BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

DEVELOPMENT PROPOSAL FOR THE
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EXECUTIVE SUMMARY (ENGLISH)

Introduction

The Mary River Project ("the Project") is a proposed iron ore mine and associated facilities located on North Baffin Island, in the Qikiqtani Region of Nunavut. Baffin Island is home to Inuit, who enjoy a culture that is unique and traditional to arctic regions. The land where the Project is located is important to Inuit culture, heritage, and their continued well-being in that these people use the resources on the land and from the sea for both their subsistence and in preserving their traditional way of life.

The Project involves the construction, operation, closure, and reclamation of an 18 million tonne-per-annum (Mt/a) open pit mine. The high-grade iron ore to be mined is suitable for international shipment after only crushing and screening and as such, no chemical processing facilities are required for this Project. A railway system will transport the ore from the mine area to an all-season deep-water port and ship loading facility at Steensby Inlet where the ore will be loaded into ore carriers for overseas shipment through Foxe Basin. A dedicated fleet of cape-sized ore carriers, capable of breaking ice, will be chartered by Baffinland from a consortium of ship owners organized by Fednav. Some non-icebreaking ore carriers and conventional ships will also be used during the open water season.

All major Project components will operate year round and, based on the currently-defined iron ore reserve, will continue to operate for about 21 years. Geological conditions suggest that additional ore may be delineated as exploration continues, potentially extending the life and/or increasing the production rate of the Project.

The Mary River site is located about 160 km south of the community of Pond Inlet (Mittimatalik) and 1000 km northwest of Iqaluit, the capital of Nunavut. Project facilities will be sited in the mine area at Mary River and port area at Steensby Inlet, with a railway line and access road connecting the two. Marine access and shipping through the construction phase and periodically during operation will occur seasonally through Milne Inlet and the existing Milne Inlet Tote Road will therefore be used periodically to access Mary River during frozen conditions. Shipping through Steensby Inlet will be seasonal through construction and year-round through operation. Access to the Project sites for personnel will be by chartered aircraft.

Site conditions play an important role in the planning and execution of the Project. The area experiences bitter cold in the wintertime and 24-hour darkness from November to January. Summers bring 24-hour daylight from May to August, but continued cool to cold conditions. While these conditions are typical of arctic environments, they substantially affect planning and logistics relative to most Project activities; but especially to shipping, procurement, construction, and field investigations.

Pre-Construction Staging

The construction and operation of major capital projects in the arctic requires significant up-front planning to address the short summer season and challenging logistics. Initial scheduling must consider the short open water periods for strategic material and supply deliveries for early works and also the activity-limiting extreme cold and darkness during the winter months until all-season facilities can be constructed and brought on-line. To facilitate this, Baffinland plans to pre-deliver in 2009 much of the materials and supplies required for the early construction works during the open water season using conventional arctic sealifts as employed to date by the Project and Nunavut communities. Sealifts carrying materials and supplies will be delivered to Milne Inlet, where they will be offloaded onto the beach and moved to Mary River via the Milne Inlet Tote Road during the winter of 2009-2010. The materials and supplies brought to Steensby Inlet will be offloaded and placed into new laydown areas that are within the planned footprint of the proposed new port facility. In addition to the sealifts, two barge camps, and bunded fuel iso-containers or a fuel tanker or barge, will be pre-positioned to overwinter in Steensby Inlet so that construction can be initiated in mid-2010, pending regulatory approval.

Construction Phase

The construction phase of the Project is expected to be carried out over a 4 year period, from 2010 through 2014. Railway construction is the critical path item for the construction phase, and as such, it will be necessary to concurrently build the railway from a number of construction locations. Construction activities for the Steensby port and the railway will be staged from the Steensby port site, and construction activities for Mary River will be staged from Milne Inlet. In addition to current facilities, a large construction camp will be positioned at Mary River as well as barge accommodations at Steensby Inlet and up to four construction camps along the rail alignment. Infrastructure such as camps and laydown areas, aggregate sources from rock quarries, and sand and gravel borrow areas will be required to support construction. The construction workforce on-site will peak at approximately 1,760 people, working 4 weeks at site followed by 2 weeks off, for a total payroll peak of 2,680 people during construction. Where possible, permanent infrastructure will be built at the onset of construction, to be used during both construction and operation phases of the Project. In many instances, temporary infrastructure will be constructed or positioned at Project sites for the duration of the construction phase only, to be removed once construction is complete.

Operation Phase

The operating life of the proposed Project is expected to be about 21 years, although additional successful exploration results could either extend the operational life, increase the annual ore production volume, or both. The open pit mine at Mary River will include waste rock storage areas, facilities for crushing and screening of ore, explosives manufacture and storage, stockpiles, rail loading and unloading, power generation, worker accommodation and support facilities such as a power plant, service and maintenance shops. About 275 people will be on-site at Mary River during operations, with another 175 workers stationed at Steensby Inlet. Access to the mine site will be by airstrip and railway from Steensby Inlet, with most supplies delivered over the railway, and only occasional winter-only use of the Milne Inlet Tote Road.

The railway from Mary River to Steensby Inlet will be 143 km long, and will deliver iron ore from Mary River to Steensby Inlet, and transport supplies from the port to Mary River. The port at Steensby Inlet will consist of a rail loading and unloading facilities and rail service/maintenance facilities; worker accommodations; ore loading, freight and tug docks; ore stockpile and ship loading facilities, and an airstrip. A dedicated fleet of about 10 icebreaking ore carriers, operated by a shipping company contracted to Baffinland will transport most of the ore to international markets 12 months a year. Additional shipping will occur during open water.

Closure and Reclamation Phase

Conceptual mine closure planning has been completed for the Mary River Project, with the objective of reclaiming Project areas to be both physically and chemically stable in the long-term for both public safety and environmental protection. Materials and equipment will either be removed from site or disposed of in the open pit, and all hazardous materials and wastes will be removed from site to licensed disposal facilities. The open pit and waste rock stockpiles will be inspected for physical stability. Roads, airstrips and development areas will be recontoured as appropriate to provide long-term stability and reduce the potential for erosion. The closure and reclamation phase is expected to be 3-years, followed by a minimum of 5-years of post-closure environmental monitoring to verify reclamation has successfully met closure and reclamation objectives.

Regulatory Processes

There are a number of regulatory processes applicable to the Project, including conformity to the North Baffin Regional Land Use Plan and possibly an amendment to the Plan. The Project is expected to undergo an environmental review by the Nunavut Impact Review Board (NIRB), an environmental review by the *Canadian Transportation Act*, and is subject to at minimum a comprehensive study under the *Canadian Environmental Assessment Act*. Baffinland expects that each of the CTA and CEAA reviews; in addition to the public review that would be necessary to amend the land use plan will be coordinated through the NIRB review process.

Various permits, licenses and approvals will be required to be issued upon successful completion of the review processes. Land tenure through leases and shorter term land use permits will be required from the Qikiqtani Inuit Association (QIA) to access Inuit Owned Lands that surround the Mary River site, and from Indian and Northern Affairs Canada (INAC) for the port at Steensby Inlet and most of the railway. Other key approvals include a Type A Water License from the Nunavut Water Board (NWB), *Fisheries Act* authorization applications with the Department of Fisheries and Oceans (DFO), approvals or exemptions under the Navigable Waters Protection Act, and a license for explosives manufacture.

The pre-construction staging is expected to be authorized prior to the completion of the Project review by NIRB. Article 12.10.2(b) gives NIRB the expressed authority to approve or issue licenses for certain exploration or development activities related to the Project if, in their judgment, it is appropriate to allow the activity to proceed prior to completion of the full review. Baffinland will apply to NIRB, pursuant to Article 12.10.2(b), to allow pre-construction staging to take place in 2009. Baffinland's development schedule presumes that this exemption will be obtained.

Stakeholder Engagement and Project Scoping

Stakeholder engagement has been an important part of the Project, engaging local communities and knowledge holders through dialogue and participation in the Project. Efforts have been and continue to be guided by the following objectives:

- To adequately scope and conduct environmental and socio-economic baseline studies
- To understand local conditions and issues both through the scientific process as well as by engaging in dialogue with local communities and knowledge holders
- To incorporate local knowledge and concerns into Project design at an early stage
- To appropriately scope an environmental assessment for the proposed Project

Baffinland established a network of community liaison offices (CLO) in 2007, which will remain in place during construction and operation phases. These offices are located in Baffinland's points-of-hire locations of (listed in alphabetic order) Arctic Bay, Clyde River, Hall Beach, Igloolik, Iqaluit and Pond Inlet. This network of CLO offices facilitate training and employment opportunities for land claims beneficiaries and are made available to all contractors working on the Project. Inuit knowledge studies are also ongoing in each of these communities.

Baffinland will operate direct flights to and from the Mary River site to Baffinland's designated points-of-hire locations. The point-of-hire locations define the Project's social zone of influence. Residents in the region that do not live at points-of-hire will not be precluded from working at the mine.

Proposed EIS Guidelines have been developed by Baffinland through its own familiarity with the Project and Project site, its own scoping activities, consultation with communities, and referral to EIS guidelines developed for other mining projects. Baffinland has provided these guidelines for NIRB's, NPC's and the NWB's consideration for adoption in whole or in part, to facilitate scoping and the development of NIRB-issued guidelines for the preparation of the Project Environmental Impact Statement.

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ᓯᕗᓂᐊᕈᓯᖓ

ᓄᓗᔭᖕᓂ (ᐱᓕᕆᐊᖑᓂᐊᕐᑐᖅ) ᐊᕿᒃᓯᒪᔪᖅ ᓴᐳᒃᓴᒻᓂᒃ ᐱᔭᐃᕕᐅᓂᐊᕐᓗᓐᓂ ᐊᒻᒪᓗ ᓱᓇᒃᑕᖅᑎᐊᕐᓗᓐᓂ ᕿᑭᕐᑕᓗᖕᒥ, ᓄᓇᕗᑦ ᐃᓗᐊᓐᓂ. ᓄᓇ ᓴᐃᒃᓴᕐᓯᐅᕐᕕᐅᓂᐊᕐᑐᖅ ᐊᑐᕈᑎᖃᑎᐊᕐᑐᖅ ᐃᓄᖕᓄᑦ ᐃᓕᖁᓯᖕᒋᓄᑦ, ᐱᖁᓯᖕᒋᓄᑦ ᐊᒻᒪᓗ ᐃᓄᓇᓱᐊᕐᕕᐅᑎᐊᕋᓱᐊᕐᓗᓐᓂ ᐃᓄᖕᓄᑦ ᐱᓇᓱᐊᕐᐅᕙᒃᓗᓐᓂ ᓄᓇᖓ ᐊᒻᒪᓗ ᑕᕆᐅᖓᓐᓂᑦ ᐊᒻᒪᓗ ᐸᐸᑎᔪᑎᒋᓗᓐᓂᔪᖅ ᐃᓄᐃᑦ ᐃᓕᖁᓯᖕᒋᓐᓂᒃ.

ᓄᓗᔭᖕᒥ ᓴᐅᒃᓴᕐᓯᐅᕐᑎᑦ (BIMC) ᑲᒪᓂᐅᔪᖅ ᑲᓇᑕᒥᐅᑕᐅᓗᓐᓂ ᑕᐅᑐᖃᕐᓗᓐᓂ ᓴᐳᒃᓴᕐᓯᐅᕐᐳᖕᒥᒃ ᓴᕿᑎᑎᓂᐊᕐᓂᕐᒥᒃ ᓄᓗᔭᖕᓂ. ᐱᒋᐊᓚᐅᕐᓯᒪᔪᖅ ᐊᕐᕌ 2004, ᓄᓗᔮᒥ ᓴᐅᒃᓴᕐᓯᐅᕐᑎᑦ (Baffinland) ᖃᐅᔨᓴᕐᓂᕐᒥᒃ ᐱᐊᓂᒃᓯᒪᓕᕐᑐᑦ ᐃᑯᑦᕐᐸᒃᓗᑎᒃ ᐊᒻᒪᓗ ᖃᐅᔨᓴᕐᐸᒃᓗᑎᒃ ᐊᕙᑎᓕᖓᓂᕐᒥᒃ ᐊᒻᒪᓗ ᐃᓅᓯᓕᖓᓂᕐᒥᒃ ᓄᓗᔭᑉ ᓄᓇᑕᖓᓐᓂ. ᓇᓗᓇᐃᔭᕐᓯᒪᑎᐊᕐᑐᒥᒃ ᖃᐅᔨᓴᕐᓂᕐᒥᒃ ᐱᓕᕆᐊᖄᓯᒪᔪᑦ ᐊᒻᒪᓗ ᐃᓚᖃᕐᓗᓐᓂ 43%101 ᓱᓇᒃᑕᓕᖓᓂᕐᓂᒃ ᐱᐊᓂᒃᓯᒪᑎᐊᕐᓗᑎᒃ ᐊᒻᒪᓗ ᓴᐅᒃᓴᔫᓂᒃ ᑲᑎᕐᓯᓯᒪᓕᕐᓗᑎᒃ ᖃᐅᔨᓴᕐᑕᐅᓚᕐᑐᓪᓚᓂᒃ 2007 ᐊᒻᒪᓗ 2008ᒥ.
ᑕᒪᓇ ᐅᔭᕐᒃᓯᐅᕐᔨᐅᓂᐊᕐᑐᖅ ᐃᒪᓇᐃᓕᐅᕐᕕᐅᓂᐊᕐᑐᖅ ᐃᓪᓗᓕᐅᕐᓗᑎᒃ, ᐃᖃᓇᐃᔭᕐᕕᒋᓗᒍ ᐊᒻᒪᓗ ᓴᐅᒃᓴᒻᒥᒃ ᐊᖏᑎᒋᔫᒥᒃ 18 ᒥᓕᐊᓐᓂᒃ ᑖᓴ ᐊᖏᑎᒋᔫᒥᒃ ᐊᕐᕌᒍᑕᒫᑦ ᐱᔭᐃᕕᒋᕙᒃᓗᒍ. ᑕᒪᓇ ᓴᐅᒃᓴᔾ ᐱᐅᓂᖓᓄᑦ ᓄᓇᒻᒥᑦ ᐱᔭᕐᑕᐅᒍᓐᓂ ᓯᖁᑎᕐᑕᐅᑐᐃᓇᕐᓗᓐᓂ ᐅᒥᐊᕐᔪᐊᒧᑦ ᐅᓯᓕᐅᔭᐅᖃᑦᕐᓂᐊᕐᑐᖅ ᓱᓇᑐᐃᓇᕐᓂᒃ ᖁᐊᕐᓴᕐᓇᕐᑐᓐᓂᒃ ᐊᑐᖃᑕᔪᖕᒋᑐᑦ. ᓄᓇᓯᐅᑎᒃᑕᖕᒥᒃ ᐊᑐᖃᑦᕐᓂᐊᕐᑐᑦ ᓴᐅᒃᓴᒻᒥᒃ ᐅᓯᒃᑦᕐᑕᐅᑕᐅᓂᐊᕐᑐᓪᓗᒥᒃ ᓄᓗᔭᓂᑦ ᑲᖏᕐᓗᒃᔪᐊᕐᒧᑦ ᐊᒻᒪᓗ ᑲᖏᕐᓗᒃᔪᐊᕐᒥ ᐅᒥᐊᕐᔪᐊᒧᑦ ᐅᓯᓕᐅᔭᐅᕙᒃᓗᑎᒃ ᓴᐅᒃᓴᔾᐃᑦ ᐊᒻᒪᓗ ᐅᒥᐊᕐᔪᐊᖅ ᓴᓂᕐᕙᔭᐅᑉ ᐊᒻᒪᓗ ᐃᓪᓗᓕᐅᑉ ᑕᕆᐅᖓᒍᑦ ᐃᖏᕐᕋᕙᒃᓗᓐᓂ. ᑖᓇ ᓴᐅᒃᓴᓕᕆᕕᒃ ᐊᐅᓚᓂᐊᕐᑐᖅ ᐊᕐᕌᒍᓐᓂᒃ 21ᓂᒃ.

ᓱᓇᒃᑖᓂᒃ ᓴᓇᕙᓕᐊᓂᖅ ᓯᕗᓕᕐᐸᒥᒃ

ᐃᓪᓗᓕᐅᕐᓂᖅ ᐊᒻᒪᓗ ᐊᐅᓚᑎᔪᑕᐅᓂᐊᕐᑐᓐᓂᒃ ᓴᓈᓂᖅ ᐅᑭᐅᕐᑕᕐᑐᓪᒥ ᐱᑐᐃᓇᐅᖕᒋᒪᑦ ᑭᓯᐊᓐᓂ ᐸᕐᓇᑎᐊᕐᓯᒪᔭᕆᐊᖃᕐᑐᖅ ᐃᓱᒪᒋᓗᒋᑦ ᐊᐅᔪᖓ ᓇᐃᑐᑯᓗᓯᖑᒪᑦ ᐊᒻᒪᓗ ᓄᓇᑕᖓ ᓄᓇᑐᓗᓐᓂ. Hᒃᑯᐊ ᓄᓗᔭᖕᒥ ᓴᐳᒃᓴᕐᓯᐅᕐᑎᑦ (Bafffinland) ᐸᕐᓇᒃᓯᒪᔪᑦ ᑕᒪᑯᐊ ᓱᓇᒃᑕᒋᔭᐅᓂᐊᕐᑐᓐᓂᒃ ᐃᓪᓗᓕᐅᕐᓂᐊᓕᕐᓗᓐᓂ ᐱᔭᐅᔭᕆᐊᖃᕐᑐᓐᓂᒃ ᑎᑭᑎᑦᓚᕐᑐᑦ 2009 ᐊᐅᔭᖓᓐᓂ.

ᐃᓪᓗᓕᐅᓕᕐᐸᑦᑕ

ᑕᐱᑳᓐᓂ ᐃᓪᓗᒋᔭᐅᓂᐊᕐᑐᑦ ᐊᒻᒪᓗ ᓱᓇᒃᑕᒋᔭᐅᓂᐊᕐᑐᑦ ᓴᓇᔭᐅᕙᓕᐊᓂᐊᕐᑐᓇᔭᐅᔪᑦ ᐊᕐᕌᒍᓐᓂᒃ ᑎᓴᒪᓐᓂᒃ (4), ᐱᒋᐊᕐᓗᑎᒃ ᐊᕐᕌᒍ 2010. ᐃᓪᓗᓕᐅᕐᓂᐊᕐᓂᖅ ᑲᖏᕐᓗᒃᔪᐊᕐᒥ ᐅᓯᒃᑦᕐᕕᐅᓂᐊᕐᑐᓪᒥᒃ ᐊᒻᒪᓗ ᓄᓇᓯᐅᑎᒃᑕᖕᒧᑦ ᐊᖁᑎᒋᔭᐅᓂᐊᕐᑐᖅ ᑲᖏᕐᓗᓕᒃᔪᐊᕐᒥᑦ ᐱᒋᐊᓚᕐᑐᖅ ᑕᒪᑯᐊ ᓯᓚᑖᓂ ᓴᓇᔭᐅᕙᓕᐊᓂᐊᕐᑐᑦ ᐱᒋᐊᓚᕐᑐᑦ ᕿᖑᐊᓐᓂᑦ. ᓴᓇᓚᖓᓕᕐᐸᑦᑕ ᓱᓇᒃᑖᒃᓴᓐᓂᒃ ᐊᒻᒪᓗ ᐃᒃᓗᒋᐅᓂᐊᕐᑐᒃ ᓴᓇᔪᖅᑲᓚᕐᑐᖅ ᖕ,ᒻᖅᔾᓂᒃ ᓴᓇᔩᓐᓂᒃ ᐱᓇᓱᐊᕈᓯᖕᓂᒃ ᑎᓴᒪᓐᓂᒃ (4) ᐊᒻᒪᓗ ᐱᓇᓱᐊᕈᓯᑦ ᒪᕐᕈᒃ (2) ᓄᖅᑲᖓᒃᓗᑎ, ᐊᑭᓕᕐᓱᕐᑕᐅᔪᖅᑲᓚᕐᑐᖅᒻ ᓴᓇᔩᓐᓂᒃ 2,80ᓂᒃ ᐃᒃᓗᓕᐅᓚᖓᓕᕐᐸᑦᑕ. ᐃᒃᓗᓕᐅᓚᖓᓕᕐᐸᑦᑕ ᓴᓈᓂᖕᒋᓐᓂ ᐃᒃᓗᒋᐅᓚᐅᐱᓚᖕᓂᐊᕐᑐᓐᓂᒃ ᐊᒻᒪᓗ ᓄᓇᑕᖓᓐᓂᒃ ᐊᕿᒃᓱᐃᓗᑎᒃ ᐊᒻᒪᓗ ᑐᐊᐸᒃᑕᖓᐊᖅᑲᑕᓚᖓᓗᑎᒃ ᐃᒃᓗᓕᐅᕐᕕᒃᓴᓐᓂᒃ.

ᐊᐅᓚᑎᓚᖓᓕᕐᐸᑦᑕ

ᐊᒻᒧᑦ ᐊᒃᑲᒃᑕᐅᑕᐅᓗᓐᓂ ᓴᐃᒃᓴᖅ ᐱᔭᕐᑕᐅᕙᓕᐊᓂᐊᕐᑐᖅ ᐊᒻᒪᓗ ᐅᔭᖅᑕ ᐊᑐᕐᑕᐅᔭᖕᒋᑐᑦ ᓴᓂᕐᕙᒃᑕᐅᕙᓕᐊᓂᐊᕐᓗᑎᒃ ᓴᐃᒃᓴᔾ ᓯᖁᑎᑕᐅᕝᖃᓚᕐᑐᖅ , ᖃᕐᑕᔪᓂᒃ ᐃᓕᓯᕕᒃᑕᖃᕐᓗᓐᓂ ᐊᒻᒪᓗ ᓱᓇᒃᑕᖃᕐᕕᖃᕐᓗᓐᓂ, ᓄᓇᓯᐅᑎᒃᑕᖕᒧᑦ ᐅᓯᖃᕐᑕᕐᕕᒃ ᐊᒻᒪᓗ

ᐅᓯᖏᔭᕐᕕᖃᕐᓗᓐᓂ, ᐃᑯᒪᖅᐅᑎᖃᕐᓗᓐᓂ, ᐃᖅᑲᐃᔭᕐᑎᑦ ᐃᓪᓗᒃᓴᖏᓐᓂᒃ ᓴᓇᓗᑎᒃ ᐊᒻᒪ ᓱᓇᑯᑖᕐᕕᖃᕐᓗᑎᒃ ᐊᒻᒪ ᓴᓇᕝᕕᖃᕐᓗᑎᒃ. ᐱᒪᖅ ᒫᓐᓂ 275ᓂᒃ ᓴᓇᔨᑕᖅᓚᕐᑐᖅ ᓄᓗᔭᖕᓂᑐᓐᓂᒃ, ᐊᒻᒪ 175ᓂᒃ ᓴᓇᔨᑕᖅᑲᓐᓂᕐᓗᓐᓂ ᑲᖏᕐᓗᒃᔪᐊᕐᒥ. Hᓐᓇ ᓴᕕᒃᓴᓕᕆᕕᒃ ᐅᐸᒃᑕᐅᔪᓇᖅᑕᕐᓂᐊᕐᑐᖅ ᑎᖏᒥᓱᑦ ᐊᒻᒪ ᓄᓇᓯᐅᑎᑯᑕᑯᑦ, ᐊᒻᒪ ᓱᓇᑯᑕᓕᒪᑦ ᓄᓇᓯᐅᑎᑯᑕᑯᑦ ᐊᓪᔪᕐᑐᕐᑕᐅᖅᑕᕐᓂᐊᕐᑐᑦ, ᐊᒻᒪ ᐃᓚᖕᓂᑯᑦ ᐅᑭᐅᖑᓕᓗᐊᕐᑎᓗᒍ ᐊᑐᕐᑕᐅᖅᑕᕐᓂᐊᕆᓗᓐᓂ.

