Kitikmeot Socio-Economic Monitoring Committee and a description of how the Proponent anticipates contributing to this framework;
- A discussion of efforts to be made by the Proponent within existing regulatory framework and government initiatives, in terms of education and skill training, community facility development and other initiatives planned by the Proponent; and
- Other social and economic responsibilities of governments in the Project impacted regions.

6.6 DETAILED PROJECT PROPOSAL DESCRIPTION

The Proponent shall describe the Project components and all activities associated with each component in a systematic way. This description shall encompass all phases of development in sufficient detail to allow the Proponent to predict potential adverse environmental effects and address public concerns about the Project; from site preparation through to construction, operations, maintenance, any potential modifications and/or expansions that may be required during the operations phase based on exploration results, temporary closure (care & maintenance), final closure (decommission & reclamation), and post closure activities. The description must include an approximate timeline for each Project component and all activities associated with each component, where applicable. The description shall also include changes that may occur in the vicinity as a consequence of the Project. Where specific codes of practice, guidelines, and/or policies may apply to items to be addressed, and particularly where these may involve thresholds and quantitative limits to be applied, those documents must be cited and may be included as appendices to the EIS.

For greater clarity, the detailed description of Project components and activities, where appropriate, shall cross-reference the impact assessment, environmental management and overall development plan sections of the EIS.

As this application incorporates facilities that are currently in place and which have been allowed to proceed pursuant to the NIRB Project Certificate [No. 003], the Proponent is required to include details clearly outlining the distinctions between Phase 1 and Phase 2 of the development so that the potential environmental and socio-economic impacts of the expanded facilities at the Doris North and Roberts Bay sites that might exceed what was anticipated in the Doris North Project Certificate may be addressed during the assessment of Phase 2. The Proponent must note below where currently proposed Phase 2 project components or activities may impact upon the ongoing function of, or may occur on existing Phase 1 Doris North Mine site and/or infrastructure.

The description shall include the following project components and associated activities, and other information as deemed necessary by the Proponent.

6.6.1 Madrid/Patch and Boston Mine Sites

6.6.1.1 Geology/Mineralogy of the Ore Deposit

The Proponent shall describe the ore resources at the three planned mine sites, including where appropriate:

- Deposit locations, including detailed maps of the mine site areas using latitude and longitude coordinates;
- Detailed structural geology maps;
- The bedrock lithology and mineralogy in the Project area;
- A description of the overburden including texture/grain size, moisture/ice content and occurrence of ice lenses and implications for the Project;;
- Fractures and their implications to the Project;
- Types of the deposits and associated bedrocks;
- Average and range of ore grades estimated for the deposits;
- Nature, depth, and thickness of the ore deposits to be mined;
- The mineralogy and geochemistry of ore and waste rock including acid rock drainage (ARD) and metal leaching (ML) potential as well as the acid neutralizing potential; and
- Ore body delineation.

6.6.1.2 Mining, Transport and Processing

The Proponent shall describe the ore mining, transportation and processing associated with the Project, using maps and diagrams whenever applicable:

- A mining plan indicating the sequence of development for the proposed open pits and underground mines at Madrid/Patch and Boston districts;
- Describe the open pits and underground mine design, mining methods, operation, and processing including site layout, mine water management, anticipated production rate, designed production capacity, production schedule, equipment selection, energy consumption and energy efficiency measures;
- Provide and describe flow sheets depicting ore processing, material flow and waste stream, energy consumption and water consumption;
- Describe the hydrogeological conditions (i.e., permeability of geological formations, hydraulic head and groundwater flow direction,) of the open pits and the underground mines, including estimates of the variance in permeability and groundwater flow, and implications of geological anomalies such as fault zones, weak rock formations or areas of higher than expected groundwater flow on the design of the open pits and underground mining facilities and implications of hydrological conditions on nearby surface waters;
- Discussion on how permafrost conditions (seasonal thawing, taliks, degradation due to mining disturbances) were considered in the design of the open pits and underground mining facilities;
- Stability analysis of the pit slopes and underground mine works and provision of adequate ground control measures where necessary;

- Design of the impoundment/retention structures and measures for run-off and seepage control;
- Design of the mine ventilation for the underground mine;
- Daily and yearly average extraction rate(s) and quantities of ore and waste rock produced;
- Cut-off grades in grams per tonne for precious metals (i.e., gold and silver) and in percent for any base metals (i.e., copper), for ore and low grade material that could be processed at some point in the future, based on current economic conditions or reasoned projections;
- Means of drilling, blasting, extraction, loading and transport of ore;
- Design, location and capacity of run-of the mine stockpile (if any) and ore stockpile facilities;
- Dust suppression technologies and dust suppressants to be used in mining, loading, transportation, storage, crushing and other processes where dust might be generated;
- A review of similar operations elsewhere in similar settings, with a discussion of the results of research on the long-term stability of the underlying permafrost and frozen materials, as well as the implications to Project planning and design;
- Measures and plans to control natural hazards and/or mitigate their impacts on the Project, such as rock falls and collapses, extreme climate events, and other geological or geomorphological events (e.g., storm, flooding, and earthquake);
- Provide a comprehensive description of the proposed mill design, including:
    - Facilities and structures include plant layout plans;
    - Mill process and operations for ore processing;
    - Reagents used;
    - Water management strategies, including methods to maximize water re-use, minimize takings of natural waters and energy consumption; and
- Provide a discussion of proposed options for transporting the final gold product from site.

6.6.1.3 Ore Stockpile Facilities

The Proponent shall, in connection with its Ore Storage Management Plan (Subsection 9.4.5), present details on the ore stockpile facilities associated with the Project, using maps and diagrams whenever applicable, and include the following:

- Anticipated quantities and grade of ore extracted, including daily and yearly average extraction rate(s);
- Description of the ore grade handling, including the design, locations and capacities of the stockpile site(s). The Proponent shall include references to similar operations in comparable conditions, applicable modelling information, and the results of research on the short and long-term thermal stability of the underlying permafrost and frozen materials;
- Description of the physical and chemical stability of the ore material to be stored, with regard to the long-term ARD and ML potential of the ore material. Consideration should

be given to the latest monitoring results from mines in the same general climatic conditions;

- Explanation of the relationship between the timing of ARD/ML and permafrost encapsulation in cold weather conditions, with consideration for potential climate change; and
- Description of run-off and seepage prevention/control structures.

6.6.1.4 Water Supply and Water Treatment Facilities

The Proponent shall present the details on all water supply and water treatment facilities associated with the Project, including the facilities at the mine site(s), mid-belt site and Roberts Bay Port site including tank farm(s) and laydown area(s). The Proponent should include the following:

- Identification and description of water supply sources (waterbodies and/or watercourses) and intake sources and facilities, and projections of volumes of water required from each source, including the frequency and timing of withdrawals;
- Description of water uses and volumes including those for camp sites, open pit and underground mines, dock facility, mill processing facility, dust suppression, firefighting reserves, workshops and maintenance facilities as well as drilling activities, etc.;
- Description of water treatment process methods for all fresh water use (i.e., mill processing and domestic water), including the design of the facility(ies);
- Design features to prevent the impingement or entrapment of fish at water intakes;
- The Proponent should provide a plan for ensuring mine operations and safety during times of low water availability (winter, and in years of exceptionally low precipitation);
- Description of the facilities for washing mine trucks and other equipment, as well as any treatment of water to be used for such activities; and
- Description of plans to recycle or re-use water resources.

6.6.1.5 Natural Drainage Diversion

The Proponent shall present, in connection with its Site Water Management Plan (Subsection 9.4.4), the details on any required alteration of drainage patterns and diversions, including the following:

- Description of any planned alteration of drainage patterns and/or diversions of natural drainage from mine site and Project facilities, and estimation of the flows to be diverted;
- Discussion of measures to prevent or mitigate sedimentation within these diverted flows;
- Discussion of potential challenges anticipated in constructing drainage diversions including seasonal effects (e.g., melting ice lenses);
- Discussion of the potential for mobilizing sediments, generating erosion and disturbances to terrain/landforms; and
- Discussion of potential environmental impacts caused by altered drainage patterns, including the extent and location of areas to be flooded seasonally as well as plans for maintaining drainage systems during seasonal extreme conditions such as spring freshet.

6.6.1.6 Mine De-Watering

The Proponent shall present, in connection with its Site Water Management Plan (Subsection 9.4.4), the details on mine de-watering required for the Project, including the following:

- Description of proposed de-watering methods and design of the mine water handling system for the open pits and underground mine including a discussion of the potential uses for the mine water;
- Description of proposed de-watering methods including a discussion of the potential uses for the water and disposal method(s) should there be a need to dispose of any water resulting from de-watering;
- Description of proposed geotechnical works, the areas that may be affected, the quantities of bottom sediment requiring disposal, and the proposed disposal methods;
- Estimates of average mine water volumes, methods used to calculate volumes, and discussion of potential uses for mine water;
- Prediction of the maximum inflow into the open pits and the underground mine during mining, including estimates of variance and likelihood of estimates. The pumping capacity should be designed by taking into consideration the predicted maximum inflow. Measurements for controlling any necessary inflow should be discussed, in addition to describing the groundwater monitoring program; and
- Anticipated salinity and general characterization of water from each pit and underground mine, including estimates of the variance of water quality.

6.6.2 Mine Site Tank Farm(s), Roberts Bay Port and Storage Facilities

The Proponent shall provide the following information regarding Project components and activities for the proposed establishment/expansion of facilities at Roberts Bay Port, tank farm(s) and storage facilities, with site maps, diagrams, and general arrangement drawings provided for reference purposes where deemed useful, as well as an analysis of alternatives if the Roberts Bay Port is not able to be utilized as proposed:

- Discussion of how the precautionary approach has been incorporated into the design of storage facilities and the proposed expansion/utilization of the existing Roberts Bay Port, to account for the challenges of the Project area including considerations for extreme temperatures, variations in ice thickness, seismic hazards, and water level change, nearshore sediment mobility and alongshore drift in the layout and structure of various facilities and design features (where applicable);
- Discussion of the study results related to bathymetry, rock and sediment geotechnical properties, and sediment thickness and sub-sea permafrost depth and thickness and quality for the proposed dock site (if required);
- Description of any transfer sites of materials from ships to barges;
- Description of all facilities proposed to be constructed at the storage facility, including discussion on the wharf storage facility, administration facility, land-based or water-based navigational aids, etc. (where applicable);
- Discussion of all potential uses of the port site and storage facilities, including predicted non-Project and/or private uses;

- Description of all facilities associated with the transfer and handling of fuel and any hazardous products;
- Description of the types and anticipated volumes/quantities of materials and equipment to be transported to and from the port, including hazardous/dangerous goods cargo;
- Description of spill contingency plans for the port and tank farm/storage facility;
- Description of the communication system and power generation unit to be employed;
- Discussion of plans for storage facility security management, and
- Discussion of the reclamation and closure of the facilities upon completion of the project.

6.6.3 Waste Management Facilities

The Proponent shall describe the sources, types and quantities of waste predicted to be generated by the Project, and the on-site processes for the collection, handling and disposing of wastes generated by the Project including any off-site disposals. The Proponent shall include the following with cross referencing to applicable management plans (Section 9.4) where appropriate.

6.6.3.1 Waste Rock Facilities

- An inventory of waste rock generated during construction and operation of the Project including overburden, waste rock, low grade mineralized material, processing wastes, excavated material, and any other related wastes if applicable;
- Description of overburden and waste rock handling, including the design, locations and capacities of the stockpiles sites, describing the options for each type of waste rock. The Proponent shall include references to similar operations in comparable conditions, applicable modelling information (i.e. general climatic conditions and climate trends and their consideration in the design of the facility), and the results of research on the long-term thermal stability of the underlying permafrost and frozen materials;
- Description of the physical and chemical stability of the types of materials to be stored and those to be used for containment construction, with regard to the short and long-term ARD and ML potential of the waste rock. Consideration should be given to the latest monitoring results from mines in the same general climatic conditions;
- Details regarding the ARD and ML characterization of waste rock, the method of testing in terms of both static and kinetic tests, the number of samples and sampling protocols, the company and personnel to carry out the tests, and implications to possible use and disposal;
- Description, in qualitative and quantitative terms of the chemistry of frozen groundwater from joints and fractures in the waste rock disposal area;
- Explanation of the relationship between the timing of ARD and ML and permafrost encapsulation in cold weather conditions, with consideration for potential climate change; and
- Estimation of the quantities of potential acid generating (PAG) and non-PAG materials that will be generated and details of the methodology used in classifying PAG and non-PAG.

6.6.3.2 Tailings Management Facilities

- Description of the tailings management facilities design;
- Description of how geotechnical factors, geological characteristics (weak rock formations, fault zones and their hydrogeological characteristics), and permafrost conditions (seasonal thawing, taliks, degradation due to tailings disposal, and long-term evolution) were considered in the design of the tailings management facility(ies);
- Description of how the general climate conditions including climate trends were considered in the design of the tailings management facilities (e.g., prevention of ice formation);
- Description of the proposed process and operations of the tailings management facilities during both operations and post-closure. The Proponent shall include a contingency plan in the event that discharges from the containment area do not meet licensing criteria;
- Description of seepage and run-off prevention and control structures and designs; and
- Description of the tailings chemistry, physical properties (rheology, solid content, consolidation density, slurry temperature, volume estimates), mineralogical characteristics and long and short-term ARD and ML potential.

6.6.3.3 Waste Water Treatment Facilities

- Description of the water treatment process for all major sources of water from the Project, including process effluent, open pit water, underground mine water, site, waste facilities and stockpile drainage/runoff, and sewage/grey waste water;
- Description of proposed mine water (i.e., process effluent, open pit water, underground mine water, site and stockpile drainage/runoff) treatment facility to be used, to include amount of treatment sludge production and its management/storage;
- Discussion related to the treated effluent discharge methods, including the design of the facility, identification of discharge points, the anticipated water quality and quantities to be disposed of, and conservation and recycling methods. Specific mention should be given to modifications that may be related to operating in arctic conditions. Include associated implications for regulatory compliance;
- Description of proposed sewage/grey water treatment facilities to be used, including a discussion of the technology to be employed, the design and locations of the facilities, point(s) of discharge, solids (sludge) disposal methods, and the quality and quantities to be disposed of, as well as the applicable discharge standards;
- Contingency measures for the disposal of effluent and sewage/grey water during periods of facility malfunction and/or disturbances, with details regarding the associated disposal and treatment technologies and facilities;
- Description of the receiving environment including the spatial extent and magnitude of alteration of the receiving waters, how the Proponent will ensure non-toxicity, the spatial extent of the mixing zone and modelling predictions for concentrations of all parameters of concern, including the equations and assumptions on which the modeling predictions were based, at key points between the discharge point and return to baseline water quality conditions; and

- Description of the on-site processes for the collection, handling and disposing of contaminated water wastes (including melt water) to be generated by the Project.

6.6.3.4 Landfill Facilities

- Research results for effectiveness of similar landfill operation facilities in comparable geological regions and climate condition;
- Locations of any landfill facilities, with estimates of containment capacities, associated design criteria and considerations to minimize impact on the surrounding environment. Include engineering features and facility layout drawings in relation to nearby roads, watercourses and waterbodies;
- Inventory of the types and volumes of non-combustible, non-hazardous industrial wastes to be generated and landfilled over the life of the Project;
- Inventory of the types and volumes of hydrocarbon contaminated wastes to be generated and sent south over the life of the Project;
- Description of the proposed collection, handling, storage, treatment, and/or disposal methods of contaminated ice, snow, soil, seepage and/or surface runoff without a landfarm on site;
- Discussion and consideration given to not having a landfarm on site as well as a description of potentially requiring a landfarm facility in the future; and
- Describe any proposed use of municipal waste facilities.

6.6.3.5 Hazardous Waste

- Inventory of the types and predicted volumes/quantities of hazardous wastes to be generated or produced by the Project activities, including shipping operations;
- Description of proposed storage, transport, handling and disposal methods to be employed for hazardous waste generated;
- Description of measures to minimize use of hazardous materials and to reduce generation of hazardous waste;
- Details regarding the destinations for each type of hazardous waste, including the disposal of containers used to transport or store hazardous materials; and
- Description of training for employees tasked with the handling of hazardous waste materials.

6.6.3.6 Camp Waste

- Description of the facilities, technologies and equipment to be used for incineration of domestic waste;
- Inventory of domestic waste to be incinerated, including both land-based and ship-based generated wastes;
- Description of the methods for disposal of incineration ash; and

- Description of wildlife deterrent programs that may be implemented to reduce depredation and prevent access to food sources by predators such as bears and wolverines.

6.6.4 Ground Transportation and Associated Water Crossings

The Proponent shall describe all ground transportation options, including all-weather and winter roads, such as access roads to facilities, mine haul roads, site service roads, various access roads, in-pit haul roads, other roads used to facilitate maintenance of infrastructure and facilities, etc. The Proponent shall describe the following in connection with the Roads Management Plan (Subsection 9.4.10), including relevant maps and drawings where useful:

- Design specification and features of all ground transportation roads, including construction methods and schedule, laydown areas, temporary works and construction camps, estimates, sources, and types of materials required for construction and maintenance, water crossings and diversions of watercourses;
- Discuss how previously installed or constructed portions of the road(s) (i.e., bridges and culverts) will be managed and maintained for the Project;
- Discuss plans to address additional traffic on any previously constructed road network (including bridges, culverts, etc.) that may require consideration, should the development of the Phase 2 Hope Bay Belt Project be granted pursuant to NLCA Section 12.5.12;
- Provide a description of any infilling of lake, wetland or stream habitats associated with road construction where applicable for the Project;
- Discussion of design features and structures planned to protect and facilitate wildlife movement (e.g., caribou crossings and migration routes) and humans that might cross the roads during operations (including ATVs and snowmobiles), including a discussion of plans to prevent/minimize collision related mortalities;
- Discussion of design features and structures planned to protect and facilitate fish movement and migration;
- Describe dust suppression, methods and types of dust suppressants as well as mitigation methods for sedimentation during construction and operations;
- Discussion of how TK has been considered in the selection of the ground transportation network;
- Relationship of ground transportation with existing hunting and travelling routes (including those routes in close proximity or intersecting planned ground transportation roads); and
- The duration, frequency and extent of use of all Project facilities, including allowances for public access and/or access for traditional pursuits.

6.6.5 Marine Shipping

The Proponent shall describe all marine shipping associated with the Project, in connection with the Shipping Management Plan (Subsection 9.4.11), including relevant maps and drawings where useful:

- Description of the proposed marine shipping vessels (types, sizes, draft, and numbers of vessels to be used, and the vessel's intended purpose), including the accommodations barge, associated frequency and timeframe for the shipping season for all project activities during each phase of the Project. Include a discussion on the existing marine traffic volumes along the proposed shipping routes to describe the marine traffic network of the region;
- Provide an analysis of proposed shipping routes with route characteristics and navigability, with corresponding maps and details regarding bathymetry, navigational aids, other marine traffic using these routes, including channel and berthing manoeuvres, anchorage components, etc.;
- Provide a description of the transit time and delay review of alternative marine routes;
- Discussion on the potential for ice breaking during the planned shipping season (including the potential for such during break-up in the spring season and during freeze-up in the fall season);
- Provide a description of any overwintering activities and discuss plans to ensure compliance with the requirements of the *Canada Shipping Act, 2001*, *Arctic Waters Pollution Prevention* Act and the associated regulations;
- Provide details on the relationship of marine shipping routes and seasons with existing hunting and travelling routes;
- A description of the procedures for avoiding disturbance of marine mammals, monitoring mammal occurrence/behaviour along shipping routes;
- Discussion of how TK has been considered in the selection of the shipping routes and timing of shipping activities;
- Description of the results from bathymetric studies undertaken along the proposed shipping routes. Additional discussion of study results should also be included for identified areas where shallow waters and/or strong current exist, with consideration given to the size of barges, and the implications for shipping safety;
- Identification of all parties responsible for ensuring safe shipping beyond the immediate port facility site;
- Estimates of the volume of goods/supplies, dangerous goods, fuel, explosives and equipment to be transported and associated protocols with shipping these goods;
- Description of loading and offloading procedures for material and supplies, dangerous goods, fuel, and explosives, including consideration of the anticipated use/reliance on policing services; and
- Discussion of how shipping and delivery/offloading of project-related materials, supplies, and fuel will be handled during times that community resupply cargo and/or existing community use are being handled, including any shared use of existing marine infrastructure.

6.6.6 Air Transportation

The Proponent shall describe all air transportation associated with the Project including the following:

- Description of all potential air transportation including air traffic, types of aircraft to be used, and the proposed use of municipal airports in the Kitikmeot region;
- Description of all facilities and infrastructure proposed for air transportation, including construction methods and schedule, transfer and handling of any required fuel, etc.;
- Estimates of the number of flights on a daily or weekly basis covering all phases of the Project, including estimated flight schedules (times and days);
- The duration, frequency, and extent of use of each airport facility/airstrip/landing area;
- Description of the anticipated use/reliance on policing services, including during emergencies; and
- Details regarding the proposed procedures for accident, malfunction and incident management and reporting for the transfer of hazardous material.

6.6.7 Borrow Pits and Quarry Sites

The Proponent shall provide information on all borrow pits and quarry sources required for the Project, in combination with the Borrow Pits and Quarry Management Plan (Subsection 9.4.12), and include:

- Maps for all sites that are to be used for borrow pits or quarries, indicating the ownership (Inuit Owned Land and Crown Land) of lands and principle geographic features (e.g., on or near eskers and other unique landscapes, the proximity to waterbodies and watercourses);
- Discussion of how the borrow pits and quarry material will be extracted;
- Discussion of how the precautionary principle has been incorporated in the design of the borrow pits and quarries in terms of minimizing potential effects to the environment, including wildlife and wildlife habitats, including fish habitat where sites are in close proximity to waterbodies and watercourses;
- Characterization of the materials at potential borrow pit and quarry site locations including ARD and ML potential, the ground ice conditions and occurrences of massive ice;
- Estimates of the quantities of materials that will be extracted from each borrow pit and quarry site;
- Estimates of quantities of materials required to build the ground transportation and site infrastructure for the Project;
- Annual estimates of quantities required for maintenance associated with ground transportation, site infrastructure, and the port site; and
- Description of proposed sediment, dust control and erosion measures in the design of the borrow pits and quarry sites.

6.6.8 Power Generation

The Proponent shall provide the following information in conjunction with its Air Quality Monitoring and Management Plan (Subsection 9.4.14):

- The energy balance for the proposed Project, including strategies for optimization and conservation;

- Discussion on how greenhouse gas emissions will be reduced;
- Type of power generation and associated infrastructure (i.e., power lines) that will be used over the Project lifespan;
- Locations (positioning) of power generation plants/stations relative to prevailing winds and other infrastructure;
- Description of diesel power generation facilities, including sources, volumes of fuel to be used, transportation methods for fuel and associated transfer points, information regarding secondary containment measures to be employed and equipment and facilities for emergency clean-up; and
- Proposed accident/incident management and reporting.

