DRAFT

GUIDELINES TO THE PREPARATION OF AN ENVIRONMENTAL IMPACT STATEMENT

FOR
SABINA SILVER CORPORATION'S HACKETT RIVER PROJECT

REV. 0 – OCTOBER 24, 2008

NUNAVUT IMPACT REVIEW BOARD
P.O. Box 1360
Cambridge Bay, Nunavut X0B 0C0
Telephone: (867) 983-4600
Fax: (867) 983-2594
E-mail: info@nirb.ca

GLOSSARY

This glossary defines the most important technical terms used in the Guidelines. It is designed to assist non-technical readers, and the definitions of terms are, therefore, of a "popular" nature.

Albedo	The amount of light reflected by a surface such as snow.
Archaeology	The scientific study of the material remains of the cultures of historical or prehistorical peoples.
Avifauna	Birds.
Bioaccumulation	The uptake and retention of contaminants by an organism from its environment.
Biodiversity	A measure of the variety of plants and animals in a particular habitat or ecosystem.
Borrow pit	A pit from which material is taken for building roads and for similar activities.
Cumulative effects	The impacts of a development taken in combination with the impacts of other past, current, or reasonably foreseeable future developments.
Delta	A deposit of sediment, usually triangular in shape, at the mouth of a river, stream or tidal inlet.
Demography	The statistical study of populations, with particular reference to births, deaths, migratory movements, age and sex.
Ecosystem	The organisms of a natural community together with their environment.
Esker	A winding ridge made of sand and gravel deposited by a melting 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	Very small particles of rock, mineral or sediment.
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" Gas	A gas released into the atmosphere, often by human activities such as burning fossil fuels, that increases the capacity of the lower atmosphere to trap heat from the sun, thereby contributing to global warming.
Hydrocarbons	Any substance containing carbon and hydrogen in various combinations (e.g., gasoline and oil).
Hydrology	The science that deals with the occurrence, circulation, distribution, and properties of the waters of the Earth, including their reactions with the environment.
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. Can occur underground in soil and rock, or above ground through piles of material.
Limnology	The study of life in lakes, ponds, and streams.
Lithology	The description of the physical characteristics of a rock, often based on its colour, structure, mineral components, and grain size.
Local Study Area	The spatial area within which local effects area are assessed (i.e., within close proximity to the action where direct effects are anticipated).
Nitrate	A compound containing nitrogen that can exist in the atmosphere or as a dissolved gas in water and that can have harmful effects on humans and animals.
Nitrite	A chemical compound produced when ammonia in wastewater is oxidized by bacterial or chemical reactions and ultimately becomes nitrate.
Nitrogen dioxide	The result of nitrate oxide combining with oxygen in the atmosphere. Nitrate oxide is a gas formed by combustion under high temperature

	and pressure, for example in a vehicle engine. Nitrogen dioxide is a major component of photochemical smog.
Nunavummiut	The indigenous inhabitants of Nunavut.
Ore	A rock or mineral that contains a valuable constituent, such as diamonds or a metal, for which it is mined and processed.
Overburden	Material that must be removed to allow access to an ore body, particularly in a surface mining operation.
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.
Permafrost	Permanently frozen ground.
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.
Plume	A visible or measurable discharge of a contaminant from a given point of origin. Plumes may occur in water or air.
Pore	A very small hole, such as may occur in some types of rock.
Post-closure	The period of time, considered to be up to 30 years, following the shut-down of a mine or other facility, during which monitoring of its effects should be continued.
Post-project audit	An evaluation after a development of all of its environmental and social impacts and of the mitigation measures applied to it.
Precautionary Principle	If performing (or not performing) some activity carries threats of serious or irreversible damage, a lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation.
Proponent	The individual or organization that wishes to carry out a development project.
Raptor	A bird that hunts by snatching its prey.
Regional Study Area	The spatial area within which cumulative effects are assessed (i.e., extending a distance from the project footprint in which both ddirect and indirect effects are anticipated to occur).

Riparian	Living or located on a river bank.
Rock glacier	Boulders and fine material cemented by ice about a meter below the surface.
Rock heave	The movement of rocks as a result of freezing and thawing.
Rotary-wing aircraft	A helicopter.
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. (See Ittarnisalirijiit Conference on Sacred Sites and Spiritual Places, Rankin Inlet, 1996).
Seismicity	The phenomenon of earth movements, in extreme cases in the form of earthquakes, and their geographic distribution.
Sulfur dioxide	A gas formed when sulfur burns in the presence of oxygen, as for example in the burning of gasoline or diesel fuel in a vehicle engine. It is a major air pollutant that is corrosive and harmful to plants and animals, especially trees.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Tailings pond	An engineered structure for storing those portions of washed, processed or milled ore that are regarded as too poor to be treated/processed further.
Talik	Permanently unfrozen ground in regions of permafrost. Usually applies to a layer that lies above the permafrost but below the active layer.
Thermal stability	The degree to which something, such as permafrost, has the capacity to remain at the same temperature over time.
Toponym	A place name.
Toxin	A poisonous substance.
Zooplankton	Very small animals that float or drift in lakes.

LIST OF ACRONYMS

ARD	- Acid Rock Drainage
BIPR	- Bathurst Inlet Port and Road
CEA	- Cumulative Effects Assessment
DPA	- Development Partnership Agreement
DEIS	- Draft Environmental Impact Statement
EIS	- Environmental Impact Statement
EMP	- Environmental Management Plan
FEIS	- Final Environmental Impact Statement
GN	- Government of Nunavut
KIA	- Kitikmeot Inuit Association
INAC	- Indian and Northern Affairs Canada
LSA	- Local Study Area
MVEIRB	- Mackenzie Valley Environmental Impact Review Board
NIRB	- Nunavut Impact Review Board
NLCA	- Nunavut Land Claims Agreement
NPC	- Nunavut Planning Commission
NWB	- Nunavut Water Board
NSA	- Nunavut Settlement Area
RSA	- Regional Study Area
VEC	- Valued Ecosystem Components
VSEC	- Valued Socio-economic Components

NOTES

(1) The terms “impact” and “effect” are used interchangeably in the present text.
(2) The terms “EIS” and “DEIS” are used interchangeably in the present text.

TABLE OF CONTENTS

1.0 INTRODUCTION

The present Guidelines are issued for the preparation of a draft Environmental Impact Statement (EIS) for the Hackett River Project by Sabina Silver Corporation (the Proponent). An EIS is a documented evaluation of the project proposal, providing detailed information regarding the proposal's environmental and socio-economic impacts (NIRB 2006). An EIS is designed to serve as the means of assessing the environmental impact of project proposals, rather than to justify decisions already made (NIRB 2006). 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 Hackett River Project is subject to the environmental review and related licensing and permitting processes established by Part 5 of the *Nunavut Land Claims Agreement* (NLCA) (Government of Canada and Tungavik Federation of Nunavut 1993). See the September 4, 2008 decision of the Minister of Indian and Northern Affairs Canada (INAC), available at http://ftp.nirb.ca/REVIEWS/CURRENT_REVIEWS/08MN006-SABINA_HACKETT_RIVER/2-REVIEW/01-SCREENING%20DECISION/ for further reference to the Part 5 Review.

The Draft Environmental Impact Statement (DEIS) developed in accordance with these Guidelines will serve as the basis for the Nunavut Impact Review Board's (NIRB or Board) review of the Project and will enable the Board and any interested party to understand and assess the potential adverse and beneficial biophysical environmental and socio-economic effects that are related to the Project.

The NIRB based these EIS Guidelines on the January 2008 *Hackett River Project Propos*al submitted by the Proponent and on the NIRB's Public Scoping process. The scoping period began in January 2008 and will continue up to the conclusion of the NIRB Scoping Meetings in Cambridge Bay on October 29 and 30, 2008. During the scoping period, the NIRB is reviewing with the public the January 2008 *Hackett River Project Proposal* prepared by the Proponent and the NIRB's environmental assessment process. Additionally during this period, the NIRB solicited and received oral and written comments from individual members of the public, government, and representatives of various groups regarding the issues to be included in the environmental review.

Upon receipt of these *draft* EIS Guidelines, the Proponent is required to prepare and submit to the NIRB a DEIS that meets or exceeds the requirements specified herein. It is the sole responsibility of the Proponent to prepare a complete DEIS that includes sufficient basic data and analyses for a complete assessment of the anticipated impacts of the Project. The DEIS should be concise and should focus on the assessment of significant environmental effects. In particular, the Proponent cannot invoke omissions in these Guidelines to justify any inadequacies in its DEIS.

The NIRB shall conduct an internal review of the material presented in the Proponent's submission of a DEIS 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 NIRB's project-specific guidelines and the NIRB's 10 Minimum EIS Requirements (Appendix A) has been omitted from the DEIS. Guideline conformity review is a presence or absence analysis; it is not intended to evaluate 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 DEIS. The NIRB will submit the DEIS to the NIRB panel, Inuit organizations, community stakeholders, regulatory bodies, technical advisors, and other interested parties for review. The technical review period includes project specific, cumulative, socio-economic, and ecosystem level impacts. Once the technical review of the document is completed, a technical meeting may be held that involves discussions on technical matters related to the DEIS. The technical meeting is kept as informal as possible in an effort to resolve technical issues prior to the Pre-Hearing Conference (PHC). After the PHC, the Proponent will be required to revise the DEIS and address any shortcomings revealed by the technical review, and to ultimately submit a Final EIS (FEIS). Once the received and accepted by the NIRB, the NIRB will notify the public and distribute the FEIS to participants in order that they prepare for their technical review that will culminate in the NIRB hearing. Finally, if there is any conflict with these Guidelines or any legislation cited herein and the NLCA, the latter shall prevail.

Should a period greater than one (1) year elapse between the issuance of these Guidelines and the Proponent's submission of their DEIS, the NIRB reserves the right to reassess these Guidelines and to update or amend them accordingly. This will allow for consideration to be given to changes in the

Project description, baseline information, relevant technological advances, or changes in the regulatory and/or regional environments.

2.0 FOCUS OF NIRB REVIEW

2.1 SCOPE OF THE PROJECT

Based on the January 2008 Project Description and the NIRB's requirements for the Proponent's development of an Environmental Impact Statement, the following subsections comprise the focus and scope of the NIRB review. In preparing the DEIS, the Proponent should follow these guidelines closely as well as paying specific attention to the requirements of the NLCA, the NIRB's Minimum EIS Requirements, and General EIS Principles as listed below. In addition, the Proponent should note that directions regarding EIS Format are a further submission requirement of the NIRB. A discussion of EIS Format requirements may be found in Subsection 4.4.

2.1.1 Nunavut Land Claims Agreement – Article 12 (Section 12.5.2 a through j)

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

2.1.2 NIRB's Minimum EIS Requirements

1. Statement of Consultation Principles and Practices

   Pre-project consultations with locally affected persons must meet or exceed usual consultation practices in Canada. When 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. 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 down the-road 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 it is anticipated that further economic development is needed for a given area, the Board expects the Proponent to provide an analysis of the deficiencies in the economic status quo.

4. Anticipated Impacts Analysis

   A comprehensive impact assessment must be carried out and which includes, but is not limited to, the 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, it will cause an additive effect. A comprehensive examination of all cumulative effects must be included in an EIS.

6. Significant Effects Analysis

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

a. The Project setting, taking into account the location's unique ecosystemic characteristics; and,
b. The severity of the impacts, taking into account: 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, any 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 under similar 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:

a. Measure the relevant effects of projects on the ecosystemic and socio-economic environments of the Nuanvut Settlement Area;
b. Determine whether and to what extent the land or resource use in question is carried out within the predetermined terms and conditions;
c. Provide the information base necessary for agencies to enforce terms and conditions of land or resource use approvals; and,
d. Assess the accuracy of the predictions contained in the project impacts statements.

10. Transboundary Effects Analysis

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

11. Any other matters deemed necessary

2.1.3 General EIS Principles

In order to fulfill the requirements set forth in section 12.5.2 of the NLCA, the Proponent must consider the following when preparing an EIS:

a) The EIS shall flow logically and be written in plain language;
b) Impacts shall be discussed in proportion to their significance;
c) The EIS Main Document shall be concise, no longer than 150 pages, numbered, and double-spaced. The EIS Main Document shall reference supporting documentation where additional information and baseline data can be found;
d) 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 can be found;
e) The EIS shall state how alternatives which were considered in it and decisions based upon it, will or will not achieve the requirements of Article 12 and other environmental laws and policies;

f) The range of alternatives discussed in the EIS shall fall within the NIRB's mandate and encompass options considered by the ultimate decision-making agency;

g) Neither Proponents nor Governments shall commit resources prejudging selection of alternatives before making a final decision; and

h) The EIS shall serve as the means of assessing the environmental impact of project proposals, rather than justifying decisions already made.

2.1.4 Hackett River Project Components

The following is a description of the physical works and activities or undertakings that constitute the Hackett River project proposal. These components and/or activities have the potential to cause significant adverse effects on the ecosystem, wildlife, or Inuit harvesting activities, and are therefore included within the scope of the project.

a) **BIPR Infrastructure** (to be constructed as part of the BIPR Project)**:**

i. **Bathurst Inlet Port**, utilization of infrastructure including:

Berth and equipment used for loading and unloading ocean going vessels; dock and associated dredging activities; fuel unloading facilities, terminal pipelines, tank farm, and dispensing systems; general cargo short-term and long-term laydown areas; general cargo handling of mobile equipment including cranes, forklifts and reach trucks; administration and maintenance offices; camp facilities and services, including accommodations and airstrip; desalination plant; site roads; waste and wastewater management and disposal systems; power plant.

ii. **All-Weather (BIPR) Road from the Port at Bathurst Inlet to an All-Weather Spur Road Connecting with the Hackett River Mine Site,** utilization of infrastructure (northern 80 km of BIPR road) including:

Activities: Transportation and haulage of fuel, dry goods, explosives and hazardous materials, equipment, ore concentrate and other materials; use of the road every day of the year that it is passable (excepting weather, wildlife, and road maintenance); and 9-10 tractor trailer units making four 40 tonne trips per day.

b) **Mobilization and Shipping** including:

Vessel and routing options; mobilization of equipment and supplies; shipping routes to the east and to the west of Bathurst Inlet; use of two 50,000 dwt ice-class vessels, each making call at the Bathurst Inlet Port five times per season.

c) **Bathurst Inlet Port**, infrastructure to be constructed and utilized by Sabina, including:

Concentrate truck receiving, unloading, and wash-down facilities; concentrate receiving, conveying, reclaiming, and ship loading systems; ore storage facility (capacity of 450,000 tonnes); concentrate dust control system; site run-off collection and treatment systems; explosives storage and handling; ammonium nitrate prill storage and handling; hazardous materials storage and handling; and possibly additional storage for goods to be backhauled to the mine.

d) **All-Weather Access (Spur) Road connecting the Hackett River Mine Site with the All-Weather (BIPR) Road to the Port at Bathurst Inlet** including:

Routing options; waterway and/or diversion structures; infilling activities; water withdrawal(s) and associated activities; navigable water crossings; stream flow diversions and alternative watercourses; alterations to watercourses; quarrying and borrow source areas; and temporary camp(s) used during the construction of the road.

