GUIDELINES

FOR THE PREPARATION OF AN

ENVIRONMENTAL IMPACT STATEMENT

for

BAFFINLAND IRON MINES CORPORATION'S

MARY RIVER PROJECT

(NIRB File No. 08MN053)

AMENDED VERSION FOR THE PHASE 2 DEVELOPMENT PROPOSAL

OCTOBER 6, 2015

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Appendix A: Nunavut Impact Review Board's 10 Minimum EIS Requirements……A-1

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

Archaeology	The scientific study of prehistoric people and their cultures.
Bioaccumulation	The process in which certain pollutants gather in living tissue (Theodore *et. al*, 1997).
Biodiversity	The diversity of plant and animal life in a particular habitat or ecosystem.
Borrow pit	Excavated areas used to provide low quality fill for construction activities such as roadbed building and landscaping. Fill of this type is usually removed from a nearby borrow pit and then compacted on the site as a base for other construction (DIAND, 1999).
Climate Change	Any long-term change in statistics of weather over periods of time that range from decades to millions of years. It can express itself as a change in the mean weather conditions, the probability of extreme conditions, or in any other part of the statistical distribution of weather. Climate change may occur in a specific region, or across the whole Earth. Climate change includes global warming.
COSEWIC	Committee on the Status of Endangered Wildlife in Canada is a committee of experts that assesses and designates which wildlife species are in some danger of disappearing from Canada.
Cumulative impacts	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.
Demography	The statistical study of populations, with particular reference to births, deaths, migratory movements, age and sex.
Dust	Airborne particulate matter ranging in diameter from 10 to 50 microns. Dust can be emitted into air from anthropogenic sources and natural sources.
Ecosystemic	Relating to the complex of a natural community of living organisms and its environment functioning as an ecological unit in nature.
Ecosystem	A functional unit consisting of all living organisms (plants, animals and microbes) in a given area, and all the nonliving physical and chemical factors of their environment linked together through nutrient cycling and energy flow. An ecosystem can include humans and be of any size, but it always functions as an integrated unit. Ecosystems are commonly

	described according to the major type of vegetation, e.g. forest ecosystems or grassland ecosystems (Tilleman, 2005).
Esker	A ridge of sand and gravel deposited by a receding glacier.
Faulting	Cracks or breaks within a body of rock, causing one part of the body of rock to slip or slide relative to the other.
Fines	The portion of a powder composed of particles [of rock, mineral or sediment] which are smaller than a specified size (Theodore *et. al*, 1997).
Fish	Includes (a) parts of fish, (b) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and (c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals (*Fisheries Act*, 2009).
Fish habitat	Spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes (*Fisheries Act*, 2009).
General circulation model	A mathematical or statistical model describing atmospheric movements over the Earth. Among other things, such models are used to predict how the climate of the Earth may evolve over the years to come as a result of, for example, changes in atmospheric pollution.
Geochemistry	The study of the chemical composition of the earth and the physical and chemical processes responsible for it.
Geology	The study of Earth in terms of its development as a planet, commonly thought of as the study of rocks.
Geomorphology	The scientific discipline that studies the surface features of the Earth, including land forms.
Geotechnical	Relating to the application of engineering to geology.
Greenhouse Gases (GHGs)	Greenhouse gases (GHGs) are gases in the atmosphere that trap energy from the sun. Naturally occurring GHGs include water vapour, ozone, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) (EC, 2008). By United Nations Framework Convention on Climate Change (UNFCCC), GHGs of interest may include: carbon dioxide (CO_2) methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6), perfluorocarbons (PFCs) and hydrofluorocarbons (HFCs).
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).
Hydrocarbons	Any organic chemical compounds that consist entirely of carbon and hydrogen (e.g., gasoline and oil).

Hydrogeology	The science that deals with the occurrence, circulation, distribution, and movement of water below the surface of the earth (groundwater), with emphasis on geological aspects.
Hydrology	The science that deals with water, its properties, distribution and circulation on or below the earth's surface.
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 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).
Inuit Qaujimaningit	Means (a) Inuit Traditional Knowledge and variations of Inuit Traditional Knowledge; (b) Inuit epistemology relating to: Inuit Societal values (including the legal obligations set out in the NLCA regarding Inuit Participation, Inuit employment and training, etc.); and Inuit knowledge (both contemporary and traditional) (QIA, 2009).
Leaching	The process by which a liquid (e.g., water) passes through a substance, picking up some of the material and carrying it to other places. Leaching can occur underground in soil and rock, or above ground through piles of material.
Limnology	Limnology is the study of the structural and functional interrelationships of organisms of inland waters as they are affected by their dynamic physical, chemical, and biotic environments" (Wetzel, 2001).
Lithology	The description of rocks on the basis of their physical and chemical characteristics (Tilleman, 2005). This often includes colour, structure, mineral components, and grain size.
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.
Mitigation	Actions taken for the purpose of reducing the negative impacts on the environment of a particular land use or activity (Tilleman, 2005). Actions may include considerations in design, construction, schedule, and restorative measures. Mitigation may also include restitution for any damage to the environment caused by a land use or activity through replacement, restoration, compensation, or any other means.

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).
Ore	A mineral or aggregate containing a precious or useful substance in a quantity and form that makes its extraction/mining profitable.
Overburden	Material that must be removed to allow access to an ore body, particularly in a surface mining operation.
Permafrost	A permanently frozen layer of soil or subsoil, or even bedrock (INAC, 2007),
Palaeontology	The study of life in the past as recorded by fossil remains.
Periphyton	Very small plants that live attached to a surface in freshwater but do not move around.
Phenology	The study of periodic phenomena in plants, such as the time of flowering in relation to climate.
Phytoplankton	Very small plants that float or drift in lakes (Tilleman, 2005).
Plume	A visible or measurable discharge of a substance from a given point of origin. Plumes may occur in water or air.
Post-closure	The period of time following the shut-down of a mine or other facility, during which monitoring of its effects should be continued.
Post-project audit	An evaluation occurring after a development which assesses the environmental and social impacts of a project and the mitigation measures applied to them.
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).
Quarries	Are any sites used for the extraction of building products or construction material from bedrock, such as limestone, shale, sandstone, or granite. Quarries may also be used as to manufacture crushed rock or other specific types of aggregate (DIAND, 1999).
Raptor	A bird that feeds wholly or chiefly on meat taken by hunting or on carrion.

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.
Rock heave	The movement of rock as a result of freezing and thawing.
Run-of-mine	This term applies to mined ore prior to it undergoing crushing or any other form of processing and treatment.
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).
Seismicity	The phenomenon of earth movements, in extreme cases in the form of earthquakes, and their geographic distribution.
Shipping	This term applies to shipping of ore, and includes activities associated with ore trans-shipment and at ore trans-shipment sites.
Significant	Significance is a consideration of the context of the project and the intensity of adverse effects, by giving particular regard to the following: a) the environmental sensitivity of the geographic area likely to be affected by the project; b) the historical, cultural and archaeological significance of the geographic area likely to be affected by the project; c) the extent of the effects of the project, including the geographical area that will be affected, the size of the affected human populations, and the size of the affected wildlife populations and related habitat; d) 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; e) the magnitude and complexity of adverse effects; f) the probability of adverse effects occurring; g) the frequency and duration of adverse effects; h) the reversibility or irreversibility of adverse effects; i) the potential for

	cumulative adverse effects given past, present and future relevant events; and j) any other factors NIRB considers relevant to assessing significance (NIRB, 2007).
Species at Risk	In this document, Species at Risk includes a): those species listed on Schedule 1 of the Species at Risk Act (SARA), b): species assessed as "at risk" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and c): species with territorial, regional, or local "at risk" status.
Sustainable development	Development that meets the needs of the present generation without compromising the ability of future generations to meet their needs.
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 water bodies.
Thermal stability	The degree to which something, such as permafrost, has the capacity to remain at the same temperature over time.
Toxic substance	A poisonous substance.
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).
Transportation corridor	The general routing for an area containing a road (winter or permanent), a pipeline, transmission line or any combination of the three, within Nunavut but outside community boundaries (NPC, 2000). In the current context, routings or tracts utilized for regular marine shipping activities are also considered to be transportation corridors.
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).
Waste rock	All rock materials, except ore and tailings that are produced as a result of mining operations.
Water crossing	An area used for the purpose of crossing a water body. Water crossings may consist of naturally occurring areas, or installed structures such as pipelines, bridges, culverts, or roads, etc.

Zooplankton	Very small animals that float or drift in lakes.

LIST OF ACRONYMS

ANFO	- Ammonium Nitrate and Fuel Oil
ARD	- Acid Rock Drainage
ATV	- All Terrain Vehicles
CEA	- Cumulative Effects Assessment
DFO	- Department of Fisheries and Oceans Canada
EIS	- Environmental Impact Statement
EMP	- Environmental Management Plan
GHG	- Greenhouse Gases
GN	- Government of Nunavut
IIBA	- Inuit Impact Benefit Agreement
INAC	- Indian and Northern Affairs Canada
IOL	- Inuit Owned Land
IPG	- Institutions of Public Government
IR	- Information Request
LSA	- Local Study Area
ML	- Metal Leaching
MSDS	- Material Safety Data Sheets
NBRLUP	- North Baffin Regional Land Use Plan
NIRB	- Nunavut Impact Review Board
NLCA	- Nunavut Land Claims Agreement
NPC	- Nunavut Planning Commission
NSA	- Nunavut Settlement Area
NWB	- Nunavut Water Board
OHF	- Oil Handling Facility
QIA	- Qikiqtani Inuit Association
ROM	- Run-Of-Mine
RSA	- Regional Study Area
SEMC	- Socio-Economic Monitoring Committee
TK	- Traditional Knowledge
TSP	- Total Suspended Particulate
TSS	- Total Suspended Solids
VEC	- Valued Ecosystem Component
VSEC	- Valued Socio-Economic Component

PART I – THE ASSESSMENT

1.0 INTRODUCTION

1.1 OBJECTIVE OF NIRB GUIDELINES

The present Guidelines are issued for the preparation of a draft Environmental Impact Statement (EIS) for the Mary River Project (the Project) proposed by Baffinland Iron Mines Corporation (the Proponent). An EIS is a tool used by Nunavut Impact Review Board (NIRB or Board) to evaluate the potential environmental and socioeconomic impacts of a project proposal and to ensure the integrated planning of development proposals (NIRB, 2006). It includes the identification and development of mitigation measures, which are measures designed to control, reduce or eliminate potentially adverse impacts of an activity or project and enhance positive impacts. It also contains monitoring and reporting methods to verify the accuracy of impact predictions.

1.2 EIS GUIDELINE DEVELOPMENT

The Mary River Project is subject to the environmental review and related licensing and permitting processes established by the *Nunavut Land Claims Agreement* (NLCA) (GC and TFN, 1993). In correspondence dated February 11, 2009, the Minister of Indian and Northern Affairs Canada (the Minister) referred the Project to the NIRB for a Review under Part 5 of Article 12 of the NLCA. The EIS developed in accordance with these Guidelines will serve as the basis for the Board's review of the Project and will enable the Board and any interested parties to understand and assess the potential adverse and beneficial biophysical environmental and socio-economic effects associated with development of the Project.

The NIRB has developed these EIS Guidelines based on the information contained within the *Mary River Project Proposal* (Baffinland, 2008a) submitted by the Proponent and on NIRB's Public Scoping process. During the scoping period, NIRB solicited and received oral and written comments from the Mary River project distribution list which included the Hunters' and Trappers' Organizations (HTO) and Hamlet offices of 11 communities in Nunavut, relevant Federal and Territorial Agencies, Inuit Organizations and interested parties regarding the issues to be included in the environmental review. Also, this distribution list included organizations in the Nunavik Region of Northern Quebec (Makivik Corporation, Kativik Environmental Quality Commission, etc.) and Labrador. This is in accordance with the Minister's direction to include groups in adjacent jurisdictions which might potentially be affected by the Proposal, as referenced below:

> *Pursuant to section 12.5.1 of the Agreement, I would like to identify a particular issue of concern for the Board to consider. Year-round shipping involving seasonal ice breaking at the rate proposed by the proponent is unprecedented in the North. As a result, I will be looking to the Board to carry out a very thorough assessment of the impacts related to this component of the Proposal, which as a starting point, will involve obtaining a clear description of the location of the shipping route for the project within the Nunavut Settlement Area. Since the parties in adjacent jurisdictions might potentially be affected by the Proposal, I request the Board to encourage the participation of these groups in the review* (INAC, 2009).

The NIRB has also conducted public scoping sessions in the following potentially-affected communities in the Nunavut Settlement Area (NSA): Pond Inlet, Arctic Bay, Resolute, Grise Fiord, Igloolik, Hall Beach, Coral Harbour, Cape Dorset, Kimmirut, Clyde River and Iqaluit. The objective of these meetings was to allow NIRB staff to effectively engage the public and

interested parties on the proposed scope of the assessment, while soliciting their advice on Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) that should be addressed by the Proponent in its EIS. A *Public Scoping Meeting Summary Report* (NIRB, 2009) was developed following these community visits in the NSA, taking into account all comments received from community members.

In light of the Minister's direction and at the request of Makivik Corporation, additional public meetings were held in villages along the coast line of Hudson Strait in Nunavik, Northern Quebec, from September 14-20, 2009. The villages the NIRB visited include Puvirnituq, Inukjuak, Akulivik, Ivujivik, Salluit, Kangiqsujuaq and Quaqtaq. A full public report will be developed by NIRB as a result of these meetings.

1.3 PREPARATION AND REVIEW OF THE EIS

Upon receipt of NIRB's EIS Guidelines, the Proponent is required to prepare and submit to NIRB a Draft EIS that meets or exceeds the requirements specified herein. While the Guidelines are intended to facilitate the Proponent's creation of a Draft EIS submission, the NIRB has endeavoured to make this document as comprehensive as possible to identify the majority of information requirements for the entire Part 5 Review Process and increase certainty on expectations by all parties. The NIRB recognizes that some of the information requested herein may not be available for a DEIS submission, or may be deemed more pertinent for a Final EIS submission. When this judgement is made by the Proponent, the timeline for the provision of the requested information must be provided. 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 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 effects.

The NIRB will conduct an internal review of the material presented in the Proponent's submission of an EIS to determine whether the document conforms to these Guidelines (conformity review). 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. 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 draft EIS.

Following a positive EIS Guidelines conformity determination by the NIRB and acceptance of the EIS submission, the NIRB will distribute the 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 COOPERATION IN THE NIRB REVIEW OF THE MARY RIVER PROJECT

The Nunavut Planning Commission (NPC), the NIRB and the Nunavut Water Board (NWB) are Institutions of Public Governments (IPGs), established under the NLCA with mandates for land use planning, impact assessment, and licensing and managing of water use, respectively, within the Nunavut Settlement Area. Section 13.6.1 of the NLCA directs the IPGs to cooperate as follows:

> *The NPC, NIRB and the NWB shall co-operate and co-ordinate their efforts in the review, screening and processing of water applications to ensure they are dealt with in a timely fashion.*

Given this direction from the NLCA, the nature of the project proposal, and a request from the Proponent (Baffinland, 2008b), NPC, NIRB, and NWB have made significant efforts to cooperate and coordinate their efforts in the NIRB's Part 5 Review for the Mary River Project.

1.4.1 Joint Review of Transportation Corridor

Upon referral of the Project to NIRB for a Part 5 Review, the Minister recommended the following:

> *In order to limit the delays to the overall review of the Proposal, I would encourage the Board and the Commission to develop an arrangement that will satisfy the outstanding requirements of the land use planning process, while not unduly encumbering the Board's Part 5 review process. Once finalized, I would encourage the Commission and Board to communicate the agreed upon processes to all parties involved in the review* (Minister, 2009).

Also, Appendix C of the North Baffin Regional Land Use Plan (NBRLUP) states:

> 3.5.11:
>
> *All parties wishing to develop a transportation corridor and/or communication corridor shall submit to the NPC a detailed application for an amendment. This application must include an assessment of alternative routes, plus the cumulative effects of the preferred route. It shall provide reasonable options for other identifiable transportation and utility facilities.*
>
> 3.5.12:
>
> *The NPC, and either NIRB or a panel acting under section 12.4.7 of the NLCA, shall publicly review the proposed corridor to determine whether the proposal adequately meets the guidelines set out in Appendices J and K. Once it is determined that a proposal does meet the guidelines, the NPC may request the ministers to amend the plan to include the new transportation corridor.*

In keeping with the Minister's direction and the provisions of the NBRLUP noted above, NIRB and the NPC have developed an arrangement to jointly review the transportation corridor (railway) proposed by the Project. The Proponent is required to include the project-specific information

stipulated in Appendices J and K of the NBRLUP (see Appendix B), within its EIS. Given that much of the required information pertains directly to the impact assessment of the Project, the Proponent should cross reference where the required information can be found within the body of the EIS. It is recommended that an appendix be included in the EIS, with references to all the information required by Appendix B, which will then serve as the Proponent's formal application for an amendment to the NBRLUP.

1.4.2 NIRB and NWB Coordination

Section 13.5.2 of the NLCA speaks to coordination between the NIRB and the NWB as follows:

> *Where the water application is referred for review under Article 12, the NWB and the review body shall coordinate their efforts to avoid unnecessary duplication in the review and processing of the application. Legislation may provide for joint hearings or authorize the NWB to forego public hearings on any water application where it has participated in a public review of the relevant water application pursuant to Article 12.*

In order to facilitate this coordination between NIRB and NWB, the Proponent shall submit an EIS with an appendix containing the *Draft* water licence application for the Project. Information requirements of the NWB for the *Draft* water licence have been included within Appendix C of these Guidelines. Where possible, the Proponent is encouraged to cross reference relevant sections of the EIS with this *Draft* water licence application, where items are required by both NIRB's environmental impact assessment and the NWB's water licensing process (e.g. Abandonment and Reclamation Plan, Waste Management Plan, Spill Contingency Plan). The *Draft* water licence application will be reviewed in accordance with the Detailed Coordinated Process Framework developed by NIRB and NWB for this review.

1.5 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

The following general principles should guide the creation of the Proponent's EIS and NIRB's assessment of the Project's impacts.

2.1 NIRB'S IMPACT REVIEW PRINCIPLES

In accordance with 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. Additionally, stating clearly how food web affects and effects cross trophic levels have been assessed for each VEC.
- Socio-economic issues, such as the Project's potential 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 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 Baffin Region of Nunavut, and how the Project will influence these trends is required - The inclusion of a time perspective, from the early planning of the Project through to its operation and possible closure over the next two decades (20 years), is important in order to provide the NIRB with a full understanding of the cumulative environmental effects of the Project 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 bio-physical 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 Nunavut Settlement Area.