6.6.9 Fuel and Explosives Facilities

The Proponent shall describe the following information, in conjunction with its Spill Contingency Plans, (Subsection 9.4.2), Hazardous Materials Management Plan (Subsection 9.4.8) and Explosives Management Plan (Subsection 9.4.13):

- Location and characteristics of fuel and explosives storage and/or manufacturing infrastructure and facilities (e.g., explosives and detonator magazines, fuel storage, ammonium nitrate storage, maintenance/wash area, process trucks and their parking area, any offices, warehouses, buildings) as well as methods of secondary containment to be employed. This will include setback distances to vulnerable features (i.e., dwellings, roads, camps, bodies of water, etc.), and between explosives facilities and fuel storage/handling areas;
- Types and estimate of quantities of all fuel types, explosives, and other similar materials required for the duration of the Project;
- Proposed measures to ensure the fuel used for mine related activities conforms with Canadian regulations (Government of Canada; 1990, 1991, 1997, 1999b, 1999c, and 2002b);
- Operational plans including Oil Pollution Prevention and/or Emergency Plans in connection with the Spill Contingency, and Oil Handling Facility Contingency Plan; and
- Methods of fuel transfer and transportation from sources to and around site.

6.6.10 Exploration

The Proponent shall provide the following information for ongoing exploration:

- Areas proposed for ongoing geotechnical investigations and mineral exploration, including drilling, over the duration of the various Project areas;
- Description of any exploration activities occurring on or near waterbodies and the mitigation measures that will be implemented to prevent impacts to aquatic life including fish and fish habitat as defined in the *Fisheries Act*;
- Description of any seismic activities to be undertaken, including a clear delineation of the location of such activities in proximity to water bodies and the anticipated effects of such activities on aquatic life, as well as proposed measures to mitigate identified impacts;

- Temporary field facilities, equipment to be used, and required ground and air transport frequencies;
- Proposed wildlife mitigation and monitoring measures associated with exploration program (e.g., compliance with the minimum flight altitudes if aerial surveys are planned or conducted, timing and type of surveys, etc.);
- Proposed mitigation to reduce interaction with other current land users, such as Tourism Operators or harvesters;
- Description of any exploration activities occurring near or interacting with other current land users, such as Tourism Operators or harvesters
- Proposed mitigation and monitoring measures designed to protect archaeological and cultural resources from being impacted by ongoing exploration; and
- Management plans for drilling waste disposal and drill site reclamation.

6.6.11 Ancillary Project Facilities and Infrastructure

The Proponent shall describe any other relevant project facilities and infrastructure not detailed in Section 6.6 including those related to site administration and personnel accommodations, for example.

7.0 IMPACT ASSESSMENT METHODOLOGY

7.1 PUBLIC CONSULTATION

As identified in Section 2.2, the Proponent shall provide highlights of any public consultation and/or engagement undertaken in the EIS in order to address concerns of the general public regarding the anticipated or potential environmental effects of the Project. The Proponent shall also describe how communication was facilitated with the public through accommodating regional languages/dialects; not only through translation but through interpretation at any community or public meetings held.

A summary of key dialogues and identified issue areas from pre-consultation and consultation activities, along with any commitments made by the Proponent to communities during these discussions must be presented in the EIS and will enable responsible agencies to:

- Assess the transparency, meaningfulness and completeness of community consultation efforts;
- Understand messages communicated within the process of dialogue;
- Obtain an increased understanding of the expectations held within communities based upon responses to specific issues raised; and
- Assess how public participation has influenced the development of the Project with an analysis of community support for, and opposition to, the Project.

The Proponent is expected to address concerns that are voiced regarding its own meaningful consultation and is required to:

- Continue to provide up-to-date information describing the Project to the public, particularly residents of communities likely to be most affected by the Project;

- Involve the public in determining how best to deliver that information, (i.e., the types of information required, translation and interpreting needs, timing of consultations, different formats, the possible need for community meetings); and
- Explain the findings documented within the EIS in a clear and direct manner to make the issues comprehensible to as wide an audience as possible.

7.2 TRADITIONAL KNOWLEDGE

The Proponent shall, with reference to Section 2.3, present and justify its definition of TK and shall explain the methodology used to collect TK, including:

- Format and location of meetings, interviews, and other data gathering efforts;
- Description of background information provided to informants;
- Level of community participation and composition of participants;
- Design of TK studies, including lists of interview questions posed to informants or other tools used in the study;
- Selection process for participants in such studies, including participants residing outside of the NSA;
- Types of TK collected; and
- Associated issues related to any proprietary status of TK used.

The Proponent shall summarize what kinds of TK were collected and describe the roles and responsibilities of all concerned individuals and organizations in collecting, analyzing, interpreting and synthesizing the TK data. The Proponent shall also indicate whether special efforts were made to collect TK from Inuit Elders, women, youth, special groups, and harvesters familiar with the Project area. Any measures to protect the anonymity and to secure the informed consent of TK providers should be outlined as well as any special restrictions on uses of certain types of TK as stipulated by TK holders.

In all sections of the EIS, the Proponent shall discuss how it weighed and incorporated TK in areas such as baseline data collection, impact prediction, significance assessment and the development of mitigation and monitoring programs. It shall explain how it integrated TK and popular science, including the manner in which it reconciled any apparent discrepancies between the two types of knowledge. The Proponent shall also include a discussion on how it dealt with discrepancies within TK (variation between individuals) and describe how and where TK is being used to address gaps in currently available scientific data.

7.3 BASELINE INFORMATION COLLECTION

The Proponent shall present baseline data, including TK, in relation to the existing biophysical and socio-economic environments relevant to the assessment of potential impacts from the Project for all proposed phases. Potential for changes in baseline conditions due to exploration activities and any potential NLCA 12.10.2 exception applications, if applicable and as may be related to the Project, must be taken into consideration. The Proponent shall explain methodologies for baseline data collection, evaluation of the adequacy of data, confidence levels associated with baseline data, and identification of significant gaps in knowledge and

understanding. The associated uncertainties and the steps to be taken to fill information gaps should be discussed. The Proponent should consider other available information containing baseline data related to the Project region, including a review of published literature, technical scientific reports, and peer-reviewed scientific literature to present a complete picture of baseline conditions.

To identify natural fluctuations and trends including cyclical and other recurrent phenomena, the Proponent shall collect baseline data to reflect sufficient time, depth and geographic broadness of both temporal and spatial scale (e.g., populations and distributions of wildlife VECs are known to fluctuate in cyclic trends over extensive time periods and geographic ranges). In order to understand the natural ecological conditions and the potential impacts from the Project on these conditions, the Proponent should consider the design of all biophysical environmental monitoring programs to ensure that the baseline data required is useful in understanding the relationship between the natural ecological conditions and the potential Project impacts on these conditions. This would improve interpretation of monitoring data in order to differentiate between natural variability and project-specific impacts. Furthermore, to ensure post-monitoring impact analysis is not confounded by temporal variation, the Proponent should incorporate reference site sampling as part of its routine baseline sampling.

Finally, the Proponent shall make any linkages explicit and describe the trade-offs. For example, deficiencies in baseline data increase uncertainties in the prediction of potential impacts, and consequently require an intensification of corresponding monitoring and mitigation programs (Section 9.3), and follow up and adaptive management plans (Section 9.7).

The description of the existing baseline and the environmental trends should include a consideration of past projects and activities carried out by the Proponent and/or others within the RSA.

7.4 USE OF EXISTING INFORMATION

In preparing its EIS, the NIRB expects that the Proponent will rely on the use of existing information and available results of surveys and studies completed in the Project region by other developers, government agencies, organizations, institutions, regional authorities and individual researchers which may be related to the Project and the environment. For example, 'lessons learned' already exist in relation to previous and/or currently active projects in Nunavut (e.g., the Meadowbank Gold Mine project, the Jericho Diamond Mine project, the Doris North Gold Mine Project, etc.) and this information should be captured by the Proponent. When using existing information to meet the requirements of various sections of the EIS Guidelines, the Proponent should either include the information directly in the EIS with clear references indicating the source of information (*i.e.*, document, section, and page numbers), or use cross-references to direct reviewers (the document, section and page number) to where they may obtain the information within the EIS or its supporting documents. The Proponent must also clarify how representative the data are, clearly separating factual lines of evidence from inference, and state any limitations on the inferences or conclusions that can be drawn from them. If conflicting information is encountered from either scientific based or TK sources, it is suggested that these conflicting viewpoints be identified and presented in a balanced manner along with the Proponent's conclusions.

The EIS must clearly document any information or knowledge gaps encountered in the existing literature or other information sources, and discuss how these gaps might affect the ability to draw conclusions and the reliability of those conclusions drawn in the assessment.

7.5 ASSESSMENT BOUNDARIES

7.5.1 Spatial Boundaries

The spatial boundaries of the assessment of the Project, and its components, shall be determined on the basis of the Project's potential impacts on the particular biophysical, social and/or economic environment being addressed. In accordance with the NIRB's definition of local and regional study areas, the Proponent shall consider the following criteria when establishing spatial boundaries for the assessment of the Project:

- The physical or socio-economic extent of project activities;
- The extent of ecosystems potentially affected by the Project;
- The extent to which traditional and contemporary land and resource use, including protected areas, and other harvesting activities could potentially be affected by the Project; and
- The size, nature and location of past, present, and reasonably foreseeable projects and activities which could interact with the items listed above.

The EIS shall define the spatial boundaries of the maximum area potentially affected by the Project, based on the boundaries for each individual type of impact, taking into account other relevant factors such as the migratory and/or life cycle of wildlife species where applicable, the socio-economic or other economic indicators. Identification of spatial boundaries should also take into account the impact pathways such as pollutant transport and bioaccumulation mechanisms. Furthermore, traditional and contemporary land use and occupancy for the past, present, and future, should be considered in addition to other factors when determining spatial boundaries for the impact assessment of the Project.

The Proponent is not required to provide a comprehensive baseline description of the environment at each of the above scales, but must provide sufficient detail to address the relevant environmental and cumulative effects of the Project. For example, the spatial boundaries for archaeological studies related to burial grounds in the Project area might reasonably be expected to differ from those for studies on migration of caribou in the area.

The boundaries for the assessment of socio-economic impacts shall be based on an analysis of the socio-economic effects directly and indirectly associated with the Project. In all cases, priority focus shall be directed to potential impacts within Nunavut, but the EIS shall also consider potential impacts outside of Nunavut, wherever there is reason to anticipate that they might occur. The EIS must contain a justification and rationale for all spatial boundaries and scales chosen.

The following general spatial boundaries are suggested:

- **Local Study Area (LSA)**: the Local Study Area shall be defined as that area where there exists the reasonable potential for immediate impacts due to Project activities, ongoing normal activities, or to possible abnormal operating conditions. The Local Study Area includes the Project facilities, buildings and infrastructure, and all areas proposed for Project activities, including entire proposed shipping routes in the NSA.
- **Regional Study Area (RSA)**: the Regional Study Area shall be defined as the area within which there exists the potential for direct, indirect, and/or cumulative biophysical and socio-economic effects. This area includes lands, communities, and portions of Nunavut and other regions of Canada that may be relevant to the assessment of wide-spread effects of the Project. The Proponent is advised to duly consider the transboundary implications of impacts to identified VECs/VSECs as results of air transportation and marine shipping for the Project.

The LSAs and RSAs may vary between disciplines and between VECs/VSECs, as they represent the likely distribution of Project effects on individual VECs/VSECs.

7.5.2 Temporal Boundaries

Like spatial boundaries, temporal boundaries may vary with, among other things, the type of impact being considered and seasonal changes. The establishment of temporal boundaries has two aspects: the time-horizon that will be used in predicting change, and the temporal variability and periodicity that characterize the predicted impacts (Whitney and Maclaren, 1985). The time-horizon used for predicting change must be a function of the anticipated duration of the Project; including the final closure and post-closure phases, the predicted impacts and the predictive capability of the various disciplines at play.

The EIS shall determine the temporal boundaries separately for the construction, operation, maintenance, temporary closure (care & maintenance), final closure (decommission & reclamation) and post-closure periods, including planned exploration to be undertaken in conjunction with the Project. A temporary closure period (i.e. care & maintenance) is understood to encompass the period of un-timely closure of the Project and specifies care and maintenance activities while the final closure period would include decommissioning and reclamation activities. The post-closure period covers the timespan after the Project has been decommissioned and abandoned, once the site has been reclaimed and returned as much as possible to its natural state. The temporal boundaries of the post-closure period may encompass many years, depending on the site, the type of Project and the methods of closure. The Proponent shall also consider, where applicable, the temporal bounds of Project alternatives under assessment, noting where they differ from those for the preferred option. As is the case for the determination of spatial boundaries, the temporal boundaries must indicate the range of appropriate scales at which particular baseline descriptions and the assessment of environmental effects are presented.

For all temporal boundaries, the EIS shall give a rationale and justification for the boundaries chosen, including a description of any consultation with members of the public or technical experts. In doing so, the Proponent shall give consideration to climate change, including warming trends, which might influence some of the impact assessment. This may include, for example, where there may be no immediate danger of permafrost degradation, but taking climate

change into consideration would have the Proponent incorporate the future possibility of this risk into the discussion of Project design where applicable. The Proponent shall also give due consideration to traditional and contemporary land use and occupancy (past, present, and future), in addition to other factors to be considered in its determination of temporal boundaries for the Project.

7.6 VALUED ECOSYSTEM AND SOCIO-ECONOMIC COMPONENTS

The EIS should include, but not necessarily be limited to, those VECs and VSECs, processes, and interactions between the VECs and VSECs that are likely to be affected by the Project and those identified in these Guidelines. If relevant, the location of these VECs/VSECs should be indicated on maps or charts, indicating to whom these components are valued and the reasons why, including ecosystemic, social, economic, recreational, tourism, aesthetic or other considerations. The Proponent should also indicate the specific geographical areas or ecosystems that are of particular concern, and their relation to the broader regional environment and economy.

The NIRB has identified the following list of biophysical and socio-economic components that may be relevant to the Project scoping and will be given the full consideration of public input as it relates to the Project. The Proponent should consider this list in the selection of VECs and VSECs. This list is not meant to be comprehensive nor exhaustive, and should give the Proponent an appropriate starting point for the identification of relevant VECs and VSECs.

7.6.1 Valued Ecosystem Components

- Air quality;
- Climate and Meteorology;
- Noise and vibration;
- Terrestrial environment, including
    - Terrestrial ecology;
    - Landforms and soils;
    - Permafrost and ground stability;
- Geological features including discussion of surficial and bedrock geology and geochemistry;
- Hydrological features (including water quantity) and discussion of hydrogeology;
- Groundwater and surface water quality;
- Sediment quality;
- Freshwater aquatic environment, including
    - Aquatic ecology;
    - Aquatic biota (including representative fish as defined in the *Fisheries Act*, benthic invertebrates, and other aquatic organisms);
    - Habitat including fish habitat as defined in the *Fisheries Act;*
    - Commercial, recreational and Aboriginal fisheries as defined in the *Fisheries Act*;

- Vegetation;
- Terrestrial wildlife and wildlife habitat, including
    - Representative terrestrial mammals to include caribou, caribou habitat and behaviour, muskoxen, wolverine, polar bears, brown bears (including both brown and grizzly), wolves, and less conspicuous species that may be maximally exposed to contaminants;
    - Wildlife migration routes and crossings;
- Birds and their habitat including
    - Raptors;
    - Migratory birds;
    - Seabirds;
- Marine environment, including
    - Marine ecology;
    - Marine water and sediment quality;
    - Marine biota including fish and Species at Risk;
    - Marine habitat;
    - Commercial, recreational and Aboriginal fisheries as defined in the *Fisheries Act*; and
- Marine wildlife, including Marine mammals such as whales and seals.

7.6.2 Valued Socio-Economic Components

- Economic development and opportunities;
- Employment;
- Education and training;
- Contracting and business opportunities;
- Population demographics;
- Traditional activity & knowledge including:
    - Land use and mobility;
    - Food security;
    - Language;
    - Cultural and commercial harvesting;
- Non-traditional land use and resource use;
- Heritage Resources:
    - Archaeology;
    - Palaeontology;
    - Cultural;
- Health and Well-being:
    - Individual and community wellness;
    - Family and community cohesion;

    - Potential indirect effects of project on frequency and types of crime incidents;
- Community infrastructure and public service, including housing; and
- Health and safety including worker and public safety.

The Proponent shall explain and justify methods used to predict potential adverse and beneficial effects of the Project on each VECs and VSECs, the interactions among these components, and the relations of these components with the environment. In particular, the Proponent must 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 should be considered not only in relation to its role in the ecosystem as a VEC, but also the value placed on it by humans for traditional use and cultural connection as a VSEC. This should be considered not only for components of the environment but also the land directly affected by the Project. The Proponent shall provide a rationale for the selection of communities and relevant studies for which baseline data are provided.

The Proponent should validate the selected VECs/VSECs, especially those VECs/VSECs that will be used to assess the significance of Project component interactions, through consultation with the potentially affected communities. Any uncertainties in the validation must be documented. The NIRB strongly recommends that the Proponent continue to seek input from communities, government agencies and other parties, as well as to incorporate the use of TK to identify the VECs and VSECs. All VECs and VSECs used in the assessment should have clearly identified indicators as outlined in Section 7.13.

The Proponent is expected to identify the components and activities of the Project that are anticipated to interact in adverse or beneficial ways with the selected VECs/VSECs and the interaction. These components and activities could be grouped into the following categories:

- Components and activities related to construction, operation, temporary closure, final closure and post-closure of the Project; and
- Components and activities induced by the Project development, which may occur in the reasonably foreseeable future.

7.7 STUDY STRATEGY AND METHODOLOGY

In describing the study methodologies, the Proponent shall explain how scientific, engineering, traditional, community, and any other knowledge was used to construct its studies and reach its conclusions. The Proponent shall identify and justify all assumptions and substantiate all conclusions presented. All data, models, and studies must be documented so that the analyses are transparent and reproducible. All data collection methods shall be specified, and the uncertainty, reliability and sensitivity of methods and models used to reach conclusions shall also be indicated. Where any study is presented as an independent appendix in the EIS, the Proponent should also provide an overview of the study in the main document, including the methodology used, assumptions made, interpretation of the results, limitations, and provide appropriate cross-referencing to the specific study as necessary.

To support the main conclusions presented in its EIS, the Proponent shall broadly identify significant gaps of knowledge and understanding, the steps taken by the Proponent to address

these gaps, and how these gaps impacted those conclusions. Where the conclusions drawn from scientific and technical knowledge are in conflict with the conclusions drawn from community and/or TK sources, the EIS shall contain a balanced presentation of the issues and a statement of the Proponent's conclusions.

7.7.1 Acquisition Methodology and Documentation

The Proponent shall specify and justify all sampling protocols and statistical processes employed in both the biophysical and social contexts. The scope and reliability of the results, the possibility of reproducing the analyses, and quality control of laboratory analyses shall be analyzed. All data that is based on environmental sampling involves some variability, which must be determined in order to assess the scope and reliability of the data. The Proponent shall specify and justify all sampling protocols and statistical processes employed in both the biophysical and social context. The reliability and scope of the results, the possibility of reproducing the analyses, and quality control of laboratory analyses shall be analyzed. The Proponent shall, for all data obtained from environmental sampling, provide a dispersion or variability coefficient (variance, standard deviation, confidence interval, etc.) and justification for sample size used.

When designing data collection or baseline studies, it is recommended that the Proponent coordinate its programs with relevant developments, government organizations, regional authorities, and researchers, as the design of any study or collection of data may be relevant to ongoing programs established or supported by the Nunavut General Monitoring Program (NGMP), as per Section 12.7.6 of the NLCA.

7.7.2 Data Analysis and Presentation

Use of qualitative criteria to describe the environment, compare various design and development options, or assess impacts, requires each criteria to be defined, their relative importance stated, and the differences between the categories (e.g., desirable, acceptable, unacceptable) indicated and justified. The Proponent shall corroborate all analyses, interpretations of results, and conclusions with a review of relevant literature, providing direct references with an indication of their public availability. Any TK references shall be indicated and sources identified, or referenced appropriately in cases where TK proprietary or confidentiality concerns exist.

The Proponent shall correlate its conclusions about impact significance with relevant guidelines or regional policies; discussing, with direct references, any thresholds referred to or adopted from these documents.

7.8 IMPACT ASSESSMENT APPROACH

The required impact assessment, including the significance analysis, shall describe: the effect considered; the significance of the effect and justification for that determination; and if applicable, how the effect fits into a cumulative effects analysis and transboundary effects analysis. In this assessment, more emphasis shall be placed on significant impacts to VECs and VSECs and the interactions between VECs and VSECs, extending across all Project phases as applicable. The biophysical elements and socio-economic elements potentially impacted by the Project components, activities and undertakings shall be referred to in the categories listed in

Section 8.0. Based on the predicted potential adverse effects, the proposed mitigation measures, including pollution prevention and control actions, shall be addressed in the main document following the relevant impact assessment of each VEC, and cross referenced to the specific management plan where detailed information is located as listed in Section 9.0.

The impact assessment for each biophysical and socio-economic element can be linked to a list of project components and activities deemed responsible for the potential impacts. Vice versa, a project component or activity can also be linked to various environment elements, in particular VECs and VSECs, on which it might potentially have impacts. A matrix or a comparable tool should be employed to identify all linkages between environmental elements and project components and activities, highlighting those significant interactions between both.

7.9 IMPACT PREDICTION

The Proponent shall explain and justify the methods used for impact prediction, including: mathematical or numerical modeling; statistical modeling (e.g., variance and correlation analyses); analysis of sequential series; expert opinion; previous experiences; and the prediction from known tendencies and TK if applicable.

All studies used in the prediction of impacts must be specified, the original authors identified, and the studies made public. All statements based on public consultation shall be justified and the sources and methodology specified. The choice of methodologies and interpretation of results shall be justified in light of current theories, knowledge and standards.

The Proponent shall assess the direct, indirect, short-term, and long-term impacts of the Project on the biophysical and socio-economic environments, and the interactions between them, focusing on the anticipated response of the VECs and VSECs. The Proponent shall also assess the degree of uncertainty associated with each predicted effect. Where potential cumulative effects are identified, a discussion should be provided related to the CEA as outlined in Section 7.11 of these Guidelines.