ᑕᒪᓇ ᐊᕐᑯᑎᐅᔪᖅ ᓄᓇᓯᐅᑎᑯᑕᖕᒍᑦ ᓄᓗᔭᖕᓂᑦ ᑲᕐᓗᒃᔪᐊᒍᑦ ᐅᖕᒪᓯᒃᑎᒋᔪᑦ 143 ᑭᓚᒥᑕ ᐊᒻᒪ ᐅᓯᖅᑕᐅᑎᐅᓂᐊᕐᓗᓐᓂ ᓴᕕᒃᓴᔭᖕᒥᒃ ᓄᓗᔭᖕᓂᑦ ᑲᖏᕐᓗᒃᔪᐊᕐᒍᑦ ᐊᒻᒪ ᐅᒥᐊᕐᔪᐊᑯᑦ ᑎᑭᐸᓕᐊᔪᓐᓂᒃ ᐅᓯᖅᑕᐅᑕᐅᖅᑕᕐᓂᐊᕐᓗᓐᓂ ᓄᓗᔭᖕᓄᑦ. Hᐋᓐᓂ ᑲᖏᕐᓗᒃᔪᐊᓪᒥ ᐅᓯᓕᕐᑐᕐᕕᖃᕐᓂᐊᕐᓗᓐᓂ ᓄᓇᓯᐅᑎᑯᑕᖕᒍᑦ ᐊᒻᒪ ᐅᓯᖏᐊᕐᕕᖃᕐᓗᓐᓂ ᐊᒻᒪ ᓄᓇᓯᐅᑎᑯᑕᖕᒥᒃ ᓴᓇᕕᖃᕐᓗᓐᓂ; ᓴᓇᔨᑦ ᐃᓪᓗᖏᓐᓂᒃ ᐱᑕᖃᕐᓗᓐᓂ; ᓴᕕᒃᓴᓐᓂᒃ ᐅᓯᖃᕐᑕᕐᕕᖃᕐᓗᓐᓂ; ᑐᓚᒃᑕᕐᕕᖃᕐᓗᓐᓂ ᐊᒻᒪ ᒥᑕᕐᕕᖃᕐᓗᑎᒃ. ᕿᓪᓕᓂᒃ (10) ᐅᒥᐊᕐᔪᐊᓐᒃ ᓯᑯᓯᐅᑎᓐᓂᒃ ᐱᑕᖃᓚᕐᑐᖅ, ᐊᐅᓚᑕᐅᓂᐊᕐᓗᑎᒃ ᑳᑐᓚᒃᓯᒪᔪᓐᓂᒃ ᑳᑐᓚᖅᑎᖃᕐᓗᑎᒃ ᓴᕕᒃᓴᕐᓯᐅᑎᓐᓂᒃ (Baffinland) ᐊᒻᒪ ᑕᓇᐅᑉ ᐊᑭᐊᓄᑦ ᓴᕕᒃᓴᓐᓂᒃ ᐊᓪᔪᕐᓯᖃᕐᑕᕐᓂᐊᕐᓗᑎᒃ ᐊᕐᕋᒍᓕᒪᖅ ᑕᕿᑦ 12. ᐸᒻᒪ ᐊᐅᔪᑯᑦ ᐅᒥᐊᕐᔪᐊᑲᓂᕐᓂᒃ ᑎᑭᑐᖅᑲᕐᑕᕐᓂᐊᕆᓗᓐᓂ

ᑖᓐᓇ ᓴᕕᒃᓴᕐᓯᐅᕐᕕᒃ ᒪᑐᔭᐅᒃᐸᑦ

ᐸᕐᓇᒃᑕᐅᓯᒪᖕᒥᔪᖅ ᑕᓇ ᓴᕕᒃᓴᕐᓂᐊᕐᕕᒃ ᒪᑐᔭᐅᓚᓇᐊᖕᒐ ᐊᒻᒪ ᒪᑐᔭᐅᒍᓐᓂ ᓄᓇᑕᖕᒐ ᐃᔨᕐᑯᓯᑐᖅᖕᒐᓄᑦ ᐊᕿᒃᑕᐅᓇᓯᐊᓚᕐᓗᓐᓂ ᓱᕈᔭᐃᑎᐊᕋᓯᐊᕐᓗᒍ. ᐱᕐᑯᑎᑦ ᐊᒻᒪ ᓱᓇᒃᑯᑦ ᐱᔭᕐᑕᐅᓚᕐᑐᑦ ᐅᕙᓗᓐᓂᑦ ᓴᐅᔭᐅᓗᑎᒃ.ᐊᒻᒪ ᓱᓇᑐᐃᓇᐃᑦ ᐱᕐᑯᑎᑦ ᕐᑯᐊᓴᕐᓇᕐᑐᖅᑐᑦ ᕐᑯᐊᕐᓴᕐᓇᕐᑐᓐᓂᒃ ᐱᓕᕆᔾᔪᑎᔪᓄᑦ ᓚᐃᓴᓐᓯᖅᑐᓄᑦ ᐊᐅᓚᕐᑎᑕᐅᓇᔭᕐᑐᑦ. ᐊᒻᒪ ᐃᓱᒪᓇᕐᓗᓐᓂ ᓄᓇᑖᖓ ᓴᓗᒪᕐᓴᕐᑕᐅᓇᔭᕆᐊᖓᓐᓂᒃ ᐊᕐᕋᒍᓄᑦ ᐱᖓᓱᓄᑦ (3) ᐊᒻᒪ ᐊᕐᕋᒍᑦ ᑕᓕᒪᑦ (5) ᐊᓂᒍᕐᓯᐊᕐᓂᖏᓐᓂ ᖃᐅᔨᓴᕐᑕᐅᔪᕐᑐᖃᕐᑕᓚᕐᓗᓐᓂ ᖃᓄᐃᖏᑲᓗᐊᕐᒪᖔᑦ.

ᒪᓕᒐᐃᑦ ᐊᑐᕐᑕᐅᔭᕆᐊᓕᑦ

ᐅᓄᕐᑐᒐᓚᖕᓂᒃ ᐊᑐᐊᒐᕐᓂᒃ-ᒪᓕᒐᓐᓂᒃ ᐱᑕᖃᕐᒪᑦ ᒪᓕᒃᑕᐅᔭᕆᐊᓕᖕᓂᒃ ᑕᑯᓇᖕᒐᑦ ᓴᕕᒃᓴᖅᓕᕆᔩᓐᓂᑦ. ᐃᓚᖃᕐᓗᓐᓂ ᕿᑭᕐᑕᓗᐸ ᕿᓕᖕᒐᖕᒐᓄᑦ ᓄᓇᒧᒃ ᐊᑐᕐᑐᐊᕐᓂᐊᕐᓗᓐᓂ ᐸᕐᓇᐅᑕᐅᔭᕆᐊᖅᑐᓐᓂᒃ ᐊᑐᕆᐊᖃᕐᓗᑎᒃᐊᒻᒪ ᐸᕐᓇᐅᑎ ᐊᕿᒋᐊᕐᑕᐅᔦᓴᕈᑖᓐᓂᒃ, ᐊᒻᒪ ᐊᓯᖏᑦ ᐋᕆᑎᒍᑦ ᐸᕐᓇᐅᑎᑦ ᐊᒻᒪ ᑕᒪᑯᐊ ᐊᕿᒃᓯᕐᑕᐅᓕᕈᑎᒃ ᓄᓇᕗᒻᒥ ᓄᓇᒧᑦ ᓇᒍᒍᓂᑐᐃᓇᖓᐊᖅᑐᓐᓂᒃ ᑲᒪᔨᐅᔦ ᐱᖃᑎᒋᓗᒋᑦ ᐸᕐᓇᐃᓚᕐᑐᑦ. ᑕᐃᒪᓕ ᑕᒪᓇ ᖃᐅᔨᓴᕐᓂᖅ ᐱᐊᓂᒃᑕᐅᒃᐸᑦ , ᐱᔦᓇᐅᑎᓐᓂᒃ ᐸᐃᐸᓐᓂᒃ , ᓚᐃᓴᓐᓯᓕᕆᓂᖅ ᐊᒻᒪ ᓇᒪᒋᔭᐅᓂᖕᒐ ᐱᐊᓂᒃᑕᐅᒃᐸᑕ ᑖᓐᓇ ᓴᕕᒃᓴᕐᓯᐅᕐᕕᒃ ᐱᓕᕆᐊᕆᔭᐅᕆᐊᓚᓚᕐᑐᖅ.

ᓄᓇᖅᑎᐅᔦ ᐃᓚᐅᓂᖏᑦ ᐊᒻᒪ ᑕᐅᑐᖃᕐᑕᐅᓂᖏᑦ ᐱᓕᕆᐊᖑᓂᐊᕐᑐᒥᒃ

ᓄᓇᖅᑎᐅᔦ ᐃᓚᐅᓂᑦ ᐊᑐᕈᑎᖃᑎᐊᕐᓯᒪᔪᖅ ᑕᒪᑐᒧᖕᒐ ᐱᓕᕆᐊᖑᓂᐊᕐᑐᒧᑦ, ᐃᓚᐅᑎᑕᐅᓗᑎᒃ ᓄᓇᓕᑦ ᐊᒻᒪ ᖃᐅᔨᑲᐃᖃᕐᑕᕐᓗᕆᑦ ᖃᐅᔨᒪᔪᑐᖃᕐᒥᖕᓂᒃ ᑲᑎᒪᓂᑯᑦ ᐊᒻᒪ ᐃᓚᐅᖃᕐᑕᕐᓂᑯᑦ ᐱᓕᕆᔦᖅᑎᓗᒍ ᑕᒪᑐᒥᖕᒐ ᓴᕕᒃᓴᓕᕆᓂᐅᓂᐊᕐᑐᒥᒃ. ᑕᒃᑯᐊ Baffinland ᐊᕿᒃᓯᓯᒪᓕᕐᑐᑦ ᓄᓇᓕᖕᓂ ᐃᖃᓇᐃᔭᕐᑎᑕᕐᓗᑎᒃ ᖃᐅᔨᒪᔨᑕᐅᓂᐊᕐᑐᓐᓂᒃ ᐊᕐᕋᒍ 2007 ᐊᒻᒪ ᑕᒃᑯᐊ ᐃᖃᓇᐃᔭᐃᓇᕐᓂᐊᕐᓗᑎᒃ ᑕᐱᖕᓇ ᐅᔭᕋᖕᓂᐊᕐᕕᒃ ᓴᓇᔪᐅᓂᖕᒐᓐᓂ ᐊᒻᒪ ᐊᐅᓚᓚᓇᓕᕐᐸᑦ. Hᒃᑯᐊ ᖃᐅᔨᒪᔨᑕᐃᑦ ᐊᓪᓚᒃᕕᖃᕐᑐᑦ ᐃᒃᐱᐊᕐᔪᖕᒥ, ᑲᖏᕐᓗᒐᐱᖕᒥ, ᓴᓂᕋᔭᖕᒥ, ᐃᒡᓗᓕᖕᒥ, ᐃᖃᓗᖕᓂ ᐊᒻᒪ ᒥᑎᒪᑕᓕᒃ. Hᒃᑯᐊ ᖃᐅᔨᒪᔨᑕᐃᑦ ᐊᕐᑯᑎᒋᔭᐅᓗᑎᒃ ᐱᓕᕆᖃᕐᑕᕐᓂᐊᕐᑐᑦ ᐃᖃᓇᐃᔭᖕᓂᒃ ᐃᓕᓂᐊᕆᑎᒃᓴᖕᓂᒃ ᐊᒻᒪ ᐃᖃᓇᐃᔭᕐᑕᕿᓯᐊᕐᑐᖕᓂᒃ ᓄᓇᑕᖃᕐᑕᐅᓯᒪᔦᑦ ᐊᒻᒪ ᓴᓇᔦᓇᕐᑎᑕᐅᓂᐊᕐᓗᑎᒃ ᑕᐱᑳᓐᓂ ᐅᔭᕋᖕᓂᐊᕐᕕᖕᒥ ᑳᑐᓚᒃᓯᒪᔦᓂ. ᐱᓄᐃᑦ ᖃᐅᔨᒪᔪᑐᖃᖏᑦ ᐱᓕᕆᐊᕆᔭᐅᖏᓇᕐᑐᑦ ᑕᒪᑯᓇᓐᓂ ᓄᓇᓕᖕᓂ.

BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT

DEVELOPMENT PROPOSAL FOR THE
MARY RIVER PROJECT

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BAFFINLAND IRON MINES CORPORATION
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DEVELOPMENT PROPOSAL FOR THE
MARY RIVER PROJECT

SECTION 1.0 - INTRODUCTION

The Mary River Project ("the Project") is a proposed iron ore mine and associated facilities located on North Baffin Island, in the Qikiqtani Region of Nunavut. Baffin Island is home to Inuit, who enjoy a culture that is unique and traditional to arctic regions. The land where the Project is located is important to Inuit culture, heritage, and their continued well-being in that these people use the resources on the land and from the sea for both their subsistence and in preserving their traditional way of life.

The Project involves the construction, operation, closure, and reclamation of an 18 million tonne-per-annum (Mt/a) open pit mine. The high-grade iron ore to be mined is suitable for international shipment after only crushing and screening and as such, no chemical processing facilities are required for this Project. A railway system will transport the ore from the mine area to an all-season deep-water port and ship loading facility at Steensby Inlet where the ore will be loaded into ore carriers for overseas shipment through Foxe Basin. A dedicated fleet of cape-sized ore carriers, capable of breaking ice, will be chartered by Baffinland from a consortium of ship owners organized by Fednav. Some non-icebreaking ore carriers and conventional ships will also be used during the open water season.

All major Project components will operate year round and, based on the currently-defined iron ore reserve, will continue to operate for about 21 years. Geological conditions suggest that additional ore may be delineated as exploration continues, potentially extending the life and/or increasing the production rate of the Project.

The Mary River site is located about 160 km south of the community of Pond Inlet (Mittimatalik) and 1000 km northwest of Iqaluit, the capital of Nunavut. Project facilities will be sited in the mine area at Mary River and port area at Steensby Inlet, with a railway line and access road connecting the two. Marine access and shipping through the construction phase and periodically during operation will occur seasonally through Milne Inlet and the existing Milne Inlet Tote Road will therefore be used periodically to access Mary River during frozen conditions. Shipping through Steensby Inlet will be seasonal through construction and year-round through operation. Access to the Project sites for personnel will be by chartered aircraft.

Baffinland Iron Mines Corporation (Baffinland) is the Project proponent. Baffinland is a Canadian mining company that is publicly traded on the Toronto Stock Exchange. The company is singularly focused on the development of the Mary River Project. Its management team has varied and substantial experience in the exploration, development, operation, closure and reclamation of mining projects in an environmentally and socially sound manner. Baffinland is headquartered in Toronto Ontario and is the sole owner of the ore deposits at Mary River.

Site conditions play an important role in the planning and execution of the Project. Northern Baffin Island has a semi-arid arctic climate with less than 200 mm of annual precipitation and an annual average temperature of about -15 ºC. The area experiences bitter cold in the wintertime and 24-hour darkness from November to January. Summers bring 24-hour daylight from May to August, but continued cool to cold conditions. The extremely cold winter temperatures and year-round cold weather result in permafrost ground that supports only sparse and short-season vegetation and soil structure which is sensitive to ground pressures and land disturbances in the summertime. Inland waterways flow for short periods during the summer, but the extreme cold winters result in most rivers and creeks either drying up or being completely frozen for much of the year. Winter also brings landfast ice in the marine inlets and along the coastline, and sea ice in the main channels. While these conditions are typical of arctic environments, they substantially affect planning and logistics relative to most Project activities; but especially to shipping, procurement, construction, and field investigations.

Baffinland commenced exploration at Mary River in 2004 and has since accomplished a number of field investigations in the region. Camp accommodations have been established at Mary River, Milne Inlet, and Steensby Inlet to support the ongoing exploration, engineering, data collection, and development programs. To date, exploration drilling, resource definition, environmental and social data collection, a scoping study (2006), and a Definitive Feasibility Study (DFS) and accompanying National Instrument 43-101 Technical Report have been completed (2008). A bulk sampling program, started in 2007, is planned for completion in 2008.

This document presents Baffinland's proposed plans to develop, operate, and close the Mary River Project as described in the DFS, and establishes the basis for scoping its social and environmental impact assessment process. It also describes the program for continued exploration which is intended to prolong the life of the Project and its consequent employment opportunities and economic benefits to the region and to the Inuit people. The document explains the logistical challenges of construction and operation in this challenging arctic environment, and presents practical concepts for site closure and reclamation, and post-closure monitoring.

This submittal will support land use applications with the Qikiqtani Inuit Association (QIA) and Indian and Northern Affairs Canada (INAC), Water License applications with Nunavut Water Board (NWB), and *Fisheries Act* authorization applications with the Department of Fisheries and Oceans (DFO). It also includes an information package on the Project's proposed water crossings to allow determinations to be made by Transport Canada on the presence/absence of navigable waters in relation to proposed project infrastructure. The Development Proposal and associated applications provide the requisite information for the Nunavut Planning Commission (NPC) to determine conformity to the North Baffin Regional Land Use Plan, as well as screening information establishing the basis for impact assessment scoping as required by the Nunavut Impact Review Board (NIRB) and the *Canadian Environmental Assessment Act* (CEAA).

1.1 PROJECT HISTORY

The Mary River iron ore deposit was originally discovered in 1962 by Murray Watts of British Ungava Explorations Limited (Brunex). Brunex staked ten claim groups in the Project area, including the Flo, Donna, and Mary claims which cover the areas now known as Deposit Nos. 1 (Flo); 2, 3 and 3b (Donna); and 4 (Mary). The private company Baffinland Iron Mines Ltd. (BIML) was established in 1963 by the financial participants and prospectors of the Brunex group to hold the Mary River claims and leases and to develop the prospects.

BIML undertook an exploration program from 1963 through 1966, with most of the field work carried out in the summers of 1964 and 1965. This work included the construction of the 100 km Milne Inlet Tote Road, and construction of gravel airstrips near the Mary River camp, at Milne Inlet, and at Katiktok Lake some 40 km northwest of Mary River and near Deposit No. 4. Apart from the required land surveys, some metallurgical test work, and re-examinations of project economics, no additional fieldwork was undertaken between 1965 and 2004.

In 2002, BIML interests were acquired by a current executive of Baffinland, with the purpose of revitalizing the Project. The current Baffinland Iron Mines Corporation was formed in early 2004, which now holds exclusive rights to the ore deposits at Mary River. Continuous contemporary exploration work began in 2004.

1.2 MINERAL TITLES AND LAND ACCESS

Baffinland is the sole owner of the three mineral leases at Mary River. Lease 2484 covers the iron ore deposit referred to as Deposit No. 1; Lease 2485 covers Deposit Nos. 2, 3, and 3B; and Lease 2483 covers Deposit No. 4. Deposit 3A, referenced in earlier Proponent documents as part of Lease 2485, has been confirmed as a continuous extension of Deposit 3, and therefore is no longer referenced separately. Similarly, recent drilling identified an additional ore body now referred to as Deposit No. 3B. The leases cover a total area of 1593.4 hectares (ha) and are renewable beyond the current 21-year period expiring on August 27, 2013. The location of the mineral leases is shown on Figure 1.2.

The Nunavut Land Claims Agreement (NLCA) establishes the requirements and expectations for development activities occurring in Nunavut. The mineral leases at Mary River predate the May 25, 1993 NLCA, but are surrounded by Inuit-owned surface and mineral (sub-surface) rights. Inuit owned surface rights in the area are administered by the QIA while Inuit-owned mineral rights are administered by the Inuit birthright corporation Nunavut Tunngavik Incorporated (NTI). The Mary River mineral leases are administered by INAC under the Canadian Mining Regulations of the *Territorial Lands Act* on federal (Crown) land. Access to the surrounding surface lands is provided through land use permits and leases issued by QIA or INAC as described in Section 1.3.5.

Baffinland has negotiated a memorandum of understanding (MOU) with NTI establishing a substantially larger package of prospective ground for Baffinland's continued iron ore exploration. An exploration agreement is currently being negotiated to grant to Baffinland rights to 100% interest in the minerals within, upon, or under the Inuit-owned parcel PI-17 surrounding Deposit Nos. 1, 2, 3, and 4 - an area totalling 16,903 ha. Figure 1.3 shows Baffinland's land position and the location of the PI-17 parcel relative to the Mary River deposits.

1.3 REGULATORY PROCESS OVERVIEW

The federal and territorial legislation and guidelines that are applicable to the development of the Mary River Project are presented in Table 1.1 and are summarized in the following sections.

There are a number of regulatory processes applicable to the Project, including conformity to the North Baffin Regional Land Use Plan, possibly an amendment to the same Plan. The Project is expected to undergo an environmental review by the Nunavut Impact Review Board (NIRB), an environmental review by the *Canadian Transportation Act*, and is subject to at minimum a comprehensive study under the *Canadian Environmental Assessment Act*.

Various permits, licenses and approvals will be required to be issued upon successful completion of the review processes. Land tenure through leases and shorter term land use permits will be required from the Qikiqtani Inuit Association (QIA) to access Inuit Owned Lands that surround the Mary River site and from Indian and Northern Affairs Canada (INAC) for the port at Steensby Inlet and most of the railway. Other key approvals include a Type A Water License from the Nunavut Water Board (NWB), *Fisheries Act* authorization applications with the Department of Fisheries and Oceans (DFO), approvals or exemptions under the *Navigable Waters Protection Act*, and a license for explosives manufacture.

The applicable regulatory processes and licensing are described in further detail below.

1.3.1 <u>Conformance to Land Use Plans</u>

Article 11 of the NLCA gives NPC the authority to review development projects to ensure conformity with approved land use plans, where they exist. Mary River Project components are located within two land-use planning regions: the North Baffin Region and the Akunniq Region. Milne Inlet, the mine site at Mary River, and about 34 km of the railway will be located within the North Baffin Planning Region where an approved Land Use Plan is in place to which the Project must conform. Most of the railway and the Steensby Inlet port will be located within the Akunniq Planning Region, which has no draft or approved land use plan in place.

The portion of the railway within the North Baffin Region is not included as a transport corridor in the North Baffin Regional Land Use Plan. Baffinland understands that the NPC views this to be a proposal for a transportation corridor requiring an amendment to the North Baffin Regional Land Use Plan. The terms of the Plan require an assessment of the preferred transportation route and its alternatives within the bounds of the planning region, as well as a public review of the route and alternatives by NPC and NIRB or a federal panel. NPC has indicated that it will participate in the environmental review of the Project as an intervener. Provided the Proponent successfully fulfills the terms of the Plan through the review process, NPC will recommend an amendment to the Plan to the Minister of INAC for approval.