2.2 PUBLIC PARTICIPATION AND ENGAGEMENT

Public participation is a central objective of the NIRB review process. Meaningful public participation requires the Review to address concerns of the general public regarding the anticipated or potential environmental effects of the project. In preparing its EIS, the Proponent is required to engage residents and organizations in all potentially-affected communities, including where relevant, adjacent jurisdictions outside of the Nunavut Settlement Area.

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 current use of land/ice and resources. The Proponent must ensure that Nunavummiut have the information that they require in respect of the Project and of 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 Part 5 Review process requires the development of a public participation and an awareness program to initiate engagement of the public during the initial stages of the review, to facilitate meaningful consultation with those communities potentially affected by a proposed project. To this end, NIRB staff has conducted public scoping sessions in the following potentially affected communities: Pond Inlet, Arctic Bay, Resolute, Grise Fiord, Igloolik, Hall Beach, Coral Harbour, Cape Dorset, Kimmirut, Clyde River, and Iqaluit (NIRB, 2009). The objective of these meetings was to allow NIRB staff to effectively engage the public and interested parties on the proposed scope of the assessment, while soliciting their advice on VECs and VSECs that should be addressed by the Proponent in its EIS. Throughout the community visits, concerns were voiced about the necessity for meaningful consultation about this proposed project. Therefore, the Proponent 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, different formats, the possible need for community meetings; and
- Explain the results of the EIS in a clear direct manner to make the issues comprehensible to as wide an audience as possible.

The Proponent must provide the highlights of this 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 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 *"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). This precautionary principle has since been incorporated into several pieces of Canadian legislation, including the *Canadian Environmental Protection Act* (CEPA, 1999), the *Oceans Act* (Oceans Act, 1996), and the *Canada National Marine Areas Conservation Act* (CNMAC, 2002). In applying a precautionary approach to its planned undertakings, the Proponent must:

- Demonstrate clearly and in detail that the proposed actions are examined in a precautionary principle manner 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 actions and the approaches to minimize these effects;
- 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.

2.4 SUSTAINABLE DEVELOPMENT

Sustainable development is defined as "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:

- The extent to which biological diversity is affected by the Project;
- 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
- The "precautionary principle" defined as follows: if 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:

- Preservation of ecosystem integrity, including the capability of natural systems (local and regional) to maintain their structure and functions and to support biological diversity;
- 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
- 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, as well as show clearly and in detail how monitoring and mitigation meet the principles of sustainable development.

2.5 TRADITIONAL KNOWLEDGE

The phrase "Traditional Knowledge" (TK) refers to Inuit Qaujimajatuqangit (*i.e.* Inuit TK) restrictively, while Inuit Qaujimaningit refers to Inuit knowledge without reference to temporality. Inuit Qaujimaningit encompasses Inuit TK (and variations thereof) as well as Inuit epistemology as it relates to Inuit Societal Values and Inuit Qaujimaningit (or Inuit Knowledge- both contemporary and traditional) (QIA, 2009). In this document, 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 casual 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 indispensible element both as baseline information and as an Inuit lens through which impact analyses can be better understood can also result in 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 that it may reasonably be expected to acquire through appropriate due diligence, in keeping with appropriate ethical standards and without breaching obligations of confidentiality.

2.6 STUDY STRATEGY AND METHODOLOGY

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. 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 they must be clearly indicated, so that the public and other interested parties have an opportunity to comment on this judgement. Where the NIRB disagrees with the Proponent's decision, it may require the Proponent to provide the additional

information. The Proponent is advised to consult with the NIRB on any issues within these Guidelines on which it plans significant deviation.

The Proponent should explain and justify methods used to predict impacts of the Project on each VEC and VSEC, the interactions among these components and the relations of these components within the environment. The information presented must be substantiated. 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 not only relates to its role in the ecosystem, but also to the value placed on it by humans. The culture and way of life of the people using, or with a cultural connection to, the area affected by the project may themselves be considered VSECs.

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

The Proponent shall broadly identify all significant gaps of knowledge and understanding where they are relevant to key conclusions presented in the EIS. The steps to be taken by the Proponent to address these gaps must also be identified. Where the conclusions drawn from scientific and technical knowledge are inconsistent with the conclusions drawn from TK, the EIS must contain a balanced presentation of the issues and a statement of the Proponent's conclusions.

2.7 USE OF EXISTING INFORMATION

In preparing the EIS, the NIRB expects the Proponent will rely heavily on the use of existing information and available results of scientific surveys and studies completed in the project regions by the government agencies, institutions and individual researchers, which are related to the Project and the environment. When using existing information to meet the requirements of various sections of the EIS Guidelines, the Proponent should either include the quoted information directly in the EIS with clear reference indicating the source of information (*i.e.* document, section, and page numbers), or clearly direct the NIRB (through cross-referencing, indicting the document, section and page number) to where it may obtain the information if referred information is contained in the EIS (including supporting documents of the EIS). This is to ensure that the referenced materials can be obtained and confirmed by reviewers. The Proponent must also clarify how representative the data are, clearly separate factual lines of evidence from inference, and state any limitations on the inferences or conclusions that can be drawn from them.

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.

3.0 SCOPE OF THE NIRB ASSESSMENT

Based on the information contained within the Project Description and the NIRB's requirements for the Proponent's development of an EIS, the following subsections comprise the focus and scope of the NIRB review. In preparing the draft EIS, the Proponent must follow these Guidelines closely, while paying specific attention to the requirements of the NLCA, the NIRB's Minimum EIS Requirements (Appendix A), and the General EIS Principles as listed below. In addition, the Proponent should note that directions regarding the EIS Format are a further

submission requirement of the NIRB. A detailed discussion of EIS format requirements may be found in Subsection 4.4.

3.1 NLCA – SECTIONS 12.5.2 AND 12.5.5

Where appropriate, the EIS shall contain information with respect to the following:

- Project description, including the purpose and need for the Project;
- Anticipated ecosystemic and socio-economic impacts of the Project;
- Anticipated effects of the environment on the Project;
- Steps which the Proponent proposes to take including any contingency plans, to avoid and mitigate adverse impacts;
- 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;
- Steps which the Proponent proposes to take to compensate interests adversely affected by the Project;
- The monitoring program that the Proponent proposes to establish with respect to ecosystemic and socio-economic impacts;
- The interests in land and waters which the Proponent has secured, or seeks to secure;
- Options for implementing the proposal; and
- 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:

- 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;
- Whether the project would unduly prejudice the ecosystemic integrity of the Nunavut Settlement Area;
- Whether the proposal reflects the priorities and values of the residents of the Nunavut Settlement Area;
- Steps which the Proponent proposes to take, or that should be taken, to compensate interests adversely affected by the project;
- Posting of performance bonds;
- A monitoring program that the Proponent proposes to establish, or that should be established for ecosystemic and socio-economic impacts; and
- Steps which the Proponent proposes to take, or that should be taken, to restore ecosystemic integrity following project abandonment.

3.2 SCOPING LIST

The following is the scoping list of the Mary River Project subject to a review of ecosystemic and socio-economic impacts under Part 5 of the NLCA.

3.2.1 Mary River Project Components

The scope of the project includes all works or undertakings, required for the construction, operation, modification, maintenance, decommissioning, abandonment or other undertakings of the listed project components:

- Milne Inlet
- Milne Inlet Tote Road
- Mary River Mine Site
- Railway
- Steensby Inlet Port
- Marine Shipping
- Air Traffic
- Ongoing Geotechnical Exploration

3.2.2 Environmental Factors

The scope of the project includes the following environment elements, associated baseline information, and related impacts assessment from construction, operation, modification, maintenance, decommissioning, abandonment or other undertakings of the listed project components above:

3.2.2.1 Biophysical Components

- Meteorology and climate (including climate change)
- Air quality
- Noise and vibration
- Geology and geomorphology
- Hydrology and hydrogeology
- Surface and groundwater quality
- Freshwater biota (including fish) and habitat
- Landforms, soil and permafrost
- Vegetation
- Terrestrial wildlife and wildlife habitat
- Birds
- Marine environment, marine water and sediment quality
- Marine wildlife and marine habitat

3.2.2.2 Socio-Economic Components

- Population Demographics
- Education and Training
- Livelihood and Employment
- Economic Development and Self-Reliance
- Human Health and Well-being
- Community Infrastructure and Public Services
- Contracting and Business Opportunities
- Culture, Resources and Land Use,
- Benefits, Royalty and Taxation
- Governance and Leadership

PART II – THE ENVIRONMENTAL IMPACT STATEMENT

4.0 OVERVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT

4.1 PRESENTATION

The Proponent shall provide an EIS that is complete, including 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, in certain sections of the EIS, the Proponent may decide that the information is better presented following a different sequence. The EIS must include a guide that cross-references the Guidelines with the EIS such that requirements of the EIS Guidelines are easily located within the EIS. In the interest of brevity, the EIS should make reference to, rather than repeat, information that has already been presented in other sections of the document. A key subject index would also be useful and should reference locations in the text by volume, section and sub-section.

The EIS shall be made available to the NIRB electronically on searchable CD-ROM, and also in hard copy. The Proponent shall be responsible, where requested, for the delivery of the EIS to regulators and relevant authorities. .

4.2 CONFORMITY

The Proponent is expected to observe the intent of the Guidelines, 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, 2006), the EIS shall contain a concordance table directing reviewers to the location (document, section, and page number) where specific information addressing the Guidelines and the NIRB's Minimum EIS Requirements may be found. The Proponent is cautioned that any significant deviation from these Guidelines could result in a negative conformity decision and subsequent requirements for revision. Where any differences in direction are encountered between the NIRB's *Guide 7* and these EIS Guidelines issued under NLCA Section 12.5.2, these Guidelines shall prevail.

In its concordance table, the Proponent shall also clearly indicate the locations of information required by Appendices B and C of these Guidelines, so that they may be completely accessible to the NPC and NWB, respectively.

4.3 LENGTH

In accordance with the NIRB's *Guide 7* (NIRB, 2006), 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 (in English, French and Inuktitut), Glossary (in English, French and Inuktitut), Table of Contents, Concordance Table, Consultants and Organizations 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 supporting documents of the main document.

4.4 FORMAT

The EIS shall be double-spaced**,** and its sections numbered. Subject to any other instructions given by the NIRB, the following format shall be adopted, based on the NIRB's *Guide 7* (NIRB 2006) and adapted as much as possible to the specific circumstances of the Project:

- Cover sheet with project description;
- Plain language summary (in English, French and Inuktitut);
- Executive summary (in English, French and Inuktitut);
- Table of Contents;
- Concordance table which lists each of the Guideline requirement and location 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 where addressed in the planning of the Project activities;
- Baseline of the existing environmental and socioeconomic information, based upon proper studies, given the environment in the region;
- Anticipated ecosystemic and socio-economic impacts of the Project proposal, including its impacts on the valued ecosystem components (VECs) and valued socio-economic components (VSECs) potentially affected by the Project (and as identified by public consultation process);
- Anticipated accidents and malfunctions, effects on the environment, contingency plans and mitigation measures;
- Anticipated effects of the environment on the Project;
- Anticipated cumulative effect of the Project on the region/regions;
- Anticipated transboundary effects;
- Steps which the Proponent proposes to take to avoid and mitigate adverse impacts, including any Contingency Plans (spills, fires, floods, etc.) and adaptive management;
- 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 and abandonment, including Abandonment and Reclamation Plan;
- 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 with respect to ecosystemic and socio-economic impacts;
- The interests in lands and waters which the Proponent has secured, or seeks to secure;
- List of permits, licenses 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.

4.5 DATA PRESENTATION

The Proponent shall provide charts, diagrams, aerial and other photographs and maps wherever appropriate and useful to clarify the text. Specifically, the Proponent shall include maps or diagrams showing all project related infrastructure and/or activities (e.g., camp sites, drilling activities, port site and mine site, transportation routes including the railway, marine shipping and air transport). Where feasible, maps shall be of a common scale and projection to facilitate comparisons. All charts, diagrams, photographs, and maps must be clearly referenced in the text of the EIS, especially where these charts, diagrams, photographs and maps are included in a separate volume to the main EIS document.

4.6 SUMMARIES

4.6.1 Executive Summary (in English, French 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 separate document.

4.6.2 Popular Summary (in English, French and Inuktitut)

The Popular Summary shall have the same general structure and objectives as the Executive Summary, but it shall be written in non-technical language and shall include such things as a glossary and additional explanatory text to assist non-specialists in appreciating the content of the EIS as a whole. The Proponent shall consider presenting the Popular Summary in hard copy. Maps indicating major project components including shipping routes and the potentially affected communities should be included, and presented in English, French and Inuktitut. The Popular Summary shall form part of the EIS, but it shall also be made available as a separate document.

4.7 TRANSLATION

In addition to the Popular Summary, Executive Summary and Glossary, being presented in English, French and Inuktitut within the EIS, the summary for each thematic volume shall also be translated into Inuktitut. Maps shall indicate common and accepted place-names usually referred to by the local populations in their own language, in addition to their 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 EIS CONTENT

5.1 THE PROPONENT

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. It shall present its environmental policy and shall specify whether and how it applies to all businesses for which it has an operating responsibility, to employees, to contractors, to subcontractors and to suppliers. It shall also describe its 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 experience in exploration, mining, railway and shipping operations, with 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 mine 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, temporary closure, final closure, and post-closure;
- Corrective actions undertaken in the past, distinguishing between those taken voluntarily and those taken at the insistence of a third party;
- The provision of security to ensure payment of compensation in the event of accidents.

The Proponent shall identify and describe any obligations or requirements that it must meet to post a bond or other form 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**.**

If the Proponent does not have prior experience in exploration, or mining, particularly for this region, it shall explain the safeguards that it intends to put in place to compensate for that lack.

5.2 REGULATORY REGIME

The Proponent shall present its understanding of the regulatory regime in which it would be operating by identifying all relevant federal, territorial, and local environmental and socio-economic standards, laws, regulations, policies, and fiscal regimes relating to Project approval, construction, operations, monitoring, and closure. The requirements imposed by Article 12 of the NLCA may be excluded from this discussion. It shall further explain how such requirements would be met and what specific governmental permits and approvals would be required. A list of currently held permits and licences, including dates of issue and expiry, shall be appended.

The Proponent should also include a discussion of any steps it proposes to take to ensure it meets its Project related tax obligations (including fuel and payroll taxes) with the Government of Nunavut (GN). The Proponent should, if applicable, also provide any relevant non-confidential information regarding its relationship with the GN in terms of the optional fuel-rebate program.

5.3 REGIONAL CONTEXT

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

5.4 ASSESSMENT BOUNDARIES

5.4.1 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 or social phenomenon

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 extent of project activities;
- The extent of ecosystems potentially affected by the Project;
- The extent to which traditional land use and Inuit harvesting 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 some wildlife species and showing clearly and in detail, how the seasonal distribution and movements of potential impacted wildlife species (VECs) were considered when defining boundaries. Identification of spatial boundaries should also take account the impact pathways as pollutant transport and bioaccumulation mechanisms. Furthermore, Inuit land use and occupancy (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 the entire proposed shipping route 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 wider-spread effects of the Project. The Proponent is advised to duly consider the transboundary implications of impacts to identified VECs/VSECs as results of 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.

5.4.2 Temporal Boundaries

Like spatial boundaries, temporal boundaries may vary with, among other things, the type of impact being considered and with 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, final closure, and post-closure periods, including planned exploration to be undertaken in conjunction with the Project. The closure period covers decommissioning, abandonment, and reclamation; post-closure covers the period after the mine has been decommissioned and the site 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 and on 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.

The Proponent shall give due consideration to Inuit land use and occupancy (past, present, and future), in addition to other factors to be considered in its determination of spatial boundaries for the Project.

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. 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 recognize increased global warming rates which might influence the some of the impact assessment, for example, there may be no immediate danger of permafrost degradation, but the Proponent must incorporate that possibility into the design of Project components where applicable.

5.5 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, to include Crown land, Inuit Owned Land, and Commissioner's land. It shall further describe those areas by providing such information as file numbers, start and end dates, fees, name of right holder, renewals, etc.

5.6 ANALYSIS OF NEED AND PURPOSE

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 LSA, RSA, and project infrastructure, including commercial, government, public, and private;
- Analysis of community support for and opposition to the Project, with particular emphasis on the proposed winter shipping route/trans-shipping especially through Milne Inlet, Eclipse Sound and into Baffin Bay, , with a description of how the Proponent has sought input from a broad range of socio-economic groups and members of the public both within and outside of NSA, and any efforts undertaken to relieve public concern;

- 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; and
- Describe the current status of Project financing, and the Proponent's financial preparedness to meet the requirement for reclamation and security should the Project proceed.

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 description of the Project components and activities shall address all phases of the Project in sufficient detail to allow the Proponent to predict potential adverse environmental effects and address public concerns about the Project. The Proponent shall describe the Project as it is planned to proceed through the site preparation, construction, operation and maintenance, and any potential modifications, closure, reclamation and post closure monitoring, which were not included in the original Mary River Project, and Early Revenue Phase. The description must include a timeline for all phases of the Project. This section must include a discussion of the planned uses of the railway sea port as related to the Project and any potential use other than for the Project.

This section contains explicit requirements for the Project components and all activities associated with each project component through the life of the Project.

6.1 ALTERNATIVES

The EIS shall include an explicit analysis of all alternative means of carrying out the Project components, 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). Recognizing that Phase 2 re-introduces the option of using the northern shipping route[1], which was initially considered "technically infeasible" and was eventually a rejected option for the original project, the Proponent must clearly explain in the alternatives assessment how circumstances have changed from its initial assessment to make this option now feasible.

The Proponent must provide a detailed analysis of the winter shipping route alternatives, clearly explaining how the decision to proceed with the proposed northern shipping route (Milne Inlet-Eclipse Sound-Baffin Bay-Greenland -Europe) was guided by ecosystemic, socio-economic, and technical feasibility considerations, and noting how public preferences and opinions were taken into consideration in the determination of the alternative selection.

This analysis must be done to a level of detail which is sufficient to allow NIRB and the public to compare the Project with the alternatives in terms of the economic costs and the environmental, social and economic impacts and benefits. The Proponent must include reasons for selection of the Project as the preferred alternative, and the reasons for rejection of other alternatives.

The EIS shall present alternatives for the following project elements:

[1] Mary River Final Environmental Impact Assessment (FEIS) Volume 3, pages 116-118 of 148.