The Proponent shall identify potential impacts resulting from each Project phase, including impacts arising from accidental events and malfunctions, with accepted practices used to draw impact predictions. Predictions shall be presented with appropriate explanations and justification, and the Proponent shall:

- Explain how scientific, engineering, community and TK was used;
- Document model assumptions, study methodologies and sensitivity analyses;
- Document data collection methods and limitations thereof;
- Support analyses, interpretation of results and conclusions with reference to appropriate literature;
- Describe how uncertainty in impact predictions have been dealt with;
- Specify and reference sources for any contributions based on TK;
- Identify which studies included the assistance of communities and individuals, who was involved (if the information can be made public), and how participants were selected;

- Identify all proposed mitigation measures and adaptive management strategies, if applicable; and
- Describe the potential residual effects and explain their significance.

7.10 IMPACTS OF THE ENVIRONMENT ON THE PROJECT

The Proponent shall discuss the potential impacts of the environment on the Project, considering such factors as geotechnical hazards (including slope and underground instability, differential or thaw settlement, frost heave, ice scour coastal erosion, and seismic activity), unfavourable geological conditions (weak zones and/or faults), permafrost (ground instability related to permafrost thaw and artesian groundwater pressure due to permafrost confinement), hydrological conditions (low precipitation years, low flow conditions in rivers etc.), severe weather events (extreme precipitation events, flooding, storm surges etc.), sea ice conditions, ice-ridu-up and pile-up, sea level trends, vertical motion of land/subsidence and global climate change.

The discussion on global climate change must describe and assess, on the basis of current knowledge, how potential climate change could affect permafrost and soils with high ice content, the hydrological regime, freshwater and groundwater regimes, and the long-term impacts of such changes on Project infrastructure (*i.e.*, water diversions and impoundment structures, waste water treatment structures, fuel and chemical storage areas, solid waste sites, road structures, waste management facilities, tailings facility, etc.). In addition, the Proponent shall identify the Project sensitivity to changes in specific climate-related parameters (CEAA, 2003). The discussion on global climate change should include:

- Effects of climate on the Project, with a focus on the design and planning of Project components and activities including: access road network and related water crossings; tank farm(s) and storage facilities; open pit mines; underground mines; waste rock stockpiles; ore stockpiles; and tailings impoundment area(s);
- Impacts of extreme meteorological events on the Project, and related considerations for Project design and planning, including, but not limited to, the following: extreme temperature and precipitation events; high winds and waves; ice-ride up and pile-up events; extreme ocean water levels (high and low); and severe fog or white out conditions. Potential changes to the timing of ice formation, active layer thickness, and frequency of storms shall also be taken into consideration;
- Consideration of sea level decline and shoaling caused by emergence/uplift of the land, including potential impacts to port site offloading area design and access, shipping route navigability, safety, and how this is addressed in the design of baseline studies and monitoring plans for relevant project components;
- Design and apply multiple scenarios on impacts assessment, where these scenarios span the range of possible future climates, rather than designing and applying a single "best guess" scenario. It is recommended that the range of future climates considered by the Proponent include scenarios used in the Arctic Climate Impact Assessment report (ACIA, 2005) as well as those in the relevant Intergovernmental Panel on Climate Change assessments for polar regions (IPCC, 2007);
- Impacts from climate change on sensitive ecosystem features within the terrestrial, freshwater and marine ecosystems;

- Predicted effects of climate change on mean and extreme climate parameters, and meteorological phenomena including flooding, storms, etc.;
- Potential effects of climate change on permafrost thawing in the Project area, with discussion of the related implications on the stability of project components (e.g., waste management facilities) and sensitive land features (e.g., Canadian Heritage Rivers, territorial or national parks), including waste management facilities; and
- Uncertainties related to climate change predictions, and the related effect on other predictions in the EIS, including water quantity and permafrost thawing.

Longer-term effects of climate change must also be discussed up to the projected closure phase of the Project. 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*" (CEAA, 2003) provides guidance for incorporating climate change considerations into an environmental assessment, and may be useful for the Proponent.

7.11 CUMULATIVE EFFECTS ASSESSMENT

A cumulative impact (or effect) can be defined as the impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions (Tilleman, 2005). Cumulative impacts can also result from individually minor but collectively significant actions taking place over a period of time.

The Proponent is expected to carry out its CEA with consideration for the following factors:

- *A larger spatial boundary (RSA rather than LSA)*: This will enable the Proponent to assess the project impacts in relation to other activities (including other projects and exploration) in the geographical region, and implies that spatial assessment boundaries may cross jurisdictional boundaries for a better understanding of additive and interactive pathways of different types of cumulative effects (NIRB, 2007);
- *A longer temporal scale (as defined in* Subsection 7.5.2*)*: This will enable the Proponent to consider all activities from past developments into the present time and the reasonably foreseeable future for a more accurate analysis of variability and significant long-term effects;
- *Alternatives analysis*: CEA requires the explicit creation of alternative development scenarios and analysis of potential cumulative effects associated with each option (Greig *et al.*, 2002). Therefore, the Proponent should endeavour to ensure its CEA addresses the alternatives presented under Section 6.4 of these Guidelines;
- *Consideration of effects on VECs and VSECs*: An effective CEA will allow the Proponent to more accurately assess how the interaction of impacts from the various Project components and activities, and those from other past, present and reasonably foreseeable projects (including exploration), might impact in a cumulative fashion on selected VECs/VSECs; and
- *Evaluation of significance*: Effective CEA requires identifying and predicting the likelihood and significance of potential cumulative effects, including direct, indirect

and residual impacts. The Proponent shall consider and determine the significance of the cumulative effects using the criteria described in Section 7.14.

As per the identified objectives and methodologies for a CEA, the Proponent shall:

- Justify the environmental components that will constitute the focus of the CEA. The Proponent's assessment should emphasize the cumulative effects on the main VECs/VSECs that could potentially be most affected by the Project;
- Present a justification for the spatial and temporal boundaries for the CEA. It should be noted that these boundaries can vary depending on the VECs or VSECs assessed. The Proponent shall give due consideration to the potential for cumulative effects that may be transboundary in nature;
- Discuss and justify the choice of projects, components and selected activities for the CEA. These shall include past activities and projects, those currently being carried out and any reasonably foreseeable project or activity. Activities should not be limited to exploration and mining-related activities but include other factors not related to mining (e.g., wildfires, roads/airstrips developed for non-mining activities, etc.); and
- Discuss the mitigation measures that are technically and economically feasible, and determine the significance of the cumulative effects. If any impact is identified and verified beyond the Proponent's sole responsibility or capacity, the Proponent shall make best efforts to identify other responsible parties in order to mitigate the impact collectively.

7.12 TRANSBOUNDARY IMPACTS

Transboundary impacts, for the purpose of the current Guidelines, are defined as those effects linked directly to the activities of the Project inside the NSA, which occur across provincial, territorial, international boundaries or may occur outside of the NSA. The Proponent shall give due consideration to the potential for transboundary impacts which may be a result from interactions between the effects of the Project in the NSA, and the effects of projects located outside the NSA. The potential for transboundary impacts related to cumulative effects associated with this Project shall also be defined.

Where feasible, the potential for transboundary impacts should be considered for all VECs and VSECs identified by the Proponent, with specific consideration given to the potential for transboundary impacts associated with marine shipping on marine mammals, migratory birds and seabirds, and their habitat, as well as the large migration range of land mammals such as caribou. Any residual effects which have the potential to occur outside of the NSA shall also be included in the Proponent's evaluation of transboundary impacts.

7.13 INDICATORS AND CRITERIA

The Proponent shall identify the indicators and/or criteria selected for assessing the potential impacts of the Project, including any cumulative and transboundary impacts, and shall justify their selection. In doing so, the Proponent shall describe the role played by consultation with members of the public (TK) and technical experts. In its discussion of indicators, the Proponent

shall emphasize the linkage between those indicators and the relevant VECs or VSECs and how TK was used in the selection of indicators used to assess potential impacts of the Project. The indicators for the VECs should include sensitivity to contaminants and environmental pathways of exposure and bio-magnification.

7.14 SIGNIFICANCE DETERMINATION

Impact significance is based on comparing the predicted state of the environment with and without the Project and expressing a judgment as to the importance of the changes identified. Assessing the significance of potential impacts is, arguably, the single most important aspect of an environmental impact statement.

In the process of significance determination, the Proponent is expected to communicate with potentially affected communities, including relevant individuals and organizations to solicit input and incorporate their views regarding the value it placed on a VEC or VSEC, as well as associated significance of impacts. The Proponent shall describe how it will determine the significance that different parties assigned to each impact, and how it will proceed if different parties ascribe varying significance to VECs, VSECs, the interaction between VECs and VSECs or the associated impacts. If it is impossible to attain a consensus on the significance of certain impacts, the Proponent shall present the range of viewpoints expressed and shall present and justify its preference, if any. Finally, the Proponent shall describe the significance it ascribes to each effect, and justify how the significance of the effect was determined, taking into consideration and avoiding duplication of the information provided above. Furthermore, the proponent shall demonstrate how uncertainty was accounted for in their significance determination for each predicted effect.

The dynamic change of ecosystems and their components must also be considered in determining impact significance. The Proponent shall evaluate the significance of potential impacts in the light of data on the current "state of health" of ecosystems and their predictable evolution, taking into account global climate change. Consistent with the ecosystem approach required above, the Proponent should highlight the interactions within and between ecosystem components in an effort to increase understanding of the dynamism of the ecosystems in question and the nature and severity of the predicted impacts.

The terms used to describe the level of significance, such as "low", "medium", "high", "adverse", "beneficial", "positive", "negative" must be clearly defined, where possible in quantitative terms. The following attributes defined by the NIRB shall be taken into consideration in determining the significance of each impact:

- Probability of effects;
- Direction or nature of impact (i.e., positive/beneficial versus negative/adverse);
- Magnitude and complexity of effects;
- Geographic extent of effects;
- Frequency and/or duration of effects;
- Reversibility or irreversibility of effects; and
- Identification of potential residual effects (see Section 9.8)

In addition, the NIRB considers other relevant attributes in assessing the significance of an impact:

- Ecological or socio-economic context/value;
- The environmental sensitivity of the area likely to be affected by the project;
- The historical, cultural and archaeological significance of the geographic area likely to be affected by the project;
- The size of the affected human populations, and the size of the affected wildlife populations and related habitat;
- The extent of the effects of the project on other regional human populations and wildlife populations, including the extent of the effects on Inuit harvesting activities;
- The potential for cumulative adverse effects given past, present and future relevant events;
- Effects on ecosystem function and integrity;
- The effect on the capacity of resources to meet present and future needs; and
- The value attached to the impacted VEC or VSEC by those who identified them.

7.15 CERTAINTY

The Proponent shall also assess the degree of uncertainty associated with each predicted effect. The level of certainty with predictions is related to limitations in the overall understanding of the ecosystem and limitations in accurately foreseeing future events or conditions. The Proponent shall provide a reasonable description how uncertainties have been dealt with, for example, through elements of the project design, monitoring and contingency plans design, etc.

8.0 PROJECT ENVIRONMENT AND IMPACT ASSESSMENT

The EIS shall provide a complete analysis of the predicted effects from the Project on the biophysical and socio-economic environments (see Section 7.0), and will serve as a basis for developing various mitigation and monitoring plans to address the potential impacts of the Project.

8.1 BIOPHYSICAL ENVIRONMENT AND IMPACT ASSESSMENT

The Proponent shall present relevant information pertaining to the biophysical environment and associated processes to be assessed (see Section 7.3) to serve as a baseline against which the potential impacts of the Project can be measured. Information should be presented in the form of a conceptual site model with clear links to ecological and human health risk assessment presented throughout the document. Baseline summaries should also include trends, timelines and how the environment is expected to change over the life of the Project. In describing the biophysical environment, the Proponent shall take an ecosystemic approach that takes into account both scientific and TK perspectives encompassing all levels of complexity found in an ecosystem, both structurally and functionally.

In its impact assessment, the Proponent shall identify and justify the thresholds or indicators, and further relate them to Project monitoring and follow-up measures. For each predicted negative

impact in this section, associated mitigation measures are to be discussed to the extent possible, with references to project design (Section 6.1) and environmental management systems (Section 9.0). The Proponent shall also include a consideration of the temporal scale and predictions of when potential impacts to each relevant VEC could reasonably be expected to manifest. The Proponent shall include a prediction of trends relating to potential project impacts that provides for a temporal scale which encompasses all closure and reclamation activities.

8.1.1 Air Quality

8.1.1.1 Baseline Information

- Background ambient air quality data collected in the LSA and RSA including airborne dust (TSP, PM_{10} and $PM_{2.5}$);
- Current sources of criteria air contaminants [TSP, PM_{10}, $PM_{2.5}$, NO_x, SO_2, volatile organic compounds (VOCs), Ozone (O_3) etc.] and GHG emissions; and
- Seasonal variations or climatic conditions associated with variations on air quality.

8.1.1.2 Impact Assessment

The Proponent is required to present a comprehensive impact analysis for all Project components and activities on air quality. This analysis shall include the following:

- Discussion of the standards, guidelines and regulations that the Proponent will incorporate to minimize and mitigate effects to air quality;
- Predictions of principle pollution emission sources from the Project at various stages, including:
    - Criteria air contaminants [TSP, PM_{10}, $PM_{2.5}$, NO_x, SO_2, volatile organic compounds (VOCs), Ozone (O_3), etc.] and GHG emissions from the fuel consumption of mobile equipment such as vehicles, marine vessels, aircrafts, and stationary equipment such as diesel generators and other combustion sources;
    - Fugitive dust and gaseous emissions from extraction and ore processing, handling, tailings, waste rock and ore stockpiling, quarries and other Project components and works; and
    - Fugitive dust emissions from ground transportation and wind erosion at various Project components including the all-weather road, access roads and mine hauling roads.
- Assessment of dispersion of Project emissions using a LSA and RSA, using appropriate modelling, and discussion of related impacts and mitigation strategies;
- Discussion of Project components and activities which may contribute to the potential for acidic input, and an evaluation of associated effects;
- Assessment of effects on air quality from Project emissions during various project stages including airborne dust (TSP, PM_{10} and $PM_{2.5}$ and/or metals) and criteria air contaminants such as SO_2, NO_x, CO, VOCs, O_3, etc.;
- Assessment of the Project's GHG contributions to both Nunavut and Canada; and

- A discussion of the potential effects of changes in air quality on human health and the environment.

8.1.2 Climate and Meteorology

8.1.2.1 Baseline Information

- A description of the baseline meteorological and climatic conditions at the LSA and RSA, including methods of determination including a discussion of how data from outside the project area may have been utilized and uncertainties encountered;
- Meteorological data including, but not limited to, air temperature, precipitation, wind directions and velocity, as well as prevailing wind directions for locations of proposed project components and along proposed shipping route(s);
- Annual, seasonal, monthly and daily average and mean values of above noted meteorological parameters; seasonal and yearly fluctuations and variability; and extreme climate events over the same period of time in which the data including site-specific data are collected in the RSA of the Project; and
- Prevalent trends related to VECs in the Project area and any resulting implications to the Project.

8.1.2.2 Impact Assessment

The Proponent is required to present a comprehensive analysis of the impact that all Project components and activities may have on climate and meteorology. This analysis shall include the following:

- Discussion of the relationship between climate change and GHG emissions from the Project; and
- Discussion on the climate parameters that may change due to emissions from the Project [GHGs, and criteria contaminants such as SO_2, NO_x, CO, VOCs, O_3, etc.].

8.1.3 Noise and Vibration

8.1.3.1 Baseline Information

- Description of baseline noise and vibration levels in the Project area, including a discussion on variability, and if applicable, the relationship between these parameters and local weather conditions, seasonal variations, etc.;
- Review of available studies/research the potential impacts of noise and vibrations on wildlife behaviours and health in both terrestrial and marine environments, with a focus on noise from similar mining and shipping operations, in comparable climate and geographical regions if possible. Emphasis should be placed on level of noise and the identification of noise sensitive species, timing, etc.; and
- Review of available studies/research on the potential impacts of noise and vibrations from blasting in or near freshwater and marine environments.

8.1.3.2 Impact Assessment

The Proponent is required to present a comprehensive analysis of the impact that all Project components and activities may have on noise and vibration. This analysis shall include the following:

- Description of anticipated noise and vibration levels from all relevant Project equipment and activities;
- Discussion of the standards, guidelines, thresholds and regulations that the Proponent will comply with to minimize and mitigate impacts associated with noise and vibrations;
- Potential increase to atmospheric noise levels from Project activities at different project stages, including those contributions arising from:
    - Ground transportation, including mine traffic, other access roads and the public where applicable;
    - Air transportation;
    - Equipment use at mine and construction sites, including power generators; and
    - Mine site operations including: blasting; drilling; crushing; screening; milling; smelting; transportation and stockpiling activities;
- Potential changes in marine noise levels due to shipping activities, as well as noise propagation in the marine environment; and
- Potential impacts of noise and vibration on the following:
    - Humans and human activity in close proximity to noise generating sources;
    - Terrestrial wildlife, with a focus on caribou and migratory birds and Species at Risk;
    - Marine mammals; and
    - Fish in fresh water and marine environments.

8.1.4 Terrestrial Environment

For the purpose of the current Guidelines, terrestrial environment includes terrestrial ecology, landform and soils, permafrost, and ground stability.

8.1.4.1 Baseline Information

- Description of existing unique or valuable landforms (e.g., eskers, fragile landscapes, wetlands), including details regarding their ecological functions and distribution in the LSA;
- Description of existing or proposed protected areas, special management areas, and conservation areas in the RSA;
- Discussion of the landforms and topographic features at areas proposed for construction of major project components, including the type, thickness, soil stability and/or clay sensitivity, and classification and distribution of soils as applicable;
- Description of the bedrock lithology, morphology, surface geology, landform and soils (including sediments and the thermal and ground ice conditions) at proposed borrow and

quarry sites, project facilities such as tailing and waste rock management facilities, roads, and other areas where earthworks are proposed. If eskers are identified as a potential source of granular material, then a description of granular material properties, including thermal condition and ice content, should also be included;

- Discussion of the potential of geohazards, that may have an effect on the project or the occurrence of which may potentially be affected by the Project (e.g., slumping, landslides, potential slippage, seismic hazards) at areas planned for Project facilities and infrastructure;
- Discussion of the relationship between permafrost processes and active layer, surface waterbodies and topography, including a description of permafrost and talik configuration in the development area and adjacent water bodies and implications for groundwater flow pathways.;
- Details regarding the suitability of topsoil and overburden for use in the re-vegetation of surface-disturbed areas;
- Description of permafrost distribution in the LSA, including areas of discontinuous permafrost, high ice-content soils, ice lenses, thaw-sensitive slopes, and talik zones;
- Description of permafrost temperatures at areas planned for Project facilities and infrastructure, including discussion of sensitivity to climate change, and implications for stability and safety of infrastructures; and
- Sites of paleontological or palaeobotanical significance within the LSA.

8.1.4.2 Impact Assessment

The Proponent is required to present a comprehensive analysis of the impact that all Project components and activities may have on the terrestrial environment. This analysis shall include the following:

- General impact on topography in the LSA as a result of Project development, borrow resource extraction, with a focus on sensitive landforms, and those serving as important vegetation and wildlife habitat;
- Potential impacts on the abundance and distribution of unique or valuable landforms (e.g., wetlands, eskers and fragile landscapes) from the Project;
- Potential for soil erosion, including stream bank erosion, resulting from surface disturbances associated with the Project components and activities (e.g. road embankments, water crossings, water management/diversions) during all Project phases;
- Potential impacts to soil quality from compaction, the deposition of air emissions and airborne fugitive dust emissions and/or spills from the Project;
- Implications to the Project planning and design of design of project components related to terrain conditions, in particular permafrost, sensitive landforms, high ice-content soils, ice lenses, thaw-sensitive slopes, and talik zones;
- Potential impacts on the stability of terrain, in particular the thermal stability, in the vicinity of facilities and infrastructure due to the thawing of the ice-rich permafrost soils and other sensitive landforms. Discussion should focus on the potential for impacts arising from surface disturbances due to construction (e.g., overburden stripping, mine pit creation, cuts/fills, excavation) of the facility and infrastructure;

- Assessment and prediction of permafrost behaviour (degradation and its rate) beneath the pits during mining and operation of the tailings management facilities including disposing of waste rock. Long-term predictions of the thermal regime around the tailings management facilities should be conducted with the consideration of climate change. Numerical modelling should be employed for both short term and long term predictions of permafrost evolution including predictions of artesian inflow into the tailings management facilities if thawing of permafrost is envisioned;
- Potential impacts on contamination of traditional foods as a result of bioaccumulation, i.e. food chain uptake through air, water and soil;
- Potential impacts on food, i.e. contamination of country foods, including those harvested or grown for subsistence or medicinal purposes (i.e. berries, etc.);
- Discussion of whether country foods are consumed, or are expected to be consumed, in the potentially affected area;
- Identification of what country foods are consumed, which parts of country foods are consumed, and their consumption frequency;
- Lists all potential contaminants and a determination of whether these contaminants may persist into country foods as a result from project activities;
- Potential impact from the loss or alteration of habitat (i.e. vegetation) due to pollutants and noise and its effects on wildlife, wildlife calving grounds and marine habitat;
- Discussion on environmental receptivity including ecological, physical and/or climatic factors that influence exposure to harmful substances; and
- Discussion of the potential for the occurrence, frequency and distribution of terrain hazards, including snow drifts and snow banks, as a result of construction activities (e.g., cut/fill, extraction of construction materials).

8.1.5 Geological features including discussion of surficial and bedrock geology and geochemistry

8.1.5.1 Baseline Information

- Description of local and regional bedrock and quaternary geology. The history of the geological formations and the description of their physical, chemical and hydrogeological properties should be given. For data obtained with in-situ investigations, maps should be provided showing the location of the boreholes, with their positions relative to the planned project component;
- Description of structural geology, such as fractures and faults, at major project infrastructure areas and where earthworks are proposed (e.g., mine site(s), Roberts Bay Port site, tank farm(s) and storage facilities, etc.);
- Typical regional and local cross-sections of the general geology should be provided showing the geological units and their elevation, groundwater table, and linear geological structures;
- Description of the geotechnical properties of bedrock and soil units, including ice content and thermal conditions of permafrost soils and rocks, as relating to slope stability, underground stability, and bearing capacity of facility foundations; and

- Acquisition of the in-situ stress either with in-situ investigation or from other sources with reasonable confidence.

8.1.5.2 Impact Assessment

The Proponent is required to present a comprehensive impact analysis for all Project components and activities on geology. This analysis should include the following:

- Potential geotechnical and geophysical hazards within the Project area, including potential seasonal subsidence, seismicity and faulting, risks associated with cut/fill slopes, underground excavation, and surface constructed facilities. Where appropriate, the assessment should be supplemented by analysis and illustrations such as maps, figures, cross sections and borehole logs;
- Potential effects on foundation stability of major Project components from geological fractures and faults, and associated implications of these features on project planning and engineering design. Those Project components assessed shall include, but are not limited to the port facilities, major watercourse crossings, open pits, underground mine, and equipment pads; and
- Risk assessment and predictions, including proposed management measures.