1.3.2 <u>The Nunavut Environmental Assessment Process</u>

Article 12 of the NLCA designates responsibility to NIRB to evaluate all development projects for their potential to cause significant social or environmental impacts. This assessment is accomplished through screening and review processes. In screening a project proposal, NIRB generally will determine that a review is required when, in its judgment:

- The Project may have significant adverse effects on the ecosystem, wildlife habitat, or Inuit harvesting activities

- The Project may have significant adverse socio-economic effects on northerners
- The Project will cause significant public concern
- The Project involves technological innovations for which the effects are unknown

All projects are subject to the screening process and consequently, a completed NIRB Screening Part 1 Form for the Mary River Project is included in Appendix A. The Project will utilize proven technologies without the need for chemical ore processing, however, due to the size and scope of the Mary River Project, Baffinland proposes that a timely recommendation to the Minister for a Part 5 review is appropriate. An amendment to the Plan, if necessary, would require a review under the NLCA in any event (Section 1.3.1).

Baffinland understands that NIRB will issue its screening decision to the Minister of INAC and the Minister will designate the Project for either a Part 5 or 6 review. NIRB or a panel, and interveners, will be responsible for providing input on the scope of that review. This document presents Baffinland's proposed project, and other relevant information considered sufficient for the purposes of the scoping process.

Based on Baffinland's project description (this Development Proposal), NIRB will in-turn issue project-specific terms of reference or EIS guidelines, defining the scope and content of the social and environmental impact assessment that will be required. Proposed EIS Guidelines have been developed by Baffinland through its own familiarity with the Project and Project site, its own scoping activities, consultation with communities, and referral to EIS guidelines developed for other mining projects. Baffinland is providing these guidelines for NIRB's consideration for adoption in whole or in part, to facilitate scoping and the development of NIRB-issued guidelines for the Part 5 review (Appendix B).

Based on the NIRB-issued final EIS Guidelines, Baffinland will develop, or cause to be developed, a Draft EIS which will collectively refer to the following documents:

- **Summary Text from/or Impact Assessment -** This report will document the current site conditions, describe the development and operating plans, identify engineering and environmental systems that will be used to control social and environmental impacts, present mitigation measures to limit social and environmental impacts to acceptable levels and maximize positive impacts, and identify the Project effects and residual impacts on both environmental and social resources. It will also address the cumulative effects of Project development and evaluate plausible alternatives. The document will meet NIRB's 10 minimum EIS requirements and the Project-specific EIS Guidelines.

- **Mitigation and Monitoring Plan** - This plan will define the management, mitigation, monitoring, and institutional measures that are needed to mitigate, offset, or reduce the social and environmental impacts of the Project to acceptable levels and to enhance beneficial impacts. It will define the actions that must be undertaken and identify who is responsible to undertake them to implement the mitigation required by the EIS.

- **Appendices** - The EIS documents will be presented in a concise, easy-to-read format which obliges that summaries and concepts be presented in the body of the EIS text, and the technical details supporting those information be presented in the Appendices. The Appendices will be used to provide supporting technical details for EIS text summaries of appropriate elements of the Project design, public consultation programs, baseline and impact assessments, monitoring programs, and management plans.

After receipt of the Draft EIS for the Project, NIRB will determine whether the submission addresses the requirements of the EIS Guidelines, and is in conformance with the NLCA. Any outstanding issues must be resolved and a Final EIS will be delivered. Following a public review process, NIRB will make an approval recommendation on the Final EIS to the Minister of INAC. Upon ministerial approval, NIRB will issue a Project Certificate authorizing the Project to proceed.

The environmental assessment review process pursuant to Article 12 of the NLCA is required for all major projects in Nunavut. At the federal level, all potentially significant projects in Canada are also subject to an environmental review process pursuant to the *Canadian Environmental Assessment Act* (CEAA). The Project's mining activities, marine terminal, railway, and all-weather airstrip all fall under the CEAA Comprehensive Study List Regulations, requiring a federal comprehensive study level of environmental assessment under CEAA. Baffinland is working with the relevant federal Authorizing Agencies to reduce redundancies in the Project review process.

Before Baffinland can proceed with railway construction, approval must be granted by the Canadian Transportation Agency (CTA) under Section 98 of the *Canadian Transportation Act*. This process also requires a social and environmental review to ensure that the location of the railway line is reasonable taking into consideration the requirements for railway operations and the competing interests of communities and ecological values that may be affected by installation of the line. CTA has indicated that it will participate in the NIRB review process to fulfill this requirement.

1.3.3 Inuit Compensation and Benefits

Implementation of the Mary River Project has the potential to contribute substantially to the economic development of local communities, the North Baffin Region, and Nunavut. Baffinland will work with the QIA and other regulatory agencies to facilitate the equitable distribution of Project benefits among the Inuit people who are affected by the Project. Article 26 of the NLCA addresses the requirements for Inuit Impact and Benefit Agreements (IIBA).

Baffinland initiated negotiations with the QIA on an IIBA for the Project in 2006. These discussions are currently ongoing in anticipation of completing a mutually acceptable IIBA prior to Project commencement, as required by NLCA. The IIBA must be consistent with the terms and conditions of Project approvals, including those established pursuant to the environmental review process, and the IIBA negotiations may inform and influence the NIRB process and resulting Project Certificate. Consequently, the IIBA is not finalized until completion of the environmental review process.

Once Baffinland and QIA finalize the IIBA, a copy is sent to the INAC Minister. The IIBA goes into effect 30 days following its receipt by the Minister unless the Minister determines, within that timeframe, that the IIBA does not conform to the provisions of the terms and conditions established in the social and environmental review process or the provisions set out in Article 26 of the NLCA.

In addition to the IIBA requirement, Article 20 of the NLCA assigns exclusive rights to the use of water on, in, or flowing through Inuit-owned land to the local Inuit organization (in this case the QIA). If it is determined through the environmental review process that Project activities are expected to substantially affect the quality, quantity, or flow of water on Inuit-owned lands, Baffinland would be required to enter into a compensation agreement with the QIA as part of its water licensing process.

1.3.4 Target Date for Project Certificate Receipt

Baffinland anticipates that all necessary permits and authorizations can be obtained in time to support a summer 2010 construction start date, based on both supply chain logistics and the review times recommended in various regulatory guidance documents. This permitting schedule is important to construction logistics in that the Project construction schedule is substantially predicated on the ability to position materials and supplies into the area during suitable weather and shipping conditions.

Current Project schedule milestones include:

- February 2008 - Definitive Feasibility Study issued
- March 2008 - issue this Development Proposal and core applications needed to initiate regulatory processes
- December 2008 - issue draft EIS
- August/September 2009 - stage equipment and materials at Steensby Inlet, Milne Inlet and Mary River (using winter road November 2009 to May 2010) to facilitate a 2010 construction start date
- April 2010 - Project Certificate issued
- June 2010 - Permits issued for construction
- July 2010 - initiate mine construction
- Early 2014 - Project commissioning
- May 2014 - first shipment of ore

In establishing the target completion schedule, Baffinland is assuming that appropriate streamlining of the review process can be accomplished, e.g., by conducting cooperative review and hearings as contemplated in both the NLCA and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, and by eliminating redundancies in the regulatory requirements. The covering letter to this document and accompanying “roadmap” outline a coordinated review schedule.

1.3.5 Other Applications Supported by this Document

A number of authorizations will be required to develop the Project for activities such as water use and waste disposal, land use, explosives manufacturing, and impacts to fish and fish habitat. Tables 1.2 and 1.3 outline the various federal and territorial authorizations applicable to the Project, their associated regulatory agencies, and relevant Project components.

Through consultation with the applicable regulatory agencies, four “core” authorizations have been identified to facilitate conformity determination to the North Baffin Regional Land Use Plan by NPC, and environmental screening by NIRB. As such, these agency-specific applications have been included as Appendix C, and this document comprises the relevant Project information to support these applications. Each of these core applications will be submitted to the jurisdictional agency along with a copy of this document.

The four core applications include:

- **Water License Application** - The water licensing process is under the purview of the Nunavut Water Board (NWB) in accordance with Article 13 of the NLCA, the *Nunavut Water and Nunavut Surface Rights Tribunal Act* and the Northwest Territories Water Regulations. Once a Project Certificate is issued by NIRB, a Type A Water License can be issued by NWB. Environmental reviews are required as part of the water licensing process but again, NIRB is expected to do a full social and environmental review for the Project as a whole. Sections 13.5.2 and 13.6.1 of the NLCA, and Section 37 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* both provide opportunities for coordinating efforts between NWB and NIRB and consequently, Baffinland is engaging with both agencies in an effort to streamline the process.

- **Application for Use of Inuit-Owned Land** - Much of the Mary River site and the land between Mary River and Milne Inlet is located on Inuit-owned land administered by the QIA. Project components on Inuit land include the Milne Inlet ship docking and offloading site, the mine site, and the majority of the Milne Inlet road except for a portion south of Katiktok Lake. Figure 1.2 shows the boundaries of the Inuit-owned land in relation to the various Project components. A Land Lease authorizing the construction of Project infrastructure and other activities (an amendment to Baffinland’s existing Commercial Lease) and a Quarry Concession Permit for quarrying activities during construction, operations, closure and reclamation must be obtained from the QIA for those activities to proceed.

- **Application for Use of Crown Land** - Most of the land south of the Mary River site is on Crown land. Project components on Crown Land include the railway, the Steensby Inlet port facilities, and a small portion of the Milne Inlet Road south of Katiktok Lake. Land use authorizations on Crown land are obtained from INAC pursuant to the *Territorial Lands Act* and will include a Type A Land Use Permit for Project infrastructure and activities supporting construction, a Land Lease allowing for the infrastructure and activities associated with the railway alignment and Steensby Inlet port site, quarry permits for construction and leases to support operation and maintenance of the quarries, and a water lot lease for project activities, docks and infrastructure in near shore waters at Steensby Inlet. Because the Project footprint on Crown land is greater than 640 acres, an Order-in-Council must be obtained from the Cabinet before the Minister of INAC can issue the leases.

- **Fisheries Authorization Application** - Unavoidable impacts to fish and fish habitat resulting from the Project must be authorized by DFO under the *Fisheries Act*. An application and covering letter are accompanied by an assessment of existing fish habitat characteristics has been appended in Appendix C.

In addition to the core applications, Transport Canada - Navigable Waters Protection Program (TC-NWPP) requested an information package to determine whether or not the Project will affect navigable waters. A transmittal letter to TC-NWPP, included in Appendix D, highlights the location of information in this document that is of particular relevance and interest to this agency.

Supporting technical information to support both land tenure applications, the DFO application for an authorization and the information requirements of TC-NWPP, are included in Appendix E. This includes the following:

- Appendix E1 - Conceptual railway drawings showing the current railway alignment, proposed quarries, construction camps, and proposed lease and construction land use boundaries in relation to the current alignment
- Appendix E2 - Railway watercourse crossings assessments – showing locations, photographs and watercourse measurements at, upstream and downstream of railway crossings
- Appendix E3 - The proposed railway alignment will encroach on a number of lakes due to grade and turning radius constraints implicit with a railway (Section 4.3). Assessments of lake encroachment sites based on the summer 2007 alignment are documented.
- Appendix E4 - The aggregate sources identified from desktop review to be near to watercourses (drainages, streams, lakes and ponds) were visited to document fish habitat
- Appendix E5 - A construction access road, required for railway construction, will deviate from the railway alignment along Cockburn Lake, due to the steep cliffs. Watercourse crossings along the preliminary construction access road alignment were assessed in the same manner as the railway alignment watercourse crossings included in Appendix F2.
- Appendix E6 – A list of all drainages, locations and preliminary assignment of proposed crossing structures is provided, conceptual drawings for typical watercourse crossings using culverts and single span bridges are provided as well as site-specific conceptual crossing designs for major watercourse crossings along the railway at Mary River and Cockburn Lake.
- Appendix E7 - Conceptual drawings for the ore, freight and tug docks proposed at the Steensby Inlet port

While the route of the railway is not expected to materially change, the alignment itself has moved slightly since the 2007 field program, and subsequent iterations of the railway alignment have resulted in several crossings moving up- or downstream of the assessed location. The alignment shown, based on the DFS, will continue to be adjusted as additional geotechnical information becomes available. Additionally, the dock designs remain under study. The information provided is intended to provide for an understanding of the Project for scoping purposes.

1.4 ONGOING ACTIVITIES

Baffinland has been carrying out exploration and associated activities at the Mary River site since 2004. Exploration drilling has primarily been accomplished by Baffinland geologists using contracted drill rigs and crews. Other organizations that have contributed to the technical work on the Project to date include:

• Aker Kvaerner E&C • Division of Aker Kvaerner Canada Inc. • Aker Arctic Technology Inc.	• Feasibility Study Contractor • Lead on mining, process, and infrastructure
• Black and M^{c}Donald	• Shipping studies and port design
• Canarail Consultants Inc.	• Construction logistics and costing
• Clark Builders	• Railway design
• Fednav Ltd. and ENFOTEC	• Construction logistics and costing
• G. H. Wahl & Associates	• Shipping and ice navigation
• HJ O'Connell Construction Ltd.	• Geological database validation, block modelling and resource estimation
• Kivalliq Marine Ltd.	• Construction logistics and costing
• Lassing Dibben Consulting Engineers Ltd.	• Shipping lane bathymetry
• North American Energy Partners Inc. • Peter Kiewit Sons Co. • PND Engineers Inc.	• Material handling – stockpiles, conveyors, rail loading/unloading and ship loading
• ProMet Engineers	• Construction logistics and costing
• Rene Carapetian	• Construction logistics and costing
• Sea Projects Alliance Inc.	• Dock design
• Starkey and Associates	• Metallurgical consulting
• Knight Piésold Ltd.	• Mining and reserve estimation
• Brubacher Development Strategies Inc.	• Shipping logistics
• Coastal and Ocean Resources Inc.	• Metallurgical Consulting
• EBA Engineering Consultants Ltd. • LGL Ltd. • Points West Heritage Consulting Ltd. • RWDI Air Inc. • Fednav Ltd. and Enfotec Technical Services Ltd.	• Environmental and Geotechnical Consultant • Lead on geotechnical engineering, Inuit knowledge, socio-economic and environmental studies, and regulatory approvals
• Studien Gesellschaft fur Eisenerz-Aufbereitung (SGA)	• Socio-economics
	• Shoreline sensitivity mapping/oceanography
	• Geotechnical/permafrost engineering
	• Marine and freshwater fisheries
	• Marine mammals
	• Archaeology
	• Air and noise modelling and monitoring
	• Shipping and ice navigation
	• Metallurgical testwork

1.4.1 Exploration and Resource Evaluation

Baffinland resumed mineral exploration activities in 2004 after a 40-year hiatus in activity at Mary River. After gaining the appropriate authorizations to proceed from NIRB and the applicable authorizing agencies, a new camp was established at Mary River, temporary facilities were authorized at Milne inlet for receiving materials and supplies, equipment was delivered and offloaded at Milne Inlet on sealifts and moved in to site over winter road, and exploration drilling on Deposit No. 1 was recommenced. Subsequent exploration programs have also been authorized for Deposit Nos. 2, 3 and 4. These exploration drilling programs and additional metallurgical testwork have continued through 2007 and are currently ongoing.

The results of these drilling campaigns were evaluated in a scoping study by Aker Kvaerner E&C, a division of Aker Kvaerner Canada Inc. (Aker Kvaerner) in 2006. The favourable scoping study results led Baffinland to further commission Aker Kvaerner to carry out a definitive feasibility study (DFS) on the Deposit No. 1 resource, commencing in late 2006. On February 19, 2008, Baffinland announced the results of the DFS on Deposit No. 1 as having exceedingly robust economics. The currently estimated mineable reserve in Deposit No. 1 is 365 Mt, (gross) grading about 65% iron.

Concurrent with those exploration activities, Baffinland has also been undertaking preliminary geotechnical, environmental and social data collection programs that have been ongoing since 2004. These programs have focused on such elements as ground conditions, soils and vegetation, water quality and quantity, sediment and fisheries, terrestrial and marine mammals, birds, meteorology and hydrology, archaeology, community social and economic conditions, and traditional knowledge of the Inuit in the area.

Current Project activities are subject to the terms and conditions of the authorizations listed in Table 1.4. Amendment applications to the above authorizations were submitted to the respective agencies in late 2007 to allow for additional exploration drilling and completion of a new drill camp along the proposed rail alignment (between the Mary River site and Cockburn Lake) and an expanded Steensby Inlet camp to support the current exploration and geotechnical drilling activities. The amendment applications were screened by NIRB, and the QIA consulted with the Community Lands and Resource Committees (CLARCs) in each of the five North Baffin communities of Arctic Bay, Clyde River, Hall Beach, Igloolik and Pond Inlet. NIRB issued its screening decision report in late February 2008 indicating that the drilling program amendments may proceed without review, and amendments to existing water license and land use permits have been issued by the NWB and INAC respectively.

1.4.2 Bulk Sampling

Aker Kvaerner's scoping study (2006) suggested the presence of a world-class high-grade iron ore deposit at Mary River. Among the recommendations for moving the Project forward was the completion of a bulk sampling program that would supply ore samples to the European iron and steel marketplace that would help demonstrate the quality and demand for the Mary River product. Baffinland submitted a screening document for the collection of this bulk sample at the end of 2006.

The bulk sampling program was approved to proceed by NIRB at the conclusion of an environmental screening in May 2007. Key elements of the program include:

- Development and operation of temporary lay-down areas, stockpiles, camps, bulk fuel storage facilities, and other support facilities at Milne Inlet

- Site development, camp expansion, modification to water supply and waste disposal facilities, and bulk fuel storage at Mary River
- Upgrade of the Milne Inlet Tote Road to all-weather capabilities
- Excavation, crushing, screening and loading of approximately 250,000 tonnes of iron ore from Deposit No. 1
- Truck haulage of the sample ore along the Milne Inlet Tote Road to the beach at Milne Inlet
- Loading of 5 shiploads in Milne Inlet via a tug and barge system fed by a conveyor arrangement mounted on a floating spud barge dock, for shipment to Europe
- Site decommissioning and removal of crossings in fish habitat and navigable waters on the Tote Road, returning it to a winter-only access road

Baffinland is proceeding with the sampling effort during the winter season of 2007-2008. In many respects, the bulk sampling program affords an excellent opportunity to collect additional data in areas including fugitive dust generation, point source emissions to air and water, and the effects of mining activities on the behaviour of wildlife in the area and the effects of ship traffic on marine mammals. Baffinland and its consultants are taking advantage of this data collection opportunity and will integrate the findings into the impact assessment process.

1.5 EXISTING FACILITIES AND IMPROVEMENTS

Figures 1.2 to 1.4 show the general locations of existing Project components, including:

- The iron ore deposits and current facility locations at Mary River
- The existing temporary development area at Milne Inlet
- The existing Milne Inlet Tote Road between Milne Inlet and the Mary River site
- The proposed railway alignment between the Mary River site and the port location at Steensby Inlet

Both NIRB and the Nunavut Planning Commission (NPC) require GIS (geographic information system) shape files to be provided for projects being proposed in Nunavut. These shape files for the Project areas are included in electronic form in Appendix A.

1.5.1 Mary River Area

Baffinland has been operating camps and related facilities at Mary River since 2004. The existing 100 person seasonally operated camp established at Mary River was expanded in early 2008 with the installation of an all season 100 person camp contemplated as part of the bulk sample program.. Potable water is supplied to the camp from Camp Lake and sanitary wastes are managed with a package sewage treatment plant and polishing/waste stabilization pond. Fuel for aircraft, drilling equipment, and light vehicles is also stored on site in appropriate facilities with bunded and lined containment. Existing facilities and improvements at the Mary River site are shown on Figure 1.3.

Exploration drilling has been ongoing since 2004 with most drill moves and local transportation conducted by helicopters. Short-haul ground transportation is accomplished using light ATVs in the summertime and snowmobiles in the wintertime. Most field programs are cut back during the wintertime due to the extreme cold and darkness; current bulk sampling activities underway during the winter of 2007-2008 represent the first year-round operations for the Project.

Access to the Mary River site is by fixed wing aircraft using a gravel airstrip (Figure 1.3). Access is also available by float or ski plane on nearby lakes. Baffinland currently operates a regular charter service to the site to move personnel and supplies.

1.5.2 Milne Inlet Area

Milne Inlet, the closest marine access and the one that is being used to support the exploration and bulk sampling activities, is located approximately 100 km to the northwest of Mary River. Milne Inlet has been used since 2004 to deliver materials and equipment by sealift through use of lightering barges landed on the beach area. Baffinland has upgraded an existing airstrip, and a trailer camp designed for peak accommodations of approximately 60 people has been installed. Bulk fuel storage and laydown areas have also been established at Milne Inlet. These facilities are shown on Figure 1.4.

The Milne Inlet Tote Road is an existing road connecting the Mary River site to Milne Inlet that was established during exploration activities in the 1960s. It is designated as a public access easement for the purpose of transportation between Milne Inlet and Mary River in Schedule 21-2 of the Nunavut Land Claims Agreement. The road is currently being upgraded to a temporary all-weather condition to support the transportation of the bulk sample ore from Mary River to the Milne Inlet beach in the winter of 2007-2008.

1.5.3 Steensby Inlet Area

Steensby Inlet, located about 140 km south-southeast of Mary River, provides a navigable access route that is being proposed as the port site from which Mary River ore will be exported. There is currently no transportation route or port facility available for use through this entry; all access to this site has, to date, been by helicopter. An existing 12-person temporary camp has been established which will be expanded to accommodate approximately 40 persons to support additional geotechnical drilling efforts in 2008. A 40 person drill camp will also be constructed in the spring of 2008 approximately mid-way along the proposed rail alignment, to facilitate geotechnical drilling for railway design (Figure 1.2).

1.6 THE PROPOSED PROJECT

The remaining sections of this document describe how Baffinland plans to construct, operate and close the Mary River Project in conformance with Nunavut and Canadian laws and regulations and to the benefit of the region and Canada. The purpose of the Project is to extract, crush and screen (no processing), and ship iron ore to steel mills overseas in an environmentally and socially sustainable manner, while sustaining a competitive rate of return to the Company's investors and lenders, and sharing Project benefits directly with the local Inuit communities.

There is a three-fold need for this project:

1. The current and reasonably foreseeable international demand for iron ore has created market conditions that Baffinland believes are favourable for building a mine at Mary River to supply high-quality iron ore to the international marketplace.

2. It is a stated Government of Nunavut objective to proactively promote exploration and mining as a driver of economic development in Nunavut. Responsible mining development at Mary River will meet these stated objectives of the Nunavut Government.

3. There is an important need for the development of infrastructure, skills training, employment, and business opportunities in Nunavut, as outlined in the Nunavut Exploration and Mining Strategy (Government of Nunavut, 2007). Given the demand for iron ore in the global marketplace, the Mary River Project has the potential, through its mineral exploration and mining activities, to contribute to meeting Nunavummiut needs for infrastructure, training, and sustainable economic development. The Project will generate benefits to both local Inuit communities through capacity-building, employment and business opportunities, and revenues to the Territorial and Federal governments in the form of tax revenues. The Inuit Impact and Benefits Agreement (IIBA), currently under negotiation between Baffinland and the regional Inuit association, will ensure that benefits from the Project flow to affected Inuit communities and the Qikiqtani Region of Nunavut.

The proposed Project envisages an 18 Mt/a production rate over a 21 year mine life. This production rate yields robust economics for the Project as stated in Baffinland's February 19, 2008 press release. Further, industry projections suggest that iron ore demand levels will remain sufficiently strong to allow a favourable return on investment early in the Project life under current market conditions. Market demand for raw materials imposed by the industrialization of countries like China and India make the current demand appear far more sustainable for longer periods of time, in comparison with previous cycles. Baffinland has commissioned Aker Kvaerner to proceed with another scoping study to assess the economics of expanding the output to 30 Mt/a by combining the resources delineated in Deposit Nos. 1, 2, and 3.