Activities: Transportation and haulage of fuel, dry goods, explosives and hazardous materials, equipment, ore concentrate and other materials; use of the road every day of the year that it remains passable (weather, wildlife, and road maintenance); and 9-10 tractor trailer units making four 40 tonne return trips per day.

e) **Hackett River Airstrip**, including:

2000 m airstrip; construction camp; fuel tank farm; diesel generators; freshwater intake; wastewater treatment; all associated navigational aids and infrastructure.

Activity: Capacity to land heavy-lift type aircraft and Boeing 727 type planes. Airstrip will facilitate transport of mine personnel and general freight/supplies. Smaller aircraft will likely fly daily between mine site and Yellowknife.

f) **Hackett River Mine Site**, including:

East Cleaver (open pit and underground); Main Zone (open pit and underground); Boot Lake (open pit and underground); mineral processing and milling facilities; power generation facilities; paste backfill plant; mine site roads and utilities; ore storage facilities; backfill stockpile; waste rock and low grade ore storage; tailings impoundment facilities; damming of waterbodies; tailings line and emergency catch basins; water, waste, and sediment management structures; water treatment plant; water supply structures; camp(s); buildings; lay-down area(s); sewage collection and treatment facilities; solid waste management facilities; landfill; landfarm; incinerator; fuel storage and dispensing systems; hazardous materials handling and storage; lake dewatering; quarrying and borrow sources; work force; stream flow diversions and alternative watercourses; alterations to watercourses; explosives storage, mixing and dispensing systems and magazines and support facilities to be included in a "licensed factory" to be located at the mine site as defined by the *Explosives Act.*

g) **Borrow Sources**, including:

Quarries, gravel pits, and waste rock piles; equipment and activities related to stripping, excavation, and crushing of aggregate; stockpiles; access roads; and waste rock and debris; and blasting activities.

h) **Alternatives Assessment –**

i. Sabina Access Road and Port

Components of Port to include:

Dock and associated dredging activities; berth and equipment for loading and unloading ocean going vessels; fuel unloading facilities; terminal pipelines; tank farm and dispensing systems; explosives storage and handling; ammonium nitrate prill storage and handling; hazardous materials storage and handling; general cargo short-term and long-term laydown areas; general cargo handling of mobile equipment including cranes, forklifts, and reach trucks; administration and maintenance offices ;camp facilities and services; accommodations and airstrip; desalinization plant; site roads; waste and wastewater management and disposal systems; power plant.

Components of Road to include:

Earthmoving, excavation, and grading activities; quarrying and borrow source areas; water withdrawal(s) and associated activities; navigable water crossings; streamflow diversions and

alternative watercourses; alterations to watercourses; and temporary camp(s) used to construct the road.

Road routing to follow the general alignment as the proposed BIPR road between port and Hackett River area, but with some variation to minimize distance traveled between port and mine site. The road would continue no further south than the Hackett River mine site.

ii. The "no-go" option

2.1.5 Scoping List

The scope of the environmental assessment is intended to address the potential impacts of the Project components listed above (Subsection 2.1.4, items a-h) on the environmental components (ecological and socio-economic) below, considering both a spatial and a temporal scale.

As such, the scoping list and resulting analysis shall address the effects of the construction, operation, modification, decommissioning, abandonment, and reclamation of each of the Project components on the ecological and socio-economic factors listed below.

a) Atmosphere, including climate change, air quality, and noise factors;
b) Hydrology and hydrogeology;
c) Groundwater quality;
d) Surface water and sediment quality *and* quantity;
e) Freshwater aquatic organisms (including fish as defined in the *Fisheries* Act) and habitat;
f) Marine water and sediment quality;
g) Marine fish and fish habitat;
h) Marine mammals and marine habitat;
i) Migratory birds and habitat;
j) Wildlife and wildlife habitat;
k) Species at risk;
l) Landforms and soils;
m) Vegetation;
n) Permafrost management;
o) Human and ecological health;
p) Socio-economic factors to include:
    a. Mobilization of human resources;

b. Purchase of local goods and services;
c. Use of local infrastructure; and,
d. Hub communities;

q) Archaeological and palaentological resources;
r) Emergency response;
s) Hazardous materials management;
t) Accidents and malfunctions;
u) Cumulative effects;
v) Transboundary effects;
w) Traditional Knowledge; and,
x) Monitoring programs (environmental and socio-economic components) and post-project analysis (PPA).

2.2 NIRB PRINCIPLES

According to the NIRB's NLCA mandate as found in Article 12.2.5, the following principles should be followed in the preparation of the DEIS:

- An Ecosystem based approach must be adopted for the review - In order to gain an adequate understanding of the effects of the Project, an ecosystem-based approach must be adopted to ensure that the review addresses both the direct impacts that the Project will have on the various ecosystem components, as well as the interactions that will occur between components.
- Socio-economic issues, such as 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 West Kitikmeot 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.

As documented in the NIRB's Minimum EIS Requirements (Subsection 2.1.2), the NIRB will consider the need for, alternatives to, and alternative means of, carrying out the Project in assessing the justifiability of any significant environmental and socio-economic effects identified, and in formulating its recommendations to the responsible Ministers.

2.2.1 Respect for the Principle of Sustainable Development

Promotion of the Principle of Sustainable Development, or development that meets the needs of the present without compromising the ability of future generations to meet their own needs, is a fundamental purpose of environmental assessment, particularly owing to the fact that the NIRB's original mandate is ecosystem-based. These EIS Guidelines are based upon three factors that the NIRB considers directly associated with sustainable development. These factors are:

1) The extent to which biological diversity is affected by the Project;
2) The capacity of renewable and non-renewable resources that are likely to be significantly affected by the Project to meet the needs of the present and those of future generations; and,
3) The Precautionary Principle, which can be explained to mean, if there are threats of serious or irreversible damage, that a lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

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

a) The preservation of ecosystem integrity, including the capability of natural systems (local and regional) to maintain their structure and functions and to support biological diversity;

b) Respect for intergenerational equity, i.e., the right of future generations to the sustainable use of renewable and non-renewable resources depends on our commitment to those resources today; and,

c) The attainment of durable social and economic benefits, particularly in Nunavut.

The NIRB requires the Proponent to demonstrate how the Project meets these three goals as noted above.

2.2.2 Emphasis on Community and Traditional Knowledge

Community knowledge, including Traditional Knowledge, is acquired as a result of a sustained relationship between a population and an environment. Community and Traditional Knowledge have an important contribution to make in completing a full assessment of the effects of the Project. This knowledge is based on personal observation, collective experience, and oral transmission over generations. The Proponent should identify any specific concerns based on local community knowledge and expertise when preparing the DEIS. The NIRB recommends that the Proponent take advantage of existing literature devoted to the understanding of community and Traditional Knowledge and its place within the environmental assessment process. An effective assessment of Traditional Knowledge can greatly assist with the required identification and validation of Valued Ecosystem Components (VECs) and Valued Socio-economic Components (VSECs) (Mackenzie Valley Environmental Review Board, July 2005)[1]. The Proponent should use every available means to ensure that a baseline level of community and Traditional Knowledge is gathered.

3.0 PROJECT DEFINITION

The project involves the construction, operation, maintenance, reclamation, and abandonment of a base metal mine in the West Kitikmeot Region of Nunavut. The proposed project would employ a

[1] The Mackenzie Valley Environmental Impact Review Board (MVEIRB) released Guidelines pertaining to the use of Traditional Knowledge in the EA process, which may assist the Proponent in the collection, use, and protection of such knowledge (MVEIRB, July 2005). With respect to existing Traditional Knowledge studies in the West Kitikmeot, The NIRB is aware of a number of organisations, such as the West Kitikmeot/Slave Study Society, which have conducted Traditional Knowledge studies which may assist the Proponent in the collection of relevant information.

combination of open pit and underground mining techniques, and the associated processing of lead, zinc, copper, silver, and gold ores. The major activities proposed for this project involve a mill, camp, airstrip and airport facilities, waste management facilities, all-weather spur road, and fuel tank farm. The proposed project would also utilise a portion of the road component of the Bathurst Inlet Port and Road (BIPR) project, as well as the deep water port located at Bathurst Inlet. An example of the highly detailed description of the Project and associated activities that shall be presented in the Proponent's DEIS is provided as follows:

- The Project property covers 12,250 hectares (ha) and is comprised of 7 mineral leases, overlain by surface rights of which approximately 72% are Inuit Owned Land, and 28% are Crown land;
- The Project will require personnel to be flown into and out of camp via an airstrip located near the mine site. All construction, operation, and consumable supplies will be transported on ocean freight systems to facilities at the Bathurst Inlet deep water port. Ore concentrate will be shipped via these haul ships from the Bathurst Inlet deep water port to national and international receiving markets;
- Transportation of materials by truck haul to and from the mine site will employ the northern portion (82 km) of the BIPR all-season road infrastructure (or alternative) in conjunction with a 23 km all-season spur road constructed by Sabina, connecting the mine site to the BIPR road (or alternative);
- Open pit mining will occur at the Boot Lake, East Cleaver, and Main Zone deposits, with stand-alone underground operations developed in order to extract mineralization immediately below the respective final pit limits at the cessation of open pit mining. In addition, waste rock storage facilities will be constructed, one for each of the Main and East Cleaver Pits;
- Underground mining will be employed for all three of the deposits (Main Zone, East Cleaver, and Boot Lake), and will be highly mechanized, employing mobile trackless mining equipment and ramp access to all mining levels within the mines. The Boot Lake mine will potentially extend to a depth of 650 m or more below surface. Mining will take place in both frozen and unfrozen ground. In addition, the methods will utilize sublevel longhole stoping, with both cemented and uncemented crushed rock backfill in the permafrost zone, and cemented paste backfill in the unfrozen zone below;

- Underground mines will be dewatered by pumping unsettled water to surface and discharging into the re-circulation process water tank in the mill plant;
- On-site ore processing of 10,000 tonnes/day using standard grinding and both copper-lead and zinc floatations to produce zinc, copper, and lead concentrates. Silver and gold value will report mostly to copper concentrate, with a small portion reporting to lead concentrate;
- Tailings from the process plant will be in slurry form, and will be piped via tailings pipeline to the Tailings Management Facility (TMF). The TMF will be formed by rockfill dams. The site of the TMF has not been determined. Justification for the site chosen will accompany detailed design details;
- Quarry and gravel pit development;
- Mined rock will be placed in the TMF and waste rock storage piles. During operation, drill cuttings from every blast hole will be assayed and materials assigned: ore, potentially acid generating (PAG), or non acid generating (NAG) designations; and waste rock will be hauled to designated waste management locations. All PAG wastes will be encapsulated within the waste rock dumps, beneath NAG cover extending the depth of the active permafrost zone;
- The mine site will be graded to divert surface runoff water to perimeter ditches, which will in turn, divert this runoff water to be collected in sedimentation ponds prior to its possible release into the surrounding environment;
- A dewatering plan to be generated and approved by regulators prior to any dewatering activities at Camp Lake;
- Exploration activities to include: delineation and exploration drilling, satellite and aircraft remote sensing, soil and sediment sampling, on-land and on-ice diamond drilling;
- Construction of multiple clear span bridges and culverts, and a bridge crossing over the Hackett River to support the all-season spur road;
- Utilization of proposed BIPR port and facilities at Bathurst Inlet to include: berth for loading and unloading ocean going vessels; fuel unloading facilities, terminal pipelines, tank farm, and dispensing systems; general cargo short-term and long-term laydown areas; general cargo handling of mobile equipment including cranes, forklifts and reach trucks; administration and maintenance offices; camp facilities and services, including airstrip; desalination plant; site roads; waste management and disposal systems; power plant;
- Port facilities to be constructed at Bathurst Inlet include: concentrate truck receiving, unloading, and wash-down facilities; concentrate receiving, conveying, reclaiming, and

shiploading systems; concentrate dust control system; site run-off collection and treatment systems; and possibly additional storage for goods to be backhauled to the mine;

- Construction of a 450,000 tonne capacity concentrate storage facility at the proposed BIPR port site;
- Construction of a mine site airstrip, 2000 m in length;
- Construction and operation of a permanent camp to accommodate approximately 300 people;
- Construction of wastewater and sewage treatment plant(s) and management of the outfall;
- Estimated 5 ML of fuel stored at the fuel tank farm on site (two 2.5 ML storage tanks). Fuel trucks will deliver fuel from storage at the port to the mine site tanks on a regular schedule;
- Chemical and hazardous materials transportation and storage;
- Explosives transportation and storage (at port and on-site magazines);
- Water required by all aspects of the proposed Project will be withdrawn from a source lake, yet to be identified by the Proponent;
- Landfill construction and solid waste management;
- Domestic wastes will be incinerated, and industrial or non-combustible wastes deposited as landfill in waste rock piles;
- Upon conclusion of activities, the Proponent plans to fully decommission the mine site.

The Proponent shall compile a description of all Project infrastructure and ancillary facilities, in addition to all activities and undertakings that are to be considered in the environmental review of the Project.

4.0 EIS OVERVIEW

4.1 PRESENTATION OF THE EIS

The Proponent shall provide an EIS that is complete, including scientific works and the Proponent's sectoral studies, and all other sources of information, including Traditional Knowledge. All scientific and sectoral studies shall be rendered current and shall be numbered and dated prior to their submission for examination. Maps, other than those used for orientation and context, shall be contained in a separate volume. The EIS shall, wherever necessary for a full understanding, be supplemented by a series of complementary documents providing technical and scientific support and containing

appropriate bibliographic references. The Proponent shall prepare and incorporate into the EIS a complete and detailed annotated bibliography of all studies and reports, including community consultations carried out in relation to the Project, and shall make such studies and reports available.

The EIS shall be made available both electronically on searchable CD-ROM, and in hard copy. The Proponent is responsible for the delivery of the DEIS to regulators and relevant authorities in addition to those recipients listed in Appendix B.

4.2 CONFORMITY

The Proponent is expected to observe the intent of the Guidelines, which will then lead to the preparation of a DEIS. Specific issues or directions described in the Guidelines must be easily identifiable in the DEIS and incorporated into the FEIS. In accordance with the NIRB's *Guide 7: Guide to the Preparation of Environmental Impact Statements* (NIRB 2006), the DEIS 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 can be found.