8.1.6 Hydrological features (including water quantity) and discussion of hydrogeology

8.1.6.1 Baseline Information

- Description of hydrology of the LSA (e.g., streams, surface water flows, subsurface water movement, ice formation, and melt patterns);
- Description of relevant hydrological regimes, drainage basins, watershed boundaries and site water balance in the RSA;
- Description of natural fluctuations, variability, and sources of variability in flow rates, including seasonal fluctuations and year-to-year variability, and the interactions between surface water and groundwater flow systems;
- Description of the timing of freeze/thaw cycles, flood zones, ice cover (seasonal patterns and spatial variation), and ice conditions and typical thicknesses, formations and melt patterns;
- Description of hydrological characteristics of streams, rivers, and lakes in each watershed of the RSA. Items listed should be considered within the context of the range of climate conditions expected (include both climatic variability such as potential for extreme events, seasonal changes);
- A conceptual and numerical hydrogeological model that discusses the hydrostratigraphy and groundwater flow systems should be presented;
- Characterization of faults and fractures within the mine area, including information about occurrence, hydraulic conductivity testing and interpretation;
- Description of interactions between permafrost, surface water and ground water, and topography, as well as rock fractures and talik zones between different surface/ground waters;

- Description of permafrost/talik distribution, permeability and hydraulic conductivity of the underlying materials; and
- Description of existing groundwater regimes, distribution characteristics and flow paths in the Project area, including any instances of frozen groundwater within/around the identified deposits.

8.1.6.2 Impact Assessment

The Proponent is required to present a comprehensive impact analysis for all Project components and activities, including its shipping activities where applicable, on hydrology and hydrogeology. This analysis should include the following:

- Discussion of the potential impact of variable and extreme stream-flows on Project design and planning, including how the design and size of proposed watercrossings would ensure adequate flow capacity to accommodate spring freshet and storm flows (e.g. 1 in 100 year or greater storm events). This should include migration contingencies if the watercrossing does not function as intended;
- Potential impacts to existing watersheds from surface water diversions required by mine site development and other Project components (e.g., waste rock stockpiles);
- Evaluation of stormwater runoff throughout the LSA, with consideration for potential impacts to receiving waters (e.g., flow rates and flow patterns);
- Potential impacts to natural drainage patterns from the construction and operation of proposed mine facilities;
- Potential impacts on terrestrial and aquatic wildlife habitat resulting from the modification or redirection of natural flows;
- Potential for ice damming and resultant effects on other resources;
- Assessment of each watercrossing and in-stream work, and potential impacts to the navigability and safety of the watercourses;
- Potential changes to permafrost and ground ice conditions as a result of Project activities, including an analysis of the potential for groundwater inflow into the open pit; and
- Potential changes to permafrost/talik distribution, groundwater distribution and flow paths.

8.1.7 Groundwater and Surface Water Quality

8.1.7.1 Baseline Information

- Identify all sources of drinking water (surface and groundwater), as well as water used for recreational purposes, within the area of influence of the project;
- Description of the natural hydrogeochemistry of groundwater system [pH, redox potential, total dissolved solids, isotopic composition, dissolved oxygen, dissolved metals anions and cations];
- Description of the physical and chemical characteristics of groundwater and surface water in the LSA, with discussion of seasonal variations of water flow and quality.

Chemical characteristics should include baseline levels of contaminants and should be compared to relevant water standards/guidelines;

- Discussion of waters in the LSA of importance to local harvesting activities by surrounding communities;
- Description of lake bathymetry and limnology in the LSA; and
- Provide baseline levels and any anticipated increases in contaminants associated with the Project in surface water and ground water.
- "Provide maps and cross sections of the study area indicating the extent of hydrostratigraphic units, permafrost, and lake taliks. Groundwater levels, potentiometric contours and groundwater flow directions should be included."
- "Provide the location and description of all on-site groundwater monitoring wells, including well diameter and screen depth and intercepted aquifer unit. Include all baseline groundwater level data."
- "Provide hydraulic conductivity data for hydrogeologic units in the study area."
- "Provide a detailed groundwater budget"
- "Include a discussion of groundwater interactions with lakes in the area."

8.1.7.2 Impact Assessment

The Proponent is required to present a comprehensive impact analysis for all Project components and activities, including its shipping activities where applicable, on groundwater and surface water quality. This analysis should include the following:

- Provide details on what the specific contaminants of potential concern to the Project are, the project activity to which they are related, the rationale for selecting them and for determining which will be carried forward into the impact assessment;
- Provide predicted increases in contaminants in groundwater and surface water as a result of the Project, specifically identifying any waterbodies used as drinking water sources, for recreational purposes, that are important to local harvesting, the fish bearing status of identified waterbodies as well as specifically identifying any other fish bearing waterbodies. For any water sources identified as being current or future drinking water sources, compare concentrations of contaminants to relevant territorial drinking standards/guidelines and/or Health Canada Drinking Water Guidelines (Health Canada, 2010);
- Potential impacts on groundwater quality and surface water quality in surrounding lakes and rivers from surface runoff and seepage, traffic on Project roads, and from dust from road traffic;
- Potential impacts on water quality due to under ice water withdrawals;
- Potential impacts on groundwater quality and surface water quality of lakes and rivers from discharges of Project waste water treatment plants. A solute transport model based on numerical groundwater flow modelling should be used for ground water quality predictions and appropriate models selected (with rationale) to predict:
    - Water quality from specific sources;
    - Water quality discharged to the environment; and

    - Dispersion, dilution and assimilation of effluent discharged to the environment;
- Potential impacts on groundwater quality and surface water quality from dust, ARD and ML resulting from waste rock stockpiles, ore stockpiles, open pit and underground mine dewatering, construction fills, embankment of roads, and open quarry sites;
- Potential impacts of faults on contaminant transport processes in subsurface and surface water quality;
- Potential impacts on surface water quality of nearby lakes and streams as a result of nutrient input from blasting activities;
- Potential for increases in suspended sediments in waterbodies as a result of construction and maintenance of the mine facilities, all-weather road and associated water crossings;
- Potential impacts on surface/ground water quality from runoff at fuel storage facilities, with consideration for possible fuel spills and malfunctions;
- Potential impacts on ground and surface water quality from accidental spills of fuel and chemicals along the ground transportation routes;
- Potential impacts on surface water quality from the deposition of particulate matter resulting from the incomplete combustion of wastes from incineration;
- Potential impacts on groundwater and surface water quality in relation to other site waste management activities, including: storage, handling, waste deposition in landfills; landfarming of contaminated soil or runoff; the management of historical contaminated material (e.g., previous spills, mishaps, releases, etc.); and sewage effluent discharges;
- Potential impacts on surface water quality from construction and operation of camps;
- Potential impacts of erosion associated with the all-weather road on surface water quality as a result of vegetation removal, cuts/fills and other surface disturbances;
- and
- Potential impact of ongoing exploration activities on surface water quality from drilling water withdrawals and returns.

8.1.8 Sediment Quality

Based on the proposed facilities and activities, the Proponent should identify water bodies that are potentially impacted by development under various pathways. For each water body, the Proponent should provide details on what baseline data is appropriate and if flow or dispersion modeling is required to assess impacts, then the baseline program should be designed to collect that information.

8.1.8.1 Baseline Information

- Description of the physical and chemical characteristics of the sediment quality in the LSA;
- Description of sedimentation rates and dispersion patterns of waterbodies within the LSA; and
- For the sedimentation deposition rates, flow models and sediment dispersion models should be provided which outline the rate and location of sediment deposition where

relevant. Provide linkage of this baseline information with the hydrology baseline information (Subsection 8.1.6.1).

8.1.8.2 Impact Assessment

The Proponent is required to present a comprehensive impact analysis for all Project components and activities, including its shipping activities where applicable, on sediment quality. This analysis should include the following:

- Potential impacts on sediment quality in surrounding lakes and rivers from surface runoff and traffic on Project roads and dust from road traffic and other project sources;
- Discussion of fluvial processes and stability as related to proposed water crossings;
- Potential sedimentation and infill rates of drainage areas that might be impacted by the Project;
- Potential impacts on sediment quality of lakes and rivers from discharges of Project waste water treatment plants;
- Potential impacts on sediment quality from ARD and ML resulting from waste rock stockpiles, ore stockpiles, open pit dewatering, construction fills, embankment of roads, and open quarry sites;
- Potential impacts of erosion associated with the all-weather road on sediment quality as a result of vegetation removal, cuts/fills and other surface disturbances;
- Potential impacts on sediment quality of nearby lakes and streams as a result of nutrient input from blasting activities;
- Potential impacts on sediment from runoff at fuel storage facilities, with consideration for possible fuel spills and malfunctions;
- Potential impacts on sediment quality from the deposition of particulate matter resulting from the incomplete combustion of wastes from incineration;
- Potential impacts to sediment quality in relation to other site waste management activities, including: the storage, handling, waste deposition in landfills; landfarming of contaminated soil or runoff; the management of historical contaminated material (e.g., previous spills, mishaps, releases, etc.); and sewage effluent discharges; and
- Potential impacts on sediment quality from construction and operation of camps.

8.1.9 Freshwater Aquatic Environment

For the purpose of the current Guidelines, freshwater aquatic environment includes aquatic ecology, aquatic biota (including representative fish as defined in the *Fisheries Act*, benthic invertebrates, and other aquatic organisms) and habitat including fish habitat as defined in the *Fisheries Act*.

8.1.9.1 Baseline Information

- Description of the limnology, freshwater biota, presence of fish and other freshwater species (with emphasis on species that perform particularly significant ecological functions), associated habitats and habitat distribution in the RSA and the LSA. This description should be based on the results of baseline information collected from studies,

available published information and/or information resulting from community consultations;

- Description of the biological composition of freshwater aquatic environments in the LSA, including: trophic state, periphyton, phytoplankton, zooplankton, benthic invertebrates, fish, and the interactions and relative significance of each trophic level identified in the food chain;
- Description and population distribution of fish species in the LSA with a focus on arctic char, lake trout, and arctic grayling, and other species identified as contributing to an Aboriginal, recreational or commercial fishery, as well as key forage fish for these species, and including baseline information on the abundance and distribution of these species;
- Characterization of habitat requirements for each fish species, including areas used for spawning, rearing, feeding and over-wintering, and any sensitive times for these activities;
- Description of existing freshwater habitat in waterbodies and watercourses within the LSA including littoral zones, aquatic and riparian vegetation, lake bottom characteristics, key habitat areas (such as fish overwintering areas, spawning, migration corridors etc.) the estimated productive capacity, etc.;
- An overview of fish species, populations, distributions and ecologies in the RSA, with emphasis on identified fish VECs and species with special designations (Species at Risk listed on Schedule 1 of the federal SARA and species with designations by the COSEWIC) or any populations of any rare or regionally unique fish species and habitats within both the LSA or RSA. This description should include reference to species having significant ecological functions, and/or importance for Inuit life and culture;
- The health of fish VEC indicator species populations and their contaminant loadings; and
- Discussion of any other issues relating to freshwater aquatic species or habitat identified through public consultation.

8.1.9.2 Impact Assessment

The Proponent is required to present a comprehensive impact analysis for all Project components and activities, including its shipping activities, on the freshwater aquatic environment. This analysis should include the following:

- Potential impacts to fish, invertebrates, and freshwater habitat including potential impacts to water and sediment quality. Consideration should be given to impacts associated with the following: water withdrawals; discharge; redirection of natural flows; explosives use; nutrient and contaminant inputs; and sewage and grey water effluent discharge;
- Potential direct or indirect effects on fish and invertebrate biota and habitat of both, including aquatic Species at Risk, from any changes to the aquatic or riparian environments, as a result of any in-water works or Project activities in close proximity to waterbodies;
- Potential impacts to fish due to blasting in or near waterbodies, including noise and vibration impacts;

- Potential impacts to fish and fish habitat from any infilling of lake, wetland or stream habitats associated with road construction(s);
- Potential impacts to freshwater fish, invertebrates and habitat from planned containment structures (e.g., sediment control structures and fuel containment structures) and potential accidental spills;
- Potential impacts on identified fish habitat critical for spawning, rearing, nursery and feeding, seasonal migration, winter refuges and migration corridors;
- Evaluation of the ability of fish to pass at water crossings along access roads taking into consideration periods of extreme low and extreme high stream flows;
- Potential impacts to fish health, distributions and populations especially taking in to consideration contamination and fugitive dust and potential impact to human health due to consumption of these fish;
- Potential impacts on contamination of traditional foods as a result of bioaccumulation, i.e. food chain uptake through air, water and soil, including a discussion of proposed monitoring;
- Discussion of the management measures for minimizing/mitigation of disturbances to fish populations, including measures to reduce the potential for establishment of invasive species in the area;
- Environmental receptivity-including ecological, physical and/or climatic factors that influence exposure to harmful substances; and
- Quantitative assessment of the ecological risks to freshwater VECs from the potential elevated contaminant loadings as a result of the Project.

8.1.10 Vegetation

8.1.10.1 Baseline Information

- Description of ecological zones, and other relevant classifications of plant associations and phenologies in the LSA;
- Description of the vegetation/plant types in the LSA, including estimated percentage cover and height for principal species, with a discussion on their particular significant ecological functions and/or their importance to wildlife and humans;
- An overview of vegetation species, populations, distributions and ecologies in the RSA, with emphasis on identified vegetation VECs and species with special designations (Species at Risk listed on Schedule 1 of the federal SARA and species with designations by the COSEWIC). This description should include reference to species having significant ecological functions, and/or importance for Inuit life and culture including TK collected related to plants and plant use in the RSA;
- Details regarding associations between vegetation cover types and soil types in the LSA;
- Presentation of available published information and/or information resulting from TK studies regarding identified VECs,
- Discussion of the health status of plant species or communities in the LSA, including baseline information on contaminant levels (including metals) in representative species consumed by wildlife and/or humans, either directly (humans eating plants) or indirectly

(humans consuming wildlife), and other vegetation that reflects sensitivity to contaminants or environmental pathways of exposure and biomagnification; and

- Any other issues related to vegetation as identified through public consultation.

8.1.10.2 Impact Assessment

The Proponent is required to present a comprehensive impact analysis for all Project components and activities, including its shipping activities, on vegetation. This analysis should include the following:

- Potential impacts to abundance and diversity of vegetation due to Project activities;
- Potential impacts to specific vegetation coverage and species composition from construction, operation, and reclamation activities in the Project area;
- Assessment of the potential loss, disturbance, and/or changes to vegetation abundance, diversity, and forage quality as a result of Project components and activities, including potential effects from airborne fugitive dust fall, airborne contaminants from emission sources, and changes to water quality and quantity, permafrost, or snow accumulation;
- Potential impacts on vegetation abundance and diversity from the transfer/introduction of invasive or exotic species into the LSA via Project equipment and vehicles, including aircraft and marine vessels;
- Potential impacts on vegetation quality due to soil erosion, structural soil changes, soil contamination, and fugitive dust and gaseous air emissions from mining, milling and waste management activities;
- Discussion of proposed vegetation monitoring, specifically contaminant levels in species directly consumed by wildlife (e.g., lichen) and/or humans (e.g., Labrador tea, blueberries) and/or indirectly consumed through food consumption (*i.e.*, caribou);
- Discussion of the management measures for minimizing/mitigation of disturbances to plant associations, including progressive reclamation/re-vegetation plans for disturbed areas, and measures to reduce the potential for establishment of invasive species in the area;
- Potential impacts on contamination of traditional foods as a result of bioaccumulation, i.e. food chain uptake through air, water and soil;
- Potential impact from the loss or alteration of habitat (i.e. vegetation) due to pollutants and noise and its effects on wildlife, wildlife calving grounds and marine habitat; and
- Discuss the potential of invasive vegetative species (weedy species) from shipping along the shore line and from transportation along the all-weather road.

8.1.11 Terrestrial Wildlife and Wildlife Habitat

For the purpose of the current Guidelines, terrestrial wildlife and wildlife habitat includes representative terrestrial mammals including: caribou (including habitat, migration, and behaviour), muskoxen, wolverine, polar bears, brown bears (including brown and grizzly bears), wolves and less conspicuous species that may be maximally exposed to contaminants; and wildlife migration routes and crossings.

8.1.11.1 Baseline Information

- Description of wildlife populations, distributions and ecologies in the RSA, with emphasis on identified wildlife VECs and species with special designations (Species at Risk listed on Schedule 1 of the federal SARA and species with designations by the COSEWIC). This description should include reference to species having significant ecological functions, and/or of importance for Inuit life and culture;
- Description of biodiversity within the RSA, and associated food chain relationships among terrestrial wildlife species;
- Presentation of available published information and/or information resulting from TK studies regarding identified VECs, including: the relative seasonal and annual trends in abundance and distributions; the estimated productive capacity; migratory patterns and associated corridors/routes; critical habitats on or in LSA and RSA; and sensitive periods;
- Description of the population health of identified VECs, with a discussion of contaminant loadings in representative species important to Inuit as a food source, such as caribou;
- Details regarding habitats within the LSA which are important for forage, shelter and reproduction of wildlife VECs, including terrestrial and aquatic habitats (e.g., sea ice, freshwater and marine waters);
- Identification of key wildlife habitats in the LSA and RSA as applicable, including: National Parks, Critical Wildlife Areas, Territorial Parks and other areas with legislated protection; eskers; caribou calving and nursing areas; denning sites; staging areas; and special locations as salt licks, insect relief habitats, and areas used by females and their young. Related discussion should also include migration routes, water course crossings, travel corridors and areas important for Inuit harvesting;
- Identification of habitats of any rare or sensitive species, such as Species at Risk, or those with similar designations or federal and territorial status;
- Description of the migratory patterns and routes of terrestrial wildlife VECs and the corresponding periods when these routes would be affected by the Project;
- Discussion of the relative health of VEC populations, including contaminant loading in representative wildlife VEC species (i.e., caribou);
- Description of the distribution and population levels of caribou in the RSA and LSA. Consideration should be given to the cyclic nature of caribou as well as the shifts in annual caribou ranges over time, with baseline information collection covering appropriate temporal and spatial scales for an accurate understanding of current population health;
- Details regarding available information on potential impacts to wildlife associated with noise, vibrations, and dust and dust deposition from relevant scientific research and TK; and
- Discussion of other pertinent issues as identified through public consultation.

8.1.11.2 Impact Assessment

The Proponent is required to present a comprehensive impact analysis for all Project components and activities, including its shipping activities, on terrestrial wildlife and wildlife habitat. This analysis should include the following:

- Potential general impacts on terrestrial wildlife in the LSA, including: interference with migratory routes; alienation from important habitat (e.g., denning sites, calving and post-calving areas); habitat fragmentation and general disturbance or disruption caused by Project activities;
- Potential impacts on population size, abundance, distribution and behaviour of wildlife VECs from:
    - Direct and indirect loss of habitat from the presence of and use of infrastructure, the conduct of project activities and associated sensory disturbances;
    - Direct and indirect impacts from potential degraded water quality and ground contamination, as well as airborne contaminants resulting from project facilities and associated activities;
    - Direct and indirect impacts from potential ice-breaking (prior to spring break-up or following fall freeze-up) associated with shipping activities, and ice management at the dock facility;
    - Direct and indirect impacts from climate change; and
    - Where relevant, the Proponent shall take into account the alteration of normal behaviour or patterns and provide any associated outcomes for overall energy balance for the relevant VEC;
- Potential impacts on wildlife from ground traffic and air traffic disturbance, particularly low level flights (*i.e.*, lower than 610 metres) during critical periods (caribou calving and post-calving). For this impact assessment, a delineated flight impact zone could be useful in determining the potential impact of flights on wildlife, with a particular focus on critical life cycle periods and planned air traffic volume and routes;
- Potential impacts on wildlife from injury or mortality caused by Project activities, particularly the use of the all-weather road, mine hauling roads and other access roads, as well as intentional killing of wildlife to defend human life or property by mine personnel;
- Potential impacts on wildlife from increased hunting pressure resulting from improved access due to Project infrastructure;
- Potential impacts of noise and vibration on wildlife from drilling, blasting and other activities as results of Project construction and operation;
- Assessment of the potential for Project activities to act as an attractant to wildlife species, and associated effect/changes to behaviour and condition;
- Evaluation of the potential for contaminants to be released into the environment as a result of the Project and to be taken up by VEC species;
- Potential impacts of contamination to sources of traditional food (including those trapped, fished, hunted, harvested or grown for subsistence or medicinal purposes) as a result of bioaccumulation, i.e. food chain uptake through air, water and soil as well as any proposed monitoring methods to track these potential impacts;

- List of all potential contaminants and a determination of whether possible uptake of these contaminants into country foods will result from project activities.
- Potential impacts from the loss or alteration of habitat (i.e. vegetation) due to pollutants and noise and any ancillary effects; and
- Evaluation of the relative health and potential for chemical toxicity for inherently sensitive wildlife species based on an analysis of exposure pathways and demographic parameters.

8.1.12 Birds and Bird Habitat

For the purpose of the current Guidelines, discussion relating to birds shall include raptors, migratory birds, marine birds and the associated habitat of each.

8.1.12.1 Baseline Information

- An overview of bird species, populations, distributions and ecologies in the RSA, with emphasis on identified bird VECs and species with special designations (Species at Risk listed on Schedule 1 of the federal SARA and species with designations by the COSEWIC). This description should include reference to species having significant ecological functions, and/or importance for Inuit life and culture;
- Description of current habitat use by VECs, including the use of Migratory Bird Sanctuaries, Key Migratory Bird Sites, Territorial Parks and other important habitats (e.g., breeding and nesting sites and staging areas) in the RSA and along the proposed shipping routes;
- Description of the relative seasonal/annual abundances, distributions and trends in range or habitat use, movements and population status of bird VECs, including but not limited to population abundance, reproductive success, mortality rates, density, diversity, etc.;
- Description of migratory patterns and routes of VECs potentially impacted by the Project, with a discussion of corresponding sensitive periods; and
- Identification of key migratory bird sites along the shipping route, including those which could potentially be affected by marine spills as a result of current and/or wind patterns.