- Alternatives for the routing of the railway and the location of the sea port, including:
    - Routing the rail line from the Mary River mine site to a seaport at Milne Inlet.
    - Using/updating existing shipping facilities at Nanisivik and routing the railway from the Mary River mine site to Nanisivik across the lower portion of Borden Peninsula.
    - Routing the rail line from the Mary River mine site to a seaport on the east coast of Baffin Island.
    - Locations of docks at preferred seaport site with consideration of bathymetric studies, minimizing underwater blasting and dredging and other factors.
- Alternatives to the proposed Phase 2 components and activities, including:
    - Increase to the approved mining rate at the Mary River site
    - Increase iron ore shipping via Milne Port, and extended shipping season
    - Expand infrastructure at Milne Port including: establishment of second dock, increased tank farm capacity, increased ore stockpiling capacity, increased camp and sewage treatment plant capacity
    - - Trans-shipping
- Alternatives to June to March Shipping from Milne Inlet and ice breaking activities in the northern corridor, including:
    - Year round shipping, with periodic suspensions during critical life periods of relevant marine wildlife species.
    - Conveyor system-based trans-shipping in Eclipse Sound.
    - Shipping during periods of open water only through Milne Inlet, Eclipse Sound and Baffin Bay but at increased frequency to accommodate proposed increase in ore tonnage.
    - Decreasing the shipping frequency by extending mine life and/or decreasing the production rate.
- Alternative of the railway not being built and the Proponent using the Milne Inlet Tote Road and northern shipping route only for the life of the Project.
- Alternative iron ore mining methods rather than conventional drilling and blasting;
- Alternatives to diesel power generation, including solar energy, wind energy, hydro and geothermal energy, etc.;
- Alternative closure and reclamation options;
- Options of ballast water treatment and discharge;
- Alternatives to antifouling coatings of ore ships; and
- Any other alternatives to Project components.

When the Proponent assesses the economic viability for each alternative option, due consideration must be given to the vulnerability of the arctic ecosystem, as well as the potential for extension of the mine life and/or increased iron ore production rates. Also, the associated cumulative effects of each option should be discussed, in accordance with the requirements of Subsection 7.8, particularly the potential for cumulative impacts on the marine ecosystem and Inuit harvesting activities. In addition to CEA, alternatives assessment shall also include the following aspects: baseline data, VECs and VSECs and assessment boundaries.

Furthermore, as indicated in public consultation (Subsection 7.4), the public opinions and preferences shall also be taken into consideration as a criterion in the assessment all the alternative options. Therefore, the alternative analyses shall include a discussion on how public

consultations by the Proponent have influenced the Project planning, and how public preferences have been considered by the Proponent in determining the preferred project alternatives.

6.2 PROJECT DESIGN

General Project design issues discussed in the EIS shall include:

- An explanation of how the environment has influenced the design of the Project. This should include consideration of relevant geographical, geological, meteorological, hydrological, and oceanographic conditions;
- A discussion on global climate change and it must describe and assess, on the basis of current knowledge, how the potential of climate change could affect permafrost and soils with high ice content, the hydrological regime, as well as marine ice flow regimes, and the long-term impacts of such changes on the Project. In addition, the Proponent shall identify the Project sensitivity to changes in specific climate-related parameters (CEAA, 2003);
- The Proponent should design and apply multiple scenarios on impacts assessments, where these scenarios span the range of possible future climates, rather than designing and applying a single "best guess" scenario (EC, 2007);
- 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 demonstration of how the Proponent has applied the precautionary principle in its Project planning, design and management;
- How potential impacts to wildlife (e.g. caribou and peregrine falcons) have influenced the design of the Project, including the geographical location of project components, special attention should be paid to the influence of peregrine falcon habitat on the selection of land farms, borrow pits and quarry sites, etc.;
- How regional socio-economic conditions have influenced the Project design. For example, how local preferences and labour capacity, etc., have influenced the design of work rotations, pace of construction, employment policy, etc.
- How project design, particularly project infrastructure and site preparation, has been influenced by the distribution of archaeological resources and sites used for harvesting of wildlife and quarrying of soapstone;
- How potential impacts to water quality, including marine water chemistry and marine biota, have influenced the design of the Project;
- How public consultation and TK have influenced the planning and design of the Project; and;
- The considerations for future development.

Recognizing that Section 6.2 of the Addendum to the EIS Guidelines already addressed the "Road Haulage Option for the Early Revenue Phase, the Proponent must ensure that its description of the alternatives for Phase 2 development specifically include discussion of the design of the Milne Tote Road and Port facilities, particularly engineering features required to mitigate potential impacts to the environment (e.g. potential impacts to wildlife migration given increased traffic volume). All assumptions underlying design features which are relevant to environmental assessment should be explicitly stated.

6.3 PROJECT PHASES

The Proponent is required to present an overall development plan which describes the Project development phases, relevant timeframes, works and undertakings associated with each phase. The Proponent should also clarify all associated monitoring and/or mitigation plans to be implemented in each phase to eliminate or minimize adverse effects that might occur at various project stages for each Project element.

6.4 FUTURE DEVELOPMENT

The Proponent shall evaluate any foreseeable expansions of the current Project, the needs of required infrastructure, and associated eco-systemic and socio-economic impacts. The Proponent shall also evaluate the potential for development of additional ore deposits in the Project area (i.e., Deposit #2, #3 and # 4) in accordance with previous and current exploration activities. Such an evaluation should be based on the Proponent's business strategic plan for the Project, other predictions and the development realized by projects of a similar nature.

In addition, the Proponent shall discuss how any foreseeable future development scenarios have been taken into consideration when designing the infrastructure and ancillary utilities for the Project. The Proponent's assessment of cumulative impacts of the Project shall also include the future development scenarios as outlined above.

6.5 DETAILED PROJECT PROPOSAL DESCRIPTION

The Proponent shall describe the Project components and all activities associated with each in a systematic way. The description shall encompass all stages of development, from site preparation through to construction, operation and maintenance (including any potential modifications and/or expansions that may be required during the operations phase based on exploration results), as well as closure and reclamation. The description must include an approximate timeline for all phases of the Project, including closure, reclamation and post closure monitoring if applicable. Where specific codes of practice, guidelines and policies apply to items to be addressed, in particular if involving 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, should cross-reference the impact assessment and environmental management sections of the EIS.

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

6.5.1 Milne Inlet

The Proponent shall describe the followings aspects of facilities or activities at Milne Inlet, particularly the expanded infrastructures at Milne Port:

- Increased ore shipment from Milne Port, and establishment of a second ore dock;
- Use of ice-breaking vessels from June through March, including additional market vessels during the open water shipping season of mid-July through mid-October;
- Use of a conveyor system for trans-shipping of ore;
- Detailed information regarding works in water, total vessel traffic to and from Milne Port including ore carriers plus freight and fuel vessels;
- Permanent campsite and associated supporting facilities;
- Design, construction and operation of port facilities;

- Truck fleet parking and maintenance areas;
- Ore stock piling, conveyance and management system;
- Noise and dust reduction technologies and equipment to be used in ore loading and handling facilities; and
- Discussion of the planned uses for the Milne Inlet facilities for the Project as well as any potential uses other than for the Project.
- Barge Handling facilities:
    - All possible uses.
    - Design and construction plans, including how precautionary principles have been incorporated into the port design.
    - Operational plans including: listing of equipment and materials to be brought into port; unloading and transport of materials and equipment.
    - Security and safety management.
- Laydown areas;
- Oil Handling Facility (OHF), bulk fuel storage facilities and management;
- Camp facilities required during operation to accommodate peak construction work force, as well as additional service buildings;
- Water supply and associated water intake sources and facilities;
- Waste (including shipping waste generated on board and hazardous waste) management facilities:
    - Including but not limited to industrial waste segregation, recycling and management facility.
    - Inert waste landfills, camp incinerator, and sewage treatment facilities.
- Communication systems; and
- Power generation unit.

6.5.2 Tote Road

The Proponent shall describe the followings aspects of facilities or activities related to the Milne Inlet Tote Road, with reference to the Road Management Plan (Section 9.4.18) where appropriate:

- Road design features (e.g. wildlife and stream crossings) to accommodate proposed traffic volumes;
- Details regarding road construction including construction material to be used and proposed measures to ensure that problematic geotechnical materials, such as any potentially acid generating rock, are not incorporated into the road or unduly exposed;
- Frequency, tonnage and type of vehicles to be used to haul iron ore and supplies over the Tote Road;
- Maintenance services and facilities; and
- Procedures for managing and mitigating potential spillage of ore fines on the Tote Road and at the Milne Inlet Port Site.
- The relationship of the Milne Tote Road with existing hunting and traveling routes (including those routes using the Tote Road, in close proximity to the Tote Road, or intersecting the Tote Road);
- Milne Inlet Tote Road upgrades:
    - Quarrying borrow sites.
    - Modifications to sea container crossings.

- Watercourse crossing installations.
- Earthworks (grading, roadbed, re-alignments).
- Traffic volume changes.
- Width of road and locations of widening.
- Locations for bridge twining.
- Locations and magnitude of realignments and grading improvement. Methods of construction.

Milne Inlet Tote Road operation and maintenance:

- Traffic volume.
- Road and water crossings maintenance.
- Dust suppression. Snow and surface runoff management, including total suspended solids (TSS) control and consideration of acid rock drainage (ARD) potential of sediment.
- Include details regarding wildlife management in light of increased road usage. The associated monitoring and mitigation plans must be updated to reflect these modifications (such as the Roads Management Plan and the Wildlife Mitigation and Monitoring Plan).

6.5.3 Mary River Mine Site

The Proponent shall describe the followings aspects of facilities or activities related to the Mine site:

- Ore truck loading and handling facilities;
- Details regarding the increase in mining fleet, as well as additional use of ore haul trucks, crushing and mobile equipment including increased mine crushing stockpile size; and
- Details regarding the building and expansion of transitional facilities for maintenance, fuel storage and workers accommodation.

6.5.3.1 Geology/Mineralogy of the Ore Deposit

The Proponent shall describe the iron ore resources at the Mary River site, including where appropriate:

- Deposit locations, including detailed maps of the mine site area;
- Detailed structural geology map;
- The lithology and mineralogy in the Project area;
- Presence of ice lenses and implications to the Project;
- The types of the deposits (hematite and magnetite) and associated bedrocks;
- The nature, depth, and thickness of the ore deposit to be mined;
- The estimated volumes and characteristics of the waste rock to be removed;
- ARD and metal leaching (ML) characteristics of ore and bed rock;
- Ore body delineation;
- The permeability of the open pit; and
- Anticipated salinity and general characterization of pit water.

6.5.3.2 Ore Mining, Transport and Processing

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

- A mining plan indicating the sequence of development for the proposed open pit;
- Characteristics of the open pit mine design and operation;
- The daily and yearly average extraction rate(s);
- The permeability of the impoundment structure(s) and the effectiveness of seepage containment, including the needs for control or retention structures if applicable;
- Means of drilling, blasting, extraction, loading and transport of ore;
- Design, location, capacity of iron ore and processed ore product stockpiling facilities, and related surface disturbance;
- The locations of the run-of-mine (ROM) stockpiles, and describe monitoring and management plans to control snow deposition, spring freshet, pooling, water run-off and storm flooding;
- The location of ore processing facilities (e.g. crushing and screening, stockpiling, conveying, loading) and the site-selection criteria, including processing equipment capacities and processing rates;
- Dust suppression technologies and dust suppressants to be used in mining, transport, crushing and other processes where dust might be generated;
- Physical characteristics of processed ore, including the size and quantities of fines and their predicted particle settling characteristics, and associated dust prevention measures;
- Chemical stability analysis of the waste rock, and relevant technical measures to prevent potential ARD and ML;
- Discussion of how geotechnical factors and geological characteristics (e.g. permafrost and related seasonal thawing, taliks and seepage conditions) were considered in the design of the open pit, including ramps, high walls, slopes (with kinetic analysis of slope stability), as well as other features in the open pit;
- Description of methods of controlling and monitoring groundwater seepage from ramps of the open pit, the processed ore and other containment areas, and the capacity to cope with storms, floods, and other intermittent natural events using a return period that is adequately conservative (e.g., 1/100 years);
- 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; and
- Measures and management 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).

6.5.3.3 Overburden and Waste Rock Disposal

The Proponent shall present:

- Description of overburden and waste rock handling, including the design and location of the storage sites, describing the options for each, with references to similar operations in a comparable conditions, and results of research on the long-term thermal stability of the underlying permafrost;
- 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 long-term acid-generation and metal-leaching potential of the waste rock. 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 acid generation and permafrost encapsulation in cold weather conditions, with consideration for potential climate change;

- Description of the physical and chemical characteristics of seepage and runoff from the waste rock piles and appropriate control measures;
- Description of the water balance, and how it was considered in the design of control measures to ensure that runoff from the pile does not result in impacts on water quality in the surrounding environment;
- Description of the potential for rock heave phenomena and any resulting implications to ground stability; and
- Description, in qualitative and quantitative terms (where appropriate), of the chemistry of frozen groundwater from joints and fractures in the waste rock disposal area.

6.5.3.4 Water Supply and Water Treatment Facilities

The Proponent shall present, in connection with its Site Water Management Plan (Subsection 9.5.5), the details on the water supply and water treatment facilities for the Project, including the following:

- Identification of water supply sources and projections of volumes required from each source;
- Description of water uses including the camp sites, open pit mine, processing facilities, dust suppression, firefighting reserves, workshops and maintenance facilities as well as drilling activities etc.;
- Description of the water supply source(s) and mitigation measures designed to prevent the entrapment of fish at water intakes, on-site use, storage and final discharge to the environment;
- Discussion of any required alteration of drainage patterns, water treatment (including water containing nitrate residues from explosives if required), diversions, and water conservation and recycling measures;
- Description of the facilities for washing mine trucks and other equipment, as well as any treatment of water used for such activities; and
- Discussion of how melt water and other water collected from potential contaminated facilities and areas, particularly with high metal content and/or hydrocarbons, will be managed.

6.5.3.5 Natural Drainage Diversion

The Proponent shall present:

- Description of any planned diversions of natural drainage from mine site and Project facilities, and estimation of the flows to be diverted;
- Discussion of potential challenges anticipated in constructing drainage diversions (e.g. melting ice lenses); and
- Discussion of the potential for mobilizing sediments, generating erosion and disturbances to terrain.

6.5.3.6 Mine De-Watering

Recognizing that the proposed pit is entirely within permafrost, the Proponent shall describe the following only where relevant:

- Description of proposed de-watering methods, with estimates of volumes to be pumped based on the meteorological baseline data;
- 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 mine water volumes, methods used to calculate volumes, and discussion of potential uses for mine water; and
- The contingency plan should the mine water volumes be significantly larger than estimated.

6.5.3.7 Landfills or Landfarms

The Proponent shall describe the following information to the extent possible:

- Research results for effectiveness of similar landfarm operation facilities in comparable geological regions and climate condition;
- Locations of any landfills and landfarms, with estimates of containment capacities, associated design basis and considerations to minimize impact on the surrounding environment;
- An inventory of materials to be land filled, taking into account the Project stages;
- Design considerations and criteria, engineering features and facilities layout drawings in relation to nearby roads, water courses and water bodies; and
- 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).

6.5.3.8 Other Facilities at the Mary River Mine Site

The Proponent shall present the following information on Project infrastructure and facilities where excluded from the above descriptions:

a) Temporary Facilities during Construction Stage

Construction camp; Contractor offices; Temporary fuel storage (iso-containers and manufactured tanks); Explosive plant; Aggregate crusher and stockpiles; Concrete batching plants; Portable lighting plants; Construction workshops and maintenance shops; Warehouses/stores; Construction equipment and vehicles; Equipment maintenance facilities; Sewage and grey water treatment; and Solid waste disposal.

b) Permanent Facilities during Operation Stage

Camp facilities; Ore crushing and screening facilities; Ore stockpiling facilities; Railway loading and unloading facilities (for mine operation supplies transported from the Steensby Inlet port); Permanent worker accommodations; Communication systems (including satellite ground station); Heavy equipment fleet parking lot; Laydown areas; Bulk fuel storage and distribution facilities; Explosive manufacturing and storage; Railway terminal facility including train loading and unloading facilities; Transportation and service vehicles; Sewage and grey water treatment; and Solid waste disposal.

6.5.4 Air Traffic

The Proponent shall provide information on:

- Description of all air traffic and types of aircraft to be used, regardless of whether an airstrip is required or not (e.g. helicopter);
- Estimates of the number of passengers to be transported and the volume of goods to be shipped through the airport facilities;
- Estimates of the number of flights and types of aircraft at each airstrip on a daily or weekly basis covering all phases of the Project;
- Description of all airport/airstrip facilities and construction methods;

- The infrastructure, service roads, fuel storage and transfer, de-icing and containment systems, methods of dust suppression;
- Identification of water bodies and watercourses that may be in-filled or encroached upon by the airstrips or airport infrastructure;
- The duration, frequency, and extent of use of each airport facility/airstrip;
- Accident/incident response reporting; and
- Estimated flight impact zones, based on flight routes, types of aircraft and traffic volumes.

6.5.5 Ground Traffic and Access Roads (excluding Rail Transportation)

The Proponent shall describe ground traffic, and associated facilities both temporary for construction purposes and permanent for operation and maintenance. Access roads include the mine hauling roads, site service roads, various access roads, railway construction and maintenance roads, all terrain vehicle (ATV) trails, etc. The Proponent shall describe the following in connection with Road Management Plan (Subsection 9.4.18), including relevant maps and drawings where useful:

- Permitting regime and land tenure of all access roads (designations of accessibility to public);
- Locations, connectivity of roads and speed limits;
- Relationship of access roads with existing hunting and traveling routes (including those routes in close proximity or intersecting planned access roads.
- Terrain conditions along the road alignments, design specification, construction methods, estimates and types of materials required for construction and maintenance; design features of all access roads, including laydown areas, temporary construction camps; types of water crossing, quantity and locations of each kind, and diversions of watercourses;
- Sediment control measures during construction and operation;
- The duration, frequency and extent of use of all facilities, including allowances for public or hunter access;
- Estimates of traffic volumes, types of vehicles, and seasonal or annual fluctuations;
- Roads management related to daily operation and maintenance, including snow removal, de-icing, snow drifts/banks management and dust suppression methods;
- Procedures and structures designed to mitigate/manage potential impacts to wildlife and wildlife movement during construction and operation (e.g. caribou crossings);
- Accident/incident response procedures and reporting; and
- 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.