4.3 LENGTH

In accordance with the NIRB's *Guide 7: Guide to the Preparation of Environmental Impact Statements* (2006), the Proponent's EIS Main Document shall be concise and not exceed 150 pages without permission from the NIRB. 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 Appendices and Technical Reports submitted in support 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: Guide to the*

Preparation of Environmental Impact Statements (2006) and adapted as much as possible to the specific circumstances of the Hackett River Project:

- Title page;
- Executive summary;
- Popular summary;
- Table of contents, including: list of tables, list of figures, list of maps, list of acronyms**;**
- Concordance table which lists each of the Guideline requirements and their location within the EIS;
- The Proponent;
- Sustainable development and precautionary principle;
- Regulatory regime;
- Regional context;
- Spatial boundaries;
- Temporal boundaries;
- Land tenure;
- Alternatives, including the "no-go" option;
- Possible impediments to the Project;
- Project justification;
- Public consultation;
- Traditional Knowledge;
- Data acquisition methodology and documentation**,** covering biophysical and socio-economic aspects;
- Data analysis and reporting;
- Detailed project proposal definition;
- Baseline data collection;
- Description of biophysical environment;
- Description of socio-economic environment;
- Impact assessment methodology**,** including determination of impact significance, selection of indicators and criteria, covering biophysical and socio-economic aspects;
- Impact assessment**,** distinguishing biophysical and socio-economic aspects;
- Cumulative effects assessment;

- Environmental management and mitigation;
- Residual impacts;
- Monitoring, evaluation, and management;
- Closure and reclamation;
- Conclusion and recommendations;
- List of consultants and organizations;
- Glossary;
- Literature cited; and
- Appendices.

Further discussion of each of the above items can be found in Section 5.0 – Environmental Impact Statement Content Guidelines.

4.5 DATA PRESENTATION

The Proponent shall provide charts, diagrams, aerial and other photographs and maps wherever useful to clarify the text; and specifically, shall include maps or diagrams showing all project related infrastructure and/or activities (e.g., port site, mine site, transportation routes including marine shipping and air transport). Where feasible, maps shall be of a common scale and projection to facilitate comparisons.

4.6 SUMMARIES

4.6.1 Executive Summary

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. Specifically, the executive summary shall provide a summary of the pre-construction, construction, and operational activities upon implementation of the Project. In addition, the executive summary shall focus on items of known or expected public concern and shall focus on 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

It is essential to the environmental assessment process that residents of those communities likely to be affected by the Project have an adequate understanding of the proposed Project and any potential impacts to the environment which may result. The Proponent shall therefore prepare a popular summary which has the same general structure and objectives as the executive summary, but is written in non-technical language and includes 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 and, if possible, in the form of a video. The popular summary shall form part of the EIS, but it shall also be made available as a separate document.

4.7 TRANSLATION

The popular summary and glossary shall be translated into the local languages and dialects prevalent in the Kitikmeot Region. Maps should indicate common and accepted place-names usually referred to by the local populations in their own language, in addition to their official toponyms.

5.0 ENVIRONMENTAL IMPACT STATEMENT CONTENT GUIDELINES

5.1 PROPONENT INFORMATION

The Proponent shall identify itself and shall 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 that of any parent company and shall specify whether and how it applies to all businesses for which it has an operating responsibility, to employees, to contractors, and to suppliers. It shall also describe its reporting systems.

The Proponent shall describe its past experience in exploration, mining, and transportation networks involving marine and all-weather road components, with particular reference to:

- Its record of compliance with governmental policies and regulations pertaining to environmental and socio-economic issues;
- Mine safety, major accidents, and spills and emergencies, including 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 change of ownership;
- Relations with Aboriginal peoples, including prior experience with Impact and Benefit 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; and
- 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.

The Proponent shall also include a discussion of the steps it proposes to take to ensure it meets its tax obligations (including fuel and payroll taxes) with the Government of Nunavut.

If the Proponent does not have prior experience in exploration, mining, or transportation networks involving marine and all-weather road components particularly for this region, it shall explain the safeguards that it intends to put in place to compensate for that lack.

5.2 REGULATORY CONTEXT

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, such as the NLCA, *the Mine Site Reclamation Policy for Nunavut* (INAC, 2002), and the *Metal Mining Effluent Regulations* (EC 2002), among others. 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, should be appended.

The Proponent shall also identify any relevant international regulatory regimes, and explain how it would comply with them.

5.3 REGIONAL CONTEXT

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

The Proponent shall note that the Nunavut Planning Commission's (NPC) *Final Report on Resource Management Planning in West Kitikmeot* (1997) established the following goals for mineral development in the region and shall indicate how it has or will give effect to each of them:

- Mining companies shall continue to minimize the negative effects of exploration and mining activities;
- Mining companies shall hire locally and purchase local goods and services whenever possible;
- New mines shall be fly-in/fly-out operations. No new permanent mining communities shall

be built;

- All proposed mining developments must include plans, complete with financial guarantees, for the eventual abandonment and restoration of sites. All hazardous wastes must be removed;
- The mining industry is encouraged to assist in identifying local carving stone deposits; and
- Mining companies shall ensure that their employees observe special hunting restrictions at mine sites and along transportation routes (NPC 1997).

There may be a more current direction indicated or guidelines issued from the NPC, which the Proponent should be aware of, given especially, the *Draft West Kitikmeot Regional Land Use Plan* (2005).

The Board would consider as *advice,* the Proponent's discussion of the extent to which the Project meets the planning objectives outlined in the latest available version of the NPC's *Draft West Kitikmeot Regional Land Use Plan* (2005).

5.4 SPATIAL BOUNDARIES

Spatial boundaries of the Project must be determined on the basis of its potential impacts on the particular biophysical or social phenomenon being addressed.

The types of data collected and the methodologies, including public consultation and discussions with technical experts, for collecting, presenting, and analyzing such data must, to the extent possible, be consistent with the Nunavut General Monitoring Program of Article 12 of the NLCA.

The Proponent shall define the spatial boundaries of the maximum area potentially affected by the Project, based on the boundaries for each individual type of impact, and taking into account an analysis of such impact pathways as pollutant transport and accumulation mechanisms. Spatial boundaries may vary according to seasons and impact pathways. For example, the spatial boundaries for hydrographical studies related to tailings pond design will probably differ from those for studies on caribou migration or shoreline erosion. The boundaries for socio-economic

assessment shall be based on an analysis of the socio-economic effects directly and indirectly associated with the Project. In all cases, priority shall be given to potential impacts within Nunavut, but the NLCA requires that potential impacts outside Nunavut shall also be considered wherever there is reason to anticipate that they might occur.

5.5 TEMPORAL BOUNDARIES

Like spatial boundaries, temporal boundaries may vary with, among other things, the type of impact and with season. 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 of the predictive capability of the various disciplines at play. The Proponent shall determine the temporal boundaries separately for the construction, operations, temporary closure, final closure, and post-closure periods. 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 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 that, over the past 50 years, the western Arctic has experienced a warming trend accompanied by increased annual precipitation and increases in the magnitude and frequency of extreme weather events. Some General Circulation Models predict continued warming at high latitudes over the next century. There may be no immediate danger of permafrost degradation, but the Proponent must incorporate that possibility into the design of Project components where applicable.

5.6 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.

5.7 ANALYSIS OF NEED AND PURPOSE

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

a) Mine and/or community re-supply implications of the Project;
b) Longer term strategic implications of the proposal in terms of the transportation networks in Nunavut and in the Northwest Territories;
c) Identification of potential customer groups in both territories including commercial, government, or private;
d) General feasibility from an economic perspective, including how this Project will benefit the West Kitikmeot communities of Cambridge Bay, Kugluktuk, Bathurst Inlet, Umingmaktok, Gjoa Haven, Kugaaruk, and Taloyoak;
e) Analysis of community support for and in opposition to the Project, including what groups stand to benefit and which stand to lose from the Project, including a description of how the Proponent has sought input from a broad range of socio-economic groups; and,
f) How the Project will provide a net economic benefit to Nunavut and Canada as a whole. This should include economic effects on existing industries and communities.

5.7.1 Project Alternatives

Alternatives to the Project shall be addressed, including the no-go option. The Proponent shall also consider alternative ways of carrying out the Project (i.e., alternatives to Project components or activities, including different locations or timings for such activities or components that might have differing environmental or socio-economic effects). The Proponent shall also discuss the nature of its reliance upon certain aspects of the BIPR infrastructure, and provide a detailed assessement of the alternatives presented should the BIPR project become unfeasible in the Hackett River project life-span.

In each case, the Proponent shall give the reasons for selecting the preferred alternative and for rejecting the others, including economic and technical analyses of each. Potential adverse and beneficial biophysical and socio-economic effects should be identified for each feasible alternative, and given to a level of detail which is sufficient to allow the NIRB and the public to compare the preferred with any other alternatives.

5.7.2 Potential Project Impediments

The Proponent shall identify those conditions that might impair the fulfillment of the Proponent's plans and commitments regarding the Project. The Proponent shall give significant consideration to the complex relationship between the Hackett River and BIPR projects, and provide a specific discussion regarding how a delay in the process for BIPR may impede the progress or alter the development of, the Hackett River.

5.8 METHODOLOGY

In describing methodology, the Proponent shall explain how it used scientific, engineering, Traditional, community, and other knowledge to reach its conclusions. Any assumptions should be clearly identified and justified. All data, models, and studies must be documented so that the analyses are transparent and reproducible. All data collection methods should be specified, and the uncertainty, reliability and sensitivity of methods and models used to reach conclusions should be indicated. All conclusions should be substantiated.

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

5.9 PUBLIC CONSULTATION

Public consultation is required when: identifying current and historical patterns of land- and resource-use; identifying VECs and VSECs; determining criteria for evaluating the significance of potential impacts; deciding upon mitigating measures; formulating compensation packages; and identifying and implementing monitoring measures, including post-project audits.

The Proponent shall explain where, how, why, and with whom it conducted public consultation, documenting its efforts to inform participants of the ways the information they supplied was or will be used. It shall demonstrate an understanding of the rights, interests, values, aspirations, and concerns of the potentially affected communities, with particular reference to those emanating from the NLCA; and shall recognize and respect those rights, interests, values, aspirations, and concerns in planning and executing the Project. Moreover, the Proponent shall explain the results of the consultation process, how the consultation process has influenced its decisions, and how it intends to address the unresolved concerns expressed.

5.10 TRADITIONAL KNOWLEDGE

The Proponent shall present and justify its definition of Traditional Knowledge in the Kitikmeot Region and shall explain the methodology used to collect it, including the format and location of meetings, the types of background information provided at meetings, the level of community participation, the design of studies on Traditional Knowledge, and the selection process for participants in such studies, and shall summarize what kinds of Traditional Knowledge were collected. The Proponent shall indicate whether special efforts were made to collect Traditional Knowledge from women.

The Proponent shall discuss how it treated Traditional Knowledge in baseline data collection, impact prediction, and significance assessment, and the development of mitigation and monitoring programmes. It shall explain how it integrated Traditional Knowledge and popular science, including the manner in which it reconciled any apparent discrepancies between the two. Any assumptions shall be identified and justified. Further, the Proponent shall describe any other past or current Traditional Knowledge studies in which it has participated or played a supporting role.

The Proponent shall outline its program to pursue the collection of Traditional Knowledge 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 Traditional Knowledge. The Proponent shall also discuss procedures for community-based monitoring of social, cultural, and ecological conditions in order to determine if, when, and how mining can contribute to community sustainability (Wismer 1996).

5.11 DATA ACQUISITION, METHODOLOGY AND DOCUMENTATION

The Proponent shall specify and justify all sampling methods and statistical processes employed in both the biophysical and social context. The reliability and scope of the results, the possibility of reproducing the analyses, and quality control of laboratory analyses shall be analyzed critically. 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. Similarly, when using mathematical models, the Proponent shall indicate the assumptions employed, the prototype used, the accuracy, and the inherent limits of interpretation. As noted in Subsection 5.4, every effort must be made to harmonize the types of data collected and their statistical treatment with the General Monitoring Program of Article 12 of the NLCA.

5.12 DATA ANALYSIS AND REPORTING

Wherever the Proponent makes use of qualitative criteria to compare various design and development options, to describe the environment, 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. The Proponent shall justify the classification of each criterion.

The Proponent shall support all analyses, interpretations of results, and conclusions with a review of the relevant literature, providing all references required and indicating the public availability of all works

consulted. Any contribution based on Traditional Knowledge shall also be specified and sources identified, subject to any concerns relating to ownership or confidentiality.

The Proponent shall provide clear statements regarding the availability, relevance, and quality of the data.

5.13 DETAILED PROJECT PROPOSAL DESCRIPTION

The description should address all phases of the Project in sufficient detail to allow the Proponent and NIRB to (a) assess the potential adverse and beneficial biophysical and socio-economic effects related to the Project, and (b) to address public concerns about the Project. The Proponent should describe all Project phases, including pre-construction, construction, operation, and decommissioning.

The Proponent should summarize the Project in terms of:

a) History of the Project development;
b) Purpose;
c) Location;
d) Scale;
e) Components;
f) Activities; and
g) Approximate scheduling and costs.

5.13.1 Project Components and Activities

The Proponent shall describe Project components and activities, distinguishing where appropriate between the exploration, construction, operations and closure phases, including where applicable:

- Exploratory work;
- Mineral resources (geology, geochemistry, drilling, and bulk sampling);

- Site preparation and clearing, and site plan;
- Earth works;
- Blasting, including a description of the types and quantities of explosives that will be used;
- Roads, and airfields;
- Work force requirements, including training required to maximize employment of Nunavummiut;
- Air, marine, and land transportation of workers and materials, with estimates of traffic types and frequencies, and which provides transportation routes for each as well;
- Use, transportation, handling, approximate quantities, and storage methods for fuel, hazardous materials, concrete, and aggregates;
- Housing, including demands on infrastructure in any communities providing access to the Project;
- Water supply and sewage- and waste-handling/treatment/disposal facilities;
- Water retention dykes and natural drainage diversions;
- Water diversions, intakes, and outlets;
- Power generation and transmission facilities;
- Off-site facilities related to expediting, transport, and storage of materials, including fuels, waste, and fixed housing, and transport facilities;
- Pits and quarries, including ore-removal methods;
- Open pit and underground mining methods;
- Milling operations;
- Processing operations;
- Stockpiling of ore, overburden and waste rock;
- Tailings/processed ore handling/treatment/disposal;
- Effluents and emissions;
- Marine and ocean-going activity, including marine shipping plans;
- Site rehabilitation; and
- Project life expectancy.

The Proponent shall give a rationale for the selection of Project components and activities, with specific consideration given to industry best practices.

The Proponent shall specifically address the following in describing Project components and activities:

5.13.1.1 Geology/Mineralogy of the Ore Deposit and Mining Methods

The Proponent shall characterize the ore from the Hackett River sites, including where appropriate:

- Location, including detailed maps of the mine area;
- Resource assumptions**;**
- Mineralogy**;**
- The type of deposit and associated bedrock (including faulting or fracturing);
- Identification of the ore deposit material, dimensions, and location;
- The lithologies and mineral associations found in the region**;**
- The average extraction rate(s) and the amount of ore to be processed daily and the expected amount of ore to be extracted each year; and
- A mine management plan indicating the sequence of development for all of the open pit and underground mines (and components therein).

The proposed characteristics of the mine shall be described, bearing in mind the need to control hazards, such as rockfalls.

Many of the foregoing can be described in the context of a mine management plan.