8.1.12.2 Impact Assessment

The Proponent is required to present a comprehensive impact analysis for all Project components and activities, including its shipping activities, on birds. This analysis should include the following:

- Description of the potential loss, alteration or isolation of habitat (e.g., staging and nesting habitats) as a result of the Project development. Special consideration should be given to Species at Risk listed on Schedule 1 of the federal SARA, species with designations by the COSEWIC, species having significant ecological functions or importance for Inuit life and culture;
- Potential disruption or alteration of migration routes due to all Project phases and activities;

- Where relevant, the Proponent shall account for alteration of normal behaviour or patterns and provide any associated outcomes for overall energy balance for the relevant VEC;
- Potential impacts on birds and bird habitat use from air contamination, vegetation contamination, ground contaminants or degraded water quality;
- Potential disturbances to birds from noise and vibrations as a result of blasting, and land and marine transportation;
- Potential impact from pre-determined Flight Impact Zones, and potential for collision with aircraft;
- Potential for Project facilities to attract wildlife such as polar bear, brown and grizzly bear, wolverine, foxes, ravens and gulls that may prey upon migratory birds and resulting impacts on the migratory bird populations;
- Potential attraction of birds and other scavengers/predators by domestic waste at camp sites;
- Potential attraction of birds to Project facilities and infrastructure for roosting and nesting sites;
- Potential for bird mortality due to collisions with tall structures, overhead wires or guy wires;
- Potential effects of shipping on coastal and marine birds and habitat, as well as potential disturbance on key migratory bird habitat areas and sanctuaries in proximity to shipping routes in the NSA;
- Incidental spills, malfunctions and other accidents associated with shipping operations and potential impacts to marine birds;
- Potential interactions, accidental injuries and mortality of marine birds directly or indirectly from proposed shipping (open water and potential ice breaking during break-up in the spring and freeze-up in the fall) activities, in particular those marine birds which congregate in areas where the shipping routes would pass through;
- Potential direct and indirect effects on marine bird behaviour, distribution, abundance, migration patterns, species health and reproduction from marine shipping;
- Evaluation of the potential for contaminants to be released to the environment from marine shipping and taken up by marine bird VECs as a result of the Project;
- Assessment of potential cumulative effects on marine bird VECs resulting from escalated marine traffic in the RSA over the mining lifecycle (and including the potentially extended minimum operation period). Consideration should be given to the possible significant increase of marine vessel traffic along shipping routes;
- Potential impacts of contaminant bioaccumulation via food chain uptake through air, water and soil, including specific impacts to traditional food sources including potential monitoring methods to track the progress of this potential impact; and
- Potential impacts from the loss or alteration of habitat (i.e. vegetation) due to pollutants and noise and its effects on bird and bird habitat.

8.1.13 Marine Environment

For the purposes of the current Guidelines, the marine environment shall include marine ecology, marine water and sediment quality, and marine biota including fish, Species at Risk, and marine habitat.

8.1.13.1 Baseline Information

- Description of marine physical processes and currents including the costal environment, biological diversity and composition, and associated interactions in the LSA (including Robert's Bay) and RSA, including the proposed shipping route(s) within the NSA;
- Data on seasonal ice cover including timing of ice freeze-up and break-up for the proposed shipping routes;
- Presentation of available bathymetric information along the proposed shipping route(s);
- Identification of sensitive habitat areas for marine fish, anadromous fish and marine mammals along the shipping route(s); and
- Presentation of TK collected related to coastal areas and ice conditions.

8.1.13.2 Impact Assessment

The Proponent is required to present an impact analysis that gives consideration to the potential for Project shipping activities to impact the marine environment. This analysis shall include the following:

- Potential risks and impacts to the marine ecosystem through the introduction of exotic species, including pathogens, through seasonal shipping;
- Potential impacts on marine water quality from: accidental spills of fuel and chemicals along the shipping routes; and from the accidental grounding/stranding of marine vessels along the shipping routes;
- Potential impacts on marine water quality and sediment quality from discharges of Project waste water treatment plants. A solute transport model based on numerical flow modelling should be used for water quality predictions and appropriate models selected (with rationale) to predict:
    - Water quality discharged to the environment; and
    - Dispersion, dilution and assimilation of effluent discharged to the environment;
- Assess the effects of project activities (effluent discharge, accommodation barge, loading docks) on fish and fish habitat of Roberts Bay;
- Potential impacts of wake effects from shipping on the shoreline stability and sensitive fish or marine mammal habitat i.e. coastal wetlands;
- Potential impacts on sedimentation patterns and subsequent impacts on subsea permafrost in the nearshore region;
- Potential impacts of sedimentation from propeller wash on water quality, fish and fish habitat and, benthic invertebrates;
- Potential impacts of ballast water discharge on water quality, fish and fish habitat, benthic invertebrates including cumulative impacts over the life of the project;

- Potential impact on marine environment and bio-accumulation in marine food chains, in particular on benthic organisms, from antifouling toxins (e.g., tributyltin) leaching from marine vessels; and
- Potential impacts of climate change and sea level change on Project elements.

8.1.14 Marine Wildlife

8.1.14.1 Baseline Information

- Description of marine wildlife populations, distributions and ecologies in the RSA, with emphasis on identified marine wildlife VECs and species with special designations (Species at Risk listed on Schedule 1 of the federal SARA and species with designations by the COSEWIC). This description should include reference to species having significant ecological functions, and/or of importance for Inuit life and culture;
- Characterization of marine wildlife habitat in the LSA, including habitat used by VECs for feeding, calving, nursing, over-wintering, and other critical activities; and
- Identification of marine wildlife species, historical and current habitats, distribution, seasonal migration patterns, critical areas (feeding area, calving areas, over winter areas, etc.), and potential interactions with shipping activities.

8.1.14.2 Impact Assessment

The Proponent is required to present an impact analysis that gives consideration to the potential for Project shipping activities to impact the marine wildlife. The Proponent shall, where any impact to marine wildlife is identified, indicate the cultural or practical importance of that species to northerners. In addition, the analysis shall include the following:

- Potential loss to or deterioration in the habitat of marine wildlife VECs due to shipping route(s). Special consideration should be given to Species at Risk listed on Schedule 1 of the federal SARA, species with designations by the COSEWIC, species having significant ecological functions, and/or of importance for Inuit life and culture;
- Potential direct and indirect impacts to marine wildlife, marine fish and marine habitat from marine shipping activities including increased noise levels;
- Potential spills, malfunctions and other accidents associated with shipping operations and any resulting impacts to marine wildlife, marine habitat and marine fish;
- Risk assessment of the potential introduction of non-native aquatic species due to ballast water discharge, ship wash and hull fouling.
- Potential interactions, accidental injuries and mortality of marine wildlife directly or indirectly from proposed shipping (open water and potential ice breaking during break-up in the spring and following freeze-up in the fall) activities, in particular those marine wildlife which congregate in areas where the shipping routes would pass through;
- Potential direct and indirect effects on marine wildlife behaviour, distribution, abundance, migration patterns, species health and reproduction from marine shipping activities;
- Evaluation of the potential for contaminants to be released to the environment and taken up by VECs as a result of the Project; and

- Assessment of potential residual and cumulative effects on marine wildlife VECs resulting from escalated marine traffic in the RSA over the mining lifecycle (and including the potentially extended mine operation period). Consideration should be given to the possible significant increase of marine vessel traffic along shipping routes.

8.2 SOCIO-ECONOMIC ENVIRONMENT AND IMPACT ASSESSMENT

The Proponent shall present baseline information on the functioning and stability of the socio-economic environment in the RSA (see Section 7.3), with a corresponding impact assessment covering all Project phases of development (construction, operations, temporary closure, final closure (decommission & reclamation), and post-closure. The Proponent shall also describe the components of the socio-economic environment and the processes affecting them as they exist without the Project. This will serve as a baseline against which the potential changes and impacts of the Project can be measured and will also justify the Proponent's selection of VSECs and indicators.

The Proponent shall provide a clear rationale for its selection of communities, the public consultation carried out, and relevant reference studies and reports from which baseline data is collected. In its impact assessment, the Proponent shall describe and assess the interactions between the socio-economic and biophysical environments, including the roles of the land and wage-based economies and the nature of a mixed economy in the North. The discussion should reflect a proper understanding of the structure and functioning of the potentially affected societies in order to identify the potential of the Project to affect them, whether positively or negatively, and to ensure that any socio-economic mitigation measures put in place by the Proponent have a reasonable likelihood of attaining their objectives. The Proponent shall also provide discussions of items which are essential to capturing the overall socio-economic analysis but are beyond the responsibility of the Proponent in the current socio-economic situation of the Kitikmeot Region or of Nunavut, or that it is expected to resolve any problems that are identified.

Whenever relevant and appropriate, data shall be disaggregated by age, gender, and ethnic affiliation. Socio-economic indicators are used to present baseline information and subsequently measure impacts related to the proposed project, those indicators selected must be adequate to address all types of foreseeable impacts, including cumulative and residual impacts. The EIS shall clearly identify and justify the Proponent's selection of indicators. In addition, the Proponent should include a treatment on the temporal aspect of when potential impacts on each relevant VSEC could reasonably be expected to manifest. Finally, the Proponent is expected to clearly identify limitations and knowledge gaps encountered in its efforts to collect the information required by the following sections of these Guidelines.

8.2.1 Economic Development and Opportunities

8.2.1.1 Baseline Information

- The traditional economy, current economic structure including the interaction between the wage and traditional economy, development trends in the Project RSA and variability in potential impacted communities as well as in Nunavut;

- The economic development levels in the Project RSA comparing to other regions in Nunavut, advantages and constraints of economy development;
- The roles the exploitation of renewable resources (e.g., subsistence and commercial hunting and fishing) play in economic terms and its significance for the local economy;
- Community and resident self-reliance; and
- Overview of Nunavut's Real Gross Domestic Product, rate of Gross Domestic Product (GDP) growth, Consumer Price Index, import/export and trade balance of goods, personal savings rate, and business investment.

8.2.1.2 Impact Assessment

- Potential impact on the local economy from regional level and community level as well as the implications of the Project on economic diversity;
- Potential impact on the traditional economic activities including hunting, fishing and sport hunting/guiding, etc.;
- Potential impacts related to accessibility and removal of barriers for traveling, fishing, hunting/trapping and other activities by local communities as a result of construction and operation of the all-weather road;
- Potential impacts on local and regional economy due to temporary closure and final closure; and
- Provide a discussion on the effects that the Project may have on Nunavut's Real Gross Domestic Product, rate of GDP growth, Consumer Price Index, import/export and trade balance of goods, personal savings rate, and business investment.

8.2.2 Employment

8.2.2.1 Baseline Information

- The labour supply statistics in terms of relative genders, ages and other demographic categories;
- Assessment of the current local and national labour force available to satisfy the needs of the Project development at each phase, identifying gaps between this availability and project needs by education level and other categories that may help to identify barriers and needs, including a discussion of the availability of Canadian labour and the potential need for foreign employees to address any gap in meeting project labour needs;
- Local household incomes, income sources, and compositions of income within the Project RSA;
- Provide sector specific breakdown of employment within the NSA;
- Existing local employment opportunities and labour supply status; and
- Discussion of the requirements for employment (e.g., education levels, criminal records, drug and alcohol policies, language abilities), and the potentials of needs to be met by local recruitment, as well as the extent to which the skills of the available workers match job requirements.

8.2.2.2 Impact Assessment

- Assessment of the potential for development of the local labour force;
- Discussion of culturally-sensitive workforce management practices that will meet both the Project's immediate labour force needs as well as the region's longer-term economic development needs;
- Evaluation of the possible effect of changes in income earnings on patterns of savings, expenditure and consumption values;
- Evaluation of the effects of competition for labour between the Project and existing businesses, institutions, and traditional activities, and
- Potential impacts on employment due to temporary and final closure.

8.2.3 Education and Training

8.2.3.1 Baseline Information

- Overview of the existing education system (early childhood through post-secondary);
- Available training programs for adults and youth through the existing education system;
- Local education infrastructure, capacity, funding resources, and administration system; and
- Education and skill levels of the residents in the Project RSA, and experience of the local labour force in different demographic categories based on available data.

8.2.3.2 Impact Assessment

- Assessment of Project impacts to the education system and how it would influence training programs. Include an evaluation on how the Project might affect attendance, retaining teachers, class sizes, and other components of the education system;
- Provide an assessment on the demands that might be placed on the educational infrastructure, capacity, funding resources and administration system;
- Requirements for education levels, skills and experiences of labour force from the Project in short, medium term and foreseeable future, taking account the vision of expansion for the Project lifespan, and regional economy development;
- Discussion of potential need of local labour force training to meet the needs of the Project. The types of training can be those specifically required by the Project, or others geared toward universally applicable skills that improve workers' opportunities in other sectors of the local economy. This assessment shall include predicted training resources and predicted resources needed to meet the designed training programs, if applicable;
- Evaluation of training programs planned by the Proponent, the associated challenges and likelihood of success of trainees to satisfy the Project needs and regional economy development with consideration of cultural and language barrier;
- Discussion of the potential for longer term community capacity building programs, if any have been planned or will be planned and are anticipated to be implemented throughout the Project's lifetime, regarding how mine training plans can enhance the transferability

of skills after the mine closure (e.g., management and HR skills, computer skills, heavy equipment experience, finance skills, etc.); and

- Discussion of other possible solutions to fill up the gap between requirements of project needs, and education level and qualifications of local labour force.

8.2.4 Contracting and Business Opportunities

8.2.4.1 Baseline Information

- Provide the most up-to-date statistics and data available as it relates to contracting and business opportunities from socio-economic studies of communities in the Project RSA;
- Estimates of goods supplied to the Project, including country food supply for Inuit workers at the mine, procurement, services contracting, and other business opportunities in the Project RSA that may result from the Project; and
- The economy structure and characteristics of the local and regional economies, existing business types, scales of the different sectors of economy, and potential capacities to meet the needs of the Project.

8.2.4.2 Impact Assessment

- Assessment of economic effects, positive and negative, stemming from the Project's contracting and business opportunities through the lifespan of the Project;
- Opportunities for local, regional, and territorial businesses to supply goods and services both directly to the Project, and indirectly to meet the demand created by the expenditure of new income by employment in the Project;
- Assessment of the Project effects on other local and regional economic sectors, in particular the competition to other business' needs due to limited capacity of local business;
- Assessment of the contributions made to public, communities and Inuit from the Project;
- Assessment of the of project-related procurement, and potential capacity to meet Project needs;
- Discussion on barriers to local business capacity building;
- Assessment of existing country food supply sources from the Project region and Nunavut, and opportunities to supply country foods for Inuit workers at the Project;
- Assessment of opportunities for local communities to diversify their economic sources and to supply new goods and services to meet the need generated by the Project; and
- Potential impacts on local businesses and services due to temporary closure and final closure.

8.2.5 Population Demographics

8.2.5.1 Baseline Information

- Description of regional and local community populations, demographics structure, composition, characteristics and population trends; and

- Discussion of observed variations in education levels, dietary habits, religious characteristics and other social aspects in different demographic categories in the RSA.

8.2.5.2 Impact Assessment

- Potential for Project-induced demographic changes in population, migration, re-distribution and the effects of those changes, including interactions between local residents and non-residents;
- Potential effects of fly-in/fly-out employment on population demographics; and,
- Potential effects from various Project phases, including unemployment as a result of temporary suspension of operations or mine closure.

8.2.6 Traditional Activity and Knowledge

For the purpose of the current Guidelines, traditional activity and traditional knowledge shall consider land use, food security, language, cultural activities and commercial harvesting.

8.2.6.1 Baseline Information

- Description of cultural, ethnic, religious, and language characteristics and diversities in the RSA;
- Local and regional economy characteristics in term of relation to traditional land use activities and wage incomes;
- Descriptions of the significance of, availability of, and level of dependence on, traditional foods as major nutritional sources by local residents within the Project RSA; including:
    - What country foods are consumed, or are expected to be consumed in the Project RSA, which parts of country foods are consumed, and their consumption frequency; and
    - Descriptions, including maps, of traditional and current hunting ranges and patterns in the LSA;
- Describe the use of caribou as a subsistence tradition, including harvesting, sustainable use of caribou, and the cultural and social activities associated therein, to specifically include hunting, community feasts, and the commissioning of arts and crafts; and
- Details regarding species that are culturally valuable to northerners.

8.2.6.2 Impact Assessment

- Potential effects of the Project on the accessibility of caribou and other wildlife species to harvesters, where such may be affected by reductions in habitat and herd sizes and/or expected changes to migration patterns or human travel routings. The risks to present and future generations of harvesters should also be considered;
- Potential impacts to cultural and traditional values and traditional lifestyles in the communities potentially affected by the Project. This discussion should give consideration to the decreased availability of caribou and other wildlife species;
- Description on how the Proponent will comply with the *Official Languages Act*;

- Potential social-economic impacts from shipping, taking into account potential impacts to marine species on which local residents rely upon for food sources;
- Potential effects to the practices associated with a traditional lifestyle that may arise from a potentially increased level of contaminants found in traditional foods;
- Potential impacts that the contamination of traditional food sources, including those trapped, fished, hunted, harvested or grown for subsistence or medicinal purposes (i.e. berries, etc.), may have on individuals, families, and communities;
- Potential changes in the traditional ways of life and household function due to wage employment associated with the Project;
- Potential impacts to Aboriginal fisheries species, including fish of cultural or practical importance to northerners;
- Potential impacts to marine wildlife of cultural or practical importance to northerners; and
- Potential impacts to vegetation of cultural or practical value to northerners.

8.2.7 Non-traditional Land Use and Resource Use

8.2.7.1 Baseline Information

- Description of known non-traditional land and resource use including protected areas, visual and aesthetic resources;
- Provide an overview of local and regional land use activities in the LSA as well as areas potentially impacted by shipping activities;
- Description of current and traditional land use areas and the importance of those areas to Inuit culture and social well beings;
- Description of known land use activities and relation to the local economy, self-reliance, food supplies and livelihood;
- Description of identified and anticipated overlapping zones and/or areas where the land use activities co-exist or interact with Project components and activities; and
- Description of the current tourism activities and recreational use occurring in the Project region.

8.2.7.2 Impact Assessment

- Description of impacts to known non-traditional land and resource use including protected areas, visual and aesthetic resources;
- Discussion of anticipated interactions between project development and land use activities by local residents in the Project RSA, in particular at the mine site, all-weather road and shipping routes;
- Potential impacts to the ongoing productivity of local or regional commercial, recreational or Aboriginal fisheries
- Potential impacts related to accessibility to areas for hunting, fishing, marine harvesting, traveling, recreational and religious activities as a result of the Project development;

- Potential effects on sustainable resource use, such as country food availability and accessibility of carving stone deposits, taking into account the CEA throughout the entire lifespan of the Project;
- Discussion of the potential impacts of the all-weather access roads to Inuit harvesting activities; and
- Describe the potential impact on the tourism industry from the Project's development which may impair the wilderness experience of tourism in the Project RSA.

8.2.8 Heritage Resources

8.2.8.1 Baseline Information

- Summary description of known archaeological/paleontological, burial, cultural and historic, sacred and spiritual sites within the LSA based on TK and scientific baseline studies. Each site shall be described on a map with a corresponding scale. Large-scale maps should be sent to the Government of Nunavut, Department of Culture and Heritage (GN-CH) upon request, to assist in its review. ;
- Description of regulatory requirements and procedures for recovery and removal of artefacts and/or fossils in areas of proposed development; and
- Description of the relationship between the cultural sites and social lives of local communities in the LSA.

8.2.8.2 Impact Assessment

- Potential impacts to archaeological and paleontological resources (e.g., burial sites, sacred sites), and other cultural sites within the LSA from development of the Project infrastructure in particular the proximity to the all-weather road, each of the mine sites and associated haul roads;
- Potential impacts on archaeological and paleontological resources from increased Project activity in the area associated with the mine including ground and marine transportation and ongoing exploration as well as non-mine related activities;
- Potential impacts to archaeological and paleontological resources as a result of borrow pit and quarry construction and operation, as well as construction and use of access roads. Discussion of how considerations for potential impacts have been incorporated in the road routing and design should also be presented; and
- Potential impacts on cultural well-being, religious and spiritual activities which are related to cultural and historic, sacred and spiritual sites.

8.2.9 Health and Wellbeing

For the purpose of the current Guidelines, discussions relating to individual and community wellness shall include family and community cohesion, as well as other indicators as may be selected by the Proponent.

8.2.9.1 Baseline Information

- Description of the current individual and family well-being including a discussion on households, family and community stability;
- Description of household social structures within the Project RSA, and where possible, the prevalent representative household social structure, including: the prevalent composition (family/kin-relations co-existing, generations in the household), the gender roles, the prevalent division of household labour based upon existing gender roles, the dominant consumption patterns, access to credit, and how resources are shared/divided within the household as well as how decisions are made in the household;
- Description of the current status of human health in the RSA, including mental, and psychological health, well-being, previous history and exposure, and identify vulnerable sub-groups where applicable; and
- Description of nutritional requirements of residents in the RSA along with quantitative information on the diet habits of residents, including consideration of details such as the seasonal, gender and age-related consumption of country foods.

8.2.9.2 Impact Assessment

- Description of potential impacts to individual and family well-being from the Project;
- Potential impacts to household social structure from the Project (e.g., one or two family members working at the mine site);
- Potential effects on lifestyle, including the effects of a major employment base away from the communities;
- Potential effects on community and family stabilities, and culture integrity due to potential demographic changes;
- Potential impacts on human mental and physical health and well-being within the RSA resulting from potential indirect effects of the Project. This discussion should give consideration to gambling, substance abuse, family violence, sexually transmitted infections and other communicable diseases;
- Potential impact on community, family and individual well-being as a result of increased access to alcohol and other controlled substances resulting from improved income levels, as well as the potential movement of these substances through the Project site or via Project-related activities (i.e. stopovers or layovers);
- Potential impacts on human health associated with traditional lifestyles where large amounts of country foods are consumed, considering the bioaccumulation and take-up of contaminants associated with changes to the level of contaminants loadings in country foods (*i.e.*, terrestrial and marine wildlife, fish, birds, and vegetation consumed by humans); and
- Potential impacts to community well-being in the RSA.

8.2.9.3 Topics for Discussion

- Description of current substance abuse issues including trends relating to the importation of drugs and alcohol, crime and violence, and other relevant social factors;

- Overview of the current financial management programs available in the potentially affected communities;
- Description of the current community well-being, including information about the capacity, availability, and affordability, where relevant, of local services and infrastructure (i.e. housing, training, education, day care services, health care, etc.);
- Description of increased pressure on existing social, institutional, and community services, facilities and services, and infrastructure;
- Potential impacts to community safety and security, including indirect impacts on frequency and types of crime incidents, with consideration for a potential influx of Project personnel into local communities during the life of the Project;
- Identify and discuss potential impacts of the Project on accident rates, alcohol and prohibited substance consumption, alcohol and prohibited substance import/export, etc.; and
- Description of barriers to current financial management programs and any incentives that would be provided by the Proponent for healthy financial management.

8.2.10 Community Infrastructure and Public Services

8.2.10.1 Baseline Information

- Description of current conditions of local supply and demand of housing, including private, public and rental housing and their costs, other infrastructure, and related capacity within the RSA;
- Description of existing public services and associated community facilities in the RSA, including law enforcement, health care, emergency response, dependency assistance, welfare utilities, temporary accommodation and food services; and
- Description of existing outpost camps and other facilities outside of municipal boundaries which facilitate harvesting and recreation activities in the LSA, particularly within the proximity of the Project.