6.5.6 Rail Traffic

6.5.6.1 Railway Corridor

In addition to the addressing the information requirements of the NBRLUP as set out in Appendix B, the Proponent shall describe the following items associated with the proposed railway corridor. Where relevant, the results of the Proponent's alternative analysis should be referenced, and maps of the routing, pictures of topography, and other pertinent information supplied

- Description of the proposed corridor, including a discussion of the intended uses and general routing, with consideration for the possible environmental and social impacts,

and any seasonal considerations that may be appropriate. The description should also include:

- All infrastructure and railway facilities and respective locations of the proposed railway corridor. Infrastructure should include water crossings, bridges, tunnels and other facilities.
- Relationship of proposed routing with existing hunting and traveling routes (including those routes in alignment, at close proximity or intersecting the planned routing);
- The distance between the railway line and associated facilities (e.g. the railway yard at Steensby Inlet), to communities or outpost camps;
- General characteristics of the surrounding ecosystem and terrain conditions along the proposed corridor, including surficial materials (thermal condition, ground ice/moisture content, etc.), topography, drainage conditions, and other factors influencing landscape stability;
- Identified locations and types of water bodies and watercourses that may be encroached upon by the railway, proposed watercrossings, and associated measures to minimize potential impacts on those water bodies and watercourses; and
- Wildlife resources and associated habitat uses, and relation to ecosystem health.

- A comparison of the proposed route with alternative routes in terms of environmental and social factors as well as technical and cost considerations. This comparison should be in reference to the Proponent's alternatives analysis (Subsection 6.1) where relevant, and shall also include:
  - Potential impacts on the ecosystem, and current and future land use within the railway corridor from proposed railway construction and operations;
  - Presence of identified cultural and spiritual sites, archaeological and palaeontological sites, and associated impacts; and
  - Advantages of the preferred route, in terms of potential for environmental impacts, technical feasibility and economic viability as compared to other routes considered.

6.5.6.2 Railway and Train Operation

In the Project area, permafrost presents numerous unique engineering challenges to surface facilities construction and maintenance. Any alteration of the thermal regime at the ground surface, including even moderate disturbance of the pre-existing ground surface energy balance can induce permafrost thawing with consequent settlement and damage to roadway or railway embankments (Goering, 2003). Among these facilities, transportation routes are likely to be particularly susceptible to destructive frost action under conditions of changing climate, railway embankments are particularly susceptible to thaw settlement damage because of the need to maintain the alignment and even grade of the rails (Instanes, *et. al.*, 2005). Tremendous efforts have been made in both scientific research (Saboundjian and Georing, 2003), and engineering fields (Cheng *et. al.*, 2008) to address these challenges around the world. In its EIS, the Proponent shall provide sufficient information pertaining to railway design and construction technologies/adaptations to adequately address these issues, with emphasis on the potential impacts to the environment, and technical and operational measures to mitigate these impacts.

This information shall include:

a) Design and Construction:

- Applicable regulations and legislation pertaining to railway construction and operation, including discussion of relevant regulatory authorities (e.g., the Canadian Transportation Agency);
- Designed number of trains per week;
- Characterization and size of locomotives (e.g., technology and performance in arctic climate) and cars to be used for this project, and implications on the design of railway;
- Description of all safety features of the railway, including signalling and communication systems, design features for the safe passage of wildlife and humans that might cross the rail line during operations (including ATVs, snow machines and sledges), emergency shelters/structures, etc.;
- Discussion of how the following issues will be addressed in the design and construction of the railway:
    - Assessment and forecasting of potential geo-hazards (e.g., flooding, erosion, and terrain instabilities such as thaw settlement, frost heave, slope instability) along the routing and associated countermeasures;
    - Mechanism of freeze-thaw damage along the railway, with proposed methods of prevention and countermeasures, corresponding to the various terrain conditions encountered;
    - Anticipated interactions between climate change and physical environmental components, such as the variability of landscape components and processes including permafrost and potential degradation, hydrological processes and stream flow, and implications to planned water crossings; and
    - Stability of railway embankment under dynamic loading and the engineering characteristics of underlying soils in the permafrost region.
- Description of proposed thermal stabilizing technology targeting embankment and underlying permafrost;
- Design and construction technologies to enhance the thermal stability, associated thawing prevention measures and building technologies of embankment and tunnel structures. In particular the technical measures for construction of rail embankments over thaw-susceptible and ice-rich soil areas;
- Description of proposed settlement prevention technology and measures to be used to ensure slope/bank stability at bridge locations;
- Details regarding the construction technology and machinery required to build railway track, bridges, and tunnels in arctic conditions and permafrost terrain conditions;
- Description of signalling and communication technology and equipment to be used to ensure safe operations;
- Details regarding the safety monitoring systems to be used (including those measures to ensure safe passage of wildlife), and related inspection and maintenance procedures for railway equipment;
- Description of braking technology and equipment to be used, with corresponding procedures and response times for emergency situations;
- Projected vibration and noise levels, and associated vibration damping and noise reduction technologies and equipment to be employed;
- Description of the railway alert or alarm systems and response mechanisms for natural disasters;

- Description of design considerations and construction methods for construction of sidings, bridges, other water crossing works, railway yards and terminals, etc.;
- Description of erosion control measures along the rail line for all drainage facilities, including bridges, culverts, ditches, dikes and berms, etc; and
- Discussion of lessons learned from other railway operations in comparable climatic conditions, and how those lessons/technological adaptations have been incorporated in the proposed railway design.

b) Operation:

- Details regarding a routing operations plan (i.e. frequency and duration of operation**)**, performance monitoring plan and regular maintenance activities;
- Projected volumes of fuel, lubricants and hazardous substances that will be transported by rail to meet the needs of the Project, on a seasonal or annual basis. Discussion of related spill contingency planning should be included or referenced to the relevant section of the EIS;
- Description of how the rail operations will be managed so as to ensure its operation by experienced staff, whether this be done by contracting rail operations with a railway consultant firm or staffing a railway crew of the Proponent itself;
- Methods to be used to keep rail locomotives ready for operation in cold weather;
- Description of proposed safety measures or management plans for the transport of dangerous goods or hazardous materials;
- Discussion of operational measures planned to protect wildlife and humans that might cross the rail line during operations (including ATVs, snow machines and sledges), and prevent/minimize collision related mortalities; and
- Discussion of other management measures required by relevant federal and territorial government agencies for railway operation.

Where appropriate, the Proponent shall present required information associated with rail/train operation in reference to the Spill Contingency Plans, (Subsection 9.4.2), the Railway Management Plan (Subsection 9.4.14) and other related plans.

6.5.7 Steensby Inlet

The Proponent shall provide the following information regarding Project components and activities at Steensby Inlet, with site maps and diagrams provided for reference purposes where deemed useful.

6.5.7.1 Steensby Site Facilities

- *Temporary Facilities during Construction Stage*: Construction Camp; Construction docks; Quarry and borrow sites, and related access roads; Concrete batch plant(s); Construction and maintenance shops; warehouses/stores; Temporary power generators; Portable lighting plants; Laydown areas/freight storage; Parking areas for construction fleet; Temporary fuel storage (iso-containers) and associated OHF; Equipment maintenance facilities; Explosives and magazines plant; Storm water and runoff water management facilities; Wastewater treatment facilities; and Land based disposal of dredged spoils.
- *Permanent Facilities during Operation Stage*: Ore management facilities including dual rotary rail car dumper, ore stockpiles and rail-mounted stacker/reclaimer system, secondary screening plant, and an ore loading dock; Ship loading and unloading facilities; Freight and tug docks; Cargo (container) handling facilities; Permanent worker accommodation and office buildings; Corridors/utilidors (used for connecting all buildings at port sites); Railway yard and maintenance facilities; with shops and

maintenance infrastructure; Communication systems; Causeway; Laydown areas/freight storage; Airstrip and related access road; Tank farm, OHF and distribution facilities; Waste management facilities (include incinerator); Power plant; Navigational aids (shipping lane and port); Potable water supply facilities; Ammonium nitrate storage; Storm water and runoff water management facilities; Wastewater treatment plant; Airstrip; Site roads and other ancillary facilities.

6.5.7.2 Port Facilities

- Discussion of how a precautionary approach has been incorporated into the design of port facilities, to account for the challenges of the Project area (i.e., considerations for extreme temperatures, ice thickness, etc. in the layout and structure of various facilities and design features);
- Discussion of all potential uses of the port facilities, including predicted non-Project uses;
- Description of the OHF and associated facilities associated with the transfer and handling of fuel and any hazardous products;
- Description of the types and anticipated volumes/quantities of materials to be transported to and from the port, including hazardous/dangerous goods cargo;
- Description of sanitation facilities and procedures in the harbour area;
- Discussion of the plans for dedicated shipping waste management in accordance with the provisions of the *International Convention for the Prevention of Pollution from Ships*, as amended by the 1978 Protocol (MARPOL, 73/78).
- Description of port ice and snow management plans and facilities;
- Discussion of procedures for the management of ballast water at the sea port and associated facilities at Steensby Inlet; and
- Discussion of plans for port security management.

6.5.8 Marine Shipping (including Ice Breaking Shipping and Ore trans-shipment)

The Proponent shall describe:

- Applicable environmental legislation, including:
  - International legislation, such as: MARPOL Convention, Protocols and Annexes as set out by the International Maritime Organization (IMO, 2008);
  - 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); and
  - How the Proponent and its shipping contractors/partners intend to either meet or exceed these requirements.
- Description of the proposed shipping fleet (types, sizes, and numbers of ships used), associated frequency and timing for all project activities from both Steensby Inlet and Milne Inlet during each phase of the Project;
- Description of proposed shipping routes both for open water and year round operations, with corresponding maps and details regarding bathymetry, navigational aids, other marine traffic using these routes, etc.
- A description of seasonal fuel storage at sea during trans-shipping operations;
- A description of trans-shipping activities and proposed location in Eclipse Sound;
- A description of proposed northern shipping route, including seasonal changes in routing;
- Operational plans and mitigation strategies to address potential interactions with traditional hunting activities and potential impacts from icebreaking;

- Discussion of how TK has been considered in the selection of the routing and timing of shipping activities;
- Discussion of study results related to bathymetry, rock and sediment geotechnical properties, sediment thickness, tides, currents and sea ice for the proposed barge landings, and anchoring sites, with emphasis on the relation to overwintering of vessels in Milne Inlet and Steensby Inlet;
- Description of the results from bathymetric studies undertaken along the proposed shipping routes, seaport site, and dock sites with details on consideration made to minimize required underwater blasting and dredging. 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 ore carriers, and the implications for shipping safety;
- Details regarding all undertakings/works required to make the selected port site accessible for shipping, including as relevant, details regarding under water blasting/dredging and installation of land-based or sea-based navigational;
- Methods of disposal of dredging material, including the proposed sites for disposal of dredged materials, site selection criteria, and means of offshore and on-shore transport;
- Disposal plans for onboard solid waste and waste water (*i.e.*, onboard sewage and grey water);
- Ballast water management plan for all Project shipping, with indication of the proposed ballast water exchange locations in mid-ocean, at the port site in Steensby Inlet, and alternative exchange zones within waters under Canadian jurisdiction;
- Proposed measures to ensure the fuel used for shipping conforms with Canadian regulations (*Benzene in Gasoline Regulations*, 1997; *Contaminated Fuels Regulations*, 1991; *Gasoline Regulations*, 1990; *Fuel Information Regulations, No. 1*, 1999; *Sulphur in Diesel Fuel Regulations*, 2002; *Sulphur in Gasoline Regulations*, 1999);
- Proposed measures to eliminate or reduce the risk of invasive aquatic and non aquatic species being introduced into Canada waters as a result of shipping;
- Measures and technologies to be adopted in the design and manufacturing of ore carriers to reduce the noise and GHG emissions;
- Discussion of required measures to prevent smuggling, illegal immigration, and other illegal activities related to international shipping;
- Description of loading and offloading procedures for dangerous goods, fuel and explosives if applicable;
- Identification of all parties responsible for ensuring safe shipping beyond the immediate port site;
- Discussion of proposed safety measures, including:
    - Measure to prevent the ship from being beset in pack ice, or being carried into rocks, shoals and small islands where the proposed shipping is close to the shoreline (e.g. in the Cape Dorset near-shore area).
    - Considerations for hiring personnel with local knowledge of the areas and weather conditions to act as ship-board monitors;
- 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 (APAR, 2009) if applicable;
- Details regarding the proposed procedures for accident, malfunction and incident management and reporting; and

- Other details as relevant which may be cross-referenced from the Shipping Management Plan (Subsection 9.4.15).

6.5.9 Borrow Pits and Quarry Sites

Borrow pits and quarry sources will be developed for construction, maintenance, and reclamation of various site facilities from Milne Inlet to Steensby Inlet. The Proponent shall present the following information for each borrowing pit and quarry source, and a summary of all such sites to be used for the Project, in combination with the Borrow Pits and Quarry Management Plan (Subsection 9.4.12):

- Maps at a scale of 1:10,000 for all sites that are to be used for borrow pits or quarries, indicating the ownerships (Inuit Owned Land [IOL] and Crown Land) of lands where borrow pits and quarries site are planned, and principle geographic features (e.g. on or near eskers and other unique landscapes, the proximity to water bodies and water courses);
- Estimates of the quantities that will be extracted from each site;
- Characterization of the materials at potential borrow site locations including the ground ice conditions and occurrences of massive ice;
- Description of how the precautionary principle is applied in the designs in terms of minimizing potential effects on environment, wildlife and wildlife habitats, as well as fish habitats if these sites are in close proximity to water bodies and watercourses;
- Description of proposed sediment and dust control measures, and
- Other details as relevant which may be cross-referenced from the Borrow Pits and Quarry Management Plan.

6.5.10 Access Roads

Access roads include the mine hauling roads, site service roads, and other roads used to facilitate railway construction, maintenance of infrastructure and facilities, and access to borrow pits and quarry sites. Where information required by this section is deemed more appropriate for the Roads Management Plan (Subsection 9.4.18), the Proponent may cross-reference to reduce duplication. The Proponent shall describe the following, and include relevant maps and drawings where useful:

- Permitting regime and land tenure of access roads;
- Relationship of access roads with existing hunting and traveling routes (including those routes aligned with existing or proposed access roads, and in close proximity or intersecting access roads;
- Discussion of public access for Project access roads;
- Discussion of design features planned to protect and facilitate wildlife (e.g. caribou crossings) and humans that might across the roads during operations (including ATVs, snow machines and sledges), and prevent/minimize collision related mortalities
- Proposed construction methods for access roads, including requirements for laydown areas temporary construction camps, water crossings and diversions of watercourses;
- Estimates of quantities and types of materials required for construction and maintenance;
- Types of water crossings, quantity of each kind and locations;
- Measures for controlling sedimentation and runoff during construction;
- Projected traffic volumes, including the types, and numbers of vehicles to be used, fluctuations on a seasonal or annual basis, and speed limits;

- Discussion of plans for controlling public access to Project access roads, including considerations relevant to design and traffic management;
- Measures for screening construction and maintenance materials for acid rock drainage potential; Methods for disposal of construction waste materials and options for use in final closure and reclamation; and
- Other details as relevant which may be cross-referenced from the Road Management Plan (Subsection 9.4.18).

6.5.11 Power Generation

The Proponent shall describe, in conjunction with its Air Quality Monitoring and Management Plan (Subsection 9.4.3) the following:

- The energy balance for the proposed Project, including strategies for optimization and conservation;
- Type of power generation that will be used over the project lifespan;
- Locations (positioning) of power generating plants/stations relative to prevailing winds and other infrastructure;
- Description of proposed utility corridors and associated transmission lines;
- Description of diesel power generation facilities, including sources, volumes of fuel to be used, transportation methods for fuel and associated transfer points, and equipment and facilities for emergency clean-up;
- Anticipated types and quantities of emissions to the atmosphere resulting from the generation of power for the Project; and
- Proposed accident/incident management and reporting.

6.5.12 Fuel and Explosives Facilities

The Proponent shall describe the following, in conjunction with its Spill Contingency Plans, (Subsection 9.4.2) Hazardous Materials Management Plan (Subsection 9.4.9) and Explosives Management Plan (Subsection 9.4.10):

- Applicable federal and territorial legislation and regulations;
- The 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). This will include distances to vulnerable features (dwellings, roads, camps, railways, bodies of water, etc.), and distances between explosives facilities and fuel storage/handling areas;
- Types and estimate of quantities of fuel, explosives, and other similar materials required for the duration of the Project;
- Operational plans (without duplication of the plans noted above) including Oil Pollution Prevention/Emergency Plans in connection with the Spill Contingency, and Oil Handling Facility Contingency Plan. This addresses fundamental requirements for the fuel transfer to ships from port and should be approved by Transport Canada;
- Methods of fuel transfer and transportation from source(s) to and around site;
- Safe handling and spill containment prevention methods and liquid effluent disposal plans;
- Evaluation of worst case scenarios (i.e. accidental explosion);
- Security measures to be implemented, if applicable;

- Accident/incident response reporting, spill response training and contents of spill kits.

6.5.13 Waste Management Facilities

The Proponent shall describe the following with cross referencing to applicable management plans (Subsection 9.4) where appropriate:

- Waste rock:
  - An inventory of waste rock generated during construction of Project infrastructure, for example: overburden, waste rock, off grade iron ore, low grade mineralized material, processing wastes, excavated material, and any other related wastes if applicable;.
  - 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 of analyses implemented in the development of the proposed pile design and runoff management plans, including any analysis related to the water balance of the waste rock pile, as well as the thermal condition of the pile and surrounding ground;
  - Proposed management plans regarding stockpile design, locations and capacities, with reference to the predicted volumes/tonnage of waste rock, physiochemical characteristics, stockpile methods and procedures, runoff management, progressive reclamation plans, and other details as deemed relevant; and
  - Discussion of proposed management plans for accommodating the projected volumes of materials at waste rock facilities; with a discussion of measures for contingency situation in which the designed facility is not adequate to accommodate waste rock really generated.
- Sewage/grey water treatment:
  - Description of proposed sewage/grey water treatment facilities to be used during construction and operations, including a discussion of the technology to be employed, the locations of the facilities, point(s) of discharge, solids (sludge) disposal methods, and the volumes and quality of the effluent, as well as the applicable discharge standards;
  - Proposed monitoring and management plans for treated effluent and sludge;
  - Contingency measures for the disposal of sewage/grey water during periods of sewage plant malfunction and/or disturbances, with details regarding the associated disposal and treatment technologies and facilities; and
  - Description of the proposed collection, handling, storage, treatment, and disposal or treatment methods for contaminated soil, snow, ice and surface runoff.
- Hazardous waste management:
  - Inventory of the types and predicted volumes/quantities of hazardous wastes to be generated or produced by Project activities, including shipping operations;
  - Description of proposed storage, transport and disposal methods to be employed;
  - Details regarding the destinations for each type of hazardous waste, including the disposal of containers used to transport or store hazardous materials;
  - Description of the facilities to be used for incineration of domestic waste;
  - Inventory of domestic waste, including both land-based and ship-based generated wastes;

- Description of incineration technologies, equipment and applicable emission regulations;
- Methods of disposal of incineration ash; and;
- Details regarding training programs for operations personnel.