SECTION 2.0 - PROJECT DESCRIPTION - PRE-CONSTRUCTION STAGING

The construction and operation of major capital projects in the arctic requires significant up-front planning to address the short summer season and challenging logistics. Initial scheduling must consider the short open water periods for strategic material and supply deliveries for early works and also the activity-limiting extreme cold and darkness during the winter months until all-season facilities can be constructed and brought on-line. To facilitate this, Baffinland plans to pre-deliver in 2009 much of the materials and supplies required for the early construction works during the open water season using conventional arctic sealifts as employed to date by the Project and Nunavut communities. Sealifts carrying materials and supplies will be delivered to Milne Inlet, where they will be offloaded onto the beach and moved to Mary River via the Milne Inlet Tote Road during the winter of 2009-2010. At Milne Inlet and Mary River, existing laydown areas and facilities will be used. New laydown areas will be established at Steensby Inlet in locations and with areas contemplated as shown on Figure 2.1. The materials and supplies brought to Steensby Inlet will be offloaded and placed into new laydown areas that are within the planned footprint of the proposed new port facility. In addition to the sealifts, two barge mounted camps or ship(s), and 20,000 L capacity bunded (with secondary containment) fuel iso-containers or a fuel tanker or barge, will be pre-positioned to overwinter in Steensby Inlet so that construction can be initiated in mid-2010, pending regulatory approval (Section 1.3.4).

Supplemental information describing the pre-construction activities and proposed mitigation and monitoring is included in Appendix F. The document explains Baffinland's specific plans for developing and operating the pre-construction staging areas.

Pre-construction staging is expected to be authorized prior to the completion of the Project review by NIRB. Article 12.10.2(b) gives NIRB the expressed authority to approve or issue licenses for certain exploration or development activities related to the Project if, in their judgment, it is appropriate to allow the activity to proceed prior to completion of the full review. Baffinland will apply to NIRB, pursuant to Article 12.10.2(b), to allow pre-construction staging to take place in 2009. Baffinland's development schedule presumes that this exemption will be obtained.

The main milestone dates of the pre-construction staging are summarised below.

Date	Activity
March 2008	Submit Baffinland Project Development Proposal and supplemental information for the Pre-Construction Staging
June 2008	NIRB issues exemption authorizing pre-construction staging to proceed; INAC completes CEAA screening; INAC and QIA issue associated land use approvals
June 2008	Baffinland orders equipment
August - early October 2009	Ships arrive to Milne Inlet and Steensby Inlet
Winter 2009/2010	Baffinland transports fuel and camp facilities from Milne Inlet to Mary River along the winter road
April 2010	NIRB issues Project Certificate authorizing start of construction

Pre-construction staging will be discussed with local communities during upcoming public meetings planned for the spring of 2008.

SECTION 3.0 - PROJECT DESCRIPTION - CONSTRUCTION PHASE

3.1 OVERALL CONSTRUCTION STRATEGY

Assuming the pre-positioning of equipment and materials as described in Section 2, the construction phase of the Project is expected to be carried out over a 4 year period. Railway construction is the critical path item for the construction phase, and as such, it will be necessary to establish a construction access road and then concurrently build the railway from a number of construction faces. Construction activities for the Steensby port and the railway will be staged from the Steensby port site, and construction activities for Mary River will be staged from Milne Inlet.

Infrastructure such as camps and laydown areas, as well as aggregate sources from rock quarries and sand and gravel borrow areas, is required to support construction. Where possible, permanent support infrastructure will be built at the onset of construction, to be used during both construction and operation phases of the Project. In many instances, temporary infrastructure will be constructed or positioned at Project sites for the duration of the construction phase only. This temporary infrastructure will to be removed once construction is complete. Major components in each area are presented below, with temporary infrastructure distinguished from permanent facilities. Site layouts during construction for Mary River, Steensby Inlet, and the railway alignment are shown on Figures 3.1, 3.2 and 3.3, respectively.

Mary River Mine Site	
Temporary Facilities	**Permanent Facilities**
o Construction camp o Contractor offices o Quarry and borrow sites, and related access roads o Temporary fuel storage (iso-containers and manufactured tanks) o Aggregate crusher and stockpiles o Concrete batching plants o Power generators o Portable lighting plants o Construction workshops and maintenance shops o Warehouses/stores o Equipment maintenance facilities	o Ore crushing and screening facilities o Ore stockpiling facilities o Railway loading and unloading facilities o Permanent worker accommodations o Communication systems o Site roads o Heavy equipment fleet parking o Laydown areas o Airstrip (existing and upgraded) o Bulk fuel storage and distribution facilities o Explosive manufacturing and storage o Water supply o Power generation o Waste management facilities o Explosives plant (used during construction)

It is expected that construction will be accomplished by several major construction companies working on various aspects of the Project. The expected workforce composition and numbers are presented in Section 5.1. Construction activities are scheduled to commence in 2010, immediately following receipt of the required regulatory approvals (Section 1.3.4), and will take place concurrently at both areas. The railway construction schedule is the critical path and is based on the timely delivery of pre-construction materials to both work faces at Mary River (via Milne Inlet) and Steensby Inlet.

Milne Inlet and Milne Inlet Tote Road	
Temporary Facilities	**Permanent Facilities**
o Temporary floating dock for sealift unloading	o Milne Inlet Tote Road (existing and upgraded)
o Bulk fuel storage facilities (existing and new)	o Laydown areas (existing)
o Camp facilities (existing)	o Airstrip (existing and upgraded)
o Communication systems	o Bulk fuel storage
o Water supply	o Waste management
o Power generation	o Quarries and borrow sources (existing)

Railway from Mary River to Steensby Inlet	
Temporary Facilities	**Permanent Facilities**
o Construction access roads	o Railway embankment
o Quarries and borrow sources	o Train loading and unloading facilities
o Construction camps (2 to 4)	o Communication systems
o Refuelling depots at camps	o Tunnels, bridges
o Explosives magazines	o Rail sidings

Steensby Inlet Port Site	
Temporary Facilities	**Permanent Facilities**
o Construction docks	o Ore stockpiling facilities
o Quarry and borrow sites, and related access roads	o Ore, freight and tug docks
	o Ship loading and unloading facilities
o Concrete batch plant(s)	o Cargo (container) handling facilities
o Construction workshops and maintenance shops	o Permanent worker accommodations
	o Rail shops and maintenance infrastructure
o Warehouses/stores	o Buildings and offices
o Temporary power generators	o Communication systems
o Portable lighting plants	o Site roads
o Laydown areas/freight storage	o Causeway
o Parking areas for construction fleet	o Laydown areas/freight storage
o Temporary fuel storage (iso-containers)	o Airstrip and related access road
o Equipment maintenance facilities	o Bulk fuel storage and distribution facilities
o Explosives plant and magazines	o Water supply facilities
	o Waste management facilities
	o Power plant
	o Navigational aids (shipping lane and port)

3.1.1 Mobilization and Re-Supply

During construction, containerized equipment and materials will be shipped to either Milne Inlet or Steensby Inlet. Personnel, equipment and materials will also be flown into the Mary River, Steensby Inlet and Milne Inlet airstrips. Items bound for the Mary River mine will be shipped to Milne Inlet during open water (August to early October) and then transported over the Milne Inlet Tote Road to the Mary River site during winter conditions. A spud barge arrangement will be anchored at the Milne Inlet beach in 2010 to handle cargo transfer for the Mary River site; ships at Steensby Inlet will be off-loaded using a rough terrain container handler or similar equipment. Existing camp facilities and laydown areas will be used for construction to the extent practical.

The following table presents the estimated number of ships arriving at Mary River and at Steensby Inlet each year during construction, as well as the total tonnage of materials to be delivered each year. The estimated number of voyages each year is based on use of conventional sealift ships, of around 7,000 to 16,000 DWT capacity, but larger ships or barges could be used depending on cost and availability.

Shipping Traffic during Construction

Location	Estimated Maritime Transportation	2010	2011	2012	2013	2014
Milne Inlet	**Vessels**	**12**	**3**	**4**	**3**	**4**
	Total Revenue Tons	105,000	30,000	43,000	30,000	33,000
	Fuel (tankers or barges)	**3**	**2**	**1**	**2**	**0**
	Total Fuel Volume (ML)	21.3	13.3	8.8	15.7	0
Steensby Inlet	**Vessels**	**15**	**11**	**8**	**4**	**3**
	Total Revenue Tons	138,000	100,000	75,000	30,000	30,000
	Fuel (tankers or barges)	**2**	**3**	**2**	**5**	**1**
	Total Fuel Volume (ML)	28.1	25.8	11.4	45.8	1

As the preceding table shows, the 2010 sealift will require the largest volume of marine traffic in the Project's construction period, with an estimated 27 vessels delivering supplies to Milne Inlet and Steensby Inlet. This volume is nearly double that of the next highest-traffic year, in 2011, and reinforces the need for advance staging of materials during the previous summer (Section 2). Fuel tankers and/or barges destined to Milne Inlet and Steensby Inlet in 2010 will berth over winter as bulk fuel storage facilities will have yet to have been constructed.

In 2011, the land-based permanent fuel tank farm constructed at Steensby Inlet will receive fuel deliveries. The existing bladder tank farm at Milne Inlet will continue to be utilized and a steel tank farm will be constructed for additional capacity. A fuel tanker may also berth over winter at Milne

Inlet. Sealifts in 2013, 2014 and 2015 are primarily for demobilizing equipment as the construction activity winds down.

A considerable fleet of equipment is required to construct the Project. While in no way a complete list, the following provides a flavour for the types and numbers of key heavy equipment involved in construction:

Approximation of the Heavy Equipment Fleet Used in Construction	
Pick-up Trucks (156)	Portable Generators (120)
Excavators (50)	Dozers (40)
Haul Trucks (20)	Loaders (5)
Drills (30)	Crushers (8)
Water trucks (6)	Miscellaneous work trucks (50)
Grader (12)	Fuel tankers (3)
Transport trucks (25)	Cranes (12)

3.1.2 Anticipated Construction Milestones

Key Project component milestones are scheduled for the following years:

- 2008
  - Exemption authorizing pre-construction staging (Section 2) is issued
- 2009
  - Stage equipment, materials, fuel and barge accommodation (August through October)
- 2010
  - Project Certificate authorizing the Project to proceed is issued in April; permits follow
  - Initiate construction following receipt of permits
  - Build Steensby airstrip
  - Commence construction of access road and railway
  - Prepare sites and develop borrow sources
  - Initiate upgrades to Milne Inlet Tote Road for oversized equipment
  - Build construction support facilities and fuel storage tanks at Milne Inlet, Mary River and Steensby Inlet
  - Construct freight and tug docks at Steensby, and spud barge arrangement at Milne Inlet
- 2011
  - All site preparation and temporary construction facilities will be in place; civil works on foundations begin
  - Construction access road for railway will be completed from Steensby Inlet to Mary River
  - Tank farms at Steensby Inlet and Mary River are completed and receive fuel delivery
- 2012
  - Main project components (mine site, railway and port) are under construction

- 2013
  - Railway construction is completed; other construction is substantially complete
  - Ore dock is completed
  - Mine commissioning starts in the fourth quarter with pre-production mining
- 2014
  - Railway will begin operation and start haulage at reduced loads, creating an ore stockpile at the Steensby Inlet port
  - Full production begins at the beginning of second quarter
- 2015
  - Demobilization of construction equipment, and reclamation of temporary areas for construction (i.e., quarries, construction access road) will likely span the first couple of years of operation

3.1.3 Ongoing Geotechnical Investigations

Geotechnical investigations have been ongoing for the past several years at the mine site, Steensby port site, and along the railway. It will be necessary to continue geotechnical investigations through the regulatory phase, and early in the construction phase as an integral element of Project execution.

3.2 MILNE INLET AND MARY RIVER

Mine construction at Mary River will be facilitated by moving equipment and materials over the Milne Inlet Tote Road during winter. With the exception of bulk fuel storage capacity, the existing facilities at Milne Inlet, shown on Figure 1.4, are sufficient to support mine construction, and will remain through the construction phase to receive sealift materials. This includes the existing trailer camp designed for a peak capacity of approximately 60 people, and the existing 8 ML bladder tank farm. Materials will have been delivered to Milne Inlet during 2009 staging activities, with materials brought over the winter road to Mary River. In 2010, a spud barge arrangement (Prudoe Bay style barges) will be anchored at the Milne Inlet beach at the location at the beach used for bulk sampling activities in 2007 and 2008. The dock will be of sufficient length to extend into the deep water so that the sealift ships may berth into it, so that lightering barges are not necessary to unload the ships anchored at distance. The dock will be in place for the duration of the construction phase only.

The Milne Inlet Tote Road will be used as a winter road during the construction phase. It will be necessary during 2010 and/or 2011 to conduct additional upgrades to the road so that oversized mine equipment (i.e., stacker/reclaimers, open pit shovels, 210 t mine trucks) may be brought into site near the end of construction. The current road upgrades for the bulk sampling program, while sufficient for transporting the ore sample in 45 t trucks, will not meet the requirements to bring in oversized equipment. Sharp turns, steep hills, and narrow roadways adjacent watercourses present barriers for the large oversized equipment. Ground work in 2008 will identify needed upgrades to the road.

3.2.1 Site Preparation Activities

The existing infrastructure at Mary River at the onset of construction will include (Figure 3.1):

- An existing 200 person camp for exploration, geotechnical and environmental personnel
- An existing airstrip with temporary airstrip lighting, adequate for small aircraft year-round and larger aircraft (i.e., Hercules) when the ground is frozen
- Laydown areas
- Fuel storage areas in bladder tank farms, totalling approximately 2 ML

Site preparation activities at the Mary River site will include:

- Upgrade the airstrip to accommodate Boeing 737s and similar sized aircraft
- Prepare any additional laydown areas or work areas
- Construct temporary accommodations
- Construct a concrete batch plant at Mary River
- Construct access roads to Project infrastructure areas
- Develop existing aggregate sources for rock, sand and gravel

Construction activities will utilize existing Project infrastructure as much as possible to decrease the land disturbance area and improve efficiency of construction activities. At Milne Inlet, existing laydown areas will be supplemented with additional laydown area within the existing lease boundaries that have been assessed by an archaeologist. Additional laydown and camp space will be established at Mary River along the existing road where ground conditions will support laydown areas and temporary camps with little to no additional grading or fill required. These areas have been assessed by a qualified archaeologist.

3.2.2 Construction Camps and Related Facilities

The current 200 person capacity camp at Mary River, constructed for the bulk sampling program, will be insufficient to house the construction crew, as exploration, geotechnical drilling, and environmental programs will be ongoing (Section 1.5.1). A temporary trailer or Weatherhaven-style construction camp, mobilized to the Mary River site during 2009 staging activities, will be constructed as soon as possible in 2010. The workforce at Mary River, including personnel supporting ongoing exploration, geotechnical and environmental programs is expected to peak at approximately 1,000 people.

Potable water will be obtained from Camp Lake, which is the current water supply and is relatively removed from Project activities. Sewage will be treated by a package sewage treatment plant likely in combination with a lagoon, with Sheardown Lake being the proposed receiving waterbody.

Waste management facilities required for the operation phase will be installed early in the construction (Section 4.1.3). Waste will be managed in the following manner:

- Temporary storage and off-site shipping of hazardous and recyclable waste materials
- Incineration of non-hazardous combustible wastes
- Landfilling of inert non-combustible wastes

Larger or additional incinerators will be brought on-line to meet the Project's needs during the construction phase, and the existing landfill created for the bulk sampling program will be expanded during construction. Incineration will be the main disposal method for combustible wastes generated on-site, which should eliminate problems associated with odours attracting wildlife, or the creation of gases through the decomposition of putrescible materials. The landfill site will be used to dispose of only inert solid waste and ashes from the incinerator. Cover will be applied as part of regular landfill operation.

Hazardous wastes that will be generated on-site will be similar to those generated during the operation phase (Section 4.1.3.6). Hazardous wastes will be temporarily stored in special containers and/or at designated locations on-site and will be respectively shipped to registered hazardous waste disposal facilities or to recycling depots.

3.2.3 Quarries and Borrow Sources

Quarry materials, including rock, sand, and gravel, will be required for additional upgrades to the Milne Inlet Tote Road and for construction at Mary River. Table 3.1 lists the aggregate sources identified for the Project, their location, and estimated in-situ volume requirements. Three large borrow areas and two rock quarries identified for the bulk sampling program (Figure 1.2) will be the primary source of material. These existing sites, along with borrow from within the tote road right-of-way are permitted under Baffinland's existing commercial lease and quarry concessions with the QIA for Inuit-owned land, which will be amended or a new lease issued for Project development.

3.2.4 Explosives

The permanent mixing plant to support mining during operation at Mary River will be built early in construction, and in the interim temporary explosives magazines will be used. Magazines will be provided for explosives and detonators for both the construction and operation phases.

3.3 STEENSBY INLET PORT AND RAILWAY

Construction at Steensby port and the railway will be facilitated by pre-positioning equipment, fuel, floating accommodations and materials at Steensby Inlet in 2009 (Section 2). Establishment of the access road and the airstrip is important to facilitate larger movements of workers, and construction of bulk fuel storage will be necessary to provide on-land fuel storage capabilities and phase out the need for fuel tankers or barges to be anchored nearby. The layout at the Steensby port site during construction is shown on Figure 3.2. The railway will be constructed from Steensby Inlet by first building the construction access road, then establishing construction camps to facilitate construction of the railway from multiple faces. The location of proposed quarries, construction camps and the construction access road is shown on Figure 3.3. The construction access road will also provide a means to truck fuel to Mary River to re-supply the new bulk fuel storage facility constructed at that location in 2011, thereby eliminating the need for overwintering fuel tankers or barges at Milne Inlet beyond 2009-2010.

3.3.1 Site Preparation Activities

Site preparation activities at Steensby Inlet will include (Figure 3.2):

- Prepare any additional laydown areas or work areas
- Develop the airstrip and the access road from the port site to the airstrip
- Commission temporary personnel accommodations
- Construct the railway access road
- Establish construction docks on the island and mainland
- Establish railway construction camps
- Construct a concrete batch plant at Steensby Inlet

Site preparation activities at Steensby Inlet will be supported by additional archaeological surveys and potentially mitigation (if warranted) for proposed development areas.

Construction of the bulk fuel storage tanks will begin, and the construction access road along the railway alignment will be constructed to facilitate railway construction and in particular two tunnels along Cockburn Lake which require considerable time to construct (Section 4.3.3).

Construction of the port will proceed with construction of permanent infrastructure including the ore, freight and tug docks, which will necessitate underwater blasting (see conceptual drawings in Appendix F7). An evaluation of dock construction alternatives is ongoing, to determine opportunities of constructing the docks with less blasting, without compromising the robust construction required to support year-round shipping in landfast ice. Bathymetric work in 2007 identified at least two localized shallow points on the shipping approach and exit, and blasting may be required to clear these locations (Figure 3.4). Additional bathymetric and geotechnical work in 2008 will confirm the substrate at these locations and whether or not blasting will be required. Dredged material will likely be disposed of on land and not at sea.

3.3.2 Construction Camps and Related Facilities

Construction personnel will be housed in two 225 person capacity floating barge mounted accommodations or ships stationed at Steensby Inlet to facilitate construction at the port, if possible. This approach would eliminate the need to construct large temporary camps on land at the port site. Two main construction camps will be established along the railway alignment, one near the major crossing of Cockburn Lake and the other north of Cockburn Lake mid-way to Ravn River. These camps will have an occupancy ranging in the order of 100 to 150 people. Consideration is being given to locating two smaller construction camps at key bridge locations. Water will be supplied from nearby lakes for the construction camps. The accommodation barges or ships at Steensby Inlet will likely be supplied potable water using an on-board desalination plant. Waste water will be treated using package sewage treatment plants or, for the smaller camps, using incinerating toilets or similar. Incinerators will be provided at each location to manage combustible non-hazardous wastes (most importantly food wastes) with all other non-hazardous wastes stored for disposal in the landfill at Mary River. Hazardous wastes generated with railway and port construction will be stored at the port site and taken offsite by sealift to licensed disposal facilities in the south.

3.3.3 Quarries and Borrow Sources

Quarry materials, including rock, sand, and gravel, will be required for construction of the Steensby port and at the Steensby airstrip, as well as the railway. Table 3.1 lists aggregate sources, their location, and estimated in-situ volume requirements. Limited sand and gravel deposits along the railway and at Steensby Inlet require that the majority of fill material be derived from quarried rock.

The majority of rock material for the railway embankment and railway construction access road base will be generated from crushed and screened cut-and-fill within the footprint of the alignments. Additional aggregate, in the order of 5 million cubic metres, is estimated to be required beyond what will be derived from rail and road cuts. The aggregate sources listed in Table 3.1 are shown on Figure 3.2 and in greater detail in the railway alignment drawings in Appendix F1. The fill material required for the Steensby airstrip will be derived from local quarries between the airstrip and the port. Limited sampling of the rock material, including geochemical testing, has been completed on a portion of the identified rock quarries, and additional investigations will be conducted in 2008 to define which quarries have suitable materials and to refine volume estimates. The current volume calculations provided in Table 3.1 are based on the assumption that only one-third of the identified sites will be used, and therefore the estimated volumes for each are conservative.

A quarry and a borrow source will be required after construction for railway maintenance through the life of the Project. At present, rock quarry BAL-1A has been identified for ballast material, and one of either BR-4, BR-5 or BOR 3/3A have been identified to remain open throughout operation as borrow pits. The 2008 field program will confirm the permanent quarry and borrow locations.

3.3.4 Explosives

The mixing plant at Steensby Inlet will be a temporary structure that will be dismantled following the completion of construction activities. Temporary magazines will be positioned at Steensby Inlet, and day-use magazines will be located along the railway throughout the construction phase.

3.4 CONCURRENT EXPLORATION ACTIVITIES

Geological exploration is expected to continue throughout construction and over the life of the mine. Exploration activities are currently ongoing at Deposit Nos. 1, 2 and 3/3B, and are scheduled to begin in the near future at Deposit No. 4. Exploration activities for Deposit Nos. 1, 2 and 3/3B will continue to be based from the Mary River site; exploration activities at Deposit No. 4 will be based from a small camp near the deposit, approximately 27 km from Mary River, for which Baffinland obtained approval in 2007. Exploration activities beyond 2010 have not been developed. Environmental monitoring programs will also continue.

SECTION 4.0 - PROJECT DESCRIPTION – OPERATION PHASE

4.1 MINE SITE

4.1.1 Mine Site Layout

During operations the Mary River mine site will consist of:

- Open pit mine and related facilities:
  - Mine haulage roads
  - Run of mine (ROM) ore stockpile
  - Ore stockpiles (lump and fines) including stacker/reclaimer system
  - Primary crusher
  - Secondary crushing and screening
  - Explosives magazines and emulsion plant
  - Waste rock dumps
- Mine site support facilities:
  - Power generating station
  - Main office, service, administration and accommodation buildings including existing exploration camp
  - Warehouse and storage yard
  - Communications system
  - Drill hole core storage
  - Geological and environmental laboratories
  - Maintenance shop mine, equipment ready line and mine office
  - Water treatment system
  - Wastewater treatment system
  - Mine water treatment system
  - Bulk fuel storage facilities
  - Incinerator
  - Landfill
  - Airstrip
  - Site roads and parking
  - Railway line terminus and loading facilities

A plan view of the mine site facilities is shown on Figure 4.1. The siting considerations for the mine site have included:

- Limit environmental impact by reducing the overall footprint
- Provide a safe working facility
- Minimize earthworks
- Minimize mining haul distances
- Provide efficient heat recovery from power plants
- Provide attractive and effective living accommodation for employees
- Reduce the distance between the accommodation area and work areas to the maximum practical extent

As is typical for work in permafrost areas, the mine site building foundations will, where possible, be sited on bedrock. Alternatively, a variety of different pile systems will be utilized in combination with elevated building designs. Surface pads consisting of locally quarried crushed rock (gravel) will be required to provide access, laydown areas, parking areas, raising of grade, and generally to protect the permafrost around all of the permanent infrastructure facilities.