8.2.10.2 Impact Assessment

- Discussion of demand for community infrastructure and public services from the Project directly and indirectly;
- Assessment of the effects on services and/or infrastructure in public and private sectors, due to the potential use by the Project directly or indirectly, including those caused by Project-induced demographic changes;
- An assessment of potential increased demand on the local and regional health care systems, including the standard medical system, emergency response and emergency medical care, medevac services, and challenges raised by any increased demand;
- Discussion of building new and updating existing structures including weather shields and outposts beyond the boundary of communities and along hunting/traveling routes, and/or at hunting grounds which may facilitate local hunting activities/traveling in Project areas;

- Assessment of incremental costs imposed by the needs from the Project directly or in directly on public infrastructure, services, including those caused by Project-induced demographic changes; and
- A discussion of community access to Project infrastructure upon closure, including the all-weather road.

8.2.10.3 Topics for Discussion

- A discussion of the potential to bring in freight for communities by return shipping, and likelihood to share shipping costs with local communities;
- Description of the extent and current capacity of the local transportation systems and associated infrastructure;
- Assessment of public health and environmental health needs and implications to the Proponent's community initiatives; and
- Potential impact on availability and adequacy of existing health infrastructure and services including medical, dental, vision, social, mental (including addictions), environmental health officers, social workers, registered nurses, medical director; access to medical travel and interventions.

8.2.11 Health and Safety (including worker and public safety)

8.2.11.1 Baseline Information

- Description of human exposure to current environmental contaminants in the RSA; and
- Discussion relating to the local health statistics when compared with other parts of Nunavut and Canada as appropriate.

8.2.11.2 Impact Assessment

- Discussion of the standards, guidelines and regulations that the Project will incorporate during construction and operations, at various Project sites to minimize the impacts and protect workers' health;
- Assessment of the health, safety and security of workers at the job sites taking into account different Project phases and locations (e.g., explosive manufacturing plant, drilling and blasting operation, and heavy equipment operations);
- Potential impacts on human health from air contamination, fugitive dusts resulting from air and ground traffic, potential impacts to potable water quality, and exposure to escalated noise and extreme weather conditions;
- Potential sources and characteristics of any conventional risks to workers or the public during all phases of the project;
- Potential effects on physical health such as mortality, morbidity, injuries, accidents, effects on sensitive sub-populations (i.e. asthma sufferers), physical hazards associated with construction, operation and closure phases; and

- Potential impacts of workplace discipline and cultural conflicts among Nunavummiut and Southern workers, including those issues which may be related to or exacerbated by language barriers between employees.

8.2.11.3 Topics for Discussion

- Description of the existing infrastructure and health services available within the RSA and the potential impact on the quality of health services, including the resources and capacity to monitor and respond to increased health hazards.

8.3 HUMAN HEALTH AND ENVIRONMENTAL RISK ASSESSMENT

Key components of the Human Health Risk Assessment process include the identification of potential Project-human interaction pathways, and hazardous substance constituents of potential concern (COPC), human receptors and assessment criteria. As such, the Human Health Risk Assessment is to include:

- Predicted sources, quantities and points of release from Project emissions and effluents containing hazardous substances;
- Selection process for COPCs;
- Identification of all pathways to human receptors including bioaccumulation in country foods;
- Identification and characterization of human receptors (workers and the public). Include maps to delineate their locations and the distances of communities, residences, temporary/seasonal residences, etc. to project sites and related infrastructure;
- Method used to convert hazardous substance exposure and intake by the various human receptors from the various pathways into an exposure or dose (e.g., conversion factors); and
- Criteria used to determine significance of impact; specifically, calculation of hazard quotients, which translates into the ratio between the predicted maximum exposure concentration for each contaminant of concern in each relevant media (i.e., air, water, soil, sediment) and the toxicity threshold for the most sensitive biological receptor in the respective medium for which toxicity information is available.

Key components of the Environmental Risk Assessment process include the identification of potential project and terrestrial and aquatic receptor interaction pathways, hazardous substance COPCs, terrestrial and aquatic ecological receptors and assessment criteria. As such, the Environmental Risk Assessment is to include:

- Predicted sources, quantities and points of release from the Project emissions and effluents containing hazardous substances;
- Selection process for COPCs;
- Identification of disease vectors;
- Identification of pathways to terrestrial and aquatic ecological receptors (VECs);
- Identification and characterization of terrestrial and aquatic ecological receptors;

- Method used to convert hazardous substance exposure and intake by the various ecological receptors from the various pathways into an exposure or dose (e.g., conversion factors);
- Exposure conditions, identifying routes of exposure (air, water, soil, food); public and occupational exposure; address high risk populations;
- Noise effects (i.e. potential effects on human health resulting from atmospheric noise levels and noise interactions with species that are traditional food sources); and
- Criteria used to determine significance of impact; specifically, calculation of hazard quotients, which translates into the ratio between the predicted maximum exposure concentration for each contaminant of concern in each relevant media (i.e., air, water, soil, sediment) and the toxicity threshold for the most sensitive biological receptor in the respective medium for which toxicity information is available.

8.4 ACCIDENT AND MALFUNCTIONS ASSESSMENT

An assessment must be provided for malfunction and accident scenarios that have a reasonable probability of occurring. The assessment is to include:

- A description of the source, quantity, mechanism, rate, form and characteristics of contaminants and other materials (physical and chemical) likely to be released to the surrounding environment during the postulated malfunctions and accidents; and
- A description of any contingency, clean-up or restoration work in the surrounding environment that would be required during, or immediately following, the postulated malfunction and accident scenarios.

The assessment for conventional malfunctions and accidents should include fire and explosion incidents and demonstrate that the conventional malfunctions and accidents are unlikely to cause long-term or residual effects both to persons and the environment, taking into account the proposed mitigation measures including preventive measures and emergency response capability.

9.0 ENVIRONMENTAL MANAGEMENT SYSTEM

9.1 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan (EMP) provides a systematic approach to consistently manage all environmental affairs for the Proponent, addressing concerns through the allocation of resources, assignment of responsibility and ongoing evaluation of practices, with an aim to improving its environmental performance by continual improvement of the management system. The Proponent shall present its environmental policy, its EMP and associated environmental management system through which it will deliver this plan. The EMP shall provide a perspective on how potentially adverse environmental effects will be managed throughout the life of the Project.

The Proponent shall discuss the flexibility of the proposed EMP to respond to changes in the mining development plan, the regulatory regime, the biophysical and socio-economic environments, technology, research results, and the understanding of TK. It shall discuss how the results from the EMP will be used in applying adaptive environmental management

throughout all phases of the Project, and identify threshold/criteria and indicators to trigger management actions in each sub plan.

The EMP shall be comprised of individual monitoring and mitigation plans, specific to various aspects, components, activities and phases of Phase 2, as well as referencing containment and control of legacy containment sources from Phase 1 or pre-existing infrastructure. Although the information requirements of the following sections are intended to be as comprehensive as possible, it is recognized that various items may be dependent on the Proponent's development plans for the Project, which will continue to be refined throughout the NIRB's review process. While some information required under these plans might not be available for the Proponent's *Draft* EIS submission, the Proponent shall include a scheduled timeline relating to stages of the NIRB's review process or the later licensing/regulatory processes when this information will become available (*i.e.,* Technical Meeting, *Final* EIS, Final Hearing, and Water Licensing). In addition, the NIRB recognizes that flexibility in the arrangement of the information requested in the following sections may be required and the Proponent may use its judgement in consolidating or arranging the information in the most effective fashion.

In its individual monitoring and mitigation plans, the Proponent shall also assess the likely effectiveness of mitigation measures and associated follow-up mechanisms for adaptive management. The Proponent shall provide a risk assessment of those economic (e.g., the global economy and international markets), or other conditions (e.g., ownership transfer) that might also impair the implementation or effectiveness of proposed mitigation measures or management.

9.2 ENVIRONMENTAL PROTECTION PLAN

The Proponent shall, based on its impact predictions for identified VECs and VSECs, prepare an Environmental Protection Plan (EPP) in accordance with its EMP prior to commencement of construction for all phases of the Project [site preparation, construction, operation, maintenance, any potential modifications, temporary closure, final closure (decommission & reclamation) and post-closure]. The EPP shall be integrated into procedure documents for all phases of the Project which target the site management staff, the Proponent's occupational health, safety and environmental compliance staff, as well as government departments and agencies tasked with environmental and regulatory compliance monitoring/surveillance. A Table of Contents and an annotated outline for the EPP is to be presented in the EIS which shall address the major Project activities, permit requirements, mitigation measures and contingency planning in combination with other management plans.

9.3 MONITORING AND MITIGATION PLANS

In accordance with the EMP, the Proponent shall present individual monitoring and mitigation plans, specific to various aspects of the Project and the environment, to be incorporated into all applicable phases of the Project. In these plans, the Proponent is required to outline how results from monitoring will be used to refine or modify the design and implementation of mitigation measures and management plans.

These plans will also help the Proponent to ensure that the Project is conducted as proposed, the predicted adverse environmental effects are promptly mitigated at the earliest possible time, and

that the conditions set at the time of the Project's authorization and the requirements pertaining to the relevant laws and regulations are met. The plans will also make it possible to ensure the proper operation of works, equipment, and facilities connected to the Project. If necessary, the plans will help reorient the work and possibly make improvements at the time of construction and implementation of the various elements of the Project.

In its monitoring and mitigation plans, the Proponent should specify proposed criteria or thresholds to trigger the mitigation measures based on its monitoring results, including the position of the person for the implementation of these mitigation measures, the system of accountability and the phase and component of the Project to which the mitigation measure would be applied.

Each of the monitoring and mitigation plans shall include:

- Objectives of the monitoring program, applicable laws, regulations and/or Acts;
- The VECs and VSECs to be monitored, with associated parameters and indicators, and selection criteria/thresholds to be compliant with;
- Description of the frequency, duration, and geographic extent of monitoring with justification for each, and identification of the personnel who will conduct the monitoring, collect, analyze and interpret data;
- Description of measures taken to protect the monitoring infrastructure from climate change and potential major climate events (e.g., extreme flows);
- Proposed actions in the event that observed results (impacts) differ from those predicted, including a discussion of actions to be taken for observed non-compliance with the law or regulations, performance targets or with the obligations imposed on contractors by the environmental provisions of their contracts;
- Proposed reporting scheme for monitoring results, including format, reporting intervals, and responsible territorial and federal authorities;
- Evaluation of the efficiency of mitigation measures, and the compliance with Project authorizations;
- Plans for integration of monitoring results with other aspects of the Project including, adjustments for operating procedures and refinement of mitigation measures;
- Procedures/mechanism to assess the effectiveness of monitoring programs, mitigation measures, and adaptive programs for areas disturbed by the Project;
- Discussion of the relationship between monitoring plans and the EMP; and
- Quality assurance and quality control measures to be applied to monitoring programs.

As described in Section 7.3, the Proponent should consider the design of all biophysical environmental monitoring programs to ensure that the baseline data required is useful in understanding the relationship between the natural ecological conditions and the potential Project impacts on these conditions. This would improve interpretation of monitoring data in order to differentiate between natural variability and project-specific impacts.

In addition, all monitoring plans should be designed so that results from these programs can be coordinated with ongoing regional initiatives or programs with relevant government organizations, or regional authorities.

9.4 BIOPHYSICAL MANAGEMENT PLANS

The Proponent shall present environmental monitoring and management plans developed to eliminate or mitigate potential negative impacts of the Project on the biophysical environment as identified in Section 8.1. The Proponent shall also identify any residual effects after appropriate mitigation measures are implemented. The plans shall be developed to reflect the complete life span of the Project, and contain appropriate monitoring and evaluation techniques (e.g., indicators) that will allow regulators to intervene in a timely and constructive manner. The plans shall target identified VECs and are to include, but should not be limited to, the following:

9.4.1 Risk Management and Emergency Response Plan

The Proponent shall provide an assessment of the potential risks from natural hazards, in both marine and terrestrial environments. This plan shall encompass the whole life of the mine and will provide mitigative measures which address the potential ecological and human health risks. The Proponent shall also identify and describe the likelihood of possible malfunctions and accidents occurring independently of, or associated with natural hazards.

The Proponent shall develop an Emergency Response Plan to be supported by appropriate manual emergency response capabilities and that can be applied to deal with the range of emergency situations considered reasonable under Project circumstances.

The following issues shall be included in the Risk Management and Emergency Response Plan:

- Assessment of potential natural hazards in the LSA and shipping corridors, including frequency, magnitude and possibilities of occurrence. Natural hazards to be considered should include extreme weather events, natural seismic events, landslides, and flooding;
- Analysis of the potential for malfunctions and accidents associated with Project facilities and activities, including land or ice based, air or marine transportation, occurring independent of, or associated with natural hazards;
- Annual aviation audits for the aircraft types, companies and infrastructure associated with all Project related air transportation and documentation of the minimum flying height and seasonal flight restriction for the Project area;
- Assessment of fire risk to evaluate potential fire hazards, as well as the fire protection systems and features (including both physical attributes and program elements) used to mitigate the effects of fire;
- Alerting, notification and reporting procedures, and associated responsible organizations and personnel;
- Contingency responding procedures corresponding to each risk, and associated security systems and prevention measures, such as monitoring systems, hazard and leak detection systems, fire-control systems, and standby emergency systems;
- Discussion of options for the medical transport of injured staff or persons both within and beyond the Project area;

- Discussion of the constraints resulting from logistics and time frames for prompt reaction, with consideration for the potential distance to an accident or emergency site, and possible weather conditions which might cause considerable delays or obstacles;
- Description of how relevant government agencies, Inuit organizations and local communities will be involved in the development and application of the plans if applicable; and
- Any other contemplated loss prevention practices, including insurance.

9.4.2 Fuel Management Plan

The Proponent shall develop Fuel Management Plans based on its Environmental Policy, to promote environmental awareness and safety. The plans shall be linked to Spill Contingency Plans, and are to include the following, at a minimum:

- Requirements of federal and territorial regulations;
- Conceptual design drawings for fuel storage areas and procedures for bulk fuel transfer;
- Substances covered by the plan (e.g., oil, fuel, hazardous materials, chemicals and other deleterious substances);
- Training for emergency response staff, including distributing Material Safety Data Sheets (MSDS) to designated emergency response and health centre staff;
- Alerting, notification and reporting procedures; and
- Duties and responsibilities of key organizations and personnel.

9.4.3 Spill Contingency Plans

The Proponent shall develop Spill Contingency Plans based on its Environmental Policy and which promote environmental awareness and safety, and further, which facilitate efficient clean-up for potential spill incidents related to the Project. These plans shall include Land, Water and Ice Based Spill Contingency Plans, Oil Handling Facility Contingency Plans and Shipboard Oil Pollution Emergency Plans. In each plan, the Proponent shall address potential constraints to timely actions and immediate clean-up of spills which result from logistical and/or weather conditions. The Proponent shall include the following elements in its development of all spill contingency plans:

a. Land, Water and Ice Based Spill Contingency Plans
   - Requirements of federal and territorial regulations;
   - Substances covered by the plan (e.g., oil, fuel, hazardous materials, chemicals and other deleterious substances), and potential spill scenarios (on land, water and ice, if applicable);
   - Training for emergency response staff, including distributing Material Safety Data Sheets (MSDS) to designated emergency response and health centre staff;
   - Alerting, notification and reporting procedures;
   - Duties and responsibilities of key spill response organizations and personnel;

- Clean-up strategies, technologies and corresponding inventory of spill response equipment and kits based on different substances of spills and environment conditions where spills might occur; and
- Spill site restoration and remediation (including treatment of contaminated soils).

b. Oil Handling Facility (OHF) Contingency Plan
   - Regulatory requirements of the Canada Shipping Act;
   - Established Oil Pollution Prevention/Emergency Plan for operation of OHF;
   - Responsible personnel required equipment and training; and
   - Response scenarios and procedures.

c. Shipboard Oil Pollution Emergency Plans (SOPEPs)
   - Requirements of national laws and regulations, as well as international regulations and standards for proposed shipping operation of the Project;
   - Marine transportation to be used for the Project including fuel tankers, container ships, barges, tugs, and any other marine vessels;
   - Discussion regarding the relationship between SOPEPs and the Canadian Coast Guard's Regional Response Plan, including identification of potential for the Regional Response Plan to be adapted to the Project;
   - Procedures for accident/incident reporting and principle emergency response; and
   - Parties (e.g., the Proponent, marine vessel operators and possible third parties) who carry out emergency actions.

9.4.4 Site Water Management Plan

The Proponent shall develop a Site Water Management Plan for the Project. This plan shall provide a consolidated source of information on the strategies to be applied to intercept, collect, contain, conserve, monitor and prevent the release of potentially contaminated waters. This plan shall also include a discussion of all major sources of water from the Project including process effluent, open pit water, underground mine water, site and stockpile drainage/runoff, and sewage/grey waste water and is to be associated with the baseline data and impact assessment required by Subsection 8.1.6.1. The plan shall at a minimum, consider the following:

- Surface runoff, snowmelt, and rainwater that might come in contact with contaminated areas at the mine sites and along roads;
- Runoff from overburden stockpiles, waste rock stockpile areas including waste rock identified with potential ARD and ML, ore stockpiles and quarry sites;
- Runoff from the lined fuel tank farms, fuel transfer stations, and landfill facilities;
- Predict the artesian inflow into the tailing management facilities during operation with support from numerical modeling if permafrost beneath the tailing management facilities is predicted to thaw during the life cycle of the tailing management facilities. The potential preferential flow along the fault cut through the pits should be considered in the inflow prediction. Measures for controlling the groundwater inflow/seepage, where necessary, should be discussed and a groundwater monitoring plan should be developed;

- Description of the water management strategies, including methods for any water conservation and recycling methods to maximize water reuse and minimize use of natural waters;
- Description of the water management for the open pits and underground mines, and the tailings management facilities with consideration for the capacity of the open pits and underground mines, and the tailings management facilities to cope with storms, floods and other intermittent natural events with consideration of a conservative precipitation event (*i.e.*, the PMP: Probable Maximum Precipitation). Design of the pumping capacity of the plant and treatment facility should take the potential maximum inflow and the PMP event into consideration;
- Contingency plans should the mine water volumes be significantly larger or less than estimated, specifically to address plans for mine operations and safety during times of low water availability;
- Management measures to reduce potential impacts to the receiving environment, including collection and monitoring of drainage water, installation of settling ponds, sumps or silt curtains, and geochemical characterization of construction materials;
- Proposed management of contact and noncontact water, and how the design of these components incorporates the consideration of climate change, especially when water diversions are proposed (*i.e.*, increased or decreased flows);
- Waste water treatment technologies and facilities, and estimated volumes and treatment targets of the effluent, as well as the applicable discharge standards including standards under the *Fisheries Act*;
- Waste water management in the construction stage at construction camps, including treatment/disposal methods, associated facilities;
- Conceptual operation and maintenance plans, including options for sewage sludge; and
- Contingency measures for sewage plant malfunction and/or disturbances, associated spill response measures, as well as treatment technologies and facilities.

9.4.5 Ore Storage Management Plan

The Proponent shall present an Ore Storage Management Plan which encompasses all ore generated or produced by the Project and includes at a minimum:

- Discussion of the predicted ore stockpile volumes/tonnage, physiochemical characteristics, stockpile methods and procedures including dust control, runoff management, progressive reclamation plans, and other details as deemed relevant;
- Description of analyses implemented in the development of the proposed pile design and runoff management plans, include description and analysis of the water balance of the stockpiled ore material; the physical and chemical characteristics of seepage and runoff from the stockpiled ore material, as well as the thermal condition of the pile and surrounding ground; and consideration in the design of control measures to ensure seepage and runoff do not impact the surrounding environment;
- Discuss the means to minimize loss of ore material to the environment by wind and other means;

- Discussion of proposed plans for accommodating the projected volumes of materials at the ore stockpile facilities; with a discussion of measures for contingency measures to address the situation in which the designed facilities are not adequate to accommodate ore actually generated;
- Details regarding the process for selecting the preferred options for management of ore stockpile, including a discussion of alternative options (methodologies as well as locations) considered, and the rationale by which the proposed scheme was selected; and
- Conceptual plan to monitor and audit ore generated.

9.4.6 Mine Waste Rock and Tailings Management Plan

The Proponent shall present a Mine Waste Management Plan which addresses all waste rock generated or produced by the Project through all Project phases as well as all tailings generated by the Project over the mine life. It may assist the Proponent to consult with the *Prediction Manual for Drainage Chemistry from Suphidic Geologic Materials* (Price, 2009) and *Cold Regions Cover System Design Technical Guidance Document* (O'Kane Consultants, 2012) in the identification of the waste rock characteristics as well as resulting plan. The Plan shall include, at a minimum:

- Discussion of the predicted volumes/tonnage, physicochemical characteristics, segregation criteria, stockpile methods and procedures including dust control, runoff and seepage management, progressive reclamation plans, and other details as deemed relevant for both waste rock and tailings;
- Description of analyses implemented in the development of the proposed pile design and runoff and seepage management plans, include description and analysis of the water balance of the waste rock pile; the physical and chemical characteristics of seepage and runoff from waste rock piles, as well as the thermal condition of the pile and surrounding ground; and consideration in the design of control measures to ensure seepage and runoff do not impact the surrounding environment;
- Description of analyses implemented in the development of the proposed pond design and runoff and seepage management plans, include description and analysis of the water balance; the physical and chemical characteristics of seepage and runoff from surrounding area, as well as the thermal condition of the pond and surrounding ground; and consideration in the design of control measures to ensure seepage and runoff do not impact the surrounding environment;
- Description of the potential for rock heave phenomena and any resulting implications to ground stability;
- Discussion of proposed plans for accommodating the projected volumes of materials at waste rock and tailings facilities; with a discussion of measures for contingency situations in which the designed facilities may not be adequate to accommodate the volumes of waste rock and tailings actually generated;
- Details regarding the process for selecting the preferred options for the management of waste rock and tailings, including a discussion of alternative options (methodologies as well as locations) considered, and the rationale by which the proposed schemes were selected;

- Detailed information on the waterways impacted by the proposed deposition of tailings to determine whether or not the Navigable Waters Protection Act (or subsequent replacement legislation) applies, as well as details of any anticipated impacts to navigation on any waterways listed as "navigable"; and
- Conceptual plans to monitor and audit mine waste rock and tailing ponds.

9.4.7 Landfill and Waste Management Plan

The Proponent shall develop a Landfill and Waste Management Plan which discusses how non-combustible, non-hazardous industrial wastes will be handled in a safe and environmentally sound manner, and includes the sorting, possible transport, and ultimate disposal of Project wastes. The plan should emphasize how the Proponent plans to minimize the environmental footprint of the Project, and shall include:

- Landfill management plans for the mining operations phase;
- A discussion of measures taken during periods of rainwater, snow and spring freshet;
- Landfill closure and reclamation plans;
- A description of plans to reduce/reuse/recycle Project wastes; and
- A discussion of any planned use of municipal waste management facilities or services.