6.5.14 Exploration

The Proponent shall describe:

- Areas proposed for ongoing geotechnical investigations and mineral exploration, including drilling, over the duration of the various Project areas (e.g. rail line, potential hydro power site, mineral deposits, etc.);
- 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/conducted, timing and type of surveys, etc.);
- 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.

6.5.15 Other Project Facilities and Infrastructure

The Proponent shall describe any other relevant project facilities and infrastructure not detailed in Subsection 6.5, and assess the potential for resulting impacts.

7.0 IMPACT ASSESSMENT APPROACHES

7.1 BASELINE INFORMATION COLLECTION

The Proponent shall present baseline data, including TK, about the existing biophysical and socio-economic environments relevant to the assessment of potential impacts from the Project in all proposed phases. Potential for changes in baseline conditions due to exploration activities 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 grey literature, technical scientific reports, and peer-reviewed scientific literature to present a complete picture of baseline conditions.

In order to identify natural fluctuations, trends and cyclical and other recurrent phenomena, the Proponent shall strive to give sufficient time depth and geographic broadness (temporal and spatial scale) to baseline data (e.g. the populations and distributions of certain wildlife VECs are known to fluctuate in cyclic trends over extensive time periods and ranges). The Proponent shall also strive to evaluate the degree that the potential for impacts from undertakings are negligible by specifying the sources of relevant prior impacts which can be identified with reasonable confidence.

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 (Subsection 9.3), follow up and adaptive plans (Subsection 9.7).

7.2 VALUED ECOSYSTEM COMPONENTS AND SOCIO-ECONOMIC COMPONENTS

This description should include, but not necessarily be limited to, those VECs and VSECs, processes, and interactions that are likely to be affected by the Project. 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, in terms of 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 Proponent should justify the methods used to predict potential adverse and beneficial effects of the Project on the VECs and VSECs, on the interactions among these components, and on the relations of these components with the environment. In particular, 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 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 Subsection 7.10.

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. These components/activities could be grouped into the following categories:

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

The following list of biophysical components and socio-economic components related to the Project, identified by NIRB through scoping, with full consideration of public input, should be considered in the Proponent's 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. The Proponent shall provide a rationale for the selection of communities and relevant studies for which baseline data are provided. The Proponent shall describe the interactions between the socio-economic and bio-physical environments, and provide an update baseline for each VSEC to include the most recently available data. If components identified in these Guidelines are not included in the EIS, the Proponent must clearly discuss its rationale for the omission.

7.2.1 Valued Ecosystem Components

- Air quality;
- Climate change;
- Noise and vibration;
- Landforms, soil, and permafrost;
- Surface water include freshwater quality and quantity;
- Freshwater fish, fish habitat and other aquatic organisms;
- Vegetation;

- Terrestrial wildlife and habitat, including representative terrestrial mammals including: caribou (including habitat, migration, and behaviour), foxes, wolverines, and wolves;
- Migratory birds and habitat (nesting areas);
- Marine and coastal habitats including sea ice and seabed sediments;
- Marine water quality;
- Marine fish and invertebrates; and
- Marine mammals including such representative species as polar bears, seals, bowhead whales, walrus, beluga whales, narwhals.

7.2.2 Valued Socio-economic Components

- Population demographics;
- Education and training;
- Livelihood and employment;
- Economic development and self-reliance;
- Human health and well-being, including local food security;
- Community infrastructure and public service;
- Contracting and business opportunities;
- Culture, Resources and Land Use
- Benefits, taxes and royalties; and
- Governance and leadership;

7.3 METHODOLOGY

In describing the methodologies used, the Proponent shall explain how it used scientific, engineering, traditional, community, and other knowledge to reach its conclusions. Any assumptions shall be identified and justified. 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 be indicated. All conclusions shall be substantiated.

The Proponent shall, to the extent possible, consider other available information, including knowledge on what types of data other project proponents, governments, and other researchers are collecting and have collected, in making choices with respect to the types of data it will collect for Project-specific monitoring programs as well as any regional monitoring initiatives it will participate in.

To support the key conclusions presented in its EIS, the Proponent shall broadly identify knowledge and understanding gaps, and identify with justification, which are significant and relevant to the conclusions. The steps taken by the Proponent to address these gaps shall also be identified. Where the conclusions drawn from scientific and technical knowledge are in conflict with the conclusions drawn from community and/or TK, the EIS shall contain a balanced presentation of the issues and a statement of the Proponent's conclusions.

7.3.1 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 reliability and scope of the results, the possibility of reproducing the analyses, and quality control of laboratory analyses shall be analyzed. All data based on environmental sampling necessarily involve some variability, which must be determined to assess the reliability and scope of the data. The Proponent shall, for all data obtained from

environmental sampling, provide a dispersion or variability coefficient (variance, standard deviation, confidence interval, etc.) and indicate the size of the sample used. The sampling methods and standards should be in accordance with those prescribed by regulators in Nunavut. Similarly, when using mathematical models the Proponent shall indicate the inputs and assumptions employed, the prototype used, the accuracy, and the inherent limits of interpretation.

For the types and formats of data, the Proponent shall consider other available information, including what types of data other project proponents, governments and researchers have collected. This recommendation applies to data collected for the General Monitoring Program, as per Article 12 of the NLCA, the Proponent's project-specific monitoring programs as well as any regional monitoring initiatives the Proponent will participate in. Every effort should be made to synchronize with the initiatives being made by Governments in respect to the General Monitoring Program.

7.3.2 Data Analysis and Presentation

The Proponent shall ensure that where qualitative criteria are used to describe the environment, to compare various design and development options, or to assess impacts, each of these criteria shall be defined, their relative importance stated, and the differences between the categories (e.g., desirable, acceptable, unacceptable) indicated with justification of each criterion. The Proponent shall support all analyses, interpretations of results, and conclusions with a review of the relevant literature, providing all relevant references and indicating the public availability of all works consulted. Any contributions based on TK shall also be specified and sources identified, subject to any concerns relating to ownership or confidentiality.

The Proponent shall also correlate its conclusions about impact significance with any thresholds referred to or adopted from relevant guidelines or regional policies.

7.4 PUBLIC CONSULTATION

Public consultation is required when:

- Identifying current and historical patterns of land and resource use;
- Acquiring 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.

The Proponent shall describe where, how, why, when and with whom it conducted public consultation, including its efforts to inform participants how the information that they supplied was or will be used. The Proponent shall also describe how communication was facilitated with the public through accommodating regional languages/dialects; not only through translation but through live translation/interpretation at community/public meetings.

A summary of key dialogues between the Proponent, consultants, community members and organizations as indicated in Section 11 of this document 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.

7.5 TRADITIONAL KNOWLEDGE

The Proponent shall present and justify its definition of TK and shall explain the methodology used to collect it, including:

- Format and location of meetings;
- Description of background information provided at meetings;
- Level of community participation and composition of participants;
- Design of studies on TK;
- Selection process for participants in such studies; and
- Types of TK collected.

The Proponent shall summarize what kinds of TK were collected and indicate whether special efforts made to collect TK from Inuit Elders, women or special groups, or harvesters familiar with the Project area.

The Proponent shall discuss how it weighed and incorporated TK in baseline data collection, impact prediction, and 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. It shall also include incidences where TK is being used to address gaps in currently available scientific data should be clearly identified as such. All assumptions shall be justified

The Proponent shall outline its program to pursue the collection of TK and to integrate it into ongoing baseline data collection, mitigation, and monitoring programs, and shall describe the roles and responsibilities of all concerned individuals and organizations in collecting, analyzing, interpreting, and synthesizing data, including TK. Furthermore, the Proponent shall describe any other past or current TK studies in which it has participated or played a supporting role.

7.6 IMPACT ASSESSMENT APPROACH

The required impact assessment, including the significance analysis, should 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 should be placed on those significant impacts on VECs and VSECs, extending across all the Project phases if applicable. The biophysical elements and socio-economic elements potentially impacted by the Project components, activities and undertakings should be referred to in the categories listed in the Subsection 8.1 and Subsection 8.2. Based on the predicted potential adverse effects, the proposed mitigation measures shall be addressed in the corresponding management plans as listed in Section 9.

The impact assessment for each biophysical and socio-economical 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

7.7 IMPACT PREDICTION

The Proponent shall explain and justify the methods used for impact prediction, including: mathematical or mechanical 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. It 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 Subsection 7.8 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 Inuit knowledge was used;
- Document model assumptions and study methodologies;
- 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.

7.8 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 should pay special attention to cumulative impacts of increased road haulage, construction/operation of second ore dock, trans-shipping and ice-breaking activities on marine species and traditional harvesting activities.

The Proponent is expected to carry out its cumulative effects assessment (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 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: This will enable the Proponent to consider all from the present time into the past 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 Subsection 6.1 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 from other past, present and reasonably foreseeable projects, might impact in a cumulative fashion on selected VECs/VSECs;
- 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 Subsection 7.11.

The CEA for the Project shall address, but not be limited to, the following areas:

- Effects of other past, present and reasonably foreseeable future projects and activities, including former mining operations at Nanisivik and Polaris mines, Baffinland's most recent bulk sampling program and ongoing geotechnical and exploratory drilling program, and present shipping activities in the RSA (including community and resource development re-supply and cruise ships). Reasonably foreseeable projects may include the proposed federal naval facility at Nanisivik, proposed at the Roche Bay Mining development project, as well as associated shipping activities in the RSA;
- Effects of potential future development of other identified deposits (#2, #3 and #4), and possible new deposits to be identified from the ongoing exploration program at or near Mary River;
- Effects of an increased lifetime for the railway and port facilities resulting from possible expansion of the currently proposed project;
- Effects of the Project that would provide for or contribute to the overall use of larger marine transportation corridors, taking into account the improved accessibility (e.g. navigational aids, improved mapping, etc.) for other marine traffic;
- Effects on the distribution, abundance and harvesting of both terrestrial and marine wildlife (including migratory birds), in terms of habitat loss (including impacts to polynyas, changes to migration patterns, population health, etc. from escalated project activities, establishment of a long-term transportation network and marine shipping routes with ice breaking at the proposed rate;
- Effects on "Species at Risk";
- Effects related to different temporal scenarios for shipping (including an option for no ice breaking in winter and spring); and
- Cumulative effects of monitoring programs planned for identifying and mitigating effects of the Project on wildlife; and Consideration of potential cumulative effects (positive and/or negative) on human health, economy, culture of the nearby communities and the region.

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;
- 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; 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 Proponents sole responsibility or capacity, the Proponent shall make best efforts to identify other responsible parties in order to mitigate the impact collectively.

7.9 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 Project's proposed shipping route runs through the Hudson Strait within the boundaries of the NSA, however, the potential for impacts in neighbouring jurisdictions outside of the NSA must be duly considered. The Proponent shall give due consideration to the potential for transboundary impacts which may be resulted from interactions between the effects of the Project in the NSA, and the effects of projects located outside Nunavut, as well as noting potential impacts of these project activities on marine mammals and their habitats. The potential for transboundary impacts related to cumulative effects associated with this Project shall be defined, and must include an updated assessment of the transboundary impacts from the proposed increase in shipping taking into account the increased amount of iron ore and the increase in duration of shipping that will occur.

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 (including trans-shipment) on marine mammals, and migratory birds. 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.

7.10 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 and technical experts. In its discussion of indicators, the Proponent shall emphasize the linkage between those indicators and the relevant VECs or VSECs.

In each case where a potential impact or an area of uncertainty is identified, the Proponent must give a clear commitment, to address this uncertainty or mitigate the impact in its Follow-Up and Adaptive Plan (Subsection 9.7).

7.11 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 ascertain the significance that different parties assigned to each impact, and how it will proceed if different parties ascribe varying significance to VECs, 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.

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 account global climate change. Consistent with the ecosystem approach required above, the Proponent should strive to 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 NIRB shall be taken into consideration in determining the significance of each impact:

- 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
- Probability of effects.

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

- Ecological/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.

7.12 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.

7.13 IMPACTS OF THE ENVIRONMENT ON THE PROJECT

The Proponent shall discuss the potential impacts of the environment on the Project, considering such factors as geo-hazards (including seismicity, slope instability, ground instability related to permafrost thaw, erosion, etc.), severe weather events (extreme precipitation events, flooding, storm surges etc.), sea ice conditions, sea level trends and global climate change. The discussion must specifically describe and assess how the potential for climate change could affect permafrost and soils with high ice content and the long-term impacts of such changes on Project infrastructure, such as water diversions and impoundment structures, wastewater treatment structures, fuel and chemical storage areas, solid waste sites, waste rock and ore piles, railway embankment, etc.

The Proponent should be aware that Steensby Inlet port facility lies in an area of falling sea level. This is fast enough to outpace any potential climate induced rise in sea level and will result in decreasing under keel depths over the life of the project (NRCan, 2009). The Proponent should plan to deal with this environmental condition and provide a discussion in its EIS.

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.

8.0 PROJECT ENVIRONMENT AND IMPACT ASSESSMENT

The EIS shall provide a complete analysis of the effects from the Project on the biophysical and socio-economic environments, which will serve as a basis for developing various mitigation and monitoring plans to eliminate or minimize the potential impacts from 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, to serve as a baseline against which the potential impacts of the Project can be measured. In describing the biophysical environment, the Proponent shall take an ecosystemic approach that takes into account both scientific and TK perspectives regarding ecosystem health and integrity. In its impact assessment, the Proponent should 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 should be discussed to extent possible, with references to project design (Subsection 6.2) and environmental management systems (Section 9.0).

8.1.1 Meteorology and Climate (including Climate Change)

8.1.1.1 Baseline Information

- A description of the baseline meteorological and climatic conditions at the LSA and RSA, including methods of determination (with 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, evaporation and sublimation rates, wind directions and velocity, and prevailing wind directions at areas of key project components and along proposed shipping routes;
- Annual, seasonal, monthly and daily average/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 are collected in the RSA of the Project;
- Prevalent trends related to key climate parameters in the Project area and any resulting implications to the Project;
- Impacts from climate change on sensitive ecosystem features within the terrestrial and marine ecosystems; and
- Predicted effects of climate change on mean and extreme climate parameters, and meteorological phenomena including flooding, storms, etc.

8.1.1.2 Impact Assessment

- Baseline information relating to all gaseous emission sources as a result of increased use ore haulage trucks along the Tote Road;
- Effects of climate condition on the Project, with a focus on the design and planning of Project components and activities including: shipping and trans-shipping, upgrades to the Milne Inlet Tote Road and related water crossings; railway embankment, water crossings (bridges) and auxiliary facilities; port facilities; open pit mine; waste rock stockpile; airstrips and access roads;
- Impacts of extreme meteorological events on the Project, and related considerations for Project design and planning, including 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 should also be taken into consideration;
- Discussion of the likelihood of all possible climate changes based on various possible scenarios, rather than designing and applying a single "best guess" scenario, and corresponding long term implications to the Project under each scenarios;
- Discussion of the likelihood for the potential occurrence and impacts from an inefficient ship engine, including incomplete combustion of marine fuel and emission of pollution and other contaminants into the atmospheric environment;
- Discussion of the relationship between climate change and greenhouse gas emissions including short-lived pollutants, ozone pre-cursors and particulate matter from ships burning low grade residual fuel oil and the potential to affect local climate
- Potential effects of climate change on permafrost thawing in the Project area, with discussion of the related implications on the stability of project components and sensitive land features, including: railway embankment; water crossings and tunnels; ore stockpiles and waste rock stockpiles; and
- Uncertainties related to climate change predictions, and the related effect on other predictions in the EIS, including water quantity and permafrost thawing.

8.1.2 Air Quality

8.1.2.1 Baseline Information

- Background air quality data and data related to atmospheric conditions collected in the RSA;
- Discussion of current sources of emissions and seasonal variations or climatic conditions associated with variations in air quality;
- Predictions of principle pollution emission sources and emission rates from the Project at various stages, including:
    - Gaseous emissions from the fuel consumption of mobile equipment such as vehicles, ships, aircrafts, and stationary equipment such as diesel generators and other combustion sources;
    - Fugitive dust emissions from ore processing, handling, 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 Milne Inlet Tote Road, access roads and mine hauling roads.

8.1.2.2 Impact Assessment

- Discussion of the standards, guidelines and regulations that the Proponent will incorporate before, during and after operations to minimize and mitigate effects to air quality;
- Assessment of effects of fossil fuel combustion from Project components, activities and equipment (including idling trains and ships) on air quality, with reference to each of the following: greenhouse gases (GHG) emission, increase of concentrations of air contaminants, such as sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), other sulphur and nitrogen compounds, total suspended particulate (TSP), PM_{10} and $PM_{2.5}$, etc.;
- Assessment of dispersion of Project emissions on a local and regional scale, 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 precipitation, and an evaluation of associated effects;
- Assessment of the Project's greenhouse gas contributions to Nunavut and Canada;
- Potential impacts on air quality from the incineration of combustible domestic waste, including the incineration of food waste at Project camp sites and onboard Project ships;
- Potential impacts to air quality, in particular the TSP, from ore crushing, hauling, transportation, loading and unloading of fine iron ore, airborne dusts from soil erosion resulting from various project disturbances, as well as fugitive dust emissions from ground traffic; and
- The impacts of blasting on air quality.