Careful consideration was given to the choice and location of ancillary facilities including the incinerator, landfill, water treatment, wastewater treatment, ammonium nitrate storage, explosives mixing and explosive magazines. Most of these facilities will be housed in buildings, and some, such as the explosives storage areas, will be remotely located from other permanent workplace facilities for reasons of health, safety and compliance with government regulations.

Geotechnical and exploration drilling are ongoing and the results from these activities may influence the positioning of site infrastructure. Additional geotechnical drilling could identify important geotechnical constraints. Ongoing drilling of Deposit No. 1 could result in changes to the pit configuration and therefore volumes and positioning of related waste rock stockpiles, explosives storage, conveyor systems, maintenance shops, access roads, and the primary crusher. While minor changes to facility location may occur as engineering designs continue to be refined, the general positioning of the Project components with respect to watersheds and other environmental boundaries are unlikely to change.

4.1.2 Mining Operations

Mining operations will require drilling and blasting within an open pit, loading of ore into mine haul trucks, delivery of the ore to a series of crushers and screens, movement (conveying) of the ore by conveyors to a stacker/stockpile, and reclaiming of the stockpile for loading into railway cars. The various steps of mining are described below.

4.1.2.1 Open Pit

The open pit will be excavated using a conventional bench configuration with access via ramps. Movement of vehicles within the pit will be monitored by a central dispatching system in order to ensure worker health and safety and operational efficiency.

The general dimensions of the final open pit based on the preliminary design presented in the DFS will be:

- Maximum length: 2.0 km
- Maximum width: 1.2 km
- Depth ranging from 465 m (northern side) to 195 m (southern side)

Geotechnical investigations have included the drilling of a 400 m deep drillhole that was instrumented with thermistors along its length. The thermistors report ground temperatures at various depths within the hole. Extrapolation of temperature gradients with depth suggests that permafrost conditions (i.e., below zero degrees Celsius for two consecutive years) extend to approximately 700 m, well below the planned mine depths. As such, water inflows into the pit are expected to be minor, consisting of shallow seasonal groundwater flows and direct contribution from precipitation events.

4.1.2.2 Explosives Storage and Blasting

Blasting at the Mary River open pit will be carried out using ammonium nitrate and fuel oil emulsion product manufactured on site. Explosives magazines will be located on site for storage of ammonium nitrate and blasting accessories in accordance with the appropriate regulations governing storage of such materials.

The explosives facility will include:

- Bulk ammonium nitrate outdoor storage area
- Bulk fuel area
- Magazine for storage of detonators, detonating cord, boosters etc.
- Emulsion manufacturing facility

The explosives facility will be located to the north of the open pit at some distance from the rest of the mine site, as shown on Figure 3.5, in accordance with the regulatory requirements for safe storage of explosives.

4.1.2.3 Loading and Hauling

Diesel-hydraulic face shovels backed up by front-end loaders will be the primary methods for loading mine haul trucks. Backhoe excavators will also be located on site for general earthworks, snow removal, and limited mining activity where the larger equipment may have limited access. Wheel and track bulldozers will be used for cleanup around mining activities and for control of rock on the benches. Graders and water trucks will be used for main haul road maintenance.

Haul trucks will be used to transport ore to the primary crusher or run-of-mine (ROM) stockpile and waste rock to the waste rock disposal areas. During the later mining stages it is estimated that a fleet of about 20 haul trucks will be used at the site.

Figure 4.2 shows a flow diagram depicting the steps involved in processing the ore after it is hauled from the open pit all the way through to it being loaded onto the ore carriers at the port at Steensby Inlet.

4.1.2.4 Ore Stockpiles

Ore will be stored in a ROM stockpile located near the crusher or fed directly into the primary gyratory crusher. The capacity of this ROM stockpile is expected to be on the order of 400,000 t.

Following secondary crushing and screening, four other temporary ore stockpiles will be used for storing lump ore and fines, with an expected combined total capacity on the order of 1.4 Mt. These stockpiles will be used for ore blending and are located near the railway loading facility.

4.1.2.5 Crushing/Screening Plant

Ore from the open pit or the ROM stockpile will be processed by crushing and screening, to produce lump product and ore fines to specifications required by the steel mills. The primary objective of the crushing systems is to maximize the production of lump product (-30 mm/+6 mm), while at the same time, keeping ore fines (-6 mm) at a minimum, since lump product has a greater value for sale. The processing plant consists of a primary crushing station, a primary screening station, a secondary crushing station, and conveyors the transfer the ore to rail-mounted mobile stacker stockpiles where the sized ore can later be reclaimed and loaded on the rail cars. The location of the crusher system is shown on Figure 4.1. It is noted that no chemicals are added to this process, it is strictly an ore sizing process.

The crushers and screens are installed inside buildings. Material handling equipment, including reclaimers, stackers and conveyors are installed outdoors. Conveyors will be equipped with wind hoods to reduce wind exposure and potential for ore fines to be blown off the conveyors. Dust collectors will be installed at transfer points and other required areas to limit fugitive dust emissions.

4.1.2.6 Waste Rock Stockpiles

Waste rock disposal areas designed for permanent storage of waste rock will be located on the northeast, northwest, west, and southwest sides of the open pit. After completion, the northwest to southwest waste rock stockpile will be joined to form a single waste rock stockpile.

The total capacity of the waste rock stockpiles is expected to be on the order of 220 Mm^3. For the purpose of the DFS, it was assumed that any waste rock classified as potentially acid-generating will be stored in designated areas within the waste rock stockpile to limit its potential for contact with meteoric water and also its exposure to oxidizing conditions.

Waste Rock Management

Potentially Acid Generating Rock

Preliminary material testing to date suggests that the majority of waste rock excavated from the open pit will be environmentally benign i.e. it will not be subject to significant metal leaching, and/or acid generation caused by oxidation of sulphide minerals. Due to its northern location, it is likely that the majority of waste rock area material will be permanently frozen, and that only the upper surficial material will be subject to seasonal freezing and thawing. The frozen material is expected to form an effective barrier for acid forming reactions since no liquid water is available and its solid form will limit the potential for exposure to oxidation.

During mining, monitoring of waste rock will help identify the presence of sulphides. If significant quantities of sulphidic waste rock are identified, then this material may be stored in a designated area of the waste rock stockpiles to limit air and water contact and where runoff from the area can be appropriately managed (see Section 4.1.3.5).

4.1.2.7 Schedule

The current mine life, including the pre-production mining period of 3 months and only 9 months of mining in the final year, is 21 years. Annual mine production is estimated at 18 Mt. The three-month pre-production period will occur during the final 3 months of 2013, when a high-grade ore stockpile will be developed near the crusher. About 13 Mt of ore will be mined, crushed and transported to Steensby Inlet in 2014, and 18 Mt will be mined each year from 2015 through 2032, with 16 Mt mined in the final year of mining (in 2033).

4.1.3 Mine Site Support Facilities

4.1.3.1 Mine Site Buildings

Accommodation Complex

The accommodation building will consist of a prefabricated modular unit supported on pile foundations. The facility will be designed to accommodate approximately 275 people in four 2-storey dormitory wings. A central core area will comprise: kitchen/dining facilities, recreational facilities, and general service space.

Maintenance Complex

The maintenance building which will comprise maintenance, warehousing and administration offices and will be constructed of structural steel with a prefinished metal roof and wall cladding supported on a pile supported foundation. Access to the building will be by man doors, overhead doors, corridors/utilidors and a high multiplex door (for the repairs shops). The complex will be equipped with oil/water separators in areas associated with the steam-cleaning facility.

Assay Laboratory

The assay laboratory will house the metallurgical office and will be used for ore sample storage, preparation and analyses.

4.1.3.2 Power Supply

A centralized power plant designed to service the entire mine site will be located to the east of the accommodation complex. The power plant will be designed to accommodate five diesel generating sets to provide enough capacity to meet the estimated power demands of 15.8 megawatts. Annual energy consumption is estimated at 114,000 megawatt hours. At any one time, three generators will be in operation, one will be on standby, and one will be spare.

The power plant building will be connected to the accommodation complex through an utilidor. To reduce emissions and fuel consumption a built-in closed-circuit, a two-stage waste heat recovery system will be used to recover waste heat from the oil cooler, aftercooler, water jacket and exhaust gas stream. This captured heat will then be used to heat site buildings.

A boiler building will provide a back-up system to supply the required building heat in the event of catastrophic failure of the power plant. The boilers will be sized to supply the entire site demand for building heat for a one week period. The boiler house will be connected to the power plant with a service utilidor for essential piping and electrical wiring.

Baffinland has conducted a pre-feasibility study on alternative energy options to supply power to either or both of the mine site and Steensby port site, focusing on hydro-electricity and wind power. A study of alternative energy options identified a potential hydro-electric site near the Steensby port site (Section 4.4.4.2), and a test wind tower installed at the Mary River site is testing the viability of wind to partially off-set diesel use. While these options do not form part of the Project, Baffinland continues to evaluate these energy options for potential longer-term implementation. Separate approvals would be sought if either hydro-electricity or wind was developed.

Corridors/Utilidors

Elevated corridors/utilidors will connect all buildings in the plant area. Besides providing corridor access for personnel, they will also contain heating services, piping and electrical trays/conduits. The corridors/utilidors will be constructed out of prefabricated modular units, supported on a structural steel framing system and pipe piles.

4.1.3.3 Water Supply

The potable water supply for the mine will be sourced from Camp Lake located about 3 km from the mine site. The potable water supply system will consist of a pump house, an insulated steel raw water pipeline and potable water storage tanks (also used to store fire protection water).

The potable water treatment plant will be located near the accommodation/administration/laboratory complex. Water treatment will consist of chemical treatment followed by settlement, filtration, polishing and chlorine or ultraviolet disinfection. Treated potable water will be stored in an insulated and heat-traced water storage tank sized to meet the requirements of the approximate 275 mine site personnel.

A water truck will deliver potable water for local consumption in remote areas such as the mine maintenance shop/office, explosives handling facility and other ancillary facilities as appropriate.

The fire protection system will include a primary fire pump (and backups) and sprinkler systems for the accommodation, administration, laboratory and warehouse facilities. A dry sprinkler system will be provided for the plant maintenance complex. Fully-equipped hose cabinets will be installed in heated buildings.

4.1.3.4 Wastewater Treatment

The wastewater treatment facility (WWTF) will be located in the vicinity of the accommodation/administration/laboratory complex. It is envisaged that the WWTF will consist of a self-contained extended aeration treatment system. Surplus solids will be dried and then incinerated on site. Ultraviolet disinfection will be used for final polishing of the treated effluent which will then be discharged into Sheardown Lake through an insulated and heat-traced pipeline. The wastewater treatment plant will be designed to achieve a high level of treatment, performance, in-line with those which are typically used by Canadian urban municipalities.

Wastewater will be collected within each building and pumped to the treatment plant via a force main pipe. At remote areas, such as the mine maintenance/mine office, explosives handling facility, wastewater will be collected in local holding tanks and collected via a tanker truck for treatment at the WWTF.

4.1.3.5 Mine Water Management

Due to the arid climate, it is not anticipated that significant volumes of surface runoff will be generated, with the possible exception of during the spring freshet. Current indications are that magnetite (and to a lesser extent haematite) ore may be susceptible to limited metal leaching when exposed to certain conditions. To address this potential issue, the ore stockpile design will provisionally incorporate appropriate runoff collection systems to allow any impacted leachate to be collected and treated, as required. Run-off collection provisions will also be made for the general site area.

At present, the potential issue of precipitation accumulation within the open pit is still being assessed to determine whether pit dewatering will be required during operations. Current indications are that the presence of permafrost will drastically minimize water inflow into the open pit. In the event that pit dewatering is required (albeit on an intermittent basis), the water will be collected in sumps located in the pit. This water will be transferred to trucks for use on the waste rock stockpiles and/or pit roads for dust suppression.

Based on the preliminary hydrologic and geochemical information collected to date, the Mary River Project is not expected to need to actively treat significant quantities of impacted mine water, if at all. However, in the event that such treatment is needed, it is currently anticipated that the mine water treatment system will consist of a storage lagoon and a lime treatment system which will be used intermittently on an as needed basis. Discharge of treated water will occur either to Sheardown Lake or to the Mary River.

4.1.3.6 Waste Management

Handling, storage, transportation and disposal of wastes generated by the Project will be conducted in a safe, efficient and environmentally-compliant manner designed to: i) minimize the risk of adverse environmental impacts, ii) protect the health and safety of site personnel, and iii) minimize wastage and avoid subsequent costly cleanup after mine closure and reclamation. The fundamental basis of the waste management plan will be to achieve positive management of wastes incorporating the implementation of a sound waste minimization program that will focus upon the principles of:

- Reduction
- Recovery
- Reuse
- Recycling

Waste Sources

A summary of the types of waste that are likely to be generated at the mine site are presented below.

Source and Type of Wastes Generated On-site	
Source	**Waste Materials**
Offices	Computers and electronic wastes, fluorescent lights
Wastewater treatment facility	Biological sludge and treated liquid effluent
Maintenance complex	Used batteries, engine oil, oil filters, tires, scrap metals, etc.
Laboratory	Chemical laboratory wastes and toxic substances
Domestic waste from construction camp and accommodation facility and kitchens/canteens	Biological sludge, garbage, oily and food wastes
Inert waste from construction sites and materials from operations	Wood, plastics, cement, sand, used construction materials, metals, pipes, glass, etc.
Medical waste from first-aid facility	Medical wastes
Open pit	Waste rock (discussed in Section 4.1.2.6)

Some of the materials included in the waste streams are classified as hazardous wastes because of the potential risk to human health and safety, property and the environment. Hazardous wastes that will be generated on-site will include: used oils, solvents and paints, used and/or surplus chemicals and medical wastes, batteries, light bulbs, and smoke detectors.

Wastes remaining after application of the waste minimization techniques will be treated and disposed of in a practical and environmentally- responsible manner. The following methods will be applied at the site:

- Temporary storage and off-site shipping of hazardous and recyclable waste materials
- Incineration of non-hazardous combustible wastes
- Landfilling of inert non-combustible wastes

Waste disposal methods are discussed below.

Waste Disposal

Incineration

The main disposal method for combustible wastes generated on-site will be incineration. This method will eliminate problems associated with odours attracting wildlife, or the creation of poisonous or flammable gases through the decomposition of putrescible materials. Ashes from the incineration process will be transported in closed drums by covered truck and buried within a designated area of the landfill. Only trained personnel will operate the incinerator(s).

Landfill

The landfill site will be used to dispose of only inert solid waste and ashes from the incinerator. An operation and maintenance plan for the landfill will guide operations. Regular cover will be applied, and a cap of native overburden will be placed on top of the landfill before decommissioning, so that the contents of the landfill will remain permanently frozen and isolated. Open burning of un-treated wood and cardboard wastes may be conducted to reduce volume requirements.

At the Mary River site the area of land required for landfill construction will be minimized because of planned waste minimization and recycling practices, and volume reduction from the incineration of food wastes. The landfill will only be operated by trained personnel who will carry out regular inspection and monitoring of the facility.

Hazardous and Recyclable Wastes

Hazardous and recyclable wastes will be temporarily stored in special containers and/or at designated locations on-site and will be respectively shipped to registered hazardous waste disposal facilities or to recycling depots. Manifests will be prepared for all materials shipped off-site and the receivers will be required to maintain chain of custody records.

4.1.3.7 Bulk Fuel Storage

All bulk fuels (e.g. Arctic grade diesel, gasoline, turbine jet fuel) will be shipped to the port at Steensby Inlet by ore carrier throughout the year, and in tankers during open water season, and stored in a tank farm at the port. Other bulk liquids (e.g. transmission fluids, lubricating oils, antifreeze and solvents etc.) will be transported in drums or large totes.

Fuel stored in the tank farm at Steensby Inlet will be transported to the mine on a weekly basis over the railway using fuel cars, and transferred into the mine site tank farm. The mine site will have a total diesel fuel storage capacity of about 16 million litres between two tank farms: one near the power plant and one near the mining operation. The tank farms will be equipped with a dike wall containment system lined with arctic grade synthetic liner. Day-to-day refuelling of vehicles will be carried out at a fuel filling depot. Aircraft and the equipment in the pit will be refuelled using a fuel truck. A number of day tanks will be required at mine infrastructure locations and buildings.

4.1.3.8 Airstrip

Without road access, the mine can only be accessed year-round by air, so a runway capable of landing jet aircraft (e.g. Boeing 737) or turboprop aircraft (e.g. Dash 8) will be required. Based on the design requirements for the proposed aircraft, the runway will have a minimum length of 1,829 m. Baffinland will utilize the existing airstrip at Mary River for to support future Project operations. For safety reasons, the runway has already been located away from permanent facilities on relatively flat topography. In addition to the length, other improvements to the airstrip will include aircraft warning, obstruction, runway and approach lighting conforming to the requirements of the *Aeronautics Act*. Parking, loading, unloading and services will be conducted within the apron area.

A dedicated bulk fuel storage facility will store and dispense Jet A fuel to aircraft and helicopters. De-icing facilities, provided at the airstrip, will consist of a portable discharge pump for the application of de-icing fluid from 200 L drums. De-icing will be carried out to the side of the runway, with propylene glycol, a biodegradable fluid which requires no treatment. Alternately, aircraft may be refuelled directly from a tank truck.

4.1.3.9 Site Roads

Two categories of roads will be constructed to serve the mining operation. A 13 km long main haul road, suitable for mine haul trucks will connect the open pit, primary crusher, and waste rock stockpile areas. Access and service roads will be constructed to handle light-duty site and commercial traffic. Other light-duty roads include an approximate 6.5 km long road from the mine haul road in the north to the plant and the airstrip, and an approximate 3.5 km long road from the haul road to the explosive magazines, raw water pumphouse, water treatment plant and conveyors.

Roads will be constructed using aggregate obtained from locally quarried and crushed rock.

4.1.3.10 Communications

An integrated, multifunctional, communications and networking infrastructure will be installed as appropriate to provide efficient communications among the Project cooperating locations and other Baffinland facilities in Iqaluit, Ottawa and Toronto. In addition, all mobile equipment and locomotives will be radio-equipped.

The various sub-systems will include the following:

- Satellite land stations
- Telephone exchange switching systems (complete with voice message and plant internal PA capabilities)

- Trunked, VHF radio systems including base stations and vehicle and handheld portable radio equipment
- Integrated multi-use fiber-optic network with Ethernet TCP/IP network infrastructure
- Optional cellular phone system

4.1.3.11 Railway Terminal

The mine site will receive the majority of its supplies by rail. The railway terminal at the mine site will feature a crushed or loadout station for loading ore into cars. The terminal will also have a fuel unloading station for unloading fuel (jet A fuel, diesel, gasoline) into the tank farm, and for unloading of general freight and ammonium nitrate.

4.2 MILNE INLET

4.2.1 Milne Inlet Beach Landing

The Milne Inlet area will have a limited role during the operation phase of the Project, to receive oversized equipment by periodic sealift on an as-required basis. Sealifts will be unloaded using barges and the cargo brought to shore for storage in the designated laydown area established for previous exploration and bulk sampling activities.

The airstrip at Milne will remain operational.

4.2.2 Milne Inlet Tote Road

The existing Milne Inlet Tote Road connects Milne Inlet to the Mary River site. During the operation phase, the road will be used in winter-only and on an as-required basis, in years when oversized equipment is required that cannot be delivered to Mary River via the railway from Steensby Inlet. This will necessitate additional upgrades to the road during construction, to accommodate the very large and wide truck loads. Operation as a winter road requires snow clearing but snowfills or other temporary crossings are not expected to be required.

4.3 RAILWAY

4.3.1 Overview and Design Considerations

Baffinland plans to build a 143 km long railway to transport iron ore from the mine site to the port located at Steensby Inlet. The basic design is for a heavy haul mineral railway, although the line will also carry some mixed general freight traffic to supply the mining operation. A passenger train (for employees) will also operate three times a week.

The proposed railway system will consist of:

- Rail line and embankment -including tunnels, bridges and sidings
- Crossings - across watercourses and drainages
- Yards and terminals - including rail loop, coupling and turn-around

- Supporting facilities - including maintenance and emergency facilities
- Train - including locomotives (engines) and cars
- Cargo
- Signalling and telecommunications

The proposed railway route is shown in Figure 4.3.

To limit impacts to the existing environment, due consideration has been given to, where possible, avoiding encroachment of the railway track near lakes, rivers and other sensitive natural features. However, the demands of railway engineering place particular restrictions upon the selection of the route. For example:

- Railroad tracks cannot form tight bends (unlike roads) due to issues relating to rail wear and train speed
- If planners propose a winding 'S' shaped route (e.g. to deviate around natural features) then there must be at least 200 m of straight track between the two curves
- Changes in grade have to be carefully planned in order to avoid undesirable compression and telescoping of carriages
- Curved sections of track physically slows the train down resulting in increased power demands upon locomotives. Similarly, increases in grade require increased power output from the locomotives. The net result is that the maximum achievable grade must be decreased if the track is also curved.

A significant factor influencing the design of the railway, particularly route alignment, is permafrost and ground conditions. Most, if not all of the ground on Baffin Island has continuous permafrost, which is defined as ground remaining at or below 0°C continuously for at least 2 years. On Baffin Island, this permanently frozen layer of rock and/or soil is about 400 m deep. Above the true permafrost is the so-called active layer of ice, soil and rock, which is subject to seasonal freezing and thawing. In this area of Baffin Island, the active layer is typically from 1 to 3 m thick. There are varying ground conditions along the rail alignment, and site investigations are ongoing to define areas with thaw-susceptible soils. Special consideration, especially for the construction of bridge foundations, is being given to the potential effects of climate change, which could increase the depth of the active layer.

4.3.2 Proposed Route and Alignment

The proposed alignment of the route (subject to ongoing optimization) for the railway from the Mary River mine to Steensby Inlet; from Mary River the railway will proceed eastward from the mine across a long series of sand and gravel terraces that lie at the southern foot of the mountain range which the Mary River deposits are a part. Terraces are often deeply cut by drainage channels from the mountains. The route then bears slightly towards the south and crosses the Ravn River approximately 4 km west of the confluence of the Ravn and Turner Rivers. Next the route continues south for approximately 30 km across a smooth plateau that slopes gradually upwards towards the south and east.

At the southern end of the plateau, the route enters the Cockburn Lake valley, follows the west bank of a Cockburn River tributary, and then hugs the lake itself until the route crosses the lake at the natural constriction in the valley. Two short tunnels, totalling 1,050 m in length, will be required as the railway descends the Cockburn Lake Valley. The route then follows the east bank of the lake for approximately 14 km, through an area requiring tunnelling and benching in bedrock.

The route continues along the east side of the lake for another 13 km across well established sand and gravel terraces and benches. At the southern end of the lake, the route works its way towards the southeast, avoiding numerous rocky hills and waterlogged ground around small lakes, until it reaches the port site at Steensby Inlet.

A number of routing alternatives were considered early in the feasibility study process, including options to cross the Ravn River downstream of Angajurjualuk Lake; running along the base of the steep cliffs along Tariujaq Arm; as well as hybrid combinations of these two routes with portions of the proposed route. The proposed route was determined to be preferred based on technical, cost and environmental factors.