9.4.8 Hazardous Materials Management Plan

The Proponent shall develop a Hazardous Materials Management Plan. The hazardous materials discussed are to include hydrocarbon contaminated soils, snow and water, fuel, lubricants, process reagents, chemical reagents used for site laboratory, solvents and paints, medical wastes, batteries, and other office-generated hazardous waste. This plan shall be developed in connection with the Emergency Response and Contingency Plan, and is to include the following:

- Characterization of potential environmental hazards posed by these materials, and the management of these through the environmental management system;
- Purchasing controls, shipment tracking procedures;
- Fuel storage monitoring program;
- Safe handling and storage procedures;
- Discussion of the allocation of responsibilities for managing shipments, storage, handling and use of potentially hazardous materials;
- Contingency and emergency response plans associated with hazardous materials;
- Type and delivery of training for management, workers, and contractors whose responsibilities include handling potentially hazardous materials as well as those that may be required to assist and/or treat any of the above if there is an emergency/accident (i.e., local fire department, health centre, Royal Canadian Mounted Police detachment, etc.);
- Procedures for the maintenance and review of records of hazardous material consumption and incidents in order to anticipate and avoid impacts on human health and the environment;
- Plans for unused chemicals and/or reagents upon the completion of Project activities;

- Procedures to track and manage wastes generated through use of these products, including regular shipments of potentially hazardous waste to licensed disposal facilities; and
- Discussion on the waste management at the dock site including shipping waste generated on board and hazardous waste.

9.4.9 Incineration Management Plan

The Proponent shall develop an Incineration Management Plan which is consistent with the guidance provided in Environment Canada's (EC) *Technical Document for Batch Waste Incineration* (EC, 2010). The Plan shall include but not be limited to the following:

- Standards/requirements for emissions from incinerator operation;
- Incineration technologies to be used, facilities and equipment to be used;
- Personnel training programs for incinerator management and operation; and
- Collection and reporting of operational data and maintenance records.

9.4.10 Roads Management Plan

The Proponent shall develop a Roads Management Plan for all access/service roads proposed in the Project areas. The Plan shall address construction, operations, temporary closure and final closure phases of the Project. In association with the Spill Contingency Plan and the Wildlife Mitigation and Monitoring Plan, this plan shall include the following:

- Permitting regime and land tenure of all ground transportation as well as designations of accessibility to public;
- Discussion on how the selected route(s) may correspond to the needs of other developers and of Nunavummiut, paying particular mind to any public consultation undertaken with respect to the proposed routing, specifically as it may relate to traditional land or resource use;
- Construction details applicable to Transport Canada's Navigable Waters Protection Program which could include, but not be limited to, any works built or placed in, on, over, under, through or across a navigable waterway (i.e. bridges, booms, dams, and causeways).
- Projected traffic volumes, including the types and numbers of vehicles to be used, fluctuations on a seasonal or annual basis, and measures to enforce speed limits;
- Protocols for accidents, accidents causing injuries, vehicle malfunction and emergency protocols;
- Mitigation measures and protocols to be implemented during construction and operations to mitigate potential impacts to wildlife, including explicit thresholds for mitigation of potential wildlife interactions, collisions and follow-up procedures;
- Measures for preventing the permafrost degradation during construction and operation of ground transportation;
- Operational procedures for daily operation and maintenance including dust suppression methods, snow removal, de-icing, snow drift/banks management;

- Measures to control surface runoff during spring freshet and flooding during construction and operation phases;
- Measures to control sedimentation during construction, maintenance and operation;
- Safety procedures, emergency reporting and procedures for fuel/chemical spills, and other emergency events;
- Plans for site reclamation, especially temporary construction camp and quarry sites which are used for extracting construction materials; disposal of construction waste materials and options of final closure and reclamation; and
- A discussion of potential future uses (e.g., potential public use).

9.4.11 Shipping Management Plan

The Proponent shall present a Shipping Management Plan for all Project-related shipping, in connection with the SOPEPs (Subsection 9.4.2), the Wildlife Mitigation and Monitoring Plan, and other related plans as applicable. This plan should include the following:

- Applicable environmental legislation, regulations Acts and guidelines associated with shipping, including:
    - International legislation, such as: MARPOL Convention, Protocols and Annexes as set out by the International Maritime Organization (IMO, 2008; MARPOL 73/78);
    - Canadian legislation, such as: *Canada Shipping Act*, *Arctic Waters Pollution Prevention Act* (e.g., the Zone/Date System, the Arctic Ice Regime Shipping System, Ice Navigators if applicable);
    - Construction details applicable to Transport Canada's Navigable Waters Protection Program which could include, but not be limited to, any works built or placed in, on, over, under, through or across a navigable waterway (i.e. bridges, booms, dams, and causeways); and
    - How the Proponent and its shipping contractors/partners intend to either meet or exceed these requirements for both barging and deep sea shipping operations and for all marine shipping alternatives.
- Description of basic contingency planning associated with the marine transportation component of the project, particularly in relation to the movement of oil, explosives and other hazardous materials;
- Provide a hazard identification analysis of the barge and ship routes and a preliminary risk analysis of the marine routes under consideration, along with intended methods of mitigating marine transportation risks;
- Discussion of proposed safety measures;
- Discussion of the challenges related to cleaning up fuel spills in the Arctic environment due to cold temperatures, presence of ice, darkness and remoteness;
- Disposal plans and management for onboard waste including solid waste and sewage/grey water while docked at the dock facility and while in transit. Plans should include discussion on how the Proponent and its shipping contractors/partners intend to either meet or exceed legislation and/or other regulatory requirements;

- Ballast water management plan for all Project shipping, as applicable, with indication of the proposed ballast water exchange locations in mid-ocean, at the dock facility in Roberts Bay, and alternative exchange zones within waters under Canadian jurisdiction. Include associated implications for regulatory compliance (Government of Canada, 2006);
- Proposed measures to eliminate or reduce the risk of invasive aquatic and non-aquatic species being introduced into Canadian waters as a result of shipping;
- Discussion of whether the shipping route or part of the proposed shipping route is a compulsory or non-compulsory pilotage area, and associated implications for regulatory compliance (Government of Canada, 2009) if applicable;
- Marine wildlife mitigation and onboard monitoring plans, including:
    - Applicable guidelines, monitoring protocols, and reporting/action procedures;
    - Measures to minimize the potential interactions between marine mammals and marine vessels; and
    - Description of how interactions between marine mammals and shipping operations will be dealt with;
- Details regarding the proposed procedures for accident, malfunctions and incident management and reporting, including accidental spills of fuel and chemicals along the shipping routes, and from the accidental grounding/stranding of ships along the shipping routes. This should include a discussion of the preparedness of adequate resources to respond to a large fuel spill from a cargo vessel in transit, with reference to the SOPEPs;
- Measures to mitigate potential impacts to the safety of persons traveling in boats along Project shipping routes;
- Smuggling prevention measures including the transport of alcohol and prohibited substances to the community;
- Anticipated use of police services for offloading supplies and materials, including dangerous goods and explosives, and in the engagement of emergency/accident procedures;
- Identified third party liabilities; and
- Measures intended to mitigate potential socio-economic impacts as results of shipping.

9.4.12 Borrow Pits and Quarry Management Plan

The Proponent shall develop a Borrow Pits and Quarry Management Plan which includes the following:

- Regulations and guidelines to be complied with;
- A description of how the Proponent will minimize the overall impact on surrounding environments by maximizing the use of existing pits and quarry sites to the extent possible, to minimize the number of opened pits, and minimizing haul distances and surface disturbance;
- Sediment, dust and erosion prevention and control measures;
- Results of ARD/ML potential testing for quarried materials and pit walls, and associated mitigation measures;

- Aggregate extraction and quarry methods, with associated mitigation measures for potential impacts on the environment, including archaeological;
- Proposed methods for handling ice, with plans to manage water released by the thawing of permafrost and ground ice; and
- Progressive reclamation strategy and associated technologies.

9.4.13 Explosives Management Plan

The Proponent shall develop an Explosives Management Plan which provides information on explosives transport, storage and handling at the Project. This plan must discuss the following:

- Applicable federal and territorial Regulations and Acts;
- Methods and procedures for the manufacture, transport, storage, handling, and use of explosives;
- Details on the manufacture and storage facilities for Ammonium Nitrate and Fuel Oil (ANFO), including applicable guidelines, monitoring protocols, and reporting/action procedures;
- Best practices to minimise usage and loss rate;
- Safe handling and spill containment prevention methods;
- Evaluation of worst case scenarios (e.g., accidental explosion);
- Security measures to be implemented;
- Personnel training program; and
- Internal audit and inspection.

9.4.14 Air Quality Monitoring and Management Plan

The Proponent shall develop an Air Quality Monitoring and Management Plan in association with the baseline data collected and the impact assessment in Subsection 8.1.1. This plan must include the following key elements:

- Description of proposed air quality monitoring and related adaptive management measures for emissions related to the Project as described in Subsection 8.1.1.2, including thresholds for action and mitigation strategies;
- An emissions reduction strategy, through which the Proponent would employ appropriate technologies and operating practices, in an effort to minimize emissions of air contaminants from all Project facilities including compliance with approved criteria, and reducing the production of GHGs and other emissions;
- A dust reduction plan which addresses the use of dust suppression agents, procedures and applicable guidelines for all Project areas where fugitive dust is a concern for air quality and human health;
- An incineration management plan, as described in Subsection 9.4.9, describing how emissions will be minimized and the *Canada-wide Standards for Dioxins and Furans* and the *Canada-wide Standards for Mercury emissions* met; and
- Procedures for reporting of project emissions and monitoring results.

9.4.15 Noise Abatement Plan

The Proponent shall develop a Noise Abatement Plan to provide information on monitoring and mitigating of noise impacts based on its impact assessment in Subsection 8.1.2. This plan must discuss:

- Applicable standards, guidelines and regulations that will be incorporated to minimize and mitigate noise effects from the Project;
- An environmental noise follow-up monitoring program indicating location, duration, timing and type of noise monitoring to be conducted;
- Description of noise control methods based on the climatic conditions and available technologies to be employed should mitigation be required;
- Measures and technologies to be adopted in the design and manufacturing of Project infrastructure and facilities to reduce noise;
- Description of noise attenuation and minimization measures to be employed through choosing appropriate equipment, installation of noise silencing devices, scheduling of take-off and landing aircrafts, and blasting timing; and
- Occupational related noise management programs.

9.4.16 Aquatic Effects Management Plan

The Proponent shall develop an Aquatic Effects Management Plan to provide information regarding proposed mitigation measures designed to protect and minimize the impacts on the aquatic system (freshwater and marine) from all project activities occurring in or near watercourses through all project phases, as well as those plans and programs designed to monitor potential effects to the aquatic system. This plan must include:

- Applicable standards, guidelines and regulations;
- Erosion and sediment control measures for works in or near waterbodies and watercourses;
- Measures to be applied to protect fish, aquatic biota, and the habitat of both during blasting in or near freshwater and marine environments;
- Description of the fish-out program proposed for the removal of fish from the lakes that are proposed to be dewatered during construction of the mine and the tailings impoundment area;
- Monitoring and reporting protocols as per the Environmental Effects Monitoring (EEM) program of the Metal Mining Effluent Regulations (EC, 2011).
- Description of monitoring study design and field methods, including indicators to be measured, sampling frequency and methods, timing, spatial extent and Universal Transverse Mercator (UTM) coordinates of sampling locations for each aquatic sampling location; and
- Description of how indictors, sampling design, methodology and the analysis will be appropriate and adequate to detect spatial and temporal project related impacts on the aquatic ecosystem and provide statistically rigorous tests of impact prediction presented in the EIS.

9.4.17 Wildlife Mitigation and Monitoring Plan

The Proponent shall develop a Wildlife Mitigation and Monitoring Plan in consultation with Government of Nunavut-Department of Environment (GN-DoE), Fisheries and Oceans Canada (DFO), Environment Canada (EC), and other relevant agencies or organizations. This plan must include appropriate mitigation and monitoring for selected terrestrial and marine species, with consideration for potential impacts identified in the relevant subsections of the EIS. This plan is required to include the following:

- Description of the LSA and the RSA for wildlife mitigation and monitoring programs;
- Selection criteria and rationales for wildlife species selected for monitoring and mitigation programs;
- Description of how TK collected by the Proponent has been integrated into baseline data collection, impact predictions and significance determinations, and the development of mitigation and monitoring programs;
- Details regarding plans for involvement of local hunters in wildlife baseline studies and monitoring program if applicable, including the mechanisms and resources allocated for local participation;
- Plans for coordinating wildlife studies/monitoring activities with other organizations, institutions, government departments and/or individual researchers conducting wildlife studies in the RSA, to minimize the impacts on wildlife from studies/survey activities;
- Discussion of how terrestrial wildlife surveys, particularly low elevation caribou surveys, and monitoring protocols (including data confidentiality) will be designed to mitigate potential impacts on terrestrial mammals, in particular caribou;
- Description of monitoring study design and field methods, including indicators to be measured, sampling frequency and methods, timing, spatial extent, and Universal Transverse Mercator (UTM) coordinates of transect lines if applicable, for each wildlife species to be monitored;
- Description of how indicators, sampling design, methodology and analysis will be appropriate and adequate to detect spatial and temporal project-related impacts on wildlife and provide statistically rigorous tests of impact predictions presented in the EIS;
- Measures to be applied to avoid or reduce the disturbance, harassment, injury or mortality of marine mammals due to shipping activities;
- Measures to be applied to avoid or reduce the disturbance, harassment, injury or mortality of terrestrial wildlife due to Project activities, including measures to prevent wildlife from entering pit areas and birds from landing on tailings impoundment area;
- Measures to minimize noise disturbance to wildlife and hunters/travellers when conducting aerial wildlife surveys;
- Procedures and structures designed to mitigate/manage potential impacts to wildlife and wildlife movement (e.g., caribou crossings and migration routes) during construction and operations;
- Plans to facilitate the safe passage of wildlife across the all-weather access road and associated mitigation measures to prevent collisions with wildlife;

- Plans and measures to avoid or reduce the potential for Project activities to act as an attractant to wildlife species and to avoid and reduce injury, illness or mortality of wildlife (including intentional killing of wildlife by mine personnel to defend human life or property);
- Description of data analysis methods, triggers/thresholds for adaptive management plans, and proposed mitigation measures;
- Mechanism for the evaluation of effectiveness of mitigation measures;
- Quality assurance and quality control measures; and
- Reporting and plan updating procedures.

9.4.18 No Net Loss Plan

The Proponent shall present a No Net Loss Plan (NNLP) to discuss measures to be implemented for off set of the loss of aquatic habitat due to Project activities and components. This plan should include the principle of No Net Loss for fish habitat as outlined in the Policy for the Management of Fish Habitat (DFO, 1986), and shall include, where appropriate, habitat replacement options and monitoring programs and off set plans as developed in consultation with DFO and KIA. The No Net Loss Plan shall discuss the following:

- Requirements of related DFO policies;
- The estimate of total fish habitat loss and methods used for estimations;
- Plans to off set losses to fish habitat in order to achieve "No Net Loss" of fish habitat productive capacity;
- Procedures and structures designed to mitigate/manage potential impacts to fish and fish habitat during construction and operation including fishout programs of any drained lakes;
- *Details regarding the proposed offsetting options, including locations and conceptual designs for implementation (e.g., rearing habitat, migration channels, etc.);*
- Include a discussion on how TK was incorporated into the development of the No Net Loss Plan;
- Description of the location(s) of the tailings impoundment area and the fish habitat affected by the deposit;
- Description of the measures to be taken to mitigate any potential adverse effect on the fish habitat that could result from plan implementation;
- Description of measures to be taken to monitor plan implementation;
- Description of the measures to be taken to verify the extent to which the plan's purpose has been achieved;
- Description of the time schedule for plan implementation, which shall provide for achievement of the purpose of the plan within a reasonable time; and
- Description of the consultation efforts for the No Net Loss Plan for the tailings impoundment area, including KIA, DFO and other affected parties, including overall effort and opportunities for parties to provide options for offsetting predicted impacts to fish and fish habitat.

9.5 SOCIO-ECONOMIC MANAGEMENT PLANS

The Proponent shall present plans, policies and programs to minimize potential negative socio-economic effects and to optimize the potential positive effects of the Project. Socio-economic management plans shall be developed and organized to correspond with the socio-economic impact assessment described in Section 8.2. Plans should reflect the complete life span of the Project, and contain appropriate monitoring and evaluation techniques (e.g., indicators) that will allow regulators to intervene in a timely and constructive manner.

In this section, the Proponent shall describe its socio-economic mitigation and monitoring plans and mitigation programs, including how they will identify, react and mitigate potentially adverse socio-economic impacts and augment positive socio-economic impacts. In consultation with the Kitikmeot Regional Socio-Economic Monitoring Committee (SEMC), the Proponent should clearly identify the role it will take in regional monitoring initiatives, including how its monitoring plans will align with those of the regional SEMC. The Proponent may also use experience from other projects or jurisdictions regarding the success of such mitigation measures as part of the Proponent's assessment of impacts and development of these plans.

The Proponent shall outline how the predominant regional language/dialect in the RSA will be incorporated into each respective plan. The management plans shall include, but are not limited the following individual plans:

9.5.1 Business Development Plan

The Proponent shall provide a Business Development Plan that includes, but is not limited to:

- Strategies for preferential hiring/contracting;
- Strategies for building capacity for local businesses and entrepreneurs;
- Communication methods to share information on opportunities with local or regional businesses;
- Community-based investment or initiatives that may lead to economic diversity; and
- Discussion on what efforts the proponent will undertake to ensure project-specific benefits can remain in the Kitikmeot region and/or in Nunavut.

9.5.2 Occupational Health and Safety Plan

The Proponent shall present an Occupational Health and Safety Plan focusing on the following elements in conjunction with its Spill Contingency Plan, Risk Management Plan, Noise Abatement Plan, and any other relevant plans:

- An overview of the occupational health and safety program for the activities and works being proposed;
- Policies and guidelines regarding interaction with Nunavut's medical health system including the provision of relevant health and safety information regarding hazardous materials, including Material Safety Data Sheets to the appropriate health centers and any emergency response staff;

- Safety and management procedures related to hazardous chemical, physical, and biological agents and materials, including their manufacture, storage, use and disposal;
- Best safety practices and safety awareness programs;
- Overview of the workplace conditions, such as accommodation, food/nutrition, health and safety, alcohol/drug/smoking policies, and recreation;
- Employee involvement and related training programs for ensuring awareness of employee responsibilities in environmental and health and safety management, including roles pertaining to safety orientation, hazard analysis, first-aid training, human-wildlife encounters and protocols to follow, etc.;
- Risk management and safety management details regarding the preparedness of mine safety equipment and devices;
- Procedures for emergency incidence reporting and actions including procedures for medical transport of injured staff or persons, including transport from the location of the incident to help, ambulance or medical transportation onsite, and medevac to local health center, hospital, or referral south;
- Details regarding workplace monitoring and control; and
- First aid training and occupational medical surveillance.

9.5.3 Community Involvement Plan

The Proponent shall present a Community Involvement Plan which discusses the following:

- Provides a clear definition of public and community for the purposes of the Community Involvement Plan:
- Mechanisms for providing information to the public and potentially affected communities regarding regular updates of Project's progress, initiatives and future work plans (e.g., training opportunities, hiring information, etc.);
- Plans and procedures for communicating with the public and Project employees during any temporary closure or slowdown periods;
- Methods and procedures for establishing effective two-way communications for collecting and addressing public concerns;
- Methods by which to evaluate public engagement efforts in order to identify the effectiveness of the plan;
- Measures to assist communities with addressing potential social needs and problems related to the Project, including proposed counselling services for employees and their families regarding matters such as substance abuse, work-related stress management, family support, etc.;
- Approach to promoting the participation of Nunavummiut in project employment, including any preferential recruitment policies or practices;
- Plans for promoting local contracting opportunities and purchasing of local products (e.g., country foods);
- Discussion of how input from communities has influenced the design and implementation of monitoring plans and initiatives;

- Discussion of communications procedures for the Proponent and members of affected communities to disseminate Project monitoring results and Project information on social, cultural, and ecological conditions; and
- Discussion of procedures for community-based monitoring of social, cultural, and ecological conditions to determine if, when, and how the Project contributes to community sustainable development.

9.5.4 Cultural and Heritage Resources Protection Plan

The Proponent shall, in consultation with the Government of Nunavut-Department of Culture and Heritage, present a Cultural and Heritage Resources Protection Plan which includes the following:

- Applicable regulations and guidelines for management of potential impacts to identified cultural and heritage resources;
- Results of archaeological investigations and studies;
- Inventory of known archaeological resources in Project areas;
- Discussion of how the results from the Proponent's impact assessment have been considered and incorporated into the plan; and
- General and site-specific measures for the protection of archaeological sites and mitigation of potential adverse impacts.

9.5.5 Human Resources Plan

The Proponent shall develop a Human Resource Plan, consulting with relevant GN departments where applicable, which includes the following:

- Applicable human resources legislation, the Proponent's understanding of labour standards practices and how the Proponent will meet the requirements developing employment policies and the Proponent's policies on compensation and benefit programs (e.g., health care plan, insurance, vacation/maternity leave, etc.);
- Recruitment strategies with communities that includes regular information updates regarding employment/training opportunities, hiring plans and time schedules, etc.;
- A strategy discussing steps to reduce labour force entry barriers and improvement to employee retention;
- Any plans for training programs designed to assist the local labour force with potential employment at the mine (e.g., partnerships with local schools and other educational institutions, on-the-job learning, and apprenticeships);
- Education and Orientation Plan to assist employees to understand their responsibilities in environmental protection and health and safety management, and to provide cultural and financial management training;
- Worker rotation and pay schedules, health and safety programs, preferential recruitment policy, gender equality, skills and entry requirements, training, career development, and counselling programs available for employees;
- Discussion of how the planned work schedules that are adapted to traditional activities, whether the Proponent will provide no-cost commuting to allow workers to continue to

live in their own communities and to participate in their traditional economic and cultural activities;

- Policies regarding onsite public safety and wellbeing; cross-cultural orientation; firearms control; sexual and gender harassment; alcohol and drug control measures; reporting of incidents involving drugs/alcohol; smoking policies; gambling activities; and supply of country food to Inuit workers at the mine site.;
- Details on any priorities for Inuit, northerners, etc. or other staffing measures targeting categories of individuals;
- Recognition and management plans regarding the rights and needs of hunting activities and traveling through Project areas by the residents from adjacent communities;
- Strategies for communicating relevant information of IIBA terms and conditions to employees;
- Policies and regulations regarding hunting and fishing by non-Inuit employees, while respecting the rights and needs of Inuit employees to harvest and pursue traditional activities, with a discussion of how such policies or regulations were designed to manage potential impacts to fisheries or wildlife resources; and
- Discussion of any proposed policies or regulations regarding the prohibition of recreational hunting, fishing and other related activities by employees at specific locations and timing in Project area.