8.1.3 Noise and Vibration

8.1.3.1 Baseline Information

- Description of baseline noise levels relating to all onshore and offshore acoustic and vibration sources, as well as iron ore transport/hauling and loading and offloading systems in the Project area, including a discussion on variability, and if applicable, their relationship with 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 railway and shipping operations, in comparable climate and

geographical regions if possible. Emphasis should be placed on the identification of noise sensitive species, timing, and levels of noise;

- Review of available studies/research on the potential impacts of noise and vibrations from blasting in or near freshwater and marine environments; and
- Description of anticipated noise and vibration levels from all relevant Project equipment and activities including road traffic and shipping;

8.1.3.2 Impact Assessment

- Discussion of the standards, guidelines, thresholds and regulations that the Proponent will comply with before, during and after operations 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 , railway operation, and use of the Milne Inlet Tote Road and other access roads;
    - Air transportation;
    - Equipment use at mine and construction sites, including power generators; and
    - Mine site operation: blasting, drilling, crushing, screening, transport and stockpiling activities.
- Potential changes in marine noise levels due to Project activities at the port sites, including use of the port, blasting, and shipping (including ice breaking), as well as noise propagation in the marine environment; and
- Potential impacts of noise and vibration on the following:
    - Humans in close proximity to noise generating sources;
    - Terrestrial animals, with a focus on caribou and migratory birds;
    - Marine mammals; and
    - Fish in fresh water and marine environments.

8.1.4 Geology and Geomorphology

8.1.4.1 Baseline Information

- Description of the bedrock, surface/subsurface geology, petrology, topography, geochemistry, hydrogeology and geomechanics of the areas that will be disturbed by major project components;
- Description of structural geology, such as fractures and faults, at major project infrastructure areas and where earthworks are proposed (e.g. Mary River Mine site, and Milne Inlet port site if earthworks are required to build a second ore dock)t.); and
- Description of the geotechnical properties of bedrock, and the characteristics of soil, including ground ice and thermal conditions, as relating to slope stability and bearing capacity of facility foundations for the second ore dock, including additional fuel storage and additional accommodation under both static and dynamic conditions.

8.1.4.2 Impact Assessment

- Potential geotechnical and geophysical hazards within the Project area, including potential seasonal subsidence, seismicity and faulting, risks associated with cut/fill slopes and constructed facilities. Where appropriate, the assessment should be supplemented by illustrations such as maps, figures, cross sections and borehole logs;

- Potential impacts of the project on geo-hazards (e.g. cuts in slopes that decrease slope stability, blasts that create fractures), as well as shoreline erosion;
- 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, docks facilities, railway embankments, tunnels, major watercourse crossings, open pit, and equipment pads; and
- Risk assessment and predictions, with proposed management measures.

8.1.5 Hydrology and Hydrogeology

8.1.5.1 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; and
- 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).

8.1.5.2 Impact Assessment

- Discussion of the potential impact of variable and extreme stream-flows on Project design and planning, including proposed water crossings;
- Potential impacts to existing water sheds from surface water diversions required by mine site development and other Project components (e.g. waste rock stockpiles) including updates for changes to Project components (e.g. Tote Road);
- Evaluation of storm water run-off throughout the Project area, 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;
- Potential impacts to the navigability of watercourses from proposed water crossings; and
- Potential impacts of the railway on the hydrology regime in the LSA, resulting from drainage diversions, ditching and rechanneling, as well as sediment runoff.

8.1.6 Groundwater/Surface Waters

8.1.6.1 Baseline Information

- Description of the physical and chemical characteristics of surface, sub-surface, ground waters in the LSA, with discussion of seasonal variations of water flow and quality;

- 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;
- 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;
- 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
- Discussion of fluvial geomorphology and stability as related to proposed water crossings.

8.1.6.2 Impact Assessment

- 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;
- Potential changes to permafrost/talik distribution, groundwater distribution and flow paths;
- Potential impacts on surface/ground water quality including sediment quality in surrounding lakes and rivers from surface runoff and traffic on Project roads;
- Potential impacts on water quality of lakes and rivers from discharges of Project wastewater treatment plants;
- Potential impacts on surface/ground water quality from ARD and ML resulting from waste rock stockpiles, ore stockpiles, open pit dewatering, construction fills, embankment of roads and railway, and open quarry sites;
- Potential impacts on surface water quality of nearby lakes and streams as a result of nutrient input from blasting activities and potential chemical leaching from rail sleeper coatings;
- Potential for increases in suspended sediments in water bodies as a result of construction and maintenance of the mine facilities, Milne Inlet Tote Road, and the railway and associated water crossings with updates for any changes to the Project;
- Potential impacts on surface/ground water quality, from runoff at fuel storage facilities, with consideration for possible fuel spills and malfunctions;
- Potential impacts on surface water quality from the deposition of particulate matter resulting from the incomplete combustion of wastes from incineration;
- Potential impacts on surface water, groundwater and sediment quality in relation to other site waste management activities, including: the storage, handling, land filling of waste; landfarming of contaminated ice/snow/soil; the management of historical contaminated material (e.g. previous spills, mishaps, releases, etc.), and sewage effluent discharges;
- Potential impacts on surface water and sediment quality from construction and operation of camps;
- Potential impacts of erosion associated with the railway on surface water quality as a result of vegetation removal, cuts/fills and other surface disturbances;
- Potential impacts of dust from rail traffic on water bodies adjacent to the railway; and
- Potential impact of ongoing exploration activities on surface water quality from drilling water withdrawals and returns.

8.1.7 Landforms, Soils and Permafrost

8.1.7.1 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 geomorphologic and topographic features at areas proposed for construction of major project components, including the type, thickness, and distribution of soils as applicable;
- Description of the bedrock lithology, morphology, geomorphology and soils (including sediments and the thermal and ground ice conditions) at proposed borrow and quarry sites, 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 described;
- Discussion of the potential for ground and rock instability (e.g., slumping, landslides, and potential slippage) at areas planned for Project facilities and infrastructure;
- Discussion of the relationship between permafrost processes and active layer, surface water bodies and topography;
- 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.

8.1.7.2 Impact Assessment

- Discussion of general impact on landform in the LSA as a result of Project development, borrow resource extraction, with a focus on sensitive landforms, and those serving as wildlife habitat;
- Implications to the Project planning and design of baseline information 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 abundance and distribution of unique or valuable landforms (e.g., wetlands, eskers and fragile landscapes), as well as aesthetics of the natural environment, resulting from Project components and activities;
- Potential impacts on the stability of terrain in the vicinity of Project facilities and infrastructure, in particular the thermal stability, abundance, and distribution of permafrost, thaw-susceptible ice-rich soils, ice lenses and other sensitive landforms and soils. Discussion should focus on the potential for impacts arising from surface disturbances due to construction (e.g. overburden stripping, cuts/fills), and any associated implications for Project design and management of project components, including railway embankments, tunnels, access roads, watercourse crossings, ore/waste rock piles, machine and equipment pads, etc.;

- 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);
- Discussion of the potential for shoreline erosion as a result of wake effects and increased open water due to ice breaking activities along proposed shipping routes;
- Discussion of the potential for soil erosion, including stream bank erosion, resulting from surface disturbances associated with the construction, operation and maintenance of Project components;
- Evaluation of ARD and ML potential of materials that will be exposed by mining, stockpiled, or disposed of;
- Potential for the contamination of soils due to the deposition of air emissions and airborne fugitive dust fall from the Project; and
- Potential impacts of land based disposal of dredged materials from marine areas.

8.1.8 Vegetation

8.1.8.1 Baseline Information

- Description of ecological zones, and other relevant classifications of plant associations and phenologies in the LSA;
- Description of the vegetation types in the LSA, including estimated percentage cover and height for principal species, with a discussion of their importance to wildlife;
- Details regarding associations between vegetation cover types and soil types in the Project area. The Proponent should include an 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 especially from the Tote Road, including airborne contaminants from emission sources, and changes to water quality and quantity, permafrost, or snow accumulation;
- Description of rare or regionally unique plant species or species assemblages, including species with federal or territorial designated status (e.g., vulnerable, threatened, endangered, extirpated, of special concern – as designated by the COSEWIC or other agencies);
- Discussion of the health status of plant species/communities in the LSA, including baseline information on contaminant levels in representative species consumed by humans, either directly or indirectly (i.e., through harvesting of foraging wildlife);
- Identification of plants in the LSA that perform particularly significant ecological functions, and/or are of importance to wildlife;
- Details regarding species that are valuable for cultural reasons known to Inuit, including potential impacts on vegetation quality due to dust fall from soil erosion, surface disturbance, fine iron ore transport using the Tote Road;
- Any other issues related to vegetation and identified through public consultation; and
- Description of TK collected related to plants and plant use in the RSA.

8.1.8.2 Impact Assessment

- Potential impacts to abundance and diversity of vegetation due to Project activities causing surface disturbance;
- 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 ships;
- Potential impacts to vegetation of cultural or practical value to Inuit;
- Potential direct and indirect loss of vegetation and associated habitat from construction of the railway;
- Potential impacts on vegetation quality due to dust fall from soil erosion, surface disturbance, fine iron ore transport, etc.;
- Discussion of proposed vegetation quality monitoring, specifically contaminant loadings of species directly consumed by humans (e.g. lichen) and/or indirectly consumed through food chain associations; and
- 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.

8.1.9 Freshwater Aquatic Environment Including Biota and Habitat

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 consultation.
- Description of the biological composition of freshwater aquatic environments in the LSA, including: trophic state, periphyton, phytoplankton, zooplankton, fish, and the interactions and relative significance of each species within identified food chains;
- Description and population distribution of fish species in the LSA with a focus on arctic char, and including the potential seasonal and annual trends in abundance and distribution of species, their migratory patterns, routes and preferred corridors, and the corresponding sensitive periods when routes include habitats potentially affected by the Project;
- 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 water bodies and watercourses (including littoral zones, aquatic and riparian vegetation, lake bottom characteristics, fish overwintering areas, the estimated productive capacity, etc.) within the LSA;
- Description of the habitats and populations of any rare, or regionally unique fish species habitats of any rare or regionally or locally unique species, species designated in Species at Risk, species listed as vulnerable, endangered, or a species of special concern by COSEWIC; species with federal or territorial(e.g., vulnerable, threatened, endangered, extirpated, of special concern), and species of the great importance for Inuit life and culture;
- The health of fish VEC species populations and their contaminant loadings;

- Discussion of any other issues relating to freshwater aquatic species or habitat identified through public consultation.

8.1.9.2 Impact Assessment

- Potential impacts to fish, invertebrates and freshwater habitat including potential impacts to water and sediment quality and quantity. Consideration should be given to impacts associated with the following: metal leaching/acid rock drainage; runoff, leaching and releases, water withdrawals; discharge; redirection of natural flows; explosives use; nutrient and toxin inputs; and sewage and grey water effluent discharge;
- Potential impacts of alteration, disruption, or destruction of fish and invertebrate biota habitat, with consideration for Project activities in close proximity to water bodies such as the noise and vibration from blasting as a result of the construction of bridges and other water crossings;
- Potential impacts to freshwater fish, invertebrates and habitat including potential impacts to water and sediment quality 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 migrations corridors;
- Evaluation of the ability of fish to pass at water crossings along access roads and the railway;
- Potential impacts associated with dust deposition and surface runoff that have high concentrations of minerals resulting from road haulage activities;
- Potential impacts to fish health, distributions and populations; and
- Evaluation of the potential for elevated contaminant loadings in freshwater VECs resulting from the uptake of contaminants released to freshwater habitat as a result of the Project.

8.1.10 Terrestrial Wildlife and Habitat

8.1.10.1 Baseline Information

- Description of wildlife populations, distributions and ecologies in the RSA, with emphasis on identified wildlife VECs and species with special designation (e.g., Species at Risk and species listed as vulnerable or endangered by the COSEWIC). This description should include reference to the significance of ecological functions, and the importance for Inuit life and culture of wildlife VECs;
- Description of biodiversity within the RSA, and associated food chain relationships among terrestrial wildlife species;
- 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 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 historic and current seasonal/annual trends in range or habitat use, movements, and distribution of all identified terrestrial wildlife VECs, with reference to scientific reports and TK;
- Description of the migratory patterns and routes of terrestrial wildlife VECs and the corresponding periods when these routes affected by the Project;
- Assessment of the potential impact of the Tote Road being a barrier to wildlife, especially caribou due to increased usage for ore haulage;
- Discussion of the relative health of VEC populations, including contaminant loading in representative wildlife VEC species, for example 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, 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 and vibrations, from relevant scientific research and TK; and
- Discussion of other pertinent issues as identified through public consultation.

8.1.10.2 Impact Assessment

- 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); 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 impact from truck traffic along the Tote Road and associated sensory disturbance;
    - 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 impact from dust fall and accumulation on forage resulting from anthropogenic sources, and natural sources influenced by anthropogenic activities;
    - Direct and indirect impacts from ice-breaking associated with shipping and ice management at seaport (with special attention to caribou migration, if applicable);
- Potential impacts on wildlife from 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 (especially caribou) from vehicle traffic on the Tote Round year-round and especially during caribou calving and post-calving. In particular, include assessment of potential impacts on caribou recovery from very low abundance as influenced by the filter/barrier effects of the physical road structure and road traffic on movement and migration, and direct and indirect loss of habitat, the conduct of project activities and associated sensory disturbances, and dust fall and accumulation on forage resulting from anthropogenic sources;

- Potential impacts resulting from barriers to movement and migration of wildlife, in particular caribou, and related disturbance caused by the physical road structure and road traffic;
- Potential impacts on wildlife from injury or mortality caused by Project activities, particularly the use of the Milne Inlet Tote Road, railway line, 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. In particular, consideration should be given to potential impacts on caribou and other wildlife VECs from frequent noise and vibration associated with transportation operations, with a focus on disturbance/disruption to caribou calving and post-calving, movement and migration;
- 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 to the environment as a result of the Project and be taken up by VEC species.

8.1.11 Birds

8.1.11.1 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 by the COSEWIC). This description should include reference to the significance of ecological functions, and/or the importance for Inuit life and culture of bird VECs;
- Description of current habitat use by VECs, including the use of Migratory Bird Sanctuaries, Key Migratory Bird Sites, 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;
- Description of migratory patterns and routes of VECs potentially impacted by the Project, with a discussion of corresponding sensitive periods;
- Identification of key migratory bird sites and important bird areas along the shipping route, including those which could potentially be affected by marine spills as a result of current and/or wind patterns; and
- Other issues as identified through public consultation.

8.1.11.2 Impact Assessment

- Description of the potential loss, alteration or alienation of habitat (e.g. staging and nesting habitats) as results of Project development. Special consideration should be given to Species at Risk, species with designations by the COSEWIC, species having significant ecological functions, and /or of importance for Inuit life and culture;
- Potential impacts on migratory birds when they are present and could interact with project activities/components, taking into account the timing of construction and operation of the proposed Milne Inlet facilities, the activities along the shipping route and at ore trans-shipment sites;
- Potential disruption or alteration of migration routes due to the Project;

- Potential impacts on birds and bird habitat use from air 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 foxes, ravens and gulls that may prey upon migratory birds and resulting impacts on the migratory bird populations;
- Potential attraction of birds by domestic waste at camp sites; and
- Potential effects of shipping and port operation on coastal birds and habitat, as well as potential disturbance on key migratory bird habitat areas and sanctuaries in proximity of shipping routes in the NSA.

8.1.12 Marine Environment, Marine Water/Ice and Sediment Quality

8.1.12.1 Baseline Data

- Description of marine physical processes, biological diversity and composition, and associated interactions in the RSA, including the proposed shipping routes within the NSA;
- Description of baseline information regarding climatic conditions at the port site, coastal hydrology, marine and coastal ecology air quality and noise levels;
- Description of the bottom sediment quality and thickness at the port site, including grain size, mobility, and the presence of subsea permafrost. A corresponding discussion of coastal and sea bottom stability at Steensby Inlet and Milne Inlet.
- Description of physical and chemical oceanographic properties including temperature, salinity, suspended solids and dissolved solutes. The information will be required to be sufficient enough to assess the impacts of discharges of ballast water and other potential discharges or effects from shipping at the proposed port site;
- Details regarding marine surface and subsurface current patterns, currents velocities, waves, storm surges, long shore drift processes and water levels from tide gauge at Steensby port site and in proximity to port and facilities areas, and along shipping routes if applicable;
- Presentation of available bathymetric information for the port site at Steensby Inlet, Milne Inlet and along the proposed shipping route through Foxe Basin and Hudson Strait;
- Description of ice climate in the RSA, including ice formation, thickness, ridging, break-up, and movement. Ice conditions along shipping routes should also be discussed using scientific studies as well as TK if possible, with consideration for predicted climate change and its possible effect on the timing of ice formation in the future;
- Description of land fast ice characteristics, including the extent and seasonal duration at the proposed port site and along shipping routes;
- Identification of sensitive habitat areas for marine mammals in the vicinity of the port site and along the shipping routes; and
- Presentation of TK collected related to coastal areas and ice conditions.

8.1.12.2 Impact Assessment

- Potential risks and impacts to the marine ecosystem through the introduction of exotic species, including pathogens, through year-round shipping with frequent voyages;

- Potential impacts on marine resources and habitat, particularly the effects from increased turbidity due to transportation and disposal of spoils from construction of the marine terminal and dredging of shallow marine areas;
- Potential impact on marine water quality, marine sediment quality, and marine biota from marine shipping and trans-shipping, including standard operations and potential spill scenarios;
- Assessment of potential contaminant loading in sea water and ice from dust plume settlement at the port site;
- Potential for the occurrence of black carbon pollution due to increased vehicular traffic, and effects on exacerbating melting ice and snow, and consequently the retreat of sea ice
- Potential indirect effects on marine water and sediment quality due to alteration of circulation by off shore structures;
- Potential impacts to marine water quality due to changes in sediment transport regime as a result of wake effects from shipping and other undertakings;
- Potential impacts to marine water quality, in particular suspended solid concentrations and sediment quality, from offshore construction and Project activities (e.g. docks and shipping infrastructure) at Steensby Inlet and Milne Inlet, including under water blasting and dredging along shipping routes;
- Potential impacts to marine water quality from waste and brine discharge (from desalination plant, if applicable), sediment and contaminant input from surface runoff;
- Potential impacts of propeller wash effects to the surficial sediment and seabed;
- Potential impacts on marine water quality from ballast water discharge within Canadian waters, in particular contaminated ballast water and/or other contaminated chemical mixtures from bilge water, sewage, grey water and garbage related to ship operations and maintenance;
- Potential impacts on marine water quality from: near shore fuel storage facilities; accidental spills of fuel and chemical at the port site or along shipping routes; and from the accidental grounding/stranding of ships along the shipping routes;
- Potential impacts on marine water quality from accidental spills of ore concentrates at the port site, or along shipping routes, and from trans-shipping activities;
- Potential effects of shipping on the integrity of the landfast ice and polynyas, with consideration for their importance as critical habitats for marine mammals; and
- 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 ships.