4.3.3 Railway Construction

The railway roadbed will consist of subgrade (embankments or cuts) and sub-ballast, which is a layer of graded crushed rock that will act as a filter layer between the embankment material and the ballast. The track structure, consisting of ballast, ties and rail, will be laid on top of the sub-ballast. During railway construction, significant quantities of sub-ballast and ballast will be required. These will be sourced from borrow areas located in proximity to the railway route (where possible).

A cross-section of a typical rail embankment is shown on Figure 4.4. Depending upon ground conditions, the rail embankment may be 1.5 m in height where the rail is constructed over rock or other thaw-stable soils, or up to 4 m in height in locations of thaw-susceptible soils. Ground conditions have a very large bearing on rail embankment construction, and mitigation of poor ground conditions ranges from avoidance, where possible, to excavation of thaw-susceptible and ice-rich soils, to construction of high embankments to insulate the rail bed from disturbing the thermal regime of the underlying soils. The height of the embankment has a large bearing on its width; a 1.5 m high embankment may measure as little as about 12 m toe of embankment to toe of embankment, whereas a 4 m embankment will measure about 50 m across.

Drainage facilities include bridges and culverts, ditches, dikes and/or berms and other protection works will be required along the entire railway route to protect against ballast washout due to surface drainage flow.

4.3.4 Watercourse and Drainage Crossings

A number of crossing structures are required along the route, including large bridges, smaller single-span bridges and culverts. Preliminary assignments of crossing structures for each drainage crossing are provided in Tables E6.1 and E6.2 in Appendix E6. Five preliminary bridge locations have been identified, with a total length of 1,400 m. Conceptual drawings of bridges for the

Mary River, Cockburn Lake, Ravn River and BR-137 (un-named) watercourses are included in Appendix E6. Several shorter bridges will be required over smaller watercourses and the majority of drainages to be crossed using culverts. Typical open deck single span bridges and culvert designs in thaw-stable and thaw-sensitive ground are also included in Appendix E6.

4.3.5 Trains and Rail Cars

Three trains will operate to transport ore. Each train will consist of several diesel-electric locomotives towing about 110 rail cars. The total fleet required has been estimated at 11 locomotives, (6 used for ore transport, 2 used for general freight and passenger (employee) train service, along with 3 spares), and 367 cars (with 34 spares). A photograph of the type of locomotive and ore cars to be used is shown included as Figure 4.4. Each train will travel 1,806 km over a 66 hour period, after which it will be subjected to a detailed safety inspection.

To reduce freight handling and to facilitate door-to-door delivery, general freight will be hauled in containers. Bulk materials used for mining operations will be hauled in tank cars or containers. Two types of cars will be required for the haulage of bulk and general freight: flat cars and tank cars. Dedicated tank cars will be needed for Jet A fuel and diesel fuel. Flat cars will be used to transport containers and large sized equipment and machinery.

There will be a regular passenger train service to move employees between the port and the mine site. This will require a passenger car, baggage car, and a generator car.

4.3.2 Railway Operations

The railway will be used predominantly for the movement of ore from Mary River to Steensby Port, but will also be used to shuttle workers arriving and departing from the Mary River airstrip during operations to and from the Steensby Port work site, and for the re-supply of materials and fuel arriving at the port to Mary River.

Maximum design speed will be 75 km/h, but the initial maximum operating speed is expected to be 60 km/h. Temporary slow orders may be required over parts of the route during the warmest period between mid-June and late August.

Combined signal and telecommunications systems will be used to safely manage the operation of mineral trains with more than 100 cars per train travelling at speeds up to 75 km/h. In addition to ore trains, the system will also manage freight trains and passenger trains.

4.3.2.1 Ore

Each year, an estimated 18Mt of ore will be transported by railway from the mine site to the port at Steensby Inlet. Total ore train length will be between 1,046 and 1,201 m depending on maximum axle load. Ore will be loaded into the uncovered cars at an estimated rate of 6,000 tonnes/hour, while the cars are in motion (through the top of the gondola car). The cars will be unloaded by rotary dumping.

4.3.2.2 Fuel

Fuel and freight trains each will run once a week. Whenever possible, these will be dispatched according to the operating patterns in such a way as to minimize mainline meets.

4.3.2.3 Passengers

A passenger train for employees travelling between Steensby Inlet and the airstrip at the mine site will operate an estimated three times a week.

4.3.2.4 General Freight

The railway line will carry some general freight traffic to supply the mining operation, such as ammonium nitrate (used to make explosives) and equipment.

4.3.3 Railway Maintenance

Maintenance of both the railway equipment and the railway track and embankment will be required throughout the life of the Project.

Locomotive maintenance will be scheduled, based on inspections which will occur on a regular basis. The typical inspection cycles will be daily, 90 day, annual and biannual. Car maintenance will be based on the results of the trip inspection carried out every 1,800 km. Brake tests and the replacement of brake hoses will also be scheduled activities.

Track maintenance is planned on the basis of a series of specific types of inspection carried out at regularly-defined intervals. These will include general visual inspections, detailed safety inspections, ultrasonic scanning for rail flaws and measurements of the track geometry.

The recommended approach to track maintenance is spot renewal which provides for the spot replacement of defective components on a daily basis. Also programmed maintenance over specific track segments will include such activities as rail grinding and the replacement of worn or defective components throughout a designated track section.

All railway equipment and rolling stock inspection and maintenance activities will be performed at Steensby Inlet in the fully equipped maintenance centre.

4.4 STEENSBY PORT SITE

4.4.1 Introduction

During operations the Steensby Inlet port infrastructure will consist of:

- Service and tug docks
- Ore management facility
    - Dual rotary rail car dumper
    - Ore stockpiles and rail-mounted stacker/reclaimer system
    - Secondary screening plant
    - Ore loading dock

- Port site facilities:
  - Power generating station
  - Communications system
  - Service/administration/accommodation buildings
  - Maintenance shop/main office
  - Potable water treatment system
  - Wastewater treatment system
  - Tank farm
  - Incinerator
  - Airstrip
  - Navigational aids as required by the Canadian Coast Guard
  - Site roads
  - Railway maintenance facility and offices
  - Rail yard

A plan showing the Steensby Inlet port layout is shown in Figure 4.5.

4.4.2 Siting Considerations

The siting objectives for the Steensby Inlet port infrastructure will be similar to the mine site i.e. they will include:

- Limit environmental impact
- Provide a safe working facility
- Minimize earthworks
- Provide efficient heat recovery from power plants
- Provide attractive and effective living accommodation for employees
- Minimize the distance between the accommodation area and work areas to maximum practical extent

The ground conditions at the Steensby Inlet port site consist of exposed rock or bedrock relatively close to the surface. As a result, foundations for the majority of structures will be founded directly on rock with the following exceptions:

- Accommodation/administration/maintenance/laboratory complex and corridors/utilidors
- Rail unloading building (excluding the car dumper bays)
- Some sections of the stacker/reclaimer

The above structures will be supported on relatively short rock socketed steel piles.

Consideration will be given to the choice of all ancillary facilities including the incinerator, water treatment and wastewater treatment facilities.

4.4.3 Docks

There will be three docks located at the port in Steensby Inlet:

- A service dock used for unloading of general freight located at the northwestern section
- An ore loading dock located on the southwestern tip of Steensby Island
- A tug fuelling dock located at the northwestern section

Bathymetry using side-scan sonar was conducted along the shoreline of Steensby Inlet at the planned dock locations. Preliminary dock designs are included in Appendix E, and are described below. Ongoing engineering and review of alternatives may result in modifications to these feasibility level designs.

Service and Tug Refuelling Docks

The service dock and tug refuelling docks will be located in a protected bay and will be constructed using sheet pile technology. Jet A, gasoline, some diesel fuel, and other freight will be delivered to the service dock where a warehouse yard will serve as a storage area. The service dock will handle tankers and freight carriers containing mine and railway equipment. The service dock will be utilized only in the summer open-water season which lasts around 2 months.

Ore Loading Dock

The ore loading dock will receive an average of 12 ore carriers per month on a year-round basis and up to 17 vessels per month in summer open-water season when non-icebreaking ships will bring additional materials and supplies. Steel shell technology has been applied to the ore dock design. A dock for cape-size ore loading carriers with a draft of 17.8 m is a major dock and represents a significant engineering and operational challenge for use in the harsh Arctic conditions. The planned annual 18 Mt ore throughput also means frequent winter traffic.

Due to the volume of diesel that will be consumed by the mine and other operations, year around fuel deliveries will be required. As such, incoming ore carriers will bring fuel supplies where diesel fuel will be delivered to the ore loading dock and pumped about 3.3 km to the storage tanks.

The winter ice cover is expected to remain stable in the area, even if it is repeatedly broken because of rapid refreezing of ship tracks. The dock may be subjected to substantial ice forces and also ship impact forces. In this case, partially-frozen backfill will provide a strong stratum against these forces.

4.4.3.1 Ice Management

When ice is repeatedly broken, accelerated brash ice growth occurs, as there is a lot of free water exposed directly to freezing temperatures. The more frequently ice is broken, the more brash ice is formed. This has repercussions when ore carriers are stationary in dock.

To reduce the risk of ships becoming frozen in during the wintertime, ballast water is typically heated by waste heat from the ships engines. This warm ballast water is released from the ship during ore loading to melt brash ice at berth. Baffinland is currently evaluating whether warm water alone is sufficient for ice management at the dock and will continue to look for technically viable economic solutions that are in-line with best management practice.

4.4.3.2 Ore Management

Ore from the mine site will be transported by train to the port at Steensby Inlet for stockpiling prior to shipping. A flowsheet diagram showing the steps involved in processing the ore from the mine site through to its loading onto the ore carriers at the port is shown in Figure 4.2. Ore handling at the port will take place on the island which will feature:

- Secondary screening plant - once unloaded, ore will be re-screened to separate out any fines generated during transportation
- Stacker/reclaimer
- Two lump ore stockpiles (estimated at 2 Mt and 0.7 Mt capacity, respectively)
- Fines ore stockpile (estimated at 1 Mt capacity)
- Ore loading dock

Ore will be loaded onto ships at a rate of about 12,000 t per hour, suggesting that a 135,000 dry weight tonne (DWT) ship will take about a half a day to fill.

4.4.4 Port Site Support Facilities

4.4.4.1 Port Site Buildings

Accommodation Complex

The accommodation building will consist of a combination of prefabricated modular units supported on pile foundations. The facility will be designed to accommodate approximately 175 people in two, two storey dormitory wings. A central core area will comprise kitchen/dining facilities, recreational facilities and general service space.

Maintenance Complex

The maintenance building, which will house maintenance, warehousing and administration offices, will be constructed of structural steel with a prefinished metal roof and wall cladding, all supported on a concrete foundation. Access to the building will be by man doors, overhead door, corridor/utilidor and high multiplex doors (in the repair shops). A separate maintenance facility will be provided at the port to service locomotives and railway rolling stock (Section 4.4.4.11).

4.4.4.2 Power Supply

A centralized 22MW power plant designed to service the entire port will be located close to the accommodation complex. The running load is estimated at 11 MW and annual energy consumption is estimated at 120 000 MWh. The port power plant features will be similar to the mine power plant as described in Section 4.1.3.2. The power plant building will be connected to the accommodation complex through an utilidor.

As discussed in Section 4.1.3.2, Baffinland conducted a pre-feasibility study on alternative energy options to supply power to either or both of the mine site and Steensby port site. A potential hydro-electric station and distribution power line has been identified at Separation Lake, located approximately 58 km east of the Steensby Inlet port site. The hydro-electric site does not form part of this Development Proposal. While hydro-electric power does not form part of the Project, Baffinland continues to evaluate this energy option for potential longer-term implementation.

If it is determined that sufficient hydro power is available, a power line could be extended along the rail line to service the Mary River site in addition to the Steensby Port site. Baffinland intends to further evaluate the feasibility of hydro-electric power generation over the next several years. Separate approvals will be sought if the hydro-electric site provides viable.

Corridors/Utilidors

Elevated corridors/utilidors will connect all buildings in the port area. Besides providing access corridors for personnel, they will also contain heating services, piping and electrical trays/conduits. Utilidors will be constructed with prefabricated modular units on a structural steel framing system and pipe piles.

4.4.4.3 Water Supply

The port potable water supply will be obtained from a reverse osmosis desalination plant located on the west shore of the mainland. The exact location and construction of the intake will be confirmed through 2008. Desalinated water will be pumped through an insulated steel pipeline to the port facilities. The treated water will be stored in two freshwater tanks, where it will be used for potable water.

4.4.4.4 Wastewater Treatment

The port wastewater treatment system will be similar to the mine system as described in Section 4.1.3.4.

4.4.4.5 Waste Management

Waste management system at the Steensby port will consist of an incinerator similar that at the mine site (Section 4.1.3.6), as well as a designated temporary storage area for non-combustible, benign waste that will be transferred by rail to the mine site for landfill disposal.

4.4.4.6 Bulk Fuel Storage

The diesel tank farm at Steensby Inlet will have a total storage capacity of approximately 45 ML. The size of the tank farm accounts for storage needed for refuelling of the tank farm at the mine site, as well as the nature of ship re-supply, with regular shipments coming on the ore carriers year-round and large re-supply during summer by tankers. The tank farm will be located inside a dike wall containment system properly lined with arctic grade synthetic liner.

4.4.4.7 Ammonium Nitrate Storage

Ammonium nitrate (used for making explosives) will be securely stored in a storage facility located close to the freight dock.

4.4.4.8 Airstrip

During operations, all incoming/outgoing personnel will be transported via railway. Therefore, only a helicopter pad located near the accommodation complex will be provided for emergency use. The airstrip used for construction will be maintained for emergency purposes only during operations.

4.4.4.9 Site Roads

The site road system will be constructed using aggregate obtained from locally quarried and crushed rock.

4.4.4.10 Communications

Communications infrastructure will be as per the description in Section 4.1.3.10.

4.4.4.11 Railway Yard and Terminal

The Steensby yard will include railway maintenance and operations building, including maintenance and administration operations, as well as car control and train dispatching. The yard will include about 15 km of yard trackage. The maintenance centre will service locomotives and railway rolling stock. It is designed to be expanded in stages over the life of the project as the railway maintenance requirements increase over time. The track maintenance crews will be housed at Steensby Inlet.

The railway terminal at the port will be used for offloading ore and for loading of supplies, equipment and bulk fuels onto trains for transportation to the mine site. To facilitate these activities, the railway terminal will feature:

- A twin rotary rail car dumper for offloading ore from the rail cars onto the ore stockpiles
- Fuel loading facilities for transferring fuel from the bulk fuel storage facility to the rail tank cars
- A small intermodal yard for container handling

4.5 SHIPPING

4.5.1 Overview

The viability of the Project relies on the constant supply of iron ore to customers, and therefore shipping of iron ore to market must occur on a 12 month-per-year basis. To ship ore to market, Baffinland has engaged Fednav, a Canadian ship owner and operator, to manage the shipping operations for the Project. Fednav intends to form a consortium of ship owners to design, finance, build, and own the ships that will be used to carry the iron ore from the Project to markets in Europe. Fednav's consortium will own and operate the dedicated fleet of ships required by the Project. Baffinland will charter the ships from the shipping consortium.

The dedicated fleet of icebreaking cape-size ore carriers will transport most of the ore to market, supplemented by the use of ships chartered on the open market during the open water season. The ships will operate in accordance with two primary legal instruments regulating ship traffic in the Canadian arctic: the *Canada Shipping Act*, and the *Arctic Waters Pollution Prevention Act*, and their associated regulations.

During the operation phase, nearly all shipping (and all icebreaking) will be to the Steensby port. Dedicated voyages to re-supply materials and equipment will travel to Steensby port during the open water season using the type of ships currently used to support the Mary River Project and other northern sealift operations. Diesel fuel will arrive on the dedicated ore carriers, supplemented in the summer by fuel tankers as necessary. Other fuels will be delivered by normal sealift tankers to the Steensby port during the open water season. Shipping to Milne Inlet will occur infrequently throughout the operations phase and only during open water, when oversized equipment is delivered that cannot be transported via the railway from Steensby Port.

4.5.2 Shipping Routes

There will be three main shipping routes for the Project:

- Steensby Inlet to Rotterdam, for the movement or ore and most re-supply of fuel
- Steensby Inlet to a southern Canadian port, for re-supply of materials and some fuel and equipment by conventional sealift over the open water
- Milne Inlet to a southern Canadian port, which will occasionally receive oversized equipment for the Project via conventional sealift over the open water

The route for marine shipment of the ore from Steensby port to Europe is south out of Steensby Inlet through Foxe Basin along the east side of Koch and Rowley Islands to where it joins with the established shipping lanes in northern Foxe Basin accessing Hall Beach and Igloolik (Figure 4.6).

Prior to 2007, when Baffinland commissioned bathymetric surveys on two shipping lane options, only cursory hydrographic surveys had been completed in the area by the Canadian Hydrographic Service about 40 years ago. Baffinland retained Kivalliq Marine Ltd. to conduct bathymetric surveys in accordance with the standards of the Canadian Hydrographic Service, of two shipping routes through northern Foxe Basin from points of departure from the established shipping route to Igloolik and into Steensby Inlet. The more westerly route departs from the existing shipping lanes near to Igloolik and Hall Beach and runs west of Rowley and Koch Islands. The easterly route departs from the existing shipping lanes south of the Spicer Islands, and runs along the east side of Rowley and Koch Islands. Based on the results of 2007 surveys, both routes are viable for the Project, but the eastern route is operationally preferable. The communities of Igloolik and Hall Beach have indicated preference for the more easterly route during public meetings held by Baffinland in September 2007, on the basis that this route was more removed from primary land use areas by the communities. Baffinland has selected the easterly route in consideration of available information, and additional "fill-in" bathymetric survey of the easterly route is planned in 2008 or 2009, adequate for developing full navigational charts.

The shipping route to Milne Inlet is well established; extending from Baffin Bay and passing through Pond Inlet, Eclipse Sound and to the head of Milne Inlet.

In addition to the route selection through northern Foxe Basin, major transportation alternatives were considered for the Project including alternate shipping routes such as shipping from Milne Inlet (which would necessitate a railway built to Milne Inlet). The shipping route from Steensby Inlet was preferred based on a number of factors, including technical factors such as the difficulty of ice navigation (related to the polar class of vessel required for ice breaking). Milne Inlet is relatively narrow and represents operational uncertainty as to whether or not ships can break ice repeatedly within the brash ice that would form within the narrow inlet. There are also environmental sensitivities such as the potential for interactions with Inuit use of the landfast ice in the area, important summering habitat for narwhal within Milne Inlet, and proximity to a national park.

Other transportation alternatives raised by communities included constructing a railway to connect to and use the existing port at Nanisivik, and constructing a railway to either Baffin Bay or South Baffin Island and east along the Ravn River to the coast. These options were considered in a preliminary way but were determined not to be viable based on cost.

4.5.3 Ship Speeds and Transit Times

The service speed of the icebreakers and other vessels in open water at full draught is about 14.5 knots and the maximum speed is over 18.5 knots. In ice conditions and at full power, 1.2 m thick level ice can typically be broken at over 7 knots speed; 3 knots in 2 m thick ice.

The duration of a round trip from Steensby port to a destination port in Europe in open water is 20 days, and in the heaviest ice conditions during a severe winter, the sailing time may be over 45 days.

The resulting shipping schedule considered in the DFS includes 141 voyages to Steensby port each year, or 282 transits to and from Steensby Inlet. This equates to a ship moving through the shipping lane roughly every 1.3 days (32 hours). This shipping frequency will increase during the open water shipping season when sealifts will provide annual re-supply and supplemental market vessels to ship additional ore.

4.5.4 Ice Navigation

Enfotec Technical Services, the ice navigation consulting arm of Fednav, conducted an ice and marine shipping assessment in support of the Project. The study included a detailed analysis of the series of winter ice atlases of the region compiled by the Canadian Ice Service since 1990 as well as numerous satellite images, to delineate areas of old ice concentration, ridged and pressured ice, as well as shear zone locations. The ice study supported the selection of Steensby Inlet as a port location, defined the proposed shipping lanes, and determined the appropriate ice class of the proposed vessels.

Ice conditions along the shipping route (extracted from Enfotec, 2007) are as follows:

- The waterway in the access to the proposed port site in Steensby Inlet develops shore fast ice each winter. The southern anchor of the shore fast ice reaches Koch Island. The boundary between the shore fast ice and the mobile pack ice of the northern Foxe Basin represents a diverging ice edge over the winter with the result that an open water lead is usually always present off the fast ice edge. The additional benefit of this diverging condition is that no shear ridge occurs along the fast ice edge in winter. There is an average of 35 nautical miles of shore fast ice leading to the Steensby Port site.
- There are no known measurements of the thickness of the fast ice of Steensby Inlet. However, the closest ice thickness measurement station in the region at Hall Beach to the southwest of Steensby Inlet has recorded average ice thicknesses at the end of the winter's growth of 192 cm with extremes of over 250 cm. These thickness average 5% to 10% more than those recorded at Pond Inlet. The shore fast ice appears very level with few ridges or leads and no possibility that old ice can become entrained in the ice over as is the case in Eclipse Sound.
- The first signs of the spring break-up is the widening of the leads found in northern Foxe Basin and along the south coast of Baffin Island during the month of April and May as solar radiation increases in the region.
- Ice reduction is slow and gradual during the months of June and July as Hudson Strait clears of sea ice and the ice edge in the Foxe Basin retreats northward.
- The fast ice of Steensby Inlet fractures during the second and third week of July. The fracture begins with the fracture of the lower portion of the fast ice in late June and this is followed by the complete fracture of the Inlet by the fourth week of July.

- The pack ice of the Foxe Basin continues to reduce during the months of August and September as strips and patches of ice in the basin gradually melt. In rare cool summers some of this remnant pack ice will remain in the Foxe Basin to become second year ice by October 1.
- Sea ice can commonly occur in the access channels into the month of September before clearing. The incidence of first year ice surviving the summer's melt has reduced in recent years and now only occurs approximately in 10% of summers. The occurrence of remnant ice in the Foxe Basin does not preclude the use of market vessels during the late summer period for the Project although some measures such as using an owner familiar with navigation in sea ice and experienced Ice Navigators would provide mitigation.
- Freeze-up starts in late October with new/young ice expanding southward from northern Foxe Basin and extending eastward through Hudson Strait in December.

The estimated 282 transits by the icebreaking ore carrier fleet to Steensby port each year, corresponds to some 185 transits that will occur during the period of November through June, when air temperatures result in the formation of ice within the ship track. Evidence of the ship track in the mobile pack ice south of the Steensby Inlet fast ice edge will quickly disappear due to the movement of the ice by winds and tide. Evidence from the MV Arctic's(another ore transport ship providing winter transport through Hudson Strait) transit of Hudson Strait in winter indicates that the ship track is indiscernible in the pack ice within six hours of the ship passing. Within the fast ice of Steensby Inlet, the ship track will remain throughout the winter. Due to the extreme cold, the ship track will quickly begin to refreeze following the passage of the vessel. Due to the frequency of transit through the track, ice formation will be continuous resulting in the build-up of rubble in the track over time. Consequently, the width of the track will gradually widen from the initial width of 100 metres to three kilometres or more by late winter.

4.5.5 Shipping Fleet

A dedicated fleet of 10 ice class cape-size vessels with a capacity of about 135,000 dry weight tonne (DWT) capacity will operate on a 12 month a year basis to transport 90% to 95% of the annual ore production to market. These vessels will be supplemented by chartering additional ships from the open market in the ice-free summer months.