5.13.1.2 Ore Recovery Plant, Extraction, and Concentration

The Proponent shall describe:

- The proposed recovery plant, including processing capacity and methods;

- The location of the recovery plant and the site-selection criteria, the differing processing stages, and the different compounds emitted to the environment during ore processing, and the related quantities, concentrations, and dispersion paths after emission; and
- The location of the ore storage pads and plans to control and, if necessary, treat, water run-off and seepage.

5.13.1.3 Processed Ore Containment

The Proponent shall:

- Describe the processed ore containment management plan, including a comprehensive description of the proposed process, structures, and operations. The Proponent shall include a contingency plan in the event that discharges from the containment area do not meet licensing criteria;
- Describe all aspects of the processed ore composition**,** including the size and quantities of fines and their predicted settling characteristics, and anticipated water quality, providing data on the quantity and quality of material to be disposed of, and describing conservation and recycling options;
- Present a chemical stability analysis;
- Discuss how geotechnical factors, including permafrost, clay slippage and pooling, the seasonal seepage conditions of sand, and water and ice in pores, were considered in the design and selection of the structures to contain the processed ore. It shall also discuss the stability of the structures, including, if applicable, the question of talik zones; and in the design and selection of the structures to contain the processed ore;
- Describe methods of controlling and monitoring groundwater seepage from 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), including a review of similar operations elsewhere, applicable modelling information, and the results of research on the long-term stability of the underlying permafrost and

frozen materials.

5.13.1.4 Overburden and Waste Rock Disposal

The Proponent shall:

- Provide a plan for overburden and waste rock handling, including the design and location of the storage sites, describing the options for each. The Proponent shall include a review of similar operations elsewhere, applicable modelling information, and the results of research on the long-term thermal stability of the underlying permafrost and frozen materials;
- Describe 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, bearing in mind the latest monitoring results from mines nearby or at least in the same general region, and present a water management plan.
- Explain the relationship between the timing of acid generation and permafrost encapsulation and cold temperatures, where possible in reference to the region in which the Project will take place;
- Describe and assess the physical and chemical characteristics of seepage and runoff from the waste rock piles**,** and describe appropriate control measures. The potential for "rock glacier" phenomena**;** and
- Describe in qualitative and quantitative terms the chemistry of frozen groundwater from joints and fractures in the waste rock disposal area.

5.13.1.5 Water Supply and Management

The Proponent shall:

- Present a water balance and provide a water management plan for the mine, processing facilities, stockpile and containment areas, and infrastructure. The water supply source(s), on-site use, storage, final discharge to the

environment, alteration of drainage patterns, water treatment (including water containing nitrate residues from explosives), diversions, and water conservation and recycling measures shall be addressed;

- Water balance estimates for the water supply source(s);
- Include estimates of mine water volumes and potential uses of the mine water;
- Discuss plans for the de-watering of Camp Lake;
- Address the issue of discharge or seepage of water;
- Methods used to calculate the above volumes;
- Describe the facilities for washing bulk trucks and other equipment, as well as any treatment of water used for washing vehicles/equipment; and
- Describe how melt water, particularly with high metal content and/or hydrocarbons will be managed.

5.13.1.6 Borrow Pits and Quarry Sites

The Proponent shall:

- Provide mapping at a scale of 1:5,000 for all sites that are to be used for borrow pits or quarries, noting which are located on or near eskers;
- Provide an estimation of the quantities that will be extracted from quarry sites;
- Describe access routes to those sites;
- Discuss the acid rock drainage (ARD) and metal leaching (ML) potential of quarried materials;
- Provide quarry management plans describing proposed operations; and
- Outline its proposed methods for handling massive ice, and plans to manage water released by the thawing of permafrost and ground ice.

5.13.1.7 Mine De-Watering

The Proponent shall provide:

- Information about de-watering methods, specifying the volumes to be pumped, the areas that may be affected, the quantities of bottom sediment requiring disposal, and the disposal methods;
- Fish salvage programs; and
- Mine inflow volumes and quality, considering seepage into the pits, pit water quality, as well as seepage from retention dykes.

5.13.1.8 All-Weather Road(s)

The Proponent shall describe, and, where useful include relevant maps and drawings providing details for:

- How the selected route(s) correspond to the needs of other developers and of Nunavummiut;
- The proposed construction of the all-weather road(s), including laydown areas, temporary camps, and on-site and off-site roads and alternative routes, paying particular attention to stream crossings and diversions of watercourses;
- The quantities and types of materials required for construction and maintenance;
- Construction and maintenance methods for all site roads, frequency of use, road width, and dust-suppression methods;
- The types and numbers of vehicles to be used to transport materials and ore along the all-weather access route(s), including the total number of trips expected daily and seasonally, the allowable and expected speeds, and best estimates of load weights (full and empty, if applicable);
- Accident/incident reporting;
- Wildlife impact mitigation procedures and/or structures; and
- Site reclamation.

5.13.1.9 Airport Facilities

The Proponent shall describe:

- Any and all airport facilities;
- The duration, frequency, and extent of use of airport facilities;
- Estimates of the volume of goods and number of passengers to be frequenting the airport facilities, on a daily and seasonal basis;
- The airport and infrastructure characteristics, service roads, fuel storage, de-icing and containment systems, methods of dust suppression, drinking and waste water disposal systems and solid waste management plans;
- Construction methods; and
- Accident/incident response reporting.

5.13.1.10 Facilities at Bathurst Inlet

The Proponent shall provide a thorough description of all facilities it intends to construct at the port site at Bathurst Inlet (where not detailed in any other part of Subsection 5.13.1 of these Guidelines). Further, the Proponent shall clearly identify those facilities associated with and to be constructed by, the BIPR Project, but which the Proponent intends to utilize, as per their January 2008 Project Description.

5.13.1.11 Fuel and Explosives Storage Sites and Methods of Fuel Transfer and Transportation

The Proponent shall describe:

- The location and characteristics of fuel and explosives storage infrastructure and systems, including the explosives factory;
- Handling and containment methods;
- The types and quantities of fuel, explosives, and other similar materials required for the duration of the Project;
- Methods of fuel transfer and transportation from source(s) to, and around site;
- Security measures to be implemented, if applicable;
- Accident/incident response reporting;
- Spill response training; and

- The location of spill kits on site.

5.13.1.12 Waste (Domestic and Hazardous) Management

The Proponent shall describe:

- Plans for sewage treatment and disposal, including the technology to be employed, the location of the facilities and any point(s) of discharge, and the volumes and chemical composition of the effluent;
- Plans for the handling, storage, treatment, and disposal of solid wastes, sewage sludge, and contaminated soils;
- The hazardous waste management plan, including a description of the types and volumes of hazardous wastes to be used or produced by all Project activities;
- Storage and disposal methods and destinations for each type of hazardous waste, including disposal of containers used to transport or store hazardous materials;
- Accident/incident response reporting;
- Spill response training; and
- The location of spill kits on site.

5.13.1.13 Power

The Proponent shall describe:

- Any studies into sources of power other than diesel generators that it conducted;
- The location of the power house relative to prevailing winds and other infrastructure (e.g., camp accommodations);
- Utility corridors, including transmission lines;
- All diesel power generation facilities, including sources, volumes and transportation of fuel, transfer points, and equipment and facilities for emergency clean-up;
- The energy balance for the proposed Project, including strategies for optimization and conservation;

- The anticipated types and quantities of emissions to the atmosphere; and
- Accident/incident management and reporting.

5.14 PROJECT DESIGN

General Project design issues discussed in the DEIS shall include:

a) An explanation of how the environment has influenced the design of the Project. This should include, but is not limited to, geographical, geological, meteorological, and oceanographic conditions;
b) Global climate change. The discussion must describe and assess, on the basis of current knowledge, how the potential for climate change (global warming) could affect permafrost and soils with high ice content, as well as marine ice flow regimes, and the long-term impacts of such changes on the Project;
c) An explanation of how public consultation has influenced the design of the Project;
d) A discussion of how design, engineering, and management plans are consistent with the maintenance of eco-systemic integrity focusing on such things as stream crossings, marine habitat, and wildlife habitat;
e) A demonstration of how the Proponent has applied the Precautionary Principle in its Project design and management; and
f) How socio-economic conditions have influenced the Project design (how have work rotations, pace of construction, employment policy, etc. been designed to meet local preferences and capacity).

All assumptions underlying design features should be explicitly stated.

5.14.1 Project Schedule

The Proponent shall provide current information on the Project's status.

5.14.2 Future Development

The Proponent shall evaluate, indicating the associated level of uncertainty, the potential for exploration and development of additional ores at the Project site and shall consider the associated impacts. Among other things, the Proponent shall specify the additional quantities of ore that might be mined and any foreseeable expansions of the Project infrastructure.

The Proponent shall also consider whether proceeding with the Project, including the associated access infrastructure, might stimulate other development projects, either exploration/mining or other, in the region. This may include an assessment of the proposed all-weather road from Bathurst Inlet south to Contwoyto Lake (BIPR) or Sabina's alternative access route – and the possibility for expansion of this road routing to other areas of the West Kitikmeot.

5.15 BASELINE INFORMATION – BIOPHYSICAL AND SOCIO-ECONOMIC ENVIRONMENTS

This section of the DEIS shall provide a baseline description of the existing physical, biological, and socio-economic environments including processes, their interrelations and interactions, and the variability in these components, processes, and interactions over time scales appropriate to this DEIS. The Proponent's description of the existing environments should be in sufficient detail to permit the identification, assessment and determination of the significance of potentially adverse and beneficial impacts that may be caused by the Project. It should also be at a level and scale of detail that enables readers to understand the material presented.

The Proponent shall strive to give sufficient time depth to baseline data, in order to permit the identification of natural fluctuations**,** trends and cyclical and other recurrent phenomena. Some species populations fluctuate in abundance every 3 to 4 years, while for other populations, this may take much longer. The Proponent shall also strive to evaluate the degree to which the baseline data characterize ecosystems that are relatively free of impacts and shall specify, where relevant, the sources of prior impacts where those can be identified with reasonable confidence**,** so as to assist in evaluating the thresholds of ecosystem components.

Fortunately, there is a substantial amount of useful and relevant information pertaining to baseline data collection. For example, the *West Kitikmeot Slave Study Society* accumulated a substantial amount of information on the environmental, cultural and socio-economic conditions of the region (2001). In order to save time and costs and avoid duplication, the NIRB encourages the Proponent to make maximum use of existing documents in preparing the DEIS. When relying on this information, the Proponent should comment on the relevance and accuracy of the existing information with respect to current conditions. Finally, the Proponent should report on the quality of the data they have gathered and/or used and outline any limitations related to the conclusions that can be drawn from this data.

5.15.1 Valued Ecosystem Components and Valued 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. The Proponent should indicate to whom these components are important and the reasons why, including social, economic, recreational, and aesthetic considerations. The Proponent should also indicate the specific geographical areas or ecosystems that may be implicated as part of the particular concerns, and their relation to the broader regional environment and economy.

The Proponent shall explain and justify the methods used to predict potential adverse and beneficial impacts 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 must validate the selected VECs and VSECs, particularly those VECs and VSECs that will be used to assess the significance of Project component interactions, through consultation with a representative sample of the affected communities[2]. Any uncertainties in this validation must be documented. To this end, the NIRB suggests that the Proponent seek community and, in particular, Traditional input regarding the identification of the VECs and VSECs to be discussed in the DEIS.

[2] Appendix C provides a list of VECs and VSECs identified through the Scoping of past projects in the West Kitikmeot. This list may serve as a useful starting point for the identification of relevant VECs and VSECs for this Project.

The Proponent is expected to expressly identify those components of the Project that may be expected to interact in adverse or beneficial ways with the VECs and VSECs.

Components may be grouped into the following categories:

- Components related to construction and operation of the Project;
- Components related to the eco-systemic effects of the Project; and,
- Components related to developments induced by the Project, and which will occur in the reasonably foreseeable future.

5.15.2 Biophysical Environment

The Proponent shall describe the components of the physical and biological environments and the processes affecting them as they exist presently, to serve as a baseline against which the potential impacts of the Project can be measured. In describing the physical and biological environment, the Proponent shall take an ecosystem approach which takes into account both scientific and community knowledge and perspectives regarding ecosystem health and integrity. The Proponent should identify and justify the indicators used to measure ecosystem integrity. These indicators should be related to Project monitoring and follow-up activities.

The Proponent's baseline description shall include, but not be limited to, the following biophysical components and processes within the Regional Study Area:

5.15.2.1 Terrestrial Environment

a) Special, sensitive, or unique geological or landform features (including inventory of wetlands and their function in the Local Study Area);
b) Coastal and sea bottom stability;
c) Shoreline conditions along shipping route;
d) Existing or proposed protected areas, special management areas, and conservation areas, such as those proposed by caribou co-management boards and land use plans;

e) Bedrock lithology, morphology, and structures;
f) Geomorphology and soils (excluding eskers);
g) Permafrost (including areas of discontinuous permafrost, high ice-content soils, ice lenses, thaw-sensitive slopes, talik zones, and stream banks);
h) Evidence of the potential for ground and rock instability (e.g., slumping, landslides, and potential slippage planes);
i) Hydrology/limnology (e.g., lakes and streams, lake sediment geochemistry, recharge zones, flood zones, ice formation, and melt patterns);
j) Fluvial geomorphology and stability of stream and river crossings;
k) Water quality and quantity (from surface and groundwater sources);
l) Sediment and soil quality and quantity;
m) Air quality and noise levels;
n) Sites of palaeontological or palaeobotanical significance; and
o) Current climatic conditions and foreseeable future trends, bearing in mind the final paragraph of Subsection 5.5.

5.15.2.2 Freshwater and Marine Environment

a) Hydrology (e.g., streams, watershed boundaries, surface water flow, subsurface water movement, flood zones, ice formation, and melt patterns);
b) Physical and chemical parameters of surface and sub-surface waters;
c) Physical and chemical properties of sediment in freshwater and marine waterbodies, including vicinity of port;
d) Substrate characteristics for areas of fish habitat;
e) Streams which support overwintering fish or are used by fish as migration routes. All fish species using affected streams should be identified;
f) Bathymetry, particularly in Bathurst Inlet;
g) Ice conditions along shipping route(s) (using Traditional Knowledge as well as scientific studies);
h) Predicted climate change and its possible effect on the timing of ice formation in the future;
i) Sensitive habitat areas; and

j) Marine currents, waves, storm surges, long shore processes at port and along shipping route(s).

5.15.2.3 Meteorology

a) Meteorology and climate data relevant to the Local Study Area. The data should reflect daily and seasonal fluctuations;
b) Wind speed and direction; and
c) Consideration of predicted climate change and related changes in mean and extreme environmental parameters such as air temperature, precipitation, storms, etc.

5.15.2.4 Air Quality and Noise

a) Air quality and noise data relevant to the Local Study Area - levels should reflect daily and seasonal fluctuations.