8.1.13 Marine Wildlife and Marine Habitat

8.1.13.1 Baseline Data

- An overview of the marine biological communities occurring within Steensby Inlet and Milne Inlet, and along the proposed shipping routes to a lesser extent, including benthic and plankton communities (infauna, and epifauna), pelagic fish, benthic invertebrates, marine fish, coastal birds, and marine mammals.
- Description of marine wildlife populations, distributions and ecologies in the RSA, with emphasis on identified marine wildlife VECs and species with special designations by the COSEWIC. This description should include reference to the significance of ecological functions, and/or the importance for Inuit life and culture of identified marine wildlife VECs;

- Description of habitat of marine VECs, including fish habitat as defined by the Fisheries Act, and existing and proposed areas with special designation (*i.e.*, Sirmilik National Park of Canada, potential National Marine Conservation Areas in the North Baffin region, and Key Marine Habitat Sites for Migratory Birds). Emphasis should be placed on those habitats identified as important to the natural life cycle of a species, and also to Inuit harvesting activities potentially impacted by port and shipping operation;
- Characterization of marine mammal habitat in the LSA, including habitat used by VECs for feeding, calving, nursing, over-wintering, and other critical activities;
- Identification of habitats of any rare or sensitive species, such as Species at Risk, or those with similar designations or status, as well as species important for Inuit harvesting;
- Identification of marine mammals species (e.g. ringed seals, beard seals, bowhead whales, walrus, belugas, narwhals, killer whales), historical and current habitats distributions, seasonal migration patterns, critical areas (feeding area, calving areas, over winter areas, etc.), and potential interactions with offshore facilities and shipping operation;
- Presentation of available published information and/or information resulting from community IQ 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 proximity of shipping routes; and sensitive periods; and
- 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 seals and walrus.

8.1.13.2 Impact Assessment

The Proponent is required to present a comprehensive impact analysis for all Project components and activities, including its shipping activities, on marine wildlife. Environmental factors could refer to *Environmental Considerations for Port and Harbour Developments*, which contains a check list of the potential adverse effects port development may generate (Davis *et. al.*, 1990), including: water pollution, contamination of bottom sediment, loss of bottom biota, damage to fisheries, beach erosion, current pattern changes, waste discharges, waterfront drainage, oil leakage and spillage, hazardous materials, emissions of dust and gases, smoke and other air pollution, noise, odour, traffic increases, landfills, and landscape impacts. This analysis should include the following:

- Potential habitat loss or deterioration during critical lifecycle stages of marine wildlife VECs, including feeding, calving and nursing due to ashore and offshore infrastructure related to sea port and shipping routes. Special consideration should be given to Species at Risk, and species listed as endangered or threatened by the COSEWIC;
- Significance of Davis Strait, Baffin Bay, Pond Inlet, Milne Inlet and Eclipse Sound to marine species, particularly any areas associated with the port facilities and shipping routes which may serve as important habitat for critical lifecycle stages of marine wildlife, such as feeding, calving and nursing grounds;
- Potential impacts to, and interactions with, Inuit harvesting in the port area and along the shipping route; and
- Implications of project activities for the proposed establishment of a Lancaster Sound National Marine Conservation Area (NMCA).
- Potential impacts to coastal processes and stability from near shore dredging of sediments and bedrock blasting;

- Potential direct and indirect impacts to marine fish and marine habitat from Project activities at Steensby Inlet and Milne Inlet, during construction, operation, modification/maintenance and decommissioning;
- Potential impact on marine wildlife and their habitat from under water blasting and dredging, and potential disposal of spoils within Steensby Inlet;
- Potential impacts to migratory birds utilizing the ice surface, with discussion of mitigations measures to be implemented to prevent impacts;
- Incidental spills, malfunctions and other accidents associated with shipping operations;
- Ballast water discharge, with discussion for the potential for discharge of contaminated ballast waters and related effects
- Risk assessment of the potential introduction and intrusion of non-native, nuisance and exotic species due to ballast water discharge and ship wash;
- Potential effects on marine mammals as a result of marine shipping, particular ice-breaking shipping and escalated noise levels at the port sites and proposed shipping routes;
- Potential interactions, accidental injuries and mortality of marine mammals directly or indirectly from proposed shipping (open water and ice breaking shipping) activities, in particular those marine mammals, which congregate around the proposed northern shipping route (Milne Inlet-Eclipse Sound-Baffin Bay)
- Potential direct and indirect effects on marine wildlife behaviour, distribution, abundance, migration patterns, species health and reproduction from marine shipping, particular ice breaking activities and contaminants;
- Potential impacts on polar bears and polar bear habitat from year-round shipping, particularly frequent ice-breaking in winter and spring. This discussion should include potential impacts on other associated wildlife and wildlife habitat (*i.e.*, polar bear prey species such as seals, walrus, and narwhals), from increased noise and repeated disturbances and how these marine mammals (including polar bears) were considered in the routing and timing of shipping activities. The Proponent must address the potential disturbance for polar bear denning habitat along the proposed shipping route;
- Potential for marine wildlife habitat loss (including seal dens) and related impacts, as a result of addition of a second ore dock, and marine shipping activities, particularly ice-breaking and the elevated noise levels;
- Evaluation of the potential for contaminants to be released to the environment and taken up by VECs as a result of the Project;
- Assessment of potential 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 ship traffic along shipping routes; and
- Potential social-economic impacts from shipping, taking into account the impact on marine species on which local residents rely on as food sources.

8.2 SOCIO-ECONOMIC ENVIRONMENT

The Proponent shall present baseline information on the functioning and stability of the socio-economic environment in the RSA, with a corresponding impact assessment covering all Project phases of development is provided, and is updated whenever there are changes to the Project in an Addendum to reflect the impact of these changes. 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. The Proponent shall describe the interactions between the socio-economic and biophysical environments, including the roles of the land- and wage-based economies and the nature of the mixed economy of the North. This is not to meant to suggest that the Proponent is responsible for the current socio-economic situation of the Baffin Region or of Nunavut, or that it is expected to resolve any problems that are identified. Nevertheless, a proper understanding of the structure and functioning of the potentially affected societies is needed 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.

Whenever relevant and appropriate, data shall be disaggregated by age, gender, and ethnic affiliation. Socio-economic indicators are used to present baseline information and subsequent 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. 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 Population Demographics

8.2.1.1 Baseline Information

- Description of regional and local community populations, demographics structure, composition, characteristics and population trends;
- Description of cultural, ethnic, religious, and language characteristics and diversities in the RSA;
- Discussion of observed variations in education levels, dietary habits, religious characters and other social aspects in different demographics categories in the RSA; and
- Description of the social life of the potentially affected communities, households, family and community stability. Issues related to substance abuse, crime and violence, and other relevant social factors should also be presented.

8.2.1.2 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 on community and family stabilities, and culture integrity due to the demographic changes;
- Potential effects from various Project phases and changes, including unemployment as a result of temporary suspension of operations or mine closure; and
- Potential effects on lifestyle, including the effects of a major employment base away from the communities.

8.2.2 Education and Training

8.2.2.1 Baseline Information

- Existing education system(early childhood through post-secondary), available training programs for adults and youth, outlook and evolution trends;
- Local education infrastructure, capacity, funding resources, and administration system;
- 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; and
- 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.

8.2.2.2 Impact Assessment

- Assessment of local labour force sources to satisfy the needs of the Project development, and identified gap between availability and project needs;
- Discussion of potential need of local labour force training to meet the needs of the Project. Those training can be specific required by the Project, or for universally applicable skills that improve workers' opportunities in other sectors of the economy, this assessment shall include predicted training resources to meet the designed training programs if applicable;
- Evaluation of training programs, if necessary and planned by the Proponent, associated challenges and likelihood of success 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 of those program have been planned or will be planned and anticipated to be implemented by the Project, 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);
- Discussion of other possible solutions to fill up the gap between requirements of project needs, and education level and qualifications of local labour force, in conjunction of the minimum Inuit employment percentage in entire labour force which will be determined by IIBA;
- Discussion of the potential impacts of project components on local education and training opportunities, taking into account any associated changes or fluctuations in labour demand and required skills to support the port operation and road services; and
- Identify the precise training programs that will upgrade employee's skill levels from D to C to B positions. Recognizing the reduced overall employment level of Phase 2 compared to the fully approved Project (i.e. original, ERP and Phase 2), discuss how the training programs will address the potential oversupply of local labour by skill level for available positions.

8.2.3 Livelihood and Employment

8.2.3.1 Baseline Information

- 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;

- Local household incomes, income sources, and compositions of income within the Project RSA;
- Local and regional economy characteristics in term of relation to traditional land use activities and wage incomes;
- Descriptions of the significance of, and level of dependence on country food as major nutrients sources by local residents within the Project RSA;
- The employment status in terms of relative genders, ages and other demographic categories;
- Existing local employment opportunities and labour supply status; a
- Expectations and perceptions to the employment at the Project by the residents in the Project RSA;
- Discussion of the potential impacts of project components on livelihood and employment opportunities for Nunavut communities including analyses for points of hire communities as well as those without direct air transportation;
- Clearly delineate between ERP operations employment, additional Phase 2 construction and Phase 2 operations employment, and the construction and operations of the fully Approved Project;
- Additional Phase 2 employment should be categorized by skill level in the same fashion as in the ERP Addendum; and
- An updated labour market analysis should also be provided for context to evaluate the potential benefits of Phase 2.

8.2.3.2 Impact Assessment

- Assessment of the potential for development of local labour force;
- Estimation of the number of jobs to be created directly and indirectly by the Project, with consideration of local business and supplying contracting;
- 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;
- Assessment of opportunities afforded to women;
- Discussion of the commuting arrangements for local hired workers, especially those who live in the communities without proposed direct air transport to mine sites;
- Evaluation of the possible effect of changes in income earnings on patterns of savings, expenditure and consumption values; and
- Assessment of the barriers and incentives to healthy financial management;
- Evaluation of the effects of competition for labour between the Project and existing businesses, institutions, and traditional activities.

8.2.4 Economic Development and Self-Reliance

8.2.4.1 Baseline Information

- the traditional economy, current economic structure and development trends in the Project RSA and variability in potential impacted communities;
- The economic development levels in the Project RSA comparing to other regions in Nunavut, advantages and constraints of economy development;

- The roles of renewable resources exploit (e.g. subsistence and commercial hunting and fishing) plays in economy and its significance for local economy; and
- Community and resident self-reliance.

8.2.4.2 Impact Assessment

- Positive and negative impact on the local economy from regional level and community level;
- Stimulation to local businesses which developed for the Project and depend on the operation of the Project;
- Potential impact on the traditional economic activities including hunting, fishing and sport hunting /guiding, etc. due to year round shipping out of Milne Inlet;
- Potential impact on the tourism from mine development which impairs the "wilderness experience" of tourism in the Project region due to year round shipping out of Milne Inlet;
- Potential impacts related to accessibility and exist of barriers for traveling, fishing, hunting/trapping and other activities by surround communities as a result of construction and operation of railway including year round shipping out of Milne Inlet;
- Potential impacts on local harvesting activities both in freezing water seasons by shipping on shipping routes, and interference with offshore fisheries/boating in open water season at both Milne Inlet and Steensby Inlet, as well as on shipping routes;
- Disruption of on ice travel routes caused by year round shipping through land fast ice and, including dangers to ice users created by both the track itself and new cracks, which is created in unpredictable places radiating from, or even distant from the track, resulting from winds and currents on the adjacent ice;
- Potential impacts on local and regional economy due to temporary closure, final closure.

8.2.5 Human Health and Well-being

8.2.5.1 Baseline Information

- Description of the current status of human health in the RSA, including mental, and psychological health and well-being;
- Description of nutritional requirements and diet habits of residents in the RSA;
- Description of the existing infrastructure and health services available within the RSA; and
- Discussion relating to the local health statistics when compared with other parts of Nunavut and Canada as appropriate.

8.2.5.2 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 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 impacts on human health from bioaccumulation and take-up of contaminants associated with changes to the level of contaminants loadings in country foods (i.e., wildlife and vegetation consumed by humans);
- Potential impacts to human health as a result of increased use of the Milne Inlet Tote Road for ore haulage and Milne Inlet Port facilities, including exposure to noise, dust and gaseous emissions;
- Potential impacts to human health as a result of ice breaking activities and associated accidents;
- Potential impacts to food security as a result of wildlife disturbance (marine and terrestrial), reduced access to traditional harvesting areas (via increased intensity in toad haulage and shipping), as well as increases in employment and purchasing power;
- Potential impacts of workplace discipline and cultural conflicts among Nunavummiut and Southern workers;
- Potential impacts on human health and wellbeing within the RSA resulting from indirect effects of the Project (e.g. substance abuse, family violence, sexually transmitted infections and other communicable diseases and gambling);
- Potential impacts on community safety and security with consideration for a potential influx of Project personnel into local communities during the life of the Project;
- Discussion of concerns relating to human safety due to potential railway accidents, malfunctions (e.g., derailment)and natural disasters (e.g. earth quakes and hazardous weather events); and
- Potential impacts to human health and community well-being of the local communities associated with impacts of the increased ore haulage on marine and terrestrial country food sources.

8.2.6 Community Infrastructure and Public Services

8.2.6.1 Baseline Information

- Description of current conditions of local housing and other infrastructure, and capacity in the RSA;
- Description of existing public services and associated community facilities in the RSA, including law enforcement, health care (including emergency response), dependency assistance, welfare utilities, temporary accommodation and food services;
- Description of existing outpost camps and other facilities outside of municipal boundaries which facilitate harvesting and recreation activities in the LSA, particularly within proximity of the Project;
- Description of the extent and current capacity of the local transportation systems and associated infrastructure; and
- Discussion of demand for community infrastructure and public services from the Project directly and indirectly.

8.2.6.2 Impact Assessment

- Assessment of incremental costs imposed by the needs from the Project directly or in directly on public infrastructure and services;
- Evaluation of the effect on services and/or infrastructure in public and private sectors, due to the potential use by the Project directly or indirectly;
- Assessment of public health and environmental health needs and implications to the Proponent's community initiatives;

- An assessment of potential increased demand for health care system, including standard medical system, emergency response and emergency medical care, medivac and other emergencies, as well as challenges brought by the increased demand;
- Potential impacts of increased employment, wages, and nearby activities, particularly ice breaking and bridge operations on community infrastructure and pubic services during Phase 2;
- A discussion of the potential to bring in freight for communities by return shipping, and likelihood to share shipping costs with local communities, which will likely reduce the life expenditure of local communities;
- Discussion of building new and updating the existing structures (e.g. weather shields, outposts) beyond of communities on hunting/traveling routes, and/or at hunting grounds to facilitate local hunting activities/traveling in Project areas; and
- A discussion of community access to Project infrastructure upon closure, including the Milne Inlet tote road, railway and sea port facilities.

8.2.7 Contracting and Business Opportunities

8.2.7.1 Baseline Information

- Most up-to-date statistics and data relating to contracting and business opportunities from socio-economic studies of communities in the Project RSA;
- estimates of goods supply, including country food supply for Inuit workers at mine, procurement, services contracting, and other business opportunities in the Project RSA from the Project; and
- The economy structure and characteristics of local and regional economy, existing business types, scales of the different sectors of economy, and potential capacities to meet the needs from the Project.

8.2.7.2 Impact Assessment

- Assessment of both negative and beneficial economic effects from the Project's contracting and business opportunities through Project lifespan and updated with any changes to 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 with updates for any changes to 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 with updates for any changes to the Project;
- Assessment of the of project-related procurement, and potential the capacity to meet the Project needs with updates for any changes to the Project;
- 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 for Inuit worker in Project;
- Assessment of opportunities for local communities to diversify their economic sources and to supply new goods and services to meet the need from the Project;

- Potential contracting and business opportunities associated with the Milne Inlet Tote Road upgrades, additional port facilities, ice-breaking, and trans-shipment of iron ore; and
- Potential impacts on local businesses and services, which developed for the Project and depend on the operation of the Project after temporary suspend and final closure.

8.2.8 Culture, Resources and Land Use

8.2.8.1 Baseline Information

The Proponent shall present:

- 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, Language, Elders and Youth upon request, to assist in its review;
- Description of regulatory requirements and procedures for recovery and removal of artifacts and/or fossils in areas of proposed development;
- Description of the relationship between cultural sites and social lives of local communities in the LSA;
- Overview of local and regional land use activities in the LSA, including national parks and similar areas, 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; and
- Description of identified and anticipated overlapping zones and/or areas where the land use activities co-exist or interact with project components or/and activities.

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 an increased project footprint associated with the Milne Inlet Tote Road upgrades and additional port facilities;
- Potential impacts on paleontological/archaeological resources from increased Project activity in the area associated with mine including ground and marine transportations and ongoing exploration as well as non mine related activities;
- Potential impacts to archaeological 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;
- Potential impacts on cultural well-being, religious and spiritual activities which are related to cultural and historic, sacred and spiritual sites.
- Discussion of anticipated interactions between project development and land use activities by local residents in the Project RSA, in particular at mine site, railway corridor and shipping routes;
- Potential impacts related to accessibilities to areas for hunting, fishing, marine harvesting, traveling , recreational and religious activities as results of the Project development;
- Potential effects on sustainable resources use, such as country food availability, accessibility of carving stones; traditional clothing in context of general impacts to

wildlife and substantive harvesting, taking account the CEA thought entire lifespan of the Project;

- Potential impact on cultural and traditional values, traditional lifestyles and heritage coherence in the potentially affected communities, which are closely related to land use activities, taking account the changes to economy structure, shift of consumption fashions, alteration of diet habit, and other social aspects; and
- Discussions of the conflict and possible solutions between the need of economic development and traditional land use activities in the project region, taking consideration of governments' role to deal with the issue.

8.2.9 Benefits, Royalty and Taxation

- Forecast royalty and taxation revenues accruing to the GN, AANDC, NTI and QIA for Phase 2. Marginal increases from ERP activities should be detailed should changes to the overall Project for Phase 2 be approved;
- Scope, progress, and potential success of the development of an IIBA with QIA, with a discussion of considerations made for all potentially impacted communities in IIBA negotiations;
- The Proponent shall briefly discuss the negotiation of the IIBA and framework, including: with whom such agreements might be negotiated, whether these negotiations are expected to be concluded prior to the construction of the Project, and what items are included in the negotiation (e.g. employment, training and education, contracting and business opportunities, workplace conditions for Inuit employees, contracting, as well as community support);
- How the interests of Inuit outside the Baffin region, but potentially impacted by the Project and its shipping are considered in the course of IIBA negotiation;
- The Proponent shall demonstrate a clear understanding of the opportunities the project presents to Nunavut communities, as well as undertake a thorough review of options for partnership with the Government of Nunavut, including the two-way negotiation of a Development Partnership Agreement as a way to maximize the benefits of the Project; and
- Any issues related to compensation required as a result of the Project.