Icebreaker ore carrier designs have been evaluated, and continue to be evaluated. The currently envisioned 135,000 DWT icebreakers will be designed as Polar Class 4 vessels, which relating to Canadian classification is between a CAC 3 and CAC 4 design. These ships would be 300 m long, 46 m wide, and have a maximum draft of 17.8 m when fully loaded. While also a subject of ongoing evaluation, it is expected that at least one of the icebreaking ore carriers will be equipped with an additional fuel tank holding in the order of 3 ML of diesel fuel, in addition to the ship's own fuel tank. The ship(s) would deliver fuel to the Steensby port upon arrival to load ore, thereby providing a year-round supply of diesel fuel to the Project. Some fuel tanker deliveries of fuel during open water is also expected to fully supplement the annual fuel needs of the Project.

Figure 4.7 shows the proposed ships in relation to the MV Arctic, a 28,000 DWT capacity ship currently dedicated to shipping ore concentrate from the Raglan Mine located in Deception Bay of Nunavik. The MV Arctic, operated by Fednav, is a familiar ship in the north, as it shipped ore concentrate for the Nanisivik and Polaris mines for many years. The capacity of the cape-sized ice breaking vessels is nearly five times the size of the MV Arctic. However, the overall length and width of the proposed ships are less than a factor of 2 greater than the MV Arctic. The large increase in ship capacity without the same incremental increase in ship dimensions is primarily a result of the depth and increased draft of the ship.

Vessel docking will be assisted in the ice-free period by two harbour tugs and linesmen on the docks. No tugs or ice breakers are required during operations in ice, as the ice class cape vessels will be sufficiently powerful to break the ice without assistance. Consideration is being given to rubble ice management techniques at the dock, including potentially using an ice management vessel.

4.5.5.1 Design Basis for Icebreaking Ore Carriers

The ability of a ship to transit ice-covered waters is determined by the vessel's ice class, a notation applied to the vessel's class certificate based on the amount of ice strengthening. The International Association of Classification Societies (IACS), as well as governments including Canada and Russia, has set rules to classify ships based on the amount of ice strengthening contained in the vessel. The IACS Unified Requirements for polar vessels will now be the standard by which all IACS members will classify Polar Vessels built after July 1, 2007, including the vessels built for the Mary River Project. The Polar Class 4 vessels identified for the Project are classed by IACS for "year-round operation in thick first-year ice with old ice inclusions."

Transport Canada regulates an Ice Regime Shipping Control System (IRSCS) as part of Arctic Shipping Pollution Prevention Regulations - ASPPR (Transport Canada, 1989). The IRSCS defines "Ice Regimes", as regions of generally consistent ice conditions based on a simple arithmetic calculation that produces an "Ice Numeral" that combines the ice regime with the vessel's ability to navigate in the region. Every ice type (including open water) has a numerical value that is dependent on the ice category of the vessel. This number is called the Ice Multiplier. The value of the Ice Multiplier reflects the level of risk or operational constraint that the particular ice type poses to each category of vessel. The ASPPR Zones that are transited to reach Steensby Inlet are Zones 15 and 8, with Zone 8 that covers Foxe Basin as the limiting zone with the higher ice regime designation of the two zones.

The IRSCS is based on previous vessel ice classification nomenclature, for which there is no established equivalencies to the new polar class standard. In the selection of the Polar Class 4 vessels as appropriate for the Project, Enfotec used the parameters of the ASPPR and the Arctic Ice Regimes Shipping System (AIRSS) to determine estimated access dates by ice class.

Because the vessels for Mary River will be of modern construction and specifically designed for project operational conditions, features can be designed into the ships to mitigate air, noise and water interactions.

The shipping season for vessels of Baltic ice class design spans from August 10 to the third week of October. This represents the “open water” season available for re-supply and the use of charter vessels to supplement ore delivery.

4.5.5.2 Ballast Water Management

Ballast is water taken on in chambers of vessels mainly to stabilize sea-going vessels, by adding weight to the vessels and maintaining a certain draft (the depth a vessel sits in the water). Empty vessels take on much more ballast than a fully laden ship. For icebreakers, ballasting is also used to keep the ice draft of the vessels constant, and to stabilize the ship, thereby optimizing stresses in different loading conditions.

Ships will exchange ballast water in accordance with The Canadian Ballast Water Control and Management Regulations (Transport Canada, May 2006). The regulations prescribe ships transiting to Canadian ports to exchange ballast water at sea in deep seas away from coastal zones, to limit the potential for foreign harmful aquatic organisms or pathogens to be released in Canadian waters where they may colonize. Ballast water will be exchanged in the mid-north Atlantic Ocean, which is part of the same ocean regime as Steensby Inlet. Upon arrive, the ships will discharge ballast water (approximately 100,000 m^3 based on the 135,000 DWT ships proposed) at the Steensby port as the ships are loaded with iron ore.

4.5.5.3 Waste Management

It is expected that the main engines of the vessels will be provided with exhaust gas catalysators, which will reduce air emissions. The vessels will be equipped with a sewage treatment plant and an incinerator for solid and liquid wastes. All tanks containing oil or oily waste will be placed in a location in the ship that will keep them separated from clean areas. A diesel fired incinerator for incinerating oil waste and sludge from the sewage plant will be installed in the incinerator room on board.

4.6 OFF-SITE FACILITIES SUPPORTING THE PROJECT

In addition to facilities constructed on-site, Baffinland may support mine site operations with airport facilities located in Iqaluit and Ottawa, suitable for management of personnel, airfreight and mine administration.

4.7 CLOSURE AND RECLAMATION PHASE

4.7.1 Overview

Conceptual mine closure planning has been completed for the Mary River Project for the Definitive Feasibility Study, based on the Project life of 21 years, with the intent of providing that former project areas are physically and chemically stable, to provide both public safety and environmental protection in the long-term. Materials and equipment will either be removed from site or disposed of in the open pit, and all hazardous materials and wastes will be removed from site to licensed disposal facilities. The open pit and waste rock stockpiles will be inspected for physical stability. Roads, airstrips and development areas will be recontoured as required to provide long-term stability and reduce the potential for erosion. Steel rails will be removed from the rail line, and tunnels will be blocked. The closure phase is expected to be 3-years, followed by a minimum of 5-years of post-closure environmental monitoring.

4.7.2 Closure Objectives

The general closure and reclamation goals for the Mary River Project are as follows:

- Provide for the long-term physical and chemical stability of the Project areas so as to protect the public's health and safety
- Enhance natural recovery of disturbed areas to a state that is compatible with surrounding land uses and to allow for future use by people and wildlife
- Implement reclamation designs that limit the need for long-term maintenance and monitoring

These goals are based on following guidelines and policy:

- Guidelines for Abandonment and Restoration Planning for Mines in the Northwest Territories, by Northwest Territories Water Board, September 1990
- Mine Reclamation in Northwest Territories and Yukon, Prepared by Steffen, Robertson and Kirsten (B.C.) Inc. for the Northern Affairs Program of the Department of Indian Affairs and Northern Development, April 1992
- Mine Site Reclamation Policy for Nunavut, Department of Indian and Northern Affairs Canada (INAC), 2002

Final closure and reclamation will include removing all equipment and materials and placement into either the on-site landfill at Mary River or into the bottom of the closed open pit (for inert materials), and restoring ground surfaces to pre-construction conditions where practical. Other equipment and materials will be transported off-site to Milne Inlet or Steensby Inlet from where they will be shipped elsewhere for either salvaging or proper disposal.

The following summarizes the closure and reclamation considerations for major project components:

4.7.3 Open Pit

The pit walls of the open pit will be inspected for physical stability at closure. Neither waste rock nor exposed ore left in the pit is expected to generate acid or leach metals after closure and reclamation. However, monitoring and evaluation of potential acid generating characteristics will be ongoing during the operations phase such that a firm understanding of rock type characteristics will be developed by the time of closure. Then, at closure the pit and walls will be visually inspected as part of the post-closure monitoring program to identify any indications of acid generation or metal leaching rock types. Any rock types exhibiting adverse geochemical characteristics that are exposed in the pit walls would be addressed appropriately.

A perimeter barrier of boulders will be constructed around the pit where access is readily available (i.e., where large waste rock stockpiles do not already provide a barrier), to prevent accidental entry by humans and wildlife. Access roads to the pit will be blocked using large rocks or beams.

4.7.4 Waste Rock Piles

The waste rock piles will be inspected for signs of physical and chemical stability. Operational plans to selectively place potentially acid generating materials as appropriate will limit the potential for adverse geochemical reactions and cover materials on the facility would be of benign rock types. The waste rock piles will be revisited as part of the post-closure monitoring program, to assess if physical or chemical stability issues require additional action.

4.7.5 Mine and Port Infrastructure

Infrastructure and equipment will be either transported to Milne or Steensby Inlet for shipment back to the mainland via sealift for disposal or salvage, or will be removed to the on-site landfill or disposed of in the bottom of the closed open pit after operations.

Concrete pads will be broken up and covered in place. Piles will be cut off just below grade and covered with local soil.

The dock structures in the water at Steensby Inlet will be left in place.

The causeway to the island at Steensby Inlet will be removed and the crossing re-opened.

The mine and port site infrastructure areas, including the ore stockpile pads, will be recontoured at closure.

Fuel Storage

All fuel will be used prior to mine closure. Tanks, drums, bladders and other fuel storage containers as well as distribution pipework will be removed after being thoroughly drained. Secondary containment liners and bedding will be tested for petroleum hydrocarbons before being removed. Liners will be sent off-site for disposal at a licensed facility. Soil beneath the lined areas will also be tested for petroleum hydrocarbons. A contaminated soil management plan will be subsequently developed.

The reclaimed fuel storage areas will be recontoured at closure.

Chemicals

Chemicals such as cleaning supplies, lubricants, antifreeze, oils, and greases will be transported off-site for either re-use or disposal. Used batteries and any other hazardous waste will be taken off-site to a licensed disposal facility for recycling or proper disposal.

Waste and Water Management

Combustible non-hazardous wastes will be incinerated on-site. Non-combustible bulky waste that has no salvage value will be landfilled on-site or disposed of at the bottom of the closed open pit.

The water supply system (tanks and lines) will be drained, dismantled, and will be either disposed of at site in the landfill or the open pit or will be transported for salvage or disposal off-site.

Sewage treatment plants will be decommissioned in accordance with manufacturer's procedures, and any remaining sewage or sludge will be incinerated. The treatment plants will be transported off-site or disposed of at site in the landfill or open pit. Lagoons and sediment control ponds, if used, will be backfilled and re-graded and levelled.

Materials disposed of in the bottom of the closed open pit will be covered with a 3 m thick cover of inert waste rock.

The landfill site will be covered with a 1.5 m thick layer of inert overburden. The landfill will have been progressively closed during operations prior to final mine closure as part of normal facility operations.

Explosives

Unused explosives will be securely contained in magazines and removed from site. The explosives magazines will be sent offsite via sealift for proper disposal or re-use.

Contaminated Soils

Contaminated soils will be managed in-situ or ex-situ on-site, as appropriate, or removed off-site for disposal at a licensed treatment or disposal facility.

4.7.6 Aggregate Sources

Borrow areas will be progressively reclaimed as part of operations, including maintaining stable side slopes and restoration of natural drainage. Final regrading at closure will be completed as required to re-establish natural drainages and limit the potential for excessive erosion. Borrow areas will be revisited as part of the post-closure monitoring program, to document that no substantial thaw settlement has occurred that will necessitate further remedial action.

4.7.7 Roads and Airstrips

Bridges and drainage crossings will be removed and the crossings returned to pre-construction conditions as much as possible.

The road embankments will be left in place. Based on site experience, it appears that ripping and revegetation attempts will cause more disturbance than leaving roads unreclaimed. As such, no ripping or revegetation is planned along the roads.

Airstrips will remain to allow for future access to the site for site inspections and other monitoring activities. Airstrip lighting will be removed. All buildings and infrastructure will be removed.

4.7.8 Railway

The steel rails will be removed from the rail line and transported to Steensby Inlet and then shipped offsite for salvage. Bridge and drainage crossings along the rail line will be removed and the crossings re-established. The rail ties and embankment will be left in place. Tunnels will be plugged and backfilled with rock or other suitable material. No ripping or revegetation will be carried out along the rail line.

4.7.9 Timing and Schedule for Closure and Reclamation

The timing of closure and reclamation is largely governed by weather. Activities such as removal of lined containment facilities and the testing and excavation of affected soils are better completed during summer months when the ground surface is not frozen. Timing of shipping off-site for proper disposal will be governed by sealift schedule, which is possible only during the open water period of August to October.

It is estimated that a minimum of 3 years will be required to complete closure and reclamation activities for the Mary River Project. These activities are expected to undertaken primarily during the months between March and October under favourable weather conditions.

4.7.10 Closure and Post-closure Monitoring

Monitoring and follow-up inspections will be conducted of the Mary River Project area in order to assess the physical and chemical stability of various components after closure and reclamation of the facilities. Annual inspections of the affected sites will be carried out for five years following the final closure to demonstrate that conditions have not changed and remain both physically and chemically stable.

The physical stability of the open pit, waste rock piles, rail rock cuts, and other Project components will be monitored through visual inspection. The chemical stability of the site will be monitored through visual inspections periodically. Where it is deemed necessary water samples will be collected and analyzed during the closure and reclamation period and for a five year period after reclamation to document that its quality is not adversely affected by the closed Project components. Monitoring of terrestrial and marine mammals will also be carried out over a 5-year time period following reclamation.

At the conclusion of the post-closure monitoring period all development areas related to the Project will be subjected to a closure inspection. At the end of each year and at the end of the 5-year monitoring period an abandonment and reclamation report with photographs will be prepared, documenting the reclamation work completed and the site conditions.

SECTION 5.0 - WORKFORCE AND HUMAN RESOURCES

5.1 WORKFORCE REQUIREMENTS

Workforce requirements have been estimated in the DFS for both the construction and operation phases of the Project. These estimates will enviably change as engineering and planning for construction continues to be refined overtime but are presented to provide a guide as to the general size of the workforce during the construction and operation phases. Manpower requirements during the closure and reclamation phase are typically a subset of the operational requirements, and as such are not discussed separately.

5.1.1 Construction Phase Workforce

Construction is scheduled to begin mid-way through 2010 and carry through into 2014 according to the current project schedule (Section 1.3.4). The estimated workforce fluctuates throughout the 4-year construction phase, as well as seasonally each year. The estimated construction workforce, shown below, ranges through the year and between each year, when the mine is commissioned and operation phase staffing ramps up.

Estimated Site Workforce During Construction

Year	Site Construction Workforce	Owner's Team	Operation Phase Workforce
2010	515 - 800	20 - 30	0
2011	680 - 1,760	20 - 30	0
2012	750 - 1,580	20 - 30	10 - 20
2013	330 - 880	20 - 30	30 - 200
2014	220	20 - 30	200 - 450

Existing ongoing exploration staffing is not included in the above table.

Estimated Project Payroll (On-site and Off-site) During Construction

Year	Site Construction Workforce	Owner's Team	Operation Phase Workforce	Total Labour Force on Payroll
2010	770 - 1,200	30 - 40	0	800 - 1,240
2011	1,025 - 2,640	30 - 40	0	1,055 - 2,680
2012	1,120 - 2,370	30 - 40	20 - 30	1,170 - 2,440
2013	500 - 1,320	30 - 40	50 - 350	580 - 1,710
2014	330	10 - 40	350 - 765	690 - 1,135

The difference in numbers between the two tables is the first lists only the “site occupancy” during construction, and the second table lists the total workforce considering the planned scheduled work rotation for most contractors during the construction phase will be 4 weeks on/2 weeks off. The work-week will consist of six 10-hour days per week with a rest day on the last day of each week, or 2,080 hours annually per person, equivalent to a 40-hour week worked full time for a year.

Successful completion of the construction phase is dependent on the quality and commitment of the workforce. The construction camps will offer comfortable quarters and recreational and entertainment facilities to promote a safe, healthy, and inviting worker environment, and to encourage workers to remain within the accommodation boundaries during leisure time.

Employee transportation to the Project site will be provided by the company. Daily flights will operate between the five North Baffin community points of hire, including (listed in alphabetical order) Arctic Bay, Clyde River, Hall Beach, Igloolik, and Pond Inlet. This transport will be via small aircraft operated by current air carriers on a charter basis. Daily flights with larger aircraft, such as a Boeing 737, will operate from Ottawa to Mary River or Steensby Inlet, via Iqaluit.

5.1.2 Operation Phase Workforce

Mine operation is scheduled to begin in 2014 according to the current project schedule. The total estimated workforce during the operation phase is 765 persons, including both on-site and off-site personnel, and both Baffinland and contract personnel. This estimate does not include staffing required for any ongoing exploration work throughout the operations phase. Most on-site staff will work on a scheduled rotation of 2 weeks working at site and 2 weeks off. The Projected distribution of the workforce is as follows:

Estimated Operations Workforce Distribution (Total Payroll)

Location	# of Personnel
Toronto and Ottawa offices	50
Montreal Shipping & sales operations	10
Iqaluit office	25
North Baffin community offices	10
Mary River site	670

The above estimated numbers are from direct employment required for operations.

Accommodation facilities will be located at Mary River and Steensby Inlet, for approximately 275 and 175 persons, respectively. During operation, workers will be flown to Mary River, and rail and port employees will be transported further on a personnel rail car. Points of hire during the operation phase will be the same as the construction phase. Aircraft similar to that used in the construction phase will operate every other day basis rather than daily.

5.1.3 Closure and Reclamation Phase Workforce

The expected duration of the closure phase is three years, during which time a subset of the operation phase workforce will be retained to carry out reclamation activities at project development areas. The details of the size and composition of the closure and reclamation workforce will be developed during the operation phase, no later than two years prior to the planned commencement of closure and reclamation activities.

5.2 EDUCATION REQUIREMENTS AND TRAINING

The network of community liaison offices (CLO) established by Baffinland during the 2007-2008 bulk sampling program will remain in place during construction and operation phases. These offices are located in (listed in alphabetic order) Arctic Bay, Clyde River, Hall Beach, Igloolik, Iqaluit and Pond Inlet. This network of CLO offices will facilitate training and employment opportunities for land claims beneficiaries and will be made available to all contractors working on the Project.

The Company has viewed its current operations as a training ground for future activities at Mary River, including mine construction and operation. The bulk sampling program in particular has been a useful opportunity to expose its current workforce to a variety of mining-related occupations. In addition to on-the-job training to date, Baffinland carried out a number of training sessions, including Workplace Hazardous Material Information System (WHMIS); First Aid; Fire Extinguisher, Fire and Emergency Preparedness; Spill Response; Archaeology; Mine Supervisor Certification; Cultural Awareness; and Heavy Equipment training. The First Aid training was also provided in several communities and was open to the general public.

Baffinland's socio-economic program is currently collecting data on baseline education and skill levels in the local communities, with the intention of assessing education and training needs for the Project. An employment skills inventory is being generated from Baffinland's current contingent of workers from the region. In March 2007, Baffinland signed a Memorandum of Understanding with the Hamlet of Pond Inlet, QIA, and the Government of Nunavut Department of Education to work together to identify people with existing skills and to identify training opportunities.

Planning for longer-term training programs is underway, so that people may obtain training and be ready for the start of mine construction in several years. Baffinland is working with stakeholders towards developing training program(s) that will prepare land claims beneficiaries for employment during the construction and operation of the Project. Training programs may include auto mechanics, welding, carpentry, word processing, heavy equipment handling, and similar skills of use during construction and operations, as well as support for professional programs such as engineering, geology, accounting, management, biology, archaeology, and human resources. Training support for jobs associated with the dedicated ship fleet will also be available.

All site personnel arriving at the Project sites currently undertake a formal site orientation program. Non-Inuit are provided a cultural awareness program as well, to build awareness and appreciation for Inuit culture as it relates to the workplace. Site orientation is mandatory for all new recruits.

SECTION 6.0 - PROJECT SCOPING

Beginning in 2005, Baffinland and its consultants have carried out a number of studies and consultations in anticipation of the NIRB environmental review process. Baffinland has expended considerable effort to engage local communities and knowledge holders, through dialogue and participation. Efforts have been and continue to be guided by the following objectives:

- To adequately scope and conduct environmental and socio-economic baseline studies
- To understand local conditions and issues, both through the scientific process as well as by engaging in dialogue with local communities and knowledge holders
- To incorporate local knowledge and concerns into Project design at an early stage
- To appropriately scope an environmental assessment of the proposed Project

This section provides an overview of the work undertaken for baseline and impact assessment scoping, the results of recent public consultation, and Baffinland's work supporting proposed zones of environmental and socio-economic influence. The outcome of Project scoping is the development of terms of reference, or Proposed Draft EIS Guidelines, for the preparation of an EIS for the Project.

6.1 BASELINE STUDIES

Areas of study have broadly included:

- Socio-economic baseline studies, including the collection of statistical data, key person interviews, and focus sessions on topics including demographics, workforce experience, health and social services, youth, education, and economic development
- Physical environment studies, including archaeology, climate, hydrology, water quality, soils, vegetation, air and noise
- Studies of terrestrial wildlife, including caribou, carnivores, birds (including raptors, geese, loons, shorebirds and songbirds), and freshwater aquatic life
- Studies of marine wildlife, including marine mammals, fish and lower trophic levels, marine and shoreline habitats

The above studies are ongoing in 2008.

6.2 INUIT KNOWLEDGE STUDIES

Inuit knowledge studies were initiated in Pond Inlet in 2006, expanded to Igloolik and Arctic Bay in early 2007, and more recently in Hall Beach and Clyde River. The overall objective of the studies has been to obtain local knowledge of wildlife, land use, and important areas to support Project decision-making and the social and environmental assessment process.

Inuit knowledge discussions held to date have informed and influenced the preceding overviews of the natural environment, local land uses, and social conditions. Information has been collected through the establishment of working groups in each community. Working groups are typically selected to represent a cross-section of people in the community with respect to sex, age, and occupation. A research agreement between each working group and Baffinland has been established that articulates the agreed-upon study approach and intended use of the information. Knowledge has been recorded through the course of discussion in working group meetings, in individual interviews, and in the conduct of focus sessions on particular themes (e.g., caribou, marine mammals, and land use). While the focus of the Inuit knowledge studies has been to collect information, much has been learned about perspectives and key issues related to the Project. Records of meetings have been reviewed to identify key issues or concerns raised by the meeting participants. More recently, focus sessions have been carried out discussing, in addition to wildlife ecology and land use, potential Project impacts and mitigation.

6.3 OVERVIEW OF SITE CONDITIONS

The following brief overview describes the environmental setting within which the Project will be undertaken.

Natural Environment

The Mary River Project is located on northern Baffin Island, which has a semi-arid arctic climate. The average temperature at Pond Inlet, the nearest regional meteorological station with a long-term climatic record, is -15.1 ºC. The mean annual precipitation at Pond Inlet is 190.8 mm, with 143.5 cm of snowfall (equivalent to 105.4 mm of rain) and 85.4 mm falling as rain. Historical records show that snow can occur in any month, and rainfall may occur from April through November. Pond Inlet experiences 24-hour darkness (with less than 2 hours of twilight) from November 12 to January 29, and continuous daylight from May 5 to August 7.