5.15.2.5 Vegetation

a) Sensitive, uncommon, or unique plants or plant communities;
b) Ecological zone, including ecozones, and ecoregions, or other appropriate ecological areas;
c) The local and regional presence of species/communities;
d) The health of these species/communities and their contaminant loadings;
e) Rare or regionally unique species or species assemblages, including species with federal, territorial, regional, or locally designated status (e.g., vulnerable, threatened, endangered, extirpated, of special concern – as designated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or other agencies) or cultural status;
f) Species that perform particularly significant ecological functions;
g) Species that are valuable for cultural reasons known to the Inuit; and
h) Any other issues identified through public consultation.

5.15.2.6 Wildlife

a) The local and regional presence of species populations;
b) The relative trends in seasonal/annual abundance, and distribution of these species populations;
c) The health of these species populations and their contaminant loadings;
d) The seasonal and annual trends in range or habitat use, movements, and population of these species;
e) The migratory patterns and routes of these species and the corresponding sensitive periods when the routes cross habitats affected by the Project;
f) Significant habitats for these species, such as eskers, calving and rearing areas, denning sites and staging areas, and such special locations as salt licks, water crossings, and insect relief habitats;
g) Wildlife management areas or similar areas for these species;
h) Habitats of any rare or regionally unique species or species with federal, territorial, regional, or locally designated status (e.g., vulnerable, threatened, endangered, extirpated, of special concern) or cultural status;
i) Timing and extent of the following caribou herds in the Regional and Local Study Areas (including areas of potential mine development or exploration related to the Project, and all shipping routes):
    - Ahiak (Queen Maud) herd
    - Bathurst herd
    - Dolphin & Union herd
    - Peary herd
    - Bluenose herd
j) Effects of climate change on migratory species such as caribou;
k) Distributions of wildlife found in region, with seasonal designations given to density and occurrance;
l) Polar bear, caribou and marine mammal distribution during shipping season and habitat along shipping route;
m) Species that perform particularly significant ecological functions;
n) Description and evaluation of biodiversity in Local Study Area; and

o) Any other issues relating to these species identified through public consultation.

5.15.2.7 Birds

a) The local and regional occurrence of species populations;
b) The relative seasonal/annual abundance and distribution of these species populations;
c) The health of these species populations and their contaminant loadings;
d) The seasonal and annual trends in range or habitat use, movements, and population status of these species;
e) The migratory patterns and routes of these species and the corresponding sensitive periods when the routes cross habitats affected by the Project;
f) Significant habitats for these species, such as breeding and nesting sites and staging areas for raptors, waterfowl, and other avifauna;
g) Established or proposed sanctuaries, refuges, or similar areas for these species;
h) Habitats of any rare or regionally unique species or species with federal, territorial, regional, or locally designated status (e.g., vulnerable, threatened, endangered, extirpated, of special concern) or cultural status;
i) Critical terrestrial and marine migratory bird sites along the shipping route (EC 2004), including those which may be affected by marine spills as a result of current and/or wind patterns;
j) Species that perform particularly significant ecological functions; and
k) Any other issues relating to these species identified through public consultation.

5.15.2.8 Fish and Other Aquatic Organisms

a) Periphyton, phytoplankton, zooplankton, and fish;
b) The local and regional occurrence of species populations;
c) The relative seasonal and annual trends in abundance and distribution of these species populations, and the estimated productive capacity of the water bodies;
d) Stream and lake bottom substrates and littoral zones, including aquatic and riparian vegetation;
e) Affected watercourses, including depths, widths, and maximum and minimum flows;

f) The health of these species populations and their contaminant loadings;
g) The migratory patterns and routes of these species, identifying preferred corridors, and the corresponding sensitive periods when the routes cross habitats affected by the Project;
h) Habitat areas for these species, including spawning, nursery, feeding, and over-wintering areas, and any sensitive periods for each of the habitat areas;
i) Management or other protected areas for these species;
j) Habitats of any rare or regionally or locally unique species or species with federal, territorial, regional, or locally designated status (e.g., vulnerable, threatened, endangered, extirpated, of special concern) or cultural status;
k) Species that perform particularly significant ecological functions; and
l) Any other issues relating to these species identified through public consultation.

5.15.3 Socio-Economic Environment

The Proponent shall provide information on the functioning and stability of the socio-economic environment in the Regional Study Area. The Proponent shall 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 impacts of the Project can be measured and also to justify the Proponent's selection of VSECs. Baseline data shall be presented on a community-by-community basis regarding such components as:

a) Human health, defined broadly to include mental health and well-being, and individual and family well-being;
b) Community well-being;
c) Population demographics;
d) Traditional Knowledge (TK) studies and information regarding culture and relationship to the land;
e) Archaeological, cultural, heritage, and burial sites, as well as sites identified by Elders as being sacred or spiritual places. Each site shall be described and delineated on a map;
f) Up-to-date socio-economic studies, particularly in the West Kitikmeot, on those

communities identified by the Proponent (and/or BIPR) as benefiting from fuel re-supply from the port;

g) Up-to-date socio-economic studies of those communities in the Northwest Territories which presently benefit from the existing supply route to Nunavut;
h) Local and Regional land and resource use, including national parks and similar areas;
i) Local and Regional economy; distinguishing between traditional and wage economies;
j) Existing employment, education, and training infrastructure;
k) Community services and infrastructure, including the demands on existing infrastructure and demands for new infrastructure such as housing, municipal services, health care provision, etc; and
l) Any other components identified through public consultation.

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 biophysical environments, including the roles of the land- and wage-based economies and the nature of the mixed economy of the North.

The Proponent shall identify and justify indicators, which, to the extent feasible, shall be identical or complementary to those used or those being developed by the NPC as referenced in the *Draft West Kitikmeot Land Use Plan* (2005). Indicators might include the following:

- Average income of residents;
- Employment levels and participation rates in both the wage- and land-based economies;
- Rates of high school completion;
- Housing (e.g., number of dwellings, average number of persons per dwelling, average number of persons per bedroom, percentage of units with full plumbing and heating systems);
- Teen birth rates;
- Number of children in care;

- Number of suicides;
- Number, type, and severity of accidents;
- Life expectancy;
- Types and frequencies of communicable diseases;
- Social Assistance cases;
- Number of alcohol- and drug-related crimes;
- Number of property crimes;
- Number of complaints of family violence;
- Types and quantities of wildlife harvested; and
- Seasonality and geographic distribution of harvesting activities.

Whenever relevant, data shall be disaggregated by age, gender, and ethnic affiliation. The foregoing is not to suggest that the Proponent is responsible for the current socio-economic situation of the Kitikmeot 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.

The indicators selected must be adequate to address all types of foreseeable impacts, including cumulative and residual impacts.

5.16 ASSESSMENT AND MITIGATION OF IMPACTS

The analysis of the biophysical and socio-economic effects should describe: the effect considered, the significance of the effect, how the effect fits into a cumulative effects analysis, and the measures proposed to mitigate those significant effects. The EIS should, to the extent possible, avoid repetition by identifying the potential adverse environmental effects and the proposed mitigation measures in the same discussion.

The EIS should provide a comprehensive analysis of the effects of the Project on the biophysical and socio-economic environments with respect to the elements and functions which may be lost or enhanced, where, how much, for how long, and with what overall effect. The DEIS should also provide an analysis of the short and long-term effects, indicating the sensitivity of the function, integrity, and health of the environments to these predicted effects.

The EIS should pay particular attention to the geographical scale of anticipated impacts, by characterising them as appropriate in or at the:

1) Local Study Area, Regional Study Area, and/or territorial levels;
2) Traditional and/or local land use areas; and
3) Ecosystem level (e.g., watershed, and wetlands).

The Proponent shall employ a matrix or a comparable tool that highlights interactions between the components of the Project and those of the relevant ecosystems, especially VECs and VSECs.

The consequences of each predicted impact for the functioning and integrity of its ecosystem must be considered in addition to the consequences for the VEC or VSEC in question.

5.16.1 Impact Assessment Methodology

The Proponent shall explain and justify the methods used for impact prediction, which can include mathematical or mechanical modeling, previous experience, statistical modeling (e.g., variance and correlation analyses), the analysis of sequential series, expert opinion, the prediction of tendencies, and Traditional Knowledge.

All studies used in the prediction of impacts must be specified, a database organized, 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.

The Proponent shall identify potential impacts separately for each Project phase, including exploration. It shall also assess the potential impacts arising from accidental events and malfunctions.

5.16.2 Significance of Impacts

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 environmental assessment to be documented in an EIS. The determination of significance shall take into account the following attributes of each impact: magnitude; geographic extent; timing**;** duration; frequency; reversibility; probability of occurrence; effect on ecosystem function and integrity; 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. Hence, the concerned communities, as well as other individuals and organizations, shall be fully consulted in defining impact significance. The Proponent shall describe how it will ascertain the significance that different intervenors assign to each impact and how it will proceed if different intervenors 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.

The dynamic change of ecosystems and their components must also be considered in determining impact significance. Changes in ecosystems can be cyclical, gradual, or the result of disasters. They can be local, regional, universal, anticipated, or unexpected. The significance of an effect on an ecosystem component can, therefore, change through time and can vary according to the "state of health" of the ecosystem or the component at the time of

the impact. EISs tend to "freeze" ecosystems and societies at a specific moment in time, often when collecting baseline data, and therefore evaluate the significance of the potential impacts upon them at that specific time. The Proponent shall evaluate the significance of potential impacts in the light of data on the dynamism and the current “state of health” of ecosystems and their components and societies and their predictable evolution in light of global climate change. Consistent with the ecosystem approach required above, the Proponent shall 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.

Any terms used to describe the significance of impacts, such as "low", "medium", or "high", must be clearly defined, and, wherever possible, in quantitative terms.

5.16.3 Indicators and Criteria

The Proponent shall identify the indicators and/or criteria selected for assessing the potential impacts of the Project, including any cumulative 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 every case where a potential impact or an area of uncertainty is identified, the Proponent must give a clear commitment in the appropriate section of the EIS as to how it will address it. The Proponent must clearly distinguish the impacts at each stage of the Project, including temporary closure, final closure and post-closure.

5.16.4 Impacts of the Environment on the Project

The Proponent shall discuss the potential impacts of the environment on the Project, considering such things as seismicity, severe weather events, sea ice conditions, and global climate change. The discussion must specifically describe and assess how the potential for climate change (global warming) could affect permafrost and soils with high ice content and the long-term impacts of such changes on Project infrastructure, particularly the tailings impoundment facility and waste rock piles.

5.16.5 Impacts of Project Components and Activities

5.16.5.1 Open Pit and Underground Mining

The Proponent shall assess the potential impacts of open pit and underground mining, taking into account the following:

- The permeability of the open pits;
- The immediate and downstream effects of de-watering the pits and other areas on habitat, aquatic organisms, and water circulation;
- Plans for managing pit water and groundwater seepage into the pits;
- Salinity and general characterization of groundwater;
- Permafrost intrusion and winter operations**;**
- The effects on receiving water bodies of water pumped from the pits;
- Any effects of exposure to air or water on ore; and
- The impacts of blasting on air and water quality, with particular reference to wastewater containing nitrites or nitrates from explosives.

5.16.5.2 Processed Ore Containment Area(s)

The Proponent shall assess the potential impacts of the processed ore containment area(s), taking into account:

- Design, location, and capacity;
- The permeability of the impoundment structure(s) and the effectiveness of seepage containment;
- The design and location of any pipelines;
- The technique and plans for filling the facility(s), including winter operations;
- The characteristics and toxicity of the processed ore, including fines; and
- Effluent treatment and discharge.

Typically, questions arise regarding:

- Current and predicted water quality;
- Discharge point for effluent;
- Microclimate;
- Fish and fish habitat;
- Need for control or retention structures; and
- Anticipated volume of tailings in relation to the storage capacity of the lake.

Particular attention shall be paid to potential impacts on wildlife, including caribou, muskox, and waterfowl.

5.16.5.3 Waste Rock, Ore and Overburden Storage

The Proponent shall assess the potential impacts of the waste rock, ore, and overburden storage, taking into account:

- The design (height, topography, spatial extent, volume, etc.) and location of the waste rock, ore, and overburden storage sites;
- The characteristics of materials to be stored;
- Plans for transporting and handling materials;
- The characteristics and volumes of seepage, techniques for collecting and disposing of seepage, and the effectiveness of drainage containment;
- Acid rock drainage;
- Metal leaching;
- The metal content of frozen groundwater in the waste rock;
- Windblown dust;
- The suitability of the overburden as a substrate for reclamation activities; and
- The potential for re-vegetation.

Particular attention shall be devoted to the potential for disruption to the movement of wildlife.

5.16.5.4 Processing and Plant Infrastructure

The Proponent shall assess the potential impacts of the processing and plant infrastructure, including**:**

- Noise from plant operations and transportation to and from the plant**;**
- Runoff from the plant or stored materials other than those addressed above**;**
- Sources and disposal of water;
- Wastes produced; and
- Chemicals used.

Particular attention shall be devoted to potential disruptions to the movements of wildlife.

5.16.5.5 Natural Drainage Diversion

The Proponent shall assess the potential impacts of any diversions of natural drainage systems. The analysis must consider the challenges encountered by other mines and comparable operations in constructing drainage diversions (such as melting ice lenses and the resulting nutrient loadings in water bodies), and the potential for mobilizing sediments and disturbing terrain.

Particular attention shall be paid to the impacts on fish, waterfowl, and aquatic mammals resulting from the modification or redirection of natural flows.

5.16.5.6 Sewage and Solid Waste Management

The Proponent shall assess the potential impacts caused by the management of solid waste and sewage**,** identifying whether either might act as an attractant to certain species of wildlife. The analysis shall consider the challenges encountered by comparable mining operations in treating and disposing of sewage and solid waste in a northern ecosystem, as well as the nutrient levels, biological oxygen demand, and winter oxygen levels of any receiving water bodies.

5.16.5.7 Hazardous Materials Management

The Proponent shall assess the potential impacts associated with the transportation, handling, storage, usage, and disposal of hazardous materials, including explosives and hydrocarbons. The analysis shall include the potential impacts to water quality from blasting residues, and the possibility that some such materials may act as attractants to some species of wildlife.

5.16.5.8 Power

The Proponent shall assess the potential impacts associated with power production**,** transmission, and distribution.

5.16.5.9 Air and Ground Traffic

The Proponent shall assess the potential impacts, including those resulting from interactions with wildlife, relating to air and road traffic, taking into account the type, frequency, and timing of traffic, particularly low-flying fixed- and rotary-wing aircraft, noise levels, and, in the case of road traffic, stream crossings.

5.16.5.10 Borrow Pits and Quarry Sites

The Proponent shall assess the potential impacts of borrow pits and quarry sites, including: noise and dust levels, slope stability, thawing of permafrost and ground ice, melt water runoff, and interactions with wildlife.

5.16.5.11 Processing Operations

The Proponent shall assess the potential impacts of processing operations, including those arising from interactions with wildlife.