9.6 MINE CLOSURE AND RECLAMATION PLAN

The Proponent shall develop a preliminary Mine Closure and Reclamation Plan for the Project which outlines how the various components set out in Section 6.0 will be decommissioned, reclaimed and closed following mine closure. The plan can be preliminary with key issues addressed for the environmental assessment in the NIRB's review, with the following requirements:

- To ensure that issues associated with the effective closure and reclamation of all Project components are considered at the earliest possible stage in the mine development process, thereby influencing mine design to take into account environmental issues related to mine closure and reclamation.
- To establish goals and final land use objectives for reclamation of lands potentially affected by the Project;
- Description of reclamation methods, time frames and schedules, including proposed progressive reclamation, research programs, and notice periods to employees and public;
- Description of temporary closure measures and a discussion of at what point a temporary closure should be considered permanent for the purposes of requiring implementation of the Mine Closure and Reclamation Plan;
- Discussion of research programs to address challenges to reclamation, given the local conditions;
- Considerations for the protection of public health and safety;
- Description of the estimated contaminant and other material (physical and chemical) levels in the environment after mine closure and remediation;

- Description of closure and post-closure monitoring of environmental components including, but not limited to, wildlife, vegetation, air quality, landform stability and water quality;
- Discussion on the long-term monitoring and maintenance that may be required once physical and chemical stability of reclaimed areas have been established;
- Discussion on reduction or elimination of environmental effects once the mine ceases operation;
- Discussion regarding re-establishing conditions that permit the land to return to a similar pre-mining land use;
- Considerations for ARD and/or ML potential of rocks and tailings, in association with related waste rock and tailings management strategies;
- Any considerations for the restoration of the natural aesthetics of the Project; and
- The Plan is to be considered a "living" document; the level of detail should undergo further revision to reflect the progress of the Project as well as changes in technology and/or standards or legislation. This plan should include the establishment of thresholds and identified adaptive management responses should such thresholds be reached. Future revisions should also consider input from consultations with communities and other stakeholders on methods to be used, and potential uses for project infrastructure, etc.

9.6.1 Care and Maintenance Plan

A preliminary Care and Maintenance Plan shall be developed for the Project in conjunction with the Mine Closure and Reclamation Plan which outlines how the various components set out in Section 6.0 will be treated in the event of a temporary closure or un-timely closure of the project. The plan can be preliminary with key issues addressed for the environmental assessment in the NIRB's review and should include a discussion on the items listed in Section 9.6.

9.7 FOLLOW-UP AND ADAPTIVE MANAGEMENT PLANS

A follow-up plan is a formal, ongoing process to verify the accuracy of the environmental impact predicted in the environmental assessment and permitting stage of the Project, and to determine the effectiveness of proposed mitigation measures. If either of these two steps identifies unusual and unforeseen adverse environmental effects, then the existing mitigation measures must be adjusted, or if necessary, an adaptive management plan with new mitigation or compensation measures must be developed. Adaptive management planning is particularly important for the areas where scientific uncertainty exists in the prediction of adverse effects. In order to offset the likelihood of mitigation failure and the potential severity of the consequences, the Proponent shall formulate a process through which the information related to effectiveness of mitigation measures is analyzed and associated adaptive measures would be employed in the environmental management system:

- The need for such a follow-up and adaptive management plan and its objectives;
- How this plan will be structured including, enforcement and penalties for non-compliance;
- Which elements of the monitoring program described in Section 9.3, would be incorporated;

- The mechanisms, through which monitoring results will be analysed, and if necessary, adjusted mitigation measures or adaptive management plan will be employed. In addition, how the effectiveness of the new mitigation measure will be assessed and verified;
- The roles to be played by the Proponent, regulatory agencies, and others in such a plan, and possible involvement of independent researchers;
- The sources of funding for the plan and reporting; and
- The quantitative triggers or thresholds that will indicate the need to alter or vary the management plan or mitigation measures.

9.8 SIGNIFICANCE OF RESIDUAL IMPACTS

After having established the mitigation measures, the EIS shall present the residual effects assessment of the Project on the components of the biophysical and human environments, so that the reader can clearly understand the real consequences of the Project, the degree of mitigation of the effects and which effects cannot be mitigated or compensated for.

The Proponent should include a summary table in this section of its EIS, which presents the effects before and after mitigation on the various components of the environment, the mitigation measures applied and the residual effects have been assessed.

The determination of significance of residual impact shall take into account the attributes of each impact in accordance with the criteria established in Section 7.14.

10.0 CONCLUSION

The EIS should end with a conclusion presenting a summary analysis of the overall projected biophysical and socio-economic impacts, anticipated transboundary and cumulative effects, proposed mitigation measures, and residual impacts. While highlighting the impacts in the Kitikmeot Region, this conclusion should clearly present the importance of the EIS findings to the NSA and Canada.

11.0 LIST OF CONSULTANTS AND ORGANIZATIONS

The Proponent shall prepare a list of all the consultants who contributed to the preparation of the EIS, including the role of each and contact information in an appendix to the EIS. In addition, the Proponent shall prepare a list of the organizations consulted, including the time, place, and purpose of the consultation, reference materials provided, and contact information for the organization.

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APPENDIX A: NUNAVUT IMPACT REVIEW BOARD'S 10 MINIMUM EIS REQUIREMENTS

The following are the minimum required elements for an Environmental Impact Statement required under a Part 5 Review:

1. Statement of Consultation Principles and Practices

The Proponent must conduct pre-Project consultations with locally affected persons. Where at all possible, information about the Project must be distributed, and comments collected with a view to resolving any differences. Discussions should include, but not be limited to, land uses, policies, resource uses, Archaeological areas, infrastructure, and terrain sensitivities. Aboriginal cultural concerns must be highlighted throughout. The Proponent shall explain where, how, why, and with whom it conducted public consultation, and shall demonstrate an understanding of the rights, interests, values, aspirations, and concerns of the potentially affected communities. All comments from the public must be summarized, documented, and presented in the EIS.

2. Definition of Project

A definition of the Project must include a discussion of any connected or subsequently related projects in order to reveal the primary purpose and better understand complex or multi-staged related proposals.

3. Statement of Project's Purpose

Based on the concepts of the Precautionary Principle and Sustainable Development, an EIS must contain a statement explaining the need for, and the purpose of the Project. Where further economic development is needed for a given area, the Board expects the deficiencies in the economic status quo to be stated.

4. Anticipated Impacts Analysis

A comprehensive impact assessment must be carried out which includes, but is not limited to, 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. Anticipated impacts include short and long-term, direct and indirect, positive and negative, cumulative, socio-economic, archaeological and cultural impacts. This element of the EIS must include a mitigation analysis that explains how the impacts could be avoided, minimized, cured, eliminated, or compensated.

5. Cumulative Effects Analysis (CEA)

Cumulative Effects must be analyzed for all Part 5 Reviews. A project proposal causes a Cumulative Effect if, when added to other projects in the region, or projects reasonably foreseeable in the region, will cause an additive effect. A comprehensive examination of all Cumulative Effects must be included in an EIS.

6. Significant Effects Analysis

The Board must be advised of the significant impacts of the Project. This should be based upon:

a. the Project setting, taking into account the location's unique ecosystemic characteristics, and

b. the severity of the impacts, taking into account, but not limited to public health, land use plans, protected areas, habitat, or species, public concern, etc.

Ultimately, the Board will decide which effects are significant and report to the Minister accordingly.

7. Project Alternatives

This requirement includes, but goes well beyond, alternative means of carrying out the Project that might be economically and technically feasible and the environmental effects of those alternative means. This assessment must include the "no-go" or "no-build" alternative, as well as the "preferred" alternative. The "no-go" alternative is not only a potentially stand-alone option; it also serves as a baseline for comparison with other development alternatives that might reasonably be proposed in the circumstances. Environment Canada's Guidelines for the Assessment of Alternatives for Mine Waste Disposal (EC, 2011) may also be used by the Proponent in their assessment.

8. Sustainability Analysis

The EIS must contain an analysis of the ability of renewable resources affected by the Project to sustain current and future generations in Nunavut and Canada.

9. Monitoring or Post-Project Analysis (PPA)

The purposes of a PPA are to:

a. measure the relevant effects of projects on the ecosystemic and socio-economic environments of the Nunavut Settlement Area;

b. determine whether and to what extent the land or resource use in question is carried out within the predetermined terms and conditions;

c. provide the information base necessary for agencies to enforce terms and conditions of land or resource use approvals; and

d. assess the accuracy of the predictions contained in the project impact statements.

10. Transboundary Effects Analysis

Where relevant, an EIS must include an assessment of all significant adverse ecosystemic or socio-economic transboundary effects.

**It is important to note that Section 12.5.2(j) of the NLCA gives the NIRB the authority to add other requirements as deemed necessary. The NIRB will always review each project proposal on a case-by-case basis, including instructions from the Minister, and may add other requirements as per s. 12.5.2 and 12.5.5 of the NLCA.

APPENDIX B: SCOPE LIST FOR THE NIRB'S ASSESSMENT OF THE PHASE 2 HOPE BAY BELT PROJECT

The scope of the Nunavut Impact Review Board's (NIRB or the Board) assessment of the Phase 2 Hope Bay Belt project proposal (the Project) is based on the requirements of Section 12.5.2 of the Nunavut Land Claims Agreement (NLCA), the NIRB's 10 Minimum Environmental Impact Statement (EIS) Requirements and the project proposal submitted by Hope Bay Mining Ltd. (HBML or Proponent) to the NIRB on December 21, 2011. This document was developed in consultation with the public and interested parties which lists the Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) that should be addressed by the Proponent's Environmental Impact Statement (EIS).

Project Description, including the purpose and need for the Project

The scope of the development under review includes the physical works and activities or undertakings that constitute the Phase 2 Hope Bay Belt project proposal as submitted to the NIRB by HBML on December 21, 2011. The temporal scope for the Project includes each stage of the project, including construction, operation, maintenance, temporary closure, final closure, post-closure periods and planned exploration to be undertaken in conjunction with the Project.

Project Proposal Summary

The Phase 2 Hope Bay Belt Project is a proposed gold mining and milling operation located approximately 125 kilometres southwest of Cambridge Bay in the Kitikmeot region. The Project will have an estimated milling rate of up to 2 million tonnes of ore per year, with anticipated total waste rock and tailings production of 350 million tonnes and 25 million tonnes, respectively. The Project would facilitate gold mining at the Madrid/Patch and Boston mineral deposits in the Hope Bay greenstone belt using both open pit and underground mining methods.

The project proposal includes the expansion of existing infrastructure at the Doris district[1], as well as the development of new infrastructure at the Madrid/Patch and Boston districts to support belt-wide mining operations. The Proponent has indicated that the number of personnel on the site at any given time is not expected to exceed 1,080 with a total of 720 on-site personnel during peak construction and 540 personnel during operations. Personnel at all project phases would be employed on a fly-in/fly-out rotational basis. HBML proposes to commence project development in 2014 – 2015, with a projected mine life of 15 years.

[1] The NIRB has previously reviewed the related but distinct Doris North Gold Mine project (NIRB File No. 05MN047) in accordance with Part 5 of Article 12 of the Nunavut Land Claims Agreement (NLCA). The Doris North Gold Mine project was allowed to proceed pursuant to the NIRB Project Certificate No. 003 which was issued September 15, 2006.

Project Components

(a) Doris North Mine Site[2]

Activities and Facilities: HBML proposes to use and/or expand existing facilities and associated activities at the Doris North site including use of the existing camp to accommodate an anticipated 360 persons during future construction of the Project; establishment of a heliport; expansion of the existing all-weather airstrip; use of potable water to be sourced from Doris Lake (as previously permitted) with use of existing sewage treatment plants; expansion of maintenance shops, administration buildings, mine dry (to include lockers, sinks, and changing rooms for personnel); use of reagent storage; development and operation of a batch plant, crushing circuit and mineral processing plant in support of underground mining activities; overburden, waste rock, and ore storage; surface water management (to include pollution and sediment control or supernatant ponds); use of previously permitted fuel storage facilities with capacity of up to 5 million litres (ML); tailings conveyance and storage (tailings storage and disposal options include sub-aqueous, sub-aerial and dry-stack with treated effluent to be discharged at Roberts Bay); development and operation of a landfill at quarried out areas; power generation and distribution; and the establishment and use of other miscellaneous support facilities.

(b) Roberts Bay Port Site

Activities and Facilities: Activities and facilities proposed include the expansion of existing deep sea and shallow water port facilities; construction of wastewater management facility of effluent for discharge; construction of maintenance shops; use of two (2) existing moored accommodation barges to house 100 personnel; and use of an additional 60 ML of diesel fuel to be stored at the existing site's main fuel storage facility as well as the establishment of additional dispensing systems.

(c) Madrid/Patch Mine Site

Activities and Facilities: Activities and facilities proposed include expansion or relocation of previous camp infrastructure, construction and operation of an all-weather airstrip; establishment of administration buildings, maintenance shops and mine dry (to include lockers, sinks, and changing rooms for personnel); diesel fuel power generation and related distribution infrastructure; establishment of fuel storage facilities; additional explosives storage facility; development of multiple open pit and underground mining operations; crushing circuit; potable water withdrawal from Patch and/or Windy Lakes; establishment of sewage treatment plant and sanitary landfill; ore and waste rock storage areas; and other miscellaneous support facilities.

(d) Boston Mine Site

[2] HBML currently owns and operates the Doris North Project (NIRB File No. 05MN047), a prospective gold mining and milling operation located within the Hope Bay greenstone belt, which has yet to commence full mining and milling operations.

Activities and Facilities: Activities and facilities proposed include expansion or relocation of previous camp infrastructure, establishment of camp facility for up to 180 personnel; establishment of heliport and all-weather airstrip; withdrawal of potable water from Aimaokatalok Lake; establishment of sewage treatment plant; establishment of maintenance shops, administration buildings, mine dry (to include lockers, sinks, and changing rooms for personnel); reagent storage; additional explosives storage facility at Tail Lake and Boston Site; development of an open pit (to include the diking of a portion of Aimaokatalok Lake) and multiple underground mining operations; establishment and operation of a crushing circuit and a mineral processing plant; waste rock and ore storage; surface water management (including pollution and sediment control or supernatant ponds); fuel storage; tailings conveyance and storage (land-based dry stack or sub-aerial tailing facilities and/or placement of some tailings underground); development of a landfill at emptied quarry areas; power generation and distribution; establishment of sewage treatment plant; establishment of mine water conveyance and treatment facilities; and other miscellaneous support facilities.

(e) Mid-belt Site

Activities and Facilities: Activities and facilities proposed include the installation of a mobile exploration camp to accommodate 180 personnel; temporary fuel storage at cache location (location to be determined); establishment of heliport, administration buildings and maintenance shops; and installation of potable water and sewage treatment plants using a number of lakes in the region as water sources.

(f) Mobilization and Shipping

Activities and Facilities: Activities and facilities proposed include annual sealift of fuel, equipment and supplies via the Arctic Ocean to Melville Sound and then to the port facility at Roberts Bay during the ice-free (open water) season in the summer months; transport of some equipment and supplies to project site using Lockheed 382 Hercules, Boeing 737, and other aircraft; use of laydown areas at various locations at the project site; use of floating line to deliver fuel from barges and/or ships to land-based storage tanks; and shipment of gold concentrate (via sealift) and/or doré gold bars (via airlift) off site; construction of either or both all-weather or ice/snow roads from the pre-existing roads at Windy Camp to the Boston site, including several proposed water crossings, to allow for material hauling, facilitate site services, and access for exploration.

(g) Abandonment, Decommissioning and Reclamation

Activities and Facilities: Activities and facilities proposed include mine decommissioning and removal of infrastructure and equipment from site; remediation of contaminated areas; reclamation of disturbed areas; enhancement of natural re-vegetation; and post-closure environmental monitoring, including installation of monitoring equipment.

Anticipated ecosystemic and socio-economic impacts of the Project

The assessment of the potential for ecosystemic and socio-economic impacts by the proposed project components and activities as outlined in the section above, and extending through all the phases of the Phase 2 Hope Bay Belt project, must refer to the environmental

and socio-economic factors listed below. The scope of potential impacts caused by the project components, activities, and undertakings to environmental and socio-economic factors shall take into account the appropriate temporal and spatial boundaries and is expected to draw upon relevant information from scientific sources and traditional knowledge.

a) Air quality
b) Climate and meteorology
c) Noise and vibration
d) Terrestrial environment, including
    i. Terrestrial ecology
    ii. Landforms and soils
    iii. Permafrost and ground stability
e) Geology (including geochemistry)
f) Hydrology (including water quantity) and hydrogeology
g) Groundwater and surface water quality
h) Sediment quality
i) Freshwater aquatic environment, including
    i. Aquatic ecology
    ii. Aquatic biota including representative fish as defined in the *Fisheries Act*, aquatic macrophytes, benthic invertebrates and other aquatic organisms
    iii. Habitat including fish habitat as defined in the *Fisheries Act*
    iv. Commercial, recreational and Aboriginal fisheries as defined in the *Fisheries Act*
j) Terrestrial vegetation
k) Terrestrial wildlife and wildlife habitat, including
    i. Representative terrestrial mammals to include caribou, caribou habitat migration and behaviour, muskoxen, wolverine, grizzly bears, polar bears, wolves and less conspicuous species that may be maximally exposed to contaminants
    ii. Wildlife migration routes and crossings
l) Birds and their habitat, including
    i. Raptors
    ii. Migratory birds
    iii. Seabirds
m) Marine Environment, including
    i. Marine ecology
    ii. Marine water and sediment quality
    iii. Marine biota including fish and benthic flora and fauna
    iv. Marine habitat
    v. Commercial, recreational and Aboriginal fisheries as defined in the *Fisheries Act*
n) Marine Wildlife
o) Terrestrial and Marine Species at Risk
p) Socio-Economic Factors, including
    i. Economic development opportunities
    ii. Employment

iii. Education and training
iv. Contracting and business opportunities
v. Population demographics
vi. Revenue (tax, royalties, etc.)

q) Traditional activity & knowledge including
i. Land use
ii. Food security
iii. Language
iv. Cultural and commercial harvesting

r) Non-traditional land use and resource use

s) Heritage Resources
i. Archaeology
ii. Palaeontology
iii. Cultural

t) Health and Well Being
i. Individual and community wellness
ii. Family and Community Cohesion

u) Community infrastructure and public services

v) Health and safety including employee and public safety

w) Residual and Cumulative Effects

x) Transboundary Effects

Anticipated Effects of the Environment on the Project

The scope of the assessment will include the potential anticipated effects of the arctic environment on the project throughout the project's life. The scope of these factors is to include:

Climate and Meteorology (including climate change)
Permafrost
Geotechnical hazards (including slope movement, differential or thaw settlement, frost heave, and ice scour)
Subsidence
Flooding
Unfavourable geological conditions

Steps which the proponent proposes to take including any contingency plans, to avoid and mitigate adverse impacts

The scope of the assessment will include any contingency plans or risk management plans to avoid and mitigate adverse impacts caused by the proposed project components and activities. These plans must extend, where relevant, through all project phases. These plans shall take into account the appropriate temporal and spatial boundaries and are expected to draw upon relevant information from scientific sources, best practice and traditional knowledge and are to include, but not be limited to:

Emergency and spill response
Hazardous materials management
Accidents and malfunctions
Regulatory requirements
Mitigation measures

Steps which the Proponent proposes to take to optimize benefits of the Project, with specific consideration being given to expressed community and regional preferences as to benefits

The scope of the assessment will include steps which the Proponent proposes to take to optimize benefits of the project, and should include, but not be limited to:

Compensation and benefits
Health benefits
Human health and well-being
Employment
Education and training
Land use
Contracting and business opportunities
Any non-confidential details from the Inuit Impact Benefits Agreement

Steps which the Proponent proposes to take to compensate interests adversely affected by the Project

The scope of the assessment will include the steps which the Proponent proposes to take to compensate interests adversely affected by the project including all non-confidential process and content details pertaining to any Inuit Impact Benefit Agreement pursued in connection with the Project.

The monitoring programs proposed by the Proponent to identify and manage ecosystemic and socio-economic interests potentially affected by the Project

The scope of the assessment will include any programs that will be established to monitor the potential ecosystemic and socio-economic impacts caused by the proposed project components and activities.

The interests in lands, waters and other resources which the Proponent has secured or seeks to secure

The scope of the project under review will include any interests in lands, waters and other resources which the Proponent has secured or seeks to secure based on the proposed works and activities or undertakings that constitute the Phase 2 Hope Bay Belt project proposal.

Nunavut Impact Review Board	Project Certificate
Nunavut Water Board	Type ‘A’ Water Licence

Kitikmeot Inuit Association	Land Use Licences, leases, easements, right-of-ways, Quarry Concession Permit(s) and various other permits
Mineral Production Lease	Nunavut Tungavik Inc.
Government of Nunavut – Community and Government Services	Quarry approval and Right-of-Way approval
Government of Nunavut – Department of Culture and Heritage	Archaeology Permit(s) and Palaeontology Permit(s)
Nunavut Research Institute	Socio-economic & Traditional Knowledge Research Licence, Scientific Research Licence
Aboriginal Affairs and Northern Development Canada	Class 'A' Land Use Permit, rights-of-ways, Land Lease, Waterlot Lease and Quarry Permit(s)
Environment Canada	Schedule 2 Amendment to Metal Mining Effluent Regulations Disposal at Sea Permit required for upgrading the existing deep water and shallow water port.
Fisheries and Oceans Canada	Section 35 authorization under the fisheries protection provisions of the *Fisheries Act*
Natural Resources Canada	Licence for a Factory and Magazine
Transport Canada	Navigable Waters Approval(s) and/or Exemption(s) and Oil Pollution Prevention/Emergency Plan as per the *Canada Shipping Act*
Workers Safety & Compensation Commission	Permit to Store Detonators, Explosives Use Permit

Options for implementing the Project

The scope of the assessment will include project alternatives including alternatives to individual components/activities, alternate timing and development options, as well as presenting the "no go" option as it pertains to the overall Project.

Any other relevant matters

The scope of the assessment will include any other matters that the NIRB considers relevant, including:

a) Technical innovations previously untested in the Arctic including new technology for mine design, operation, and tailings management;
b) Traditional knowledge;
c) Statement of consultation principles and practices;
d) Significant effects analysis;
e) Sustainability analysis;

f) Interactions between Valued Ecosystem Components and Valued Socio-Economic Components;
g) Discussion of similar resource development projects in other jurisdictions; and
h) Planned future development and the associated level of uncertainty.