8.2.10 Governance and Leadership

8.2.10.1 Baseline Information

- A description of current social and governmental regime in the Project region, structure and functions of the governments, Inuit organizations, other co-management organizations and interactions among those organizations;
- A description of the Proponent's understanding on the roles of 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 Qikiqtani Socio-Economic Monitoring Committee;
- The leadership of GN in policies making responsibilities on contracting, operation and management of community infrastructure, community and regional development planning; mechanism, processes and structures for conflict resolution; and
- Other social and economic responsibilities of governments in the Project impacted regions.

8.2.10.2 Impact Assessment

- Discussion of how the Project planning meets the needs of regional economy development strategic plan (community wellness initiatives, Hamlet programs, housing etc.), if applicable, which are managed by Federal and territorial governments agencies, and Inuit organizations;
- Assessment of how potential interest conflicts will be managed in current governance regime during Project development; and
- Discussion of efforts to be made by the Proponent within existing regulatory framework and government's initiatives, in terms of socio-economic monitoring, education and skill training, community facility development and other initiatives planned by the Proponent.

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 preliminary 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 the Project. 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 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 its individual monitoring and mitigation plans, 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 for major aspects of

construction and operations, prior to the commencement of construction. The EPP shall be integrated into construction and operation procedure documents which target the site foreperson, 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. If appropriate, a table of contents and an annotated outline for the EPP is to be presented in the EIS which shall address the major construction and operational 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 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 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 compliance 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;
- 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.

9.4 BIOPHYSICAL ENVIRONMENTAL MANAGEMENT PLANS

The Proponent shall present environmental management plans developed to eliminate or mitigate potential negative impacts of the Project on the biophysical environment as identified in Subsection 8.1. The Proponent shall also identify any residual effects after appropriate mitigation measures are implemented. These management plans shall target identified VECs.

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 should encompass the whole life of the mine to mitigate the potential ecological and human health risks. The Proponent should identify and describe the likelihood of possible malfunctions and accidents occurring independently of, or associated with natural hazards.

The following issues should 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 based and marine transportation, occurring independent of or associated with natural hazards;
- 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 of the plans if applicable; and
- Any other contemplated loss prevention practices, including insurance.

9.4.2 Spill Contingency Plans

The Proponent shall develop Spill Contingency Plans based on its Environmental Policy, to promote environmental awareness and safety, as well as to facilitate efficient cleanup for potential spill incidents related to the Project. These plans should include Land Based Spill Contingency Plans, Oil Handling Facility Contingency Plan and Shipboard Oil Pollution Emergency Plans. In each plan/plans, the Proponent should address potential constraints due to logistics, sea ice, and weather conditions for timely actions and immediate cleanups. When developing those plans, the following elements should be included:

a. Land Based Spill Contingency Plan
   - Requirements of federal and territorial regulations;
   - Substances covered by the plan (e.g. oil, 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 MSDS to designated emergency response and health centre staff;
- Alerting, notification and reporting procedures;
- Duties and responsibilities of key spill response organizations and personnel;
- Cleanup 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.

b. Oil Handling Facility 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 including a worst-case fuel spill scenario involving the entire contents of the largest fuel storage container on-site, whose impact distance is the greatest, and taking into consideration passive but not active mitigation measures. The scenario should detail product recovery, temporary storage and waste management needs and capacity.

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;
   - Major components which cover iron ore carriers, fuel tankers and other ships to be used for the Project;
   - 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, ships operators and possible third party) who carry out emergency actions.

9.4.3 Air Quality Monitoring and Management Plan

The Proponent shall develop an Air Quality Monitoring and Management Plan, which is associated with the baseline date and impact assessment and predictions in Subsection 8.1.2, this plan should include the following key elements:

- Description of proposed air quality monitoring and related adaptive management measures, 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 contaminates, comply with approved criteria, and reduce production of GHGs;
- 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 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 monitoring results.

9.4.4 Noise Abatement Plan

The Proponent shall develop a Noise Abatement Plan to provide information on monitoring and mitigating of noise impacts based its impact assessment in Subsection 8.1.3. This plan should 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;
- Description of noise attenuation and minimization measures to be employed through choosing appropriate equipment, installation of noise silencing devices, scheduling of takeoff and landing aircrafts, and blasting timing; and
- Occupational related noise management programs.

9.4.5 Site Water Management Plan

The Proponent shall develop a Site Water Management Plan for the Project. This Plan should provide a consolidated source of information on the strategies to be applied to intercept, collect, contain, monitor and prevent the release of potentially contaminated waters. This plan should be associated with the baseline date and impact assessment required by Subsection 8.1.5, and should consider the following:

- Surface runoff, snowmelt, and rainwater that might come in contact with contaminated areas;
- Runoff from waste rock stockpile areas and quarry sites, in particular the waste rock stockpiles with ARD and ML potential;
- Runoff from the lined fuel tank farms, fuel transfer stations, the landfarm facility and the landfill facility;
- Storm water/freshet from roads, borrow areas and airstrips with emphasis on those areas relating to iron ore fines stockpiles and other contamination-sensitive areas; and
- Management measures to reduce potential impacts to the receiving environment, including collection and monitoring of drainage water, installation of settling ponds/sumps and/or silt curtains, and characterization of construction materials.

9.4.6 Sewage/Grey Water Management Plan

- The Proponent shall develop a Sewage/Grey Water Management Plan with consideration for the following:
- Sewage/grey water treatment technologies and facilities, and estimated volumes and treatment targets of the effluent, as well as the applicable discharge standards;
- Sewage/grey 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.

9.4.7 Incineration Management Plan

The Proponent shall present an Incineration Plan which should discuss the following:

- Standards/requirements for emissions from incinerator operation;
- An inventory of domestic waste to be incinerated, including both land-based and onboard generated waste;
- Incineration technologies, facilities and applicable standards;
- Disposal of incineration ash; and
- Personnel training programs for incinerator management and operation.

9.4.8 Waste Rock Management Plan

The Proponent shall present a Waste Rock Management Plan which should encompass all wastes generated or produced by the Project through all Project phases. This plan should be associated with the description of waste rock management facilities in Subsection 6.4.13, and should include:

- An inventory of waste rock, including overburden, off grade iron ore, low grade mineralized material, processing wastes and excavated materials generated during construction of the transportation systems and other infrastructure;
- Stockpile design, locations and capacities, with reference to the estimate of waste rock volume/tonnage and associated physiochemical character. Details related to waste rock stockpile methods and procedures, runoff management, and plans for progressive reclamation should also be presented;
- Details regarding the process for selecting the preferred options for management of waste rock, including a discussion of alternative options (methodologies as well as locations) considered, and the rationale by which the proposed scheme was selected.
- Technically achievable measures to accommodate the projected volumes of material;
- Contingency plans for the proposed control measures should it be found the capacity is inadequate; and
- Conceptual plan to monitor and audit mine waste rock.

9.4.9 Hazardous Materials Management Plan

The Proponent shall develop a Hazardous Materials Management Plan. This plan should be developed in connection with the Emergency Response and Contingency Plan, and include the following:

- Hazardous materials discussed should include: fuel and lubricants, chemical reagents used for site laboratory, solvents and paints, medical wastes, batteries, and other office-generated hazardous waste;
- Inventory of the types and volumes of hazardous wastes generated or produced by Project activities;
- 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;
- Methods for transport, storage, handling, and use;
- Identification of disposal methods for potentially hazardous waste generated;
- 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;
- 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; and
- Procedures to track and manage wastes generated through use of these products, including regular shipments of potentially hazardous waste to licensed disposal facilities.

9.4.10 Explosives Management Plan

The Proponent shall develop an Explosives Management Plan which should provide information on explosives transport, storage and handling at the Project. This plan should 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);
- Best practices to minimise usage and loss rate;
- Spill reporting and clean up procedures;
- Personnel training program; and
- Internal audit and inspection.

9.4.11 Landfill Management Plan

The Proponent shall develop a Landfill Management Plan which discusses how non-combustible, non-hazardous industrial wastes will be handled in a safe and environmentally sound manner. This plan should include:

- Inventory of the types and volumes of non-combustible, non-hazardous industrial wastes to be generated and land filled over the life of the Project;
- Landfill design including construction materials, locations and capacities;
- Management plans for operations;
- Rainwater, snow and spring freshet management plans; and
- Final reclamation plans.

9.4.12 Borrow Pits and Quarry Management Plan

The Proponent shall develop a Borrow Pits and Quarry Management Plan which should include 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;
- Erosion prevention and control measures;
- Results of ARD 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 resources and wildlife;

- 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 Aquatic Ecosystem Management Plan

The Proponent shall develop an Aquatic Ecosystem Management Plan to address mitigation measures to be implemented to protect and minimize the impacts on aquatic system from project activities occurred in or near and water courses during construction, operation, closure and reclamation phases. This plan should include:

- Erosion and sediment control measures for works in or near water bodies and water courses;
- Measures to be applied to protect fish, aquatic biota, and the habitat of both during blasting in or near freshwater and marine environments; and
- Monitoring and reporting protocols.

9.4.14 Railway Management Plan

The Proponent shall present a Railway Management Plan in conjunction with Spill Contingency Plan, Wildlife Mitigation and Monitoring Plan, and other related plans as deemed appropriate. This plan should provide information that encompasses construction and operation phases, including a discussion of the following:

- Applicable Regulations, Acts, and Guidelines;
- Associated with the Wildlife Mitigation and Monitoring Plan, a description of planned measures to monitor and mitigate potential noise and vibration related impacts on caribou and other wildlife species;
- Mitigation measures might include considerations related to the scheduling and timing of railway operation during critical wildlife life cycle stages (e.g., caribou calving and migration);
- Measures to be employed to protect wildlife from accidental injury and minimize collision related mortalities;
- Measures to prevent spills of fuel/dangerous goods transported by trains during operation;
- Mitigation measures to ensure the safety of traveling, fishing, hunting/trapping activities for persons using snow mobile, sledges and ATVs in the vicinity of the railway;
- Contingency /safety plans for natural disasters, hazardous weather conditions, and potential malfunction and accidents from failures of mechanical and/or communication equipment;
- Measures to prevent wind blowing fine iron ore and other materials; and
- Other management plans to mitigate/manage potential adverse impacts on the ecosystem and human health directly or indirectly resulting from railway operation.

9.4.15 Shipping Management Plan

The Proponent shall present an updated Shipping Management Plan based upon the increase in shipping activity that is being proposed, as well as for all Project-related shipping, in connection with the SOPEPs (Subsection 9.4.2, c), the Wildlife Mitigation and Monitoring Plan, and other related plans as applicable. This plan should include the following:

- Applicable legislation, regulations, Acts and guidelines;

- Discussion of shipping operations associated with the Voisey's Bay and Raglan mine developments, with a focus on any applicable lessons learned, and implications to the proposed shipping for the Project, if any;
- Protocols for the transport of fuel and other dangerous goods;
- Ballast water management plan;
- Onboard waste management plan (including solid waste, sewage, and other domestic waste);
- Marine wildlife mitigation and onboard monitoring plans, including:
    - Applicable guidelines, monitoring protocols, and reporting/action procedures;
    - Qualifications and training plans for marine mammal monitors;
    - Measures to minimize the potential interactions between marine mammals and ships; and
    - Description of how interactions between marine mammals and shipping operations will be dealt with.
- Smuggling prevention measures;
- Identified third party liabilities;
- Contingency plans for accidental spills of fuel and chemicals, extreme weather conditions, and malfunctions during shipping operations, with reporting/action procedures. 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 by snow mobiles, sledges, and boats along Project shipping routes; and
- Measures intended to mitigate potential socio-economic impacts as results of shipping.

9.4.16 Wildlife Mitigation and Monitoring Plan

The Proponent shall develop a Wildlife Mitigation and Monitoring Plan with consultation with Government of Nunavut, Department of Environment (GN-DoE), Fisheries and Oceans Canada (DFO) and other relevant agencies or organizations. This plan should 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 also should 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;
- Discussion of how impacts to Polynyas will be minimized or prevented;
- A clear and detailed 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 individual researchers which carry out 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 truck traffic operational flexibility along the Tote Road that can accommodate different levels of mitigation;
- Measures to be applied to avoid or reduce the disturbance, harassment, injury or mortality of marine mammals due to shipping or ice breaking activities;
- Measures to minimize noise disturbance to wildlife and hunters/travellers when conducting aerial wildlife surveys;
- Plans to facilitate the safe passage of wildlife across the railway, and associated mitigation measures to prevent collisions with wildlife;
- 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 the plan updating procedures.

9.4.17 Offsetting Plan for Serious Harm to Fish

The Proponent shall present an Offsetting Plan, developed in consultation with Fisheries and Oceans Canada-Fisheries Protection Program (DFO-FPP), the Qikiqtani Inuit Association and impacted communities. This plan should discuss the following:

- Requirements of Fisheries Act and related DFO-FPP policies;
- A description of the measures that will be implemented to offset the serious harm to fish;
- An analysis of how these measures will offset the serious harm to fish;
- A description of the measures and standards that will be in place during the implementation of the offsetting plan to avoid or mitigate any adverse effects on fish and fish habitat that could result from the implementation, and an analysis of how those measures and standards will avoid or mitigate those adverse effects;

9.4.18 Roads Management Plan

The Proponent shall develop a Roads Management Plan for the Milne Inlet Tote Road and other access/service roads in the Project areas, covering construction, operation and reclamation phases of the Project. In association with the Spill Contingency Plan and the Wildlife Mitigation and Monitoring Plan, this plan shall include the following:

- General company policies for private roads and roads accessible for public;
- Speed limits of various types of roads;
- Operational procedures for dust suppression, snow removal and snow drift management, control of surface runoff including spring freshet and flooding, and sediment control measures during maintenance and operation;
- Discussion of public access and related management, associated mitigation or safety measures if relevant;

- Mitigation measures and protocols to be implemented during construction and operations to mitigate potential impacts to water;
- Mitigation measures and protocols to be implemented during construction and operations to mitigate potential impacts to wildlife, including collisions and follow-up procedures;
- Safety procedures, emergency reporting and procedures for fuel/chemical spills, and other emergency events; and
- Plans for closure and reclamation, including a discussion of potential future uses (e.g., potential public use).

9.5 SOCIO-ECONOMIC ENVIRONMENTAL 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. These Socio-Economic Environmental Management Plans shall correspond to the socio-economic impacts assessment described in Subsection 8.2. Also these monitoring plans should 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.

In this section, the Proponent shall describe its socio-economic 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 Qikiqtaaluk 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 general areas that shall be considered by the Proponent's socio-economic monitoring include human resources, occupational health and safety, community and public involvement, implementation of benefits agreements (IIBA), and if applicable, development partnership agreements. 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 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:

- Policies and guidelines regarding interaction with Nunavut's medical health system ;
- Best safety practices and safety awareness programs;
- 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, etc.;
- Risk management and safety management Details regarding the preparedness of mine safety equipment and devices;
- Procedures for emergency incidence reporting and actions;
- Details regarding workplace monitoring and control; and
- First aid training and occupational medical surveillance.

9.5.2 Community Involvement Plan

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

- 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.);
- Methods and procedures for the establishing effective two-way communications for collecting and addressing public concerns;
- 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; 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.

9.5.3 Cultural and Heritage Resources Protection Plan

The Proponent shall 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 protection of archaeological sites and mitigation of potential adverse impacts.

9.5.4 Human Resources Plan

The Proponent shall develop a Human Resource Plan. This plan should include the following:

- Applicable human resources legislation and the Proponent's policies regarding compensation and benefit programs (e.g., health care plan, insurance, vacation/maternity leave, etc.);
- Recruitment strategies to overcome potential entry barriers, education and training programs both for Project specific and universally applicable skills (e.g., partnerships with local schools and other educational institutions, on-the-job learning, and apprenticeships).A discussion of associated with regular information updates to public regarding employment/training opportunities, hiring plans and time schedules, etc. should also be included;
- Education and Orientation Plan to assist employees to understand their responsibilities in environmental protection and health and safety management;
- Worker rotation and pay schedules, health and safety programs, preferential recruitment policy, gender equality, skills and entry requirements, training and career development;

- 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;
- Considerations of the following issues: on-site public safety and wellbeing; cross-cultural orientation; firearms control; sexual and gender harassment; alcohol and drugs control measures; and supply of country food to Inuit workers at the mine site;
- 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 closed and reclaimed following mine closure. The plan can be preliminary with key issues addressed for the Environmental Assessment in NIRB's Part 5 Review, and NWB Type A water license application, with the following targets:

- 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 major targets for reclamation of lands potentially affected by the Project;
- Description of reclamation methods, time frames and schedules, including proposed 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 aspects 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 closure and post-closure monitoring of environmental components including, but not limited to, wildlife, vegetation, air quality, landform stability and water quality;
- Discussion the need for long-term monitoring and maintenance by establishing physical and chemical stability of reclaimed areas;
- Discussion on reduction or elimination of environmental effects once the mine ceases operation;
- Discussion regarding re-establish conditions that permit the land to return to a similar pre-mining land use;

- Considerations for ARD and/or ML potential of rocks, in association with related waste rock management strategies;
- Any considerations for the restoration the natural aesthetics of the project; and
- The Plan is considered to be 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. 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.

9.7 FOLLOW-UP AND ADAPTIVE MANAGEMENT PLAN

A follow-up plan is a formal, ongoing process to: verify the accuracy of the environmental impact predicted in the EA 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 plan with new mitigation or compensation measures must be developed, in particular 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 be employed in the environmental management system:

- The need for such a follow-up and adaptive 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, would incorporate;
- The mechanisms, through which monitoring results will be analysed, and if necessary, adjusted mitigation measures or adaptive 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; and
- The sources of funding for the plan and reporting.

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 Subsection 7.11.

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 Baffin

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 their role 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 organisation.

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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. Inuit 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 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:

- the Project setting, taking into account the location's unique Ecosystemic characteristics, and
- 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.

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:

- measure the relevant effects of projects on the Ecosystemic and socio-economic environments of the Nunavut Settlement Area;
- determine whether and to what extent the land or resource use in question is carried out within the predetermined terms and conditions;
- provide the information base necessary for agencies to enforce terms and conditions of land or resource use approvals; and
- Assess the accuracy of the predictions contained in the project impact statements.

10. Trans-Boundary Effects Analysis

Where relevant, an EIS must include an assessment of all significant adverse Ecosystemic or socio-economic trans-boundary 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.