5.16.5.12 Accidents and Malfunctions

The Proponent shall assess the potential impacts, including those resulting from interactions with wildlife, of accidents and malfunctions, including worst-case scenarios, and shall evaluate their probability of occurrence. Internal and external reporting procedures shall also be described.

5.16.5.13 Exploration Program

The Proponent shall assess the potential impacts of exploration activities, whether by the Proponent itself or by other parties that utilize Project infrastructure.

5.16.5.14 Temporary Closure, Final Closure, and Reclamation Programs

The Proponent shall assess the potential impacts associated with temporary closure, final closure, and reclamation of the Project.

5.16.5.15 Other Site Facilities and Infrastructure

The Proponent shall assess the potential impacts, including those resulting from interactions with wildlife, of all other site facilities and associated infrastructure not detailed in Subsection 5.16.5.

5.16.6 Physical and Biological Impacts

5.16.6.1 Landscape and Terrain

The Proponent shall assess the potential impacts on such factors as terrain stability, permafrost and ground ice (including ground ice in eskers, kames, or deltas used as quarries or borrow pits), ice lenses, seismicity, rock heave, and geochemistry. Attention shall be paid to sites of palaeontological and palaeobotanical significance.

The Proponent shall pay attention to such potential impacts as disturbance to the active layer of permafrost and the resultant ecological effects, permanent changes in the local use of the landscape by wildlife, and permanent aesthetic and physical changes to the landscape. Other potentially important impacts are those on eskers (e.g., by quarrying for granular material) and the resultant effects on wildlife. Eskers are important to wildlife, as they provide migration routes for caribou, offer habitat for small mammals, and are used by carnivores, including Grizzly bears, foxes and wolves, for travelling, denning, and feeding. The Proponent shall also discuss the use of Traditional Knowledge in assessing eskers in relation to both wildlife use and as burial grounds, as studies have shown that eskers are in some areas the landforms with the greatest archaeological potential (INAC 2001).

5.16.6.2 Water Quality and Quantity

The Proponent shall assess the potential impacts on surface and ground waters. The analysis shall include the impacts on water quality and quantity, catchment areas, and permafrost in relation to:

- Site facilities and infrastructure;
- In-filling and blasting;
- Collecting and treating wastewater and surface runoff;
- Mine water;
- Groundwater seepage;
- Water management (inputs, outputs, re-use);

- Contaminant loading and dispersion (including surface runoff and airborne contaminants);
- Acid rock drainage, metal leaching (including metal leaching from frozen groundwater in the waste rock), and geochemistry;
- Sedimentation (plumes and dispersion);
- Changes in water flow caused by stream diversions or otherwise;
- Processed ore containment area operation, discharge, and de-watering;
- The release of contaminants, including ores, that could affect water quality and/or potable water, and human health; and
- The contamination of waste rock drainage by residual nitrogen in the form of nitrates or nitrites from ammonium-nitrate-based explosives.

Moreover, the Proponent shall indicate where day-to-day operational problems might occur, particularly regarding runoff control and treatment, and predict the effects of a worst-case scenario in which there is an uncontrolled release of contaminants, including, for example, hydrocarbons or nitrate-contaminated water into the aquatic environment.

The Proponent shall identify water quality objectives from the perspectives of socio-economic/human health and ecological health. For example, the receiving water criteria of the Canadian Council of Ministers of the Environment and the *Canadian Environmental Quality Guidelines* for fresh water and aquatic life for total suspended solids, total arsenic, total copper, and any other relevant metals shall be referred to for comparative purposes.

5.16.6.3 Air Quality

The Proponent shall quantify the gaseous emissions from fuel consumption, air-borne dust from road transportation, blasting and crushing operations, and wind erosion of waste rock dumps and exposed tailings, and shall discuss the possible effects of such activities (e.g., effect on lichen, effects on workers' safety).

The analysis shall also address the following:

- The atmospheric dispersion of emissions on a local and regional scale;
- Atmospheric conversion processes of emissions (e.g., secondary particulates) and linkages between chemicals, the environment, and human health;
- Potential biological receptors, such as vegetation and wildlife;
- The potential for the release of any "greenhouse" gases; and
- The effects on plant phenology and wildlife if changing albedo alters the timing or pattern of snow melt.

Relevant indicators may include the *Canadian Environmental Quality Guidelines* and *Guidelines Respecting Ambient Air Standards for Sulphur and Total Suspended Particulate Matter in the Northwest Territories*, under the *Environmental Protection Act*.

5.16.6.4 Vegetation

The Proponent shall assess the potential impacts on:

- Local plant communities (e.g., vascular, non-vascular, wetland, and riparian);
- Plant phenology;
- Any rare, endangered, or highly valued species; and
- Wildlife dependent upon specific habitats or species of vegetation, whether the dependency is seasonal or otherwise.

5.16.6.5 Birds

The Proponent shall assess the potential impacts to birds including: loss, alteration, or alienation of habitat such as staging or nesting habitats (e.g., wetlands); disruption of migration routes; disturbance by human activity such as blasting or air and road traffic; and bioaccumulation.

5.16.6.6 Aquatic Organisms and Habitats

The analysis of potential impacts on aquatic organisms and habitats shall include:

- The productive capacity of aquatic ecosystems, with particular reference to species of fish that are important for recreational or subsistence purposes;
- Water quality, bearing in mind the *Canadian Environmental Quality Guidelines*;
- Habitat loss, alteration, or alienation;
- Rare and/or sensitive aquatic organisms and habitats;
- Mortality (including sport fishing by Project workers); and
- Noise.

The Proponent shall evaluate potential impacts against Fisheries and Oceans Canada's *No Net Loss Policy* (1986) as well as the potential applicability of the *Metal Mining Effluent Regulations* (EC 2002).

5.16.6.7 Wildlife

Special consideration shall be given to species listed as vulnerable, endangered, or a species of special concern by COSEWIC; to those that residents of the Kitikmeot Region record as being vulnerable or endangered locally or regionally; and to species of particular social, cultural, and economic importance, including those for human consumption purposes.

The analysis of the potential impacts shall include:

- Habitat loss or alteration (e.g., fragmentation, connectivity);
- Mortality (including sport hunting by Project staff);
- Displacement;
- Disruption of movement (e.g., migration, home ranges);
- Altered inter-specific relationships, including those with humans;

- Noise or other forms of disturbance on the ground or by aircraft; and
- Bioaccumulation and biomagnification of toxins.

The Proponent shall assess the implications of the above on the overall health of wildlife populations, communities, and ecosystems.

The Proponent shall give special consideration to the following:

5.16.6.7.1 Caribou

Potential impacts on caribou could include: disruption of movements and migration corridors (due to the mine site, roads, or air traffic, particularly low-level flying by fixed- or rotary-wing aircraft); loss or alteration of habitat or calving grounds; deaths or injuries due to collisions with vehicles; disturbance when feeding or resting; and the possibility that caribou may be trapped in the tailings. The Proponent shall evaluate how the potential effects could affect caribou harvesting, as well as the potential effects of diverting caribou around the mine site on their energy balance, which, among other things, can affect the quality of the meat and reproductive success.

Indicators could include: the number of caribou using a specific crossing, calving ground, or winter range; the number of caribou in a herd; physical condition as evidenced by body or marrow fat or other indicators; and the level of contaminants in tissues and organs.

5.16.6.7.2 Grizzly Bear

Grizzly bears are listed as a species of special concern by COSEWIC based on their low densities and productivity. Baseline data shall relate to such topics as movements, habitat use, diet, and den locations. The effects of camp infrastructure, attractant sources, including the possibility of habituation, and human-bear interactions shall be considered. The cumulative effects of habitat loss and of the increased frequency of interactions with humans shall also be considered.

5.16.6.7.3 Musk-Oxen

Potential impacts on musk-oxen may include loss or alteration of habitat**,** collisions with vehicles, and the susceptibility of herds to mine-related sources of disturbance during calving.

5.16.6.7.4 Wolves, Wolverines, and Foxes

Potential impacts may relate to habitat, including denning and other critical areas. Wolverines are listed as a species of special concern by COSEWIC based on their low densities and productivity.

5.16.7 Socio-Economic Impacts

The Proponent shall assess the potential impacts on socio-economic and cultural components, taking into account the following:

- The health of the workers, their families, and other residents (human health includes physical, psychological, emotional, spiritual, and mental health);
- Demographics, such as Project-induced changes in population numbers, migration, and distribution, and the effects of those changes, including interactions between local residents and non-residents;
- The traditional way of life of the residents of the Region especially their use of the land for economic, cultural, and other purposes, including the Project's contribution, if any, to increased levels of contaminants in traditional foods;
- The cultural well-being of the communities, based on indicators defined in collaboration with the concerned communities;
- The social life of the concerned communities, family and community stability, problems of substance abuse, crime and violence, including the effects of a major employment base away from the communities;
- Archaeological, burial, cultural, heritage, and sacred sites;
- Changes in (a) hunting, trapping, or guiding areas; (b) commercial, Nunavummiut, and sport fishing areas; (c) conservation areas, territorial and

federal parks, International Biological Program sites, or other ecological reserves or preserves; (d) recreation and tourism areas and recognized scenic areas; (e) the "wilderness experience" (including the potential for compromising the development of protected areas in the region); (f) navigable waters; and (g) industrial and commercial areas. The Proponent shall pay particular attention to local perceptions of the preceding effects;

- The likely evolution of the local, regional, territorial, and national economies over the life of the Project, having regard to direct, indirect, and induced effects on income and employment, in particular the effects on: (a) wage and salary employment by skills category over the life of the Project (including estimates of Nunavummiut and other participation); (b) opportunities for local, regional, and territorial businesses to supply goods and services both directly to the Project and to meet the demand created by the expenditure of new income by employees and suppliers; (c) opportunities to diversify the economic base of Nunavut to produce and to supply new goods and services; and (d) prices and the cost of living;
- Opportunities for participation by Nunavummiut workers from the West Kitikmeot Region and Nunavut in wage and salary employment, considering such factors as: the number of jobs to be created and the required skills; the effect of competition for labour between the Project and existing businesses, institutions, and traditional activities; the adequacy of training opportunities available to Nunavummiut to take advantage of jobs created by the Project, including apprenticeship opportunities and training organized by the Proponent; the extent to which the skills of the available workers match job requirements; the level of interest in mining work; commuting arrangements for workers; and barriers to employment, such as issues pertaining to the care of children and Elders;
- Increased pressure on existing social, institutional, and community services, transportation facilities and services, and infrastructure;
- Any permanent changes to infrastructure and services;

- Revenues accruing to federal, Nunavut, and local governments, and net incremental costs imposed on governments by the Project, including savings realized and incremental costs of infrastructure and services; and
- Community and local government organizations.

The impact of an industrial development in this region, particularly where human populations are low, is directly related both to its pace and to its scale. For example, given the small and relatively untrained work force, the scale of the Project might affect employment benefits, whereas its pace, if abrupt, could cause social or cultural disruption and prove to be more significant than its scale.

The Proponent shall address the potential for social and cultural disruption by, among other things, discussing social problems and evaluating the potential impacts of the Project on exacerbating or relieving such problems. The fear that the difficulties of coping with prolonged absences of family members might increase stress in families already dealing with cultural disruption should also be addressed.

If an urban centre, such as Yellowknife, Kugluktuk, or Cambridge Bay is to serve as the main point of hiring for non-Nunavummiut, Nunavummiut living there might suffer from the effects of in-migration by job-seekers, which could include housing shortages, prostitution, an increase in poverty, and strains on community resources to deal with such issues. Even if the foregoing are not considered to be probable direct effects of the proposed Project, they should be addressed in the assessment of its indirect and cumulative effects.

The Proponent must evaluate how the temporary or final closure of the mine would affect workers and communities. For example, how does it perceive its responsibility to its workforce and the local economy once operations shut down either temporarily or permanently? Would it put in place a program of workforce adjustment for the last few years of operations, assuming that the Project life extends, to provide such things as employee assistance, career counselling, educational subsidies, and re-training programs?

It would be desirable to use an input-output model to assess potential economic impacts, including indirect and induced effects. The Kitikmeot Corporation commissioned the development of an economic model for the Kitikmeot Region by Drs Jack Stabler and Eric Howe. The Proponent shall employ this, or a comparable model to the fullest possible extent.

5.16.8 Cumulative Effects Assessment

The Proponent shall provide a brief overview of the theory and practice of cumulative effects assessment (CEA) especially as it applies to the ecosystem model of evaluating environmental impacts, and shall justify the methodology adopted in relation to the design of the Project, its management, and the proposed approach to impact assessment[3].

The Proponent shall demonstrate how project-specific CEA fits into regional planning initiatives. It shall assess the potential cumulative effects of the Project to determine its impacts in combination with past, current, or reasonably foreseeable future developments of mines and other projects within a designated distance of the site of the Project, determined in conformity with Subsection 5.4. The Proponent shall determine which other human activities have affected or are likely to affect the same VECs, VSECs, or ecosystems as the Project. The Proponent shall then predict the impacts of the Project in combination with those of the other past, present, and reasonably foreseeable future projects, using the most appropriate methodology on a case-by-case basis that is capable of incorporating all of the relevant impacts. At a minimum, it shall consider the cumulative effects of other existing and reasonably foreseeable mines and exploration camps in the region, including at a minimum, those owned by Oz Minerals, Tahera Diamond Corporation, Dundee Precious Metals Inc., and Kennecott Canada, and potential future development in the region in light of the results of current exploration; gold and other precious and base metal mines and deposits, the existing Tibbitt to Contwoyto Lake winter road, and the proposed BIPR facilities, specifically, the all-weather road and deep sea port.

[3] As an example, the March 2004 *Environmental Impact Assessment Guidelines* developed by the Mackenzie Valley Environmental Impact Review Board (MVEIRB) establish a framework by which a Cumulative Effects Analysis should be conducted.

The term "probable future development" is defined to mean: projects or activities that are currently under regulatory review or those that will be submitted for regulatory review in the near future, as determined by the existence of a project description in the possession of a government department or agency. Nevertheless, where less precise information about a possible development exists, the Proponent shall refer to it and shall offer its opinion on whether it might need to be taken into account at a later date.

In considering reasonably foreseeable future developments, the Proponent shall also evaluate the impacts of the Project should it provide for or contribute to a transportation network (both overland and marine as with the proposed BIPR project).

The Proponent shall give due consideration to trans-boundary impacts, including the effects of the Project outside Nunavut and the interactions between the effects of the Project and the effects of projects located outside Nunavut. Trans-boundary effects originating from the Project should be clearly defined.

The Proponent shall describe and justify all assumptions, models, information limitations and associated levels of uncertainty. It shall explain its approach to handling the uncertainty associated with CEA.

5.16.9 Environmental Management and Mitigation

5.16.9.1 Overview

The Proponent shall describe general and specific measures intended to mitigate the potentially significant adverse environmental effects of the Project. Mitigation is defined as the elimination, reduction, or control of the adverse environmental effects of the Project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation, or any other means.

The description of mitigation measures shall include procedures to avoid environmentally sensitive areas or seasons, contingency programs to respond to

accidents and emergencies, restorative procedures to be implemented on disturbed sites, and compensation programs for damage caused by the Proponent's activities to the environment, property, or the land- and resource-use of others.

The Proponent should discuss and evaluate the effectiveness of the proposed measures and assess the likelihood of mitigation failure and the potential severity of the consequences. Information should be provided on similar mitigation methods used with similar projects and the degree of success achieved. All uncertainties related to the mitigation measure should be clearly described and, if possible, quantified. The discussion of these effects and their proposed mitigation should give full consideration to community knowledge of the environment and of appropriate and effective mitigation measures. The Proponent should identify who is responsible for the implementation of these measures, the system of accountability and the phase and component of the Project to which the measure would be applied.

Moreover, the Proponent shall discuss the negotiation of an agreement or agreements with the concerned communities that would permit them to participate fully in the planning, execution, and evaluation of mitigation measures.

The Proponent shall also evaluate the costs and economic and technical feasibility of the mitigation measures considered, specify who would be responsible for their implementation, and provide a timetable for implementing them.

5.16.9.2 Management Plans

The Proponent shall present environmental management plans to prevent or mitigate all the potential impacts of the Project as identified in Subsection 5.16.5, and shall also clearly identify any residual effects.

Management plans shall target at a minimum, the following, as well as any other VECs or VSECs identified by the Proponent or any other stakeholder, intervenor, or participant:

- Tailings;
- Waste rock;
- Blasting;
- Domestic and industrial solid wastes;
- Liquid waste;
- Spill contingency plan (transport and storage of fuels and other hazardous materials);
- Acid rock drainage;
- Emergency response plan;
- Water supply (including potable and process water);
- Landscape;
- Permafrost;
- Water quality;
- Water management plan, including natural and on-site collection and drainage;
- Air quality;
- Vegetation;
- Caribou and their habitats;
- Grizzly bears and other scavengers and wildlife potentially attracted to the site;
- Other bird and wildlife species and their habitats;
- Aquatic organisms and habitats;
- Archaeological sites and sacred or spiritual sites;
- Traffic;
- Human resources;
- Nunavummiut involvement;
- Public involvement, including a communications strategy;
- Education and orientation;
- Occupational health and safety;
- Emergency response and contingency plans (including plans for wildlife encounters, fires, aircraft/vehicle crashes, medical emergencies, mine rescue,

hazardous materials spills, malfunctions of key Project components, natural disasters, and discoveries of historic resources);

- Site rehabilitation; and
- Ability to post full security.

The Proponent shall discuss the flexibility of the proposed environmental management plans to respond to changes in the mine development plan, the regulatory regime, the natural or socio-economic environment, technology, research results, or the understanding of Traditional Knowledge. It shall discuss how the results from the environmental management plans would be used in applying adaptive environmental management[4] throughout all phases of the Project, and identify threshold criteria or indicators to trigger management action.

The Proponent shall give a rationale for the proposed management plans and shall assess their likely effectiveness. It shall also give a rationale for the rejection of mitigation measures and justify trade-offs between cost savings and effectiveness. It shall provide a risk assessment of those economic or other conditions that might impair the effectiveness of mitigation measures.

By way of *example*, the Voisey's Bay Nickel Company's EIS for their mine/mill project in Labrador included an Environmental Health & Safety (EH&S) Management System composed of 11 integrated plans:

- Environmental Protection Plans;
- Emergency Response and Contingency Plans;
- Occupational Health & Safety Plan;
- Impact and Benefits Plan;
- Human Resources Plan;
- Reclamation Plan;

[4] Adaptive environmental management revises traditional conceptions conditioning environmental impact review procedures. Its principles are outlined by Holling (1978) and refer to intra-ecological connections, spatial behaviour of events, erratic alterations in natural systems, and dynamic variability. Holling also identifies several misconceptions commonplace in the environmental review process.

- Education and Orientation Plan;
- Aboriginal Involvement Plan;
- Public Involvement Plan;
- Monitoring and Follow-Up Plan;
- Auditing and Continual Improvement Plan.

Each EH&S Plan is related to the determined VECs and VSECs and identifies management needs by project phase, thus taking a life-of project horizon.

Another *example* to consider is the Diavik Diamonds Project at Lac de Gras, NWT. Diavik committed to the following Environmental Management Plans:

- Waste Management Plan;
- Water Management Plan;
- Hazardous Materials Management Plan;
- Blasting/Explosives Management Plan;
- Quarry Management Plan;
- Emergency Response Plan;
- Processed Ore Containment Management Plan;
- Country Rock and Till Storage Management Plan;
- Dredged Lakebed Sediment Management Plan;
- Abandonment and Restoration Plan(s);
- Biotite Schist Management Plan;
- Exploration Environmental Management Plan;
- Traffic Management Plan;
- No Net Loss Plan;
- Construction Area and Activity Management Plan; and
- Operations Area and Activity Management Plan.

Environmental Protection or Management Plans are practical documents that set out detailed site-specific protection measures or procedures that can be designed for such things as: clearing of vegetation; storage, handling, and transfer of fuel and other

petrol products; sewage disposal; solid waste disposal; quarrying and aggregate removal; erosion prevention; drilling and exploration; dust control; noise control; blasting; permafrost; mineralized rock and acid mine drainage; and stream crossings.

5.16.9.3 Management of Impacts on Physical Environment

The present subsection is only illustrative of what *might* be done. The Proponent should present specific measures for each VEC that is likely to be significantly impacted, such as denning sites and raptor nesting sites.

5.16.9.3.1 Caribou

Mitigation measures for impacts on caribou could include**:**

- Fencing of roads, landing strips, tailings ponds, and other potentially dangerous areas;
- Education of employees;
- Speed restrictions (the Proponent must show how they will be enforced) during caribou migration to reduce the risk of vehicles' colliding with caribou; and
- Designing roads and other infrastructure in ways that discourage caribou from interacting with them.

The Proponent shall integrate mitigation measures into a detailed caribou management and monitoring plan. The use of Traditional Knowledge in minimizing the effects of the Project on caribou (e.g., diverting caribou from tailings) and in establishing a monitoring program shall be discussed. The establishment of a multi-party Bathurst Herd caribou management board could be considered. Such a board could perhaps play a role in CEA, as one potential cumulative effect of the Project could be loss of habitat for caribou.

5.16.9.3.2 Fish

The Proponent shall discuss measures to compensate for the loss of aquatic habitat, including habitat replacement. The principle of No Net Loss (Policy for the Management of Fish Habitat, Department of Fisheries & Oceans, 1986) for fish habitat shall be applied.

5.16.9.3.3 Bears

Mitigation measures designed to prevent bears from becoming habituated to the mine site might include fencing, the removal of solid wastes, and devices to frighten them.

5.16.9.4 Management of Impacts on Socio-economic Environment

The Proponent shall present policies and programs to minimize potential negative socio-economic effects and to optimize potential positive effects. The general areas that shall be considered are human resources, occupational health and safety, Nunavummiut involvement, public involvement, IBAs, and Development Partnership Agreements.

5.16.9.4.1 Human Resources

The Proponent shall prepare a Human Resources Plan, which might consider: human resources legislation; organization planning; succession and career plans; compensation plans and profit-sharing; benefit programs (e.g., health care plan, work clothing and safety equipment, vacation leave); work rotation and pay schedules; health and safety programs; hiring practices and procurement; skills and entry requirements; training and development; control of movements to and from the Project site; on-site public safety with respect to firearms, while respecting the rights and needs of harvesters from adjacent communities to travel freely through the country; alcohol and drugs; smoking; sexual and gender harassment; employment for women; human resource information systems; labour relations (e.g., procedure for submitting grievances or concerns, disciplinary procedures); employee

communications; incorporation of relevant IBA terms and conditions; and the use of and payment for municipal facilities and services in local communities.

The Proponent shall also develop an Education and Orientation Plan to help all employees to understand their responsibilities in environmental and health and safety management.

The Proponent shall give special consideration to promoting the participation of Nunavummiut in Project employment and related business opportunities by addressing, for example: employment preferences to Nunavummiut; recruitment strategies to overcome entry barriers; education and training programs (e.g., partnerships with local schools and other educational institutions, on-the-job learning, and apprenticeships); cross-cultural orientation; preference to northern businesses; commuting arrangements; northern allowances; the types of food available to workers at the mine site; and the pursuit of on-site sport hunting and fishing by non-Nunavummiut employees, while respecting the rights and needs of Nunavummiut employees to harvest and pursue traditional activities and all applicable regulations, including the use of local guiding services.

The Proponent might note that hunting and fishing are usually prohibited at the Nunavut mining sites. And for example, recreational angling was determined to have the greatest single potential impact on fish populations of all the activities associated with the Diavik project. For this reason, prohibiting recreational angling by all employees at or near the Hackett River site might go a long way towards avoiding impacts on fisheries resources.

The Proponent shall discuss the extent to which its policies regarding such things as preferential hiring, northern allowances, safety, and alcohol and drugs would be applied to contractors and sub-contractors. It shall also discuss criteria for selecting contractors.

Some mines have initiated a Job Development Strategy under the stewardship of northern businesses, which aims to identify and cultivate employment and business opportunities for northern workers and entrepreneurs that reflect the goals and desires of northern residents and of the business community. The strategy also has the potential for creating opportunities for those who prefer not to work at the mine site. The Proponent should evaluate the feasibility of becoming a partner in the Job Development Strategy or, if that is not feasible, coordinating its activities with it so as to avoid competition and duplication.

The Proponent shall describe a program to invest a specified portion of the wealth created by the Project in the natural and human capital of the region. Such a program can be likened to an economic diversification or development trust fund.

The Proponent shall design mitigation and monitoring measures in such a manner as to reduce potential social and cultural disruption, which could include: work schedules that are adapted to traditional activities; the provision of no-cost commuting to allow workers to continue to live in their own communities and to participate in their traditional economic and cultural activities; assistance to communities to address social problems, whether solely related to the Project or not; and counselling services to employees and their families regarding matters such as financial management, substance abuse, and work-related stress management.

The Proponent shall discuss environmental management and monitoring techniques designed to mitigate potential cumulative effects and to increase understanding of cumulative effects. That discussion shall include follow-up plans to verify the accuracy of the environmental assessment and determine the effectiveness of mitigation measures. The Proponent's responsibilities shall reflect the Project's anticipated contribution to cumulative environmental effects from an ecosystem perspective.

5.16.9.4.2 Occupational Health and Safety

The Proponent shall present an Occupational Health and Safety Plan that focuses on good safety practices, safety awareness, risk management, mine rescue, employee involvement, and management commitment. It shall address: safety reporting; safety orientation; hazard analysis; training in first-aid, cardio-pulmonary resuscitation, fire-fighting and -prevention, and spill response; workplace monitoring and control; and medical surveillance.

5.16.9.4.3 Nunavummiut Involvement

In discussing means to involve Nunavummiut, the Proponent might consider on-site observers (who would be responsible for monitoring certain Project activities), liaison committees (to facilitate communication, consultation, and resolution of environmental matters), and the compilation, review, and use of Nunavummiut place names and other Traditional Knowledge.

5.16.9.4.4 Public Involvement

The Proponent shall describe a Public Involvement Plan, the objectives of which shall be to: provide information to the public and concerned communities on Project design and activities; identify mitigation needs; gain understanding of public concerns; develop two-way communications with the concerned communities; and obtain input to environmental and health and safety management decisions.

Public involvement techniques could include: mail or hand-outs to households; videos on Project components; communication sessions to explain the results of the EIS; information sessions on specific subjects; corporate public offices in the Region or in Nunavut; open houses; workshops on Project development; meetings with government officials, interest groups, and other parties; presentations to interest groups and the public; community forums; site visits; toll-free telephone lines; a company newsletter; annual environmental reporting; release of Project documents; local monitoring committees; and media releases.

Wherever the Proponent undertakes public consultation and involvement, it shall ensure that participants and the public in general are subsequently informed how their views and knowledge were taken into consideration and applied.

Appendices to the EIS must contain full documentation on public consultation, including records of any follow-up, and plans for public consultation throughout the entire project life.

5.16.9.4.5 Impact and Benefit Agreements

The EIS must respect all of the provisions of the NLCA relating to impact and benefits agreements, including Article 6, Part 4 of Article 9, Part 3 of Article 20, Article 26, and Article 27.

The Proponent shall discuss the negotiation of an Impact and Benefit Agreement (IBA), including with whom such agreements might be negotiated and whether they will be concluded prior to the construction of the Project.

The NLCA empowers the Nunavut Water Board to request from the applicant, when considering a water application, information regarding the …*steps which the proponent proposes to take to compensate interests adversely affected by water use* (NLCA, s. 13.8.1(d)) and the …*interests in the lands and waters which the proponent has secured or seeks to secure* (NLCA, s. 13.8.1(f)). The Nunavut Water Board has water and waste-in-water jurisdiction and otherwise has the option to conduct joint hearings with the NIRB.

Issues that shall be covered in the IBA might include: assurances that local communities are able to take advantage of job opportunities; training; preferential hiring programmes; financial transfer payments; royalties; equity participation; new business development and contract arrangements; compensation for declines in harvests of fish and wildlife; participation in monitoring activities; dispute-resolution; and the other issues raised by the signatories.

In discussing compensation, the Proponent shall address such issues as eligibility, burden of proof, access by individuals to resources to help them to pursue claims, and dispute-resolution mechanisms.

5.16.9.4.6 Development Partnership Agreement

The Proponent shall, without disclosing any confidential or non-public information, provide details regarding the DPA insofar as monitoring responsibilities and the Kitikmeot Regional Socio-Economic Monitoring Committee are referenced.

5.16.9.4.7 Pollution Prevention

The Proponent shall highlight any pollution prevention measures to be implemented. Pollution prevention is defined by the Federal Government in the document *Pollution Prevention: A Strategy for Action* (EC 2000), which links the concept of pollution prevention with sustainable development - a vision that includes a clean, healthy environment and a strong, robust economy**,** and which works to avoid the creation of pollution rather than trying to manage it after it has occurred.

5.17 RESIDUAL IMPACTS

Residual impacts are those for which feasible mitigation measures could not be conceived and for which compensation has not yet been determined. They also include the effects that persist after mitigation measures have been successfully applied. Both short-term and long-term residual impacts must be considered.

The Proponent shall describe the residual effects of the Project in a way that permits comparisons with the Project's potential effects in the absence of mitigation, and shall express their significance in the same manner as for the said potential effects, using the same criteria. It shall also assess the reliability of the planned mitigation measures and the environmental consequences of their failure.

5.18 RISK ASSESSMENT AND EMERGENCY RESPONSE PLAN

The Proponent shall carry out a Preliminary Risk Assessment and prepare an Emergency Response Plan for the Project, discussing potential risks associated with its construction and operation. Potential ecological and human health risks should be assessed as part of these plans. Any possible abnormal events should be discussed, along with the safeguards that may be used to reduce these risks. Potential hazards both in the marine environment, and those related to land-based activities should be discussed and contingency plans to deal with spills of hydrocarbons, or other deleterious substances, on land or at sea, should be included. The Proponent should outline the steps it will take with respect to risk management, including loss prevention practices and insurance.

5.19 MONITORING, EVALUATION, AND MANAGEMENT

5.19.1 Overview

Consistent with Part 7 of Article 12 of the NLCA, the Proponent should describe the environmental and socio-economic monitoring programs to be incorporated into all phases of the Project. A follow-up monitoring program is necessary to verify the accuracy of the environmental assessment of the Project and determine the effectiveness of mitigation measures.

The Proponent shall present a monitoring plan that includes compliance, biophysical, and socio-economic monitoring programs, and a follow-up program to integrate monitoring results into a coherent action plan and to evaluate the effectiveness of mitigation measures during operation and after the final closure of the Project. In every case, the Proponent shall explain what is to be monitored, why it needs to be monitored, and how it will be monitored.

Compliance monitoring refers to verifying the Proponent's conformity with regulatory standards and requirements. Biophysical monitoring involves the monitoring of such biophysical components as air, water, and land. Socio-economic monitoring involves the

monitoring of socio-economic parameters, for example employment of Nunavummiut and other northerners and the purchase of goods and services in the region.

The Proponent shall discuss how its monitoring program would distinguish between natural environmental changes and those caused by the Project, how it would assess the validity of impact predictions, how monitoring results would be used to modify management programs and Project policies, and how it would respond to unexpected adverse effects. It shall also discuss the use of criteria or thresholds to assess impacts (e.g., the use of lichen as an indicator species due to its sensitivity to sulphur dioxide and nitrogen dioxide and its importance in the diet of caribou).

The Proponent shall strive at every phase of the Project to collect data in a manner that is consistent with existing databases, including those of the Nunavut Planning Commission and the Department of Sustainable Development, provided that doing so will not significantly compromise its ability to monitor effectively given Project-specific conditions.

The description of the approach to monitoring shall address:

- Monitoring methodologies, standards, objectives and a corresponding data-collection schedule. The schedule shall describe the frequency of data-collection and -analysis, and shall distinguish between on- and off-site activities, describing the logistics for carrying out both types of activities;
- The subjects and parameters to be monitored, and the criteria used in their selection;
- The geographic extent of monitoring;
- Internal and external reporting and response mechanisms and structures, including procedures to be followed in the event that monitored results deviate significantly from predicted results;
- Approaches and methods for monitoring the cumulative effects of the Project;
- Integration of monitoring results with other aspects of the Project, including adjustments to operating procedures and refinements to mitigation measures;
- Experience gained from prior and current monitoring programs;

- The roles of independent experts, government agencies, communities, holders of Traditional Knowledge, and renewable resource users, and any joint monitoring programs;
- Procedures to assess the effectiveness of monitoring programs, mitigation measures, and recovery programs for disturbed areas; and
- The role of communications plans in monitoring, and procedures to communicate the results of monitoring to interested parties.

In the case of post-closure monitoring, the Proponent shall describe how long monitoring will continue and shall identify who will assume the costs and responsibility, especially in the event of changes of corporate ownership.

The Proponent shall consult with all concerned regulatory authorities and stakeholders to maximize the chances that it proposes a clear, comprehensive, and proactive monitoring plan.

5.19.2 Community Liaison Committees

If the Proponent proposes that one or more Community Liaison Persons or Committees (CLCs) be established to participate in monitoring activities, then the following shall be considered:

- The level of community support for participating on a CLC. The CLC shall be treated seriously by the community, and the community appointees shall be accountable in practical and identifiable ways to the community. Community appointees shall be given time and assistance to familiarize themselves with all of the relevant aspects of mining;
- Reaching a clear understanding among all involved regarding the role of the CLC, its purpose and its limitations. Impact monitoring shall be clearly defined and written into the mandate of the CLC, and all participants shall agree on its meaning. Consensus shall be reached regarding the framework for the monitoring activities, such as what is being monitored, what data and how much of it is required, and whether the monitoring activities themselves are sustainable;

- Methods for maintaining the CLC's visibility in the community;
- The Proponent's accountability to the CLC and to the community. The Proponent must be, as a matter of policy, willing to respond to the findings of monitoring;
- The provision of information and reporting on the activities of the CLC to the communities. For example, if community members are to be involved in monitoring impacts, they must be adequately informed of the types of effects that they are likely to encounter. Likewise, community members must have access to the results of the monitoring to which they contribute; and
- The provision of sufficient financial, technical, and administrative resources to the community members so that they can participate in a meaningful way in the CLC. The budget for the CLC should depend on the scale and complexity of the mining operation and should be reassessed from time to time (adapted from Penn, 1996).

5.20 CLOSURE AND RECLAMATION

The Proponent shall present a Closure and Reclamation Plan that **respects all applicable regulations and standards** and addresses the open pit and underground mines, mine rock, overburden, and tailings disposal facilities and areas, buildings and site infrastructure, fuel and hazardous materials storage facilities, wastes, borrow pits and quarries, roads and associated water crossings, deep sea port, airport, and all other areas of disturbance. It shall state its goals for reclamation, such as the re-establishment of stable physical landforms and land-use productivity, and the long-term physical and chemical stability of water resources. It shall discuss reclamation methods and the schedule and time frame (e.g., progressive reclamation). It shall also discuss how the Closure and Reclamation Plan would be updated periodically by, for example, incorporating ongoing research and technological advances or changes to standards or legislation.

The Proponent shall specify when a temporary closure should be considered permanent.

The Proponent shall discuss a research program that is consistent and compatible with broader efforts under way within Nunavut to address challenges to reclamation, such as the cold environment, poor soil development, limited topsoil resources, slow growth rates, limited seed production, low soil moisture, and short growing seasons.

The Proponent shall discuss the aesthetic impacts and the safety to both humans and wildlife of abandoned open pits, and shall discuss alternative development approaches that could accelerate the filling of pits and underground mines once mining is completed (e.g., filling of pits with waste rock, tailings, or water**,** provided that it can be demonstrated that such an option is environmentally acceptable).

The Proponent shall evaluate the cost and feasibility of going beyond mere reclamation by enhancing wildlife habitats and undertaking other forms of beneficial landscaping.

The Proponent shall discuss post-closure monitoring of such environmental components as wildlife, re-vegetation, landform stability, and water quality. Issues such as the introduction of exotic species of plants for purposes of re-vegetation shall be discussed.

5.21 CONCLUSION AND RECOMMENDATIONS

The DEIS should end with a conclusion presenting an overall analysis of the projected biophysical and socio-economic impacts, anticipated cumulative effects, proposed mitigation measures, and any residual impacts. While highlighting the impacts in Nunavut, this conclusion should clearly present the importance of the DEIS findings to the entire Regional Study Area.

5.22 LIST OF CONSULTANTS AND ORGANIZATIONS

The Proponent shall present a list of all consultants who contributed to the preparation of the DEIS, and including their role and contact information.

In addition, the Proponent shall prepare a list of the organizations consulted, including: the time, place, and purpose of the consultation; and contact information for the organization. An appendix shall contain copies of the materials presented at such meetings and other relevant materials.

6.0 LITERATURE CITED

CCME (Canadian Council of Ministers of the Environment). *Canadian Environmental Quality Guidelines* and *Guidelines Respecting Ambient Air Standards for Sulphur and Total Suspended Particulate Matter in the Northwest Territories,* under the *Environmental Protection Act.*

Department of Fisheries and Oceans. 1986. *Policy for the Management of Fish Habitat.* Available at http://www.dfo-mpo.gc.ca/canwaters-eauxcan/infocentre/legislation-lois/policies/fhm-policy/index_e.asp.

EC (Environment Canada). 2000. *Pollution Prevention: A Federal Strategy for Action.* Available at http://www.ec.gc.ca/pollution/strategy/en/index.cfm.

EC (Environment Canada). 2002 (amended October 2006). *Metal Mining Effluent Regulations.* Available at http://www.ec.gc.ca/nopp/docs/regs/mmer/en/index.cfm.

EC (Environment Canada). 2004. *Submission to the Nunavut Impact Review Board September 10, 2004 – Public Registry Document 139.* Available at: http://ftp.nunavut.ca/nirb/Reviews/03UN114.

GN DoE (Government of Nunavut – Department of the Environment). 2004. *Submission to the Nunavut Impact Review Board November 12, 2004 – Public Registry Document 198 (b).* Available at http://ftp.nirb.ca/REVIEWS/CURRENT_REVIEWS/03UN114-BIPR_PROJECT/02-REVIEW/04-EIS%20GUIDELINES/DRAFT%20EIS%20GUIDELINES/COMMENTS/.

Holling, C. 1978. *Adaptive Environmental Assessment and Management*. Toronto, Ontario: John Wiley & Sons.

INAC and TFN (Indian and Northern Affairs Canada and Tungavik Federation of Nunavut). 1993. *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada* (Nunavut Land Claims Agreement). Ottawa, Ontario: INAC and TFN.

INAC 2001. *Esker Habitat Characteristics and Traditional Use Study in the Slave Geological Province – Final Report to the West Kitikmeot / Slave Study.* Yellowknife, NT: INAC.

INAC. 2002. *Mine Site Reclamation Policy for Nunavut.* Ottawa, Ontario: INAC.

MVEIRB (Mackenzie Valley Environmental Impact Review Board). 2004. *Environmental Impact Assessment Guidelines.* Yellowknife, NT: MVEIRB.

MVEIRB (Mackenzie Valley Environmental Impact Review Board). 2005. *Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment.* Yellowknife, NT: MVEIRB.

NIRB (Nunavut Impact Review Board). 2006. *Guide 7: Guide to the Preparation of Environmental Impact Statements.* Cambridge Bay, NU: NIRB.

NPC (Nunavut Planning Commission). 1997. *Summary of Actions. Final Report on Resource Management Planning in West Kitikmeot.* Cambridge Bay, NU: NPC.

NPC (Nunavut Planning Commission). 2005. *Draft West Kitikmeot Land Use Plan.* Cambridge Bay, NU: NPC. For access contact mtownsend@npc.nunavut.ca.

Penn, Alan. 1996. *Monitoring the Ecological and Social Impacts of Mining. Community Participation and Corporate Policy*. Unpublished paper prepared for the conference "Tapping Traditional Resources – International Perspectives on the Mineral Industry and Aboriginal Community Development."

West Kitikmeot Slave Study Society. 2001. *Final Report - West Kitikmeot Slave Study.* Yellowknife, NT: West Kitikmeot Slave Study Society.

Whitney, J.B.R. and V.W. Maclaren (ed.). 1985. A Framework for the Assessment of EIA Methodologies. In *Environmental Impact Assessment: The Canadian Experience*. Toronto, Ontario: Institute for Environmental Studies, Environmental Monograph No. 5.

Wismer, Susan. 1996. The Nasty Game. *Alternatives Journal* 22(4).

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

Proponents must comply with the following 10 minimum requirements for an Environmental Impact Statement:

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 comprehensive impact assessment must be carried out which includes, but is not limited to, environmental effects that are likely to result from the Project in combination with other projects or activities that have been, or will be, carried out. Anticipated impacts include short and long-term, direct and indirect, positive and negative, cumulative, socio-economic, Archaeological and cultural impacts. This element of the EIS must include a Mitigation analysis that explains how the impacts could be avoided, minimized, cured, eliminated, or compensated.

5. Cumulative Effects Analysis (CEA)

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

6. Significant Effects Analysis

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

- 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.

APPENDIX B: DRAFT EIS DELIVERY ADDRESSES

Nunavut Impact Review Board (Cambridge Bay)
PO Box 1360
Cambridge Bay, NU
X0B 0C0

Nunavut Water Board (Gjoa Haven)
PO Box 119
Gjoa Haven, NU
X0B 1J0

Cambridge Bay Hamlet Office
PO Box 16
Cambridge Bay, NU
X0B 0C0

Kugaaruk Hamlet Office
PO Box 205
Kugaaruk, NU
X0B 1K0

Kugluktuk Hamlet Office
PO Box 309
Kugluktuk, NU
X0B 0E0

Taloyoak Hamlet Office
PO Box 8
Taloyoak, NU
X0B 1B0

Gjoa Haven Hamlet Office
General Delivery
Gjoa Haven, NU
X0B 1J0

Bathurst Inlet Port and Road Committee
PO Box 820
Yellowknife, NT
X1A 2N6

APPENDIX C: VALUED ECOSYSTEM COMPONENTS AND VALUED SOCIO-ECONOMIC COMPONENTS

Valued Ecosystem Components

The following list serves as an example of some VECs identified through the Public Scoping for other projects located in the West Kitikmeot, which may be an appropriate beginning point for the identification of relevant VECs:

- Species at risk, as defined by *Species at Risk Act (SARA):*
    - Dolphin-Union caribou herd *(of special concern)*
    - Grizzly bear *(of special concern)*
    - Wolverine *(of special concern)*
    - Polar bear *(of special concern)*
    - Peregrine falcon *(of special concern)*
    - Short-eared owl *(of special concern)*
    - Ivory gull *(of special concern)*
    - Beluga whale, Eastern High Arctic/Baffin and Cumberland Sound populations *(of special concern)*
    - Ross's gull *(threatened)*
    - Peary caribou, Somerset and Devon Islands/low arctic portion of population *(endangered)*
    - Eastern arctic bowhead *(endangered)*
    - Bering Wolffish *(endangered)*
    - Eskimo Curlew *(endangered)*

- Caribou: Ahiak herd, Bathurst herd, Dolphin & Union herd, Peary herd and Bluenose (East and West) herds
- Wolf
- Four horn Sculpin (Myoxocephalus quadricornis)

Valued Socio-economic Components

The following list serves as an example of some of the VSECs that have emerged throughout different processes in the Kitikmeot region[5]. This list is not meant to be exhaustive, but rather to give the Proponent a foundation from which to begin the identification of relevant VSECs:

- Aesthetics of development projects
- Archaeological sites and other heritage resources, including those underground, in and around the Proposed Project location
- Objects and places of recreational, scenic, spiritual and ecological value

[5] GN-DoE. 2004. *Submission to the Nunavut Impact Review Board November 12, 2004 – Public Registry Document 198 (b).*

- recreational uses in and around the Proposed Project location
- Human health and safety, with “health” defined as “a state of complete physical, mental and social well-being”
- Cultural and economic health of communities in the NWT and Nunavut
- Use of land and resources for traditional purposes by Aboriginal and Inuit persons
- Tourism
- Inuit lifestyle and living off the land
- Environmental protection in support of subsistence economy and culture
- Employment and job opportunities
- Economic development at community level
- Inuit ownership of businesses
- Training
- Youth opportunities
- Families and parenting
- Learning from experience to predict and prevent negative social impacts
- Strong local organisations (Hamlets, Social Services, Hunter and Trapper Organisations)
- Healthy diets
- Participation in the community
- Labour supply available in communities
- Traditional land use
- Stress on individuals/families
- Personal and household income
- Regional economy
- Potential for language loss