Surficial landforms and deposits are associated with recent, widespread glaciation on Baffin Island. Surficial geology consists of locally abundant Holocene glaciolacustrine sediments, fluvial sediments (alluvial deposits), marine and glacio-marine deltaic sediments, and end moraine till, with occasional outcrops of pre-Quaternary bedrock. The North Baffin region and Mary River area lies within the Committee Belt, a granite-greenstone terrane with intermixed rift basin sediments and volcanic rocks and bounded by Precambrian mountains to the east and Palaeozoic lowland plateaus to the west. The Project lies within the zone of continuous permafrost, with an active layer thickness of up to two metres and a permafrost depth that may be as much as 700 m deep, based on extrapolation from temperature gradients measured in a 400 m-deep thermistor-instrumented drillhole.

The extremely cold temperatures of the region, combined with permafrost ground conditions result in a short period of runoff that typically occurs from June to September. All rivers and creeks, with perhaps the exception of the very largest systems, freeze completely solid or are dry during the winter months. The runoff coefficient is very high due to the combination of low temperatures, low infiltration and minimal vegetative cover, and correspondingly, surface water is abundant, and the region is dotted with thousands of small lakes and streams. Groundwater infiltration and storage in the region is limited due to the permafrost.

Surface waters in the region are neutral to slightly alkaline, with low to very low turbidity and low nutrient levels.

The vegetation of northern Baffin Island contains fewer species and typically less ground coverage in comparison with more southerly tundra environments. Vegetation communities include upland areas recently emerged from glacial ice, mixed tundra on lower slopes, heath tundra on drier slopes and sheltered banks tundra polygons on expansive lacustrine or glacio-fluvial deposits, wetlands, and riparian associations.

Terrestrial wildlife in the region is comprised of the following seven species: caribou, wolf, arctic fox, ermine, Brown and Pearyland Collared lemmings, and arctic hare. Caribou in the region are currently present at low densities, although existing trails, Inuit knowledge and harvest records indicate a much greater distribution and abundance of caribou in the past. Inuit knowledge also indicates that there potentially are three different types of caribou that can occupy the region: migratory, resident and mainland. A low density of carnivore dens in relation to widespread potential denning habitat suggests a typical low density of foxes and wolves, and a depressed prey base as well.

Notable bird use in the area consists of some flyover of migratory birds (particularly geese) moving to and from Bylot Island and an abundance of raptors and loons. Raptor nesting habitat is widespread throughout the region, and the Peregrine Falcon (subspecies tundris), which have been recovering from near extinction in the late 1960s and were upgraded from being ‘threatened’ to being a ‘species of special concern’ in 1992, are abundant throughout the region.

Baffin Island has fewer freshwater fish species than are found on the adjacent Nunavut mainland and several islands in the western Arctic. Arctic char is the most abundant and widely distributed fish species in the lakes, rivers, and streams of Baffin Island.

During the open-water period narwhal, bowhead whale, ringed seal, bearded seal, and harp seal utilize the waters of Milne Inlet and Eclipse Sound. Beluga and killer whales are also occasionally present. To the south, Bowhead whale, beluga, narwhal, and occasionally killer whales move into Foxe Basin during the open-water period. Bowhead whale in Foxe Basin congregate in an area to the north of Igloolik, near the entrance to Fury and Hecla Straits, while other marine mammal species in the area favour the western portion of the basin. During periods of ice cover, ringed seals and polar bears are common throughout the region, frequenting areas of landfast and pack ice. Polar bears have also been observed at coastal and inland locations during the open-water period. Bearded seal populations are concentrated along cracks and leads in the sea ice, along with walrus to the south throughout Foxe Basin and along the landfast ice edge at the entrance to Steensby Inlet.

Narwhal, beluga, and seals are actively harvested by Pond Inlet community members throughout Pond Inlet, Eclipse Sound and the adjacent fiords including Milne Inlet and are important cultural components and food sources for the community.

The harvest of marine mammals is also of importance to Igloolik and Hall Beach community members. Most harvest occurs along the west coast of Foxe Basin in the vicinity of the communities, but some harvest occurs throughout Foxe Basin during summer, and along the landfast ice edges including the outlet of Steensby Inlet during winter.

Lancaster Sound contains a number of overlapping conservation features, including the Bylot Island, which is a bird sanctuary, forms part of the Sirmilik National Park of Canada, and includes Important Bird Areas and International Biological Program Ecological Sites. Of these, the national park and bird sanctuary are afforded legal protections and restrictions on land use.

The Mary River Project components are removed from protected areas and known critical habitats such as national wildlife areas and critical wildlife areas. To date, ship access to the Mary River site has been through Baffin Bay and Eclipse Sound to a beach at Milne Inlet, and the shipping route to Milne Inlet passes by Sirmilik National Park and the Bylot Island Bird Sanctuary. The Milne Inlet Tote Road, originally constructed in the 1960s and currently being upgraded as part of the bulk sample program has facilitated overland access from Milne Inlet to the mine site location. The overland route south to Steensby Inlet from the mine site location and the corresponding marine transportation route through Foxe Basin is relatively removed by protected areas or known designated habitats.

Historic and Contemporary Land Use

Human habitation of the region extends back at least 4,000 years based on current archaeological data. The historic period of the North Baffin region began in the late 16th century with the first whaling and exploration in areas adjacent to Baffin Bay. Euro-Canadian exploration in the Foxe Basin area dates from the overwintering of two ships in the Igloolik area in 1822 - 1823. The Hudson Bay Company, Royal Canadian Mounted Police (RCMP), and the Catholic and Anglican Churches established themselves at different times in the vicinity of each of the existing communities, from as early as 1921 (Matthiasson, 1992). The establishment of these institutions, as with the whalers before, influenced land use and settlement patterns through the mid-twentieth century. The Distant Early Warning (DEW) line sites in Foxe Basin also influenced land use patterns. The current permanent settlements in the region occurred sporadically, mainly in response to government policy and housing initiatives in the 1960s (QIA, 2006). Land use patterns changed substantially in response to movement of Inuit into permanent settlements (Matthiasson, 1992).

There are five North Baffin communities with traditional land use ties to the Project area: Arctic Bay, Clyde River, Hall Beach, Igloolik, and Pond Inlet. Pre-settlement (1920-1960s) and post-settlement (1960s to 1974) land use is described in the Inuit Land Use and Occupancy Project (Milton Freeman Research Ltd., 1976), and has been confirmed through discussions within the communities. Each of these communities traveled and hunted within the North Baffin region. The Nunavut Wildlife Harvest Study (Priest and Usher, 2004), documenting contemporary Inuit land use, suggests that in most cases land use has become more concentrated around the communities since their establishment.

Both the North Baffin and Foxe Basin regions have been subject to scientific study for decades. Tourism activities have increased in recent years, and include local outfitting for kayaking, nature viewing, and polar bear hunting. Cruise ships also visit the North Baffin region each summer.

The North Baffin, specifically Lancaster Sound, was the focus of potential oil and gas exploration in the late 1970s. The lead-zinc Nanisivik Mine operated near Arctic Bay through the 1980s and 1990s and closed in 2002. More recently, mineral exploration activities across Nunavut, including the North Baffin region, have increased.

Parks and conservation areas are also located in the area. Sirmilik National Park of Canada (established in 2001) is one of Canada's newest national parks and covers a considerable landmass with four separate land parcels, including overlap with the Bylot Island Bird Sanctuary. Tamaarvik Territorial Park, located adjacent to the community of Pond Inlet and next to the Little Salmon River, is a local campground and park.

Social and Economic Environment

The North Baffin Region is home to a young and growing population. As of 2006, 5,387 people resided in the region, a 9.4% increase over the 2001 population. Forty-one percent of the North Baffin population is under the age of 15 years.

Inuktitut is the dominant mother tongue in the North Baffin, with over half of the population speaking only Inuktitut at home. Approximately one-quarter of the North Baffin population is comprised of unilingual Inuktitut speakers.

High infant mortality rates contribute to shorter life expectancy averages in Nunavut. Life expectancy at birth is nearly ten years less than it is across Canada. High death rates from suicide amongst young people also contribute to Nunavut's lower than average life expectancy. The major causes of death in Nunavut are cancer, suicide, heart disease, and accidents.

There is generally inadequate housing availability in local communities, as across Nunavut, with resultant overcrowding. As such, housing is a key priority for the Government of Nunavut. The proportion of home ownership by house occupants is also relatively low: less than one-quarter of families in Iqaluit and approximately one-fifth of families in North Baffin communities own their own homes.

Rates of reported crime vary across North Baffin communities, but generally fall within the middle to low range for crime rates across Nunavut.

Overall, the level of education within the population remains lower across Nunavut when compared to the rest of Canada. In Iqaluit, between half to three-quarters of Inuit have no high school diploma, and in the North Baffin, at least two-thirds of Inuit have not gained their high school diplomas. This level of high school completion in the North Baffin is similar to that seen elsewhere in Nunavut. Many Nunavummiut have pursued training outside the school system through programs provided by Arctic College, often through local Adult Learning Centres.

Incomes in the North Baffin are much lower than those in Iqaluit. While 60% of the Iqaluit population had after-tax incomes equivalent to $40,000 or more, only 20% of North Baffin residents reported this level of income. Further, 40% of North Baffin residents have incomes of less than $10,000. Income levels in Iqaluit have improved considerably across all income levels over the past decade, with the establishment of Iqaluit as the capital and government centre of Nunavut. In the North Baffin, there was little change in income levels during the years between 1996 and 2000. Improvements occurred between 2000 and 2004, however. While incomes of the higher-income families are lower in the North Baffin than in Iqaluit, the rate of increase has been similar, with the income level of the top 30% of the North Baffin residents increasing by 50%.

Across Nunavut, income is largely held by a small portion of the population. Approximately 75% of total income goes to 30% of the population. Income is somewhat more evenly distributed in Iqaluit. The North Baffin labour market supplies an estimated 1,050 to 1,250 full time or full time equivalent wage positions filled by Inuit, including 590 to 675 positions filled by Inuit males and 450 to 570 positions filled by Inuit females.

One-third of the working-aged (15+) Inuit population of the North Baffin has no involvement in the labour force while one-in-seven work full time all year round. Involvement in the wage economy is much higher in Iqaluit, with over one-third of the Inuit working-aged population working full time, all year round, and only one-quarter having no employment income. Part-time Inuit workers across the North Baffin and Iqaluit earn approximately one-third the wages that full-time Inuit workers earn.

6.4 COMMUNITIES CLOSE TO THE PROJECT

Socio-economic studies and public consultation to date have been focused on the five North Baffin communities in closest proximity to the Mary River Project components, and in Iqaluit, the territorial capital. These communities were selected based on the guidance presented in "*A Proponent's Guide to Conducting Public Consultation for the NIRB Environmental Assessment Process,"* (NIRB, 2006).

Baffinland's points-of-hire locations are communities where the Company currently operates and plans to operate direct flights to and from the Mary River site to supply workforce demands for the Project. In designating these communities as points-of-hire, there is no intention to exclude qualified workers from other communities in the region or from other parts of Nunavut. Transportation to and from the point-of-hire communities will be accomplished using commercial air carriers. These points-of-hire are based primarily on Baffinland's goal of offering preferential employment opportunities to qualified Inuit workers, through consideration of the community's existing socio-economic and/or ecosystemic ties to the Project area, followed by its geographic proximity. Each of the following communities has existing and/or historical ties to the Mary River Project area and is targeted to supply workers to the Project. Consequently, Baffinland has engaged the following communities, shown in Figure 1.1:

- **Pond Inlet** - This community is located on North Baffin Island and is the closest geographically to the Mary River mine site, located approximately 160 km northeast of Mary River. Pond Inlet relies on hunting in the marine environment of Eclipse Sound and Milne Inlet as well as caribou hunting through the Mary River area. The community currently provides supplies and employees to the Project and Baffinland has established a community liaison office (CLO) to streamline training and employment actions within the community. The CLO office will continue to coordinate employment and other community-company initiatives during all phases of the Project. Baffinland is planning to provide transportation between Pond Inlet and the Mary River site to supply Project workforce demands.

- **Igloolik** - This community is located on the mainland but is the closest community to the Steensby port site (155 km) and second closest geographically to the Mary River Site (230 km). Historically, Igloolingmiut spent the summer hunting caribou along the western side of North and Central Baffin Island. Current harvest patterns show that while Igloolingmiut utilize the Baffin coast and marine areas at the mouth of Steensby Inlet, their activities are heavily concentrated around the community on Melville Peninsula and the closest Baffin Island shoreline to the north. Igloolingmiut still hunt around

Rowley and Koch Islands and even in Steensby Inlet, and therefore the Project shipping route in this area may have both land use and ecosystemic effects on this community. Baffinland has already established a CLO office in Igloolik to organize and facilitate its employment initiatives and has retained a translator to assist with unilingual candidates speaking only Inuktitut. Baffinland is also planning to provide transportation between Igloolik and the Project site to help meet its manpower requirements.

- **Hall Beach** - This community is located on the mainland just south of Igloolik, some 192 km from the Steensby port site and 288 km southwest of the Mary River site. Hall Beach harvest patterns are distinct from Igloolik despite their proximity, with a concentration of marine harvesting centred on the Hall Beach area. Some hunting occurs on Baffin Island intermixed with Igloolik hunting, including Rowley and Koch Islands and even in Steensby Inlet, and therefore the Project shipping route in this area may have both land use and ecosystemic effects on this community. Because of its proximity to the Project area, Baffinland is planning to provide employee transportation between Hall Beach and the Project site and has already established a CLO office there.

- **Arctic Bay** - This community is located on North Baffin Island, some 280 km northwest of the Mary River site. Harvest patterns and Inuit land use patterns indicate that the effect of Project activities on current land use patterns of Arctic Bay residents is less than what it would have been historically. While Arctic Bay residents may use the Milne Inlet, Eclipse Sound and Mary River areas for hunting on a sporadic or occasional basis, other geographic areas are more important to this community's land use. However, given the past mining activity associated with the nearby and now-closed Nanisivik Mine, Arctic Bay is a good option for supplying manpower to the Project because some people in this community are already familiar with mining and have skill sets that will likely match Project needs. Consequently, Baffinland has retained a company translator in Arctic Bay and has established a CLO office to facilitate employment processes. The company is also planning to provide workforce transportation between Arctic Bay and the Mary River site to support Project needs.

- **Clyde River** - This community is also located on North Baffin Island but quite a bit further from the Project area than the other communities (415 km to the east). Historical land use information and discussions with elders from various communities suggest that the people of the Clyde River area used to travel inland from Cambridge Fiord facing Baffin Bay, into the Ravn River area east of Angajurjualuk Lake and southeast of Mary River. Harvest patterns suggest that contemporary land use activities are now concentrated closer to the community and do not extend over the mountains to the centre of Baffin Island, which is a watershed divide and appears to act as an ecosystemic boundary. However, because of its proximity and its historical ties to the Mary River area, Baffinland has established a CLO office in this community and is planning to include Clyde River as a point-of-hire community and provide transportation to and from Mary River.

- **Iqaluit** - This community is both geographically and eco-systemically well removed from the Project area, but it is already socio-economically tied to the Project. Baffinland has already established an office in Iqaluit and brings workers in to support the exploration and bulk sampling activities on a nominal three-days-per-week schedule through this community. Also, the presence of the local government agencies results in additional Project activities in Iqaluit associated with the regulatory process. The size and developed commercial economy in Iqaluit makes it a logical procurement centre and point-of-hire for the Project. Also, it is conceivable that mine employees originally based in other

Baffin communities may opt to move to Iqaluit due to its amenities and relative lower cost of living. Baffinland plans to continue to provide transportation between Iqaluit and Mary River to help supply Project workforce demands.

Other communities in the Qikiqtani Region were considered in terms of potential Project interactions, but are not likely to be directly affected by Project development. Baffinland intents to focus on the five North Baffin communities as its direct points-of-hire, although qualified workers from other Inuit communities will be welcomed to the Project workforce. The communities of Kimmirut and Cape Dorset are located on South Baffin Island, and ships associated with the Project will pass through Hudson Strait. These communities are geographically, socio-economically, and eco-systemically removed from the Project area and while Project ships pass near to the communities, a review of recent harvest data for Cape Dorset and Kimmirut show that hunting activities are very concentrated along the coast and do not extend into Hudson Strait. The ice conditions in the Hudson Strait are classified as mainly first year ice in restricted motion and as such harvesting activities are physically restricted to the near shore of the Strait because of dangerous ice conditions.

Qikiqtarjuaq, Pangnirtung, Grise Fiord and Resolute were also considered but are not likely to be affected by the Project. These communities are geographically, socio-economically, and eco-systemically removed from the Project area. All Project activities, including shipping routes, are far removed from these communities and their land use patterns do not encroach on areas that may potentially be affected by the Project.

6.5 STAKEHOLDER ENGAGEMENT ACTIVITIES

Baffinland has been proactive in engaging with a number of stakeholders to better understand their issues and concerns regarding the Project. Information and stakeholder feedback obtained through consultation has been integrated into the Project design and planning process, as broad community support is critical to the ultimate success of the Project.

6.5.1 Consultation with Potentially-Affected Communities

Consultation with local stakeholders began with the recommencement of exploration activities in 2004. Engagement activities initially focused on Pond Inlet residents, the QIA and INAC as landowner representatives, and the Nunavut Water Board to obtain and disseminate information regarding the exploration efforts and later regarding the bulk sampling plans. A summary of these consultation efforts is presented in Table 6.1. Listed meetings include those that Baffinland's consultants have held with various community groups, including elder committees, hunter and trapper organizations, and Inuit knowledge working groups. The list is not exhaustive, but gives good insight as to the nature of Baffinland's consultation efforts within the communities.

The 2007 efforts and future planned activities have been broadened in scope and outreach to include all of the six communities that are expected to be directly affected by Project implementation. Baffinland undertook its first formal public consultation on the mine Development Proposal in September 2007 to inform stakeholders and solicit public input on the plans being developed in the Definitive Feasibility Study (Aker Kvaerner, 2008). The potentially-affected communities include the five northern communities defined in Section 6.4 and the Nunavut capital Iqaluit. The objective of these meetings was to hold dialogue with the communities, provide them with accurate information regarding the Project Development Proposal being considered, identify any issues or concerns that may be associated with the planned Project activities, and to integrate appropriate stakeholder feedback into Project decision-making.

The public meetings in the North Baffin communities were particularly well attended, and feedback on the proposed Project was balanced. Baffinland was encouraged by the level of engagement demonstrated by the communities and will look forward to continued dialogue. Records of the public meetings were translated into Inuktitut and subsequently distributed to the communities through the Hamlets. Key issues identified through these meetings focused on potential impacts to wildlife and their potential to affect food security, the opportunities for employment and the logistics thereto, the opportunity for regional economic development and the need to make sure that the IIBA agreement will benefit directly-affected local communities, the need for effective environmental controls and mine closure planning, and a desire to maintain the existing social fabric of the Inuit culture. The following sections summarize the feedback by community from these public meetings.

Clyde River - September 19, 2007

- Concern over disturbance to wildlife, including the potential for the rail line to interrupt caribou migration
- Questions about employment including: rotations; flights from communities to the Project site; minimum requirements for hiring; training; living conditions and availability of country food at site
- Whether inter-community travel is possible, given that Baffinland will be operating aircraft shuttles in the region
- An expressed interest in good communication between the Company and the community to work together to mutual benefit, with reference to poor experiences with other projects in the past
- Perspectives regarding employment – recognizing non-academic qualifications and language barriers; encouraging youth to stay in school and not quit to work at the mine
- Questions about drug testing at the job site; if past drug use will limit employment; and comments regarding the need for zero tolerance due to safety, with reference to an injury that occurred at a mine when someone was under the influence
- Questions regarding royalties and the status of negotiations of the IIBA with the QIA
- Questions about the fate of project infrastructure at mine closure, and concern that low metals prices in the future could result in closure and the loss of good jobs
- Questions about the ore geochemistry, with reference to people's knowledge of the ore at Nanisivik
- Comments regarding the potential for social and cultural changes in the community if the Project proceeds
- Questions about environmental monitoring and Inuit involvement in monitoring

Pond Inlet - September 20, 2007

- Concern over disturbance to wildlife, including air traffic disturbance to caribou at a time when the number of caribou is low; the potential for the rail line to interrupt caribou migration; and ship disturbance to narwhal
- Concern that the IIBA will not bring benefit to the community level, and an interest in indirect benefits such as community infrastructure, as an outcome of a mine
- Disappointment that Iqaluit is now the "hub" for the Project, when it was previously Pond Inlet
- The need for certainty over employment, that when people take time off that their jobs are there to go back to, with reference to previous experiences with Nanisivik and Polaris
- Questions whether or not inter-community travel would be interrupted, if Project activities will be communicated to the community, and if project sites can be used as stopping points for land users

Arctic Bay - September 24, 2007

- Concern over potential disturbance to wildlife, including low-flying aircraft affecting hunters, and shipping effects to walrus and how this will affect Igloolingmiut, with reference to shipping for Nanisivik affecting the distribution of narwhal for Arctic Bay hunters
- Questions about the potential environmental effects of explosives residue from blasting and ore geochemistry
- Questions about the potential for low ore prices to affect the mine with premature closure
- Questions about mine closure
- Inquiry if Baffinland will provide reduced freight rates as Nanisivik previously provided
- Comment regarding poor communication experienced in 2007 between workers in the community and the employer in Iqaluit, such that people have not been clear when they are to go to work and when they are to travel
- Concern over the potential for the rail line to interrupt the migration of caribou towards Arctic Bay, and whether or not compensation will be provided for lost harvests
- A comment that once the train is running, that caribou will get used to the train in the way they got used to people in the past
- Whether or not Inuit are involved in environmental monitoring
- If the company would consider funding requests, such as the capital funding contributions the Government of Nunavut provides to hamlets for infrastructure
- If Arctic Bay's co-operative will receive business like the co-operative in Pond Inlet, including the purchase of country food for workers
- If there will be a tailings pond
- A positive acknowledgement of Baffinland's work with the Inuit knowledge working groups
- Questions about worker's compensation in the case of injuries, with reference to previous experiences in the early days of Nanisivik

Igloolik

- Multiple comments regarding marine shipping through Foxe Basin, with repeated stated preference for an easterly route; a stated preference for no shipping through Foxe Basin; and one suggestion that the westerly route was better because of ice
- Questions about the viability of shipping to Milne Inlet, Cape Dorset or Nanisivik port, as alternatives to shipping through Foxe Basin
- Multiple comments regarding the changing community demographics, and the need for jobs for youth, as elders who used the land more are passing on, and that youth prefer store-bought food over country food
- Concern about dock construction at Steensby Inlet affecting the marine wildlife
- What benefits, beyond employment, will be brought to the community to help their needs
- Inquiry if businesses and schools will be built within the community, for those who want to work but do not want to leave the community
- Inquiry if inter-community travel is possible, given that Baffinland will be operating aircraft shuttles in the region
- Comments of general support of the Project, and the need for communication, which will result in cooperation and agreement and avoid problems later on
- Comment that animals are affected by hunting, and if the Project is done right, that the animals should not be bothered
- Reference to helicopters affecting hunting (without specific reference to the Project)
- A comment by a Qaatiliit Working Group member that he found during the group's site visit to Mary River that day that the site was clean, with no garbage, and the wildlife was not disturbed
- A question about compensation if the wildlife are disturbed
- Comment that Igloolik is a cultural community; whether or not IQ will be taken seriously, and that there are many social issues arising from Federal government involvement and they don't want another large social impact
- Will the soapstone at Mary River be available if mining is taking place?
- Comments that Inuit can only work 2 weeks and not for 3 months, and that because of the cost of living, working more would be better
- If there will be drilling jobs available at the mine
- Question about the purity of iron ore at Mary River, and the terminology to describe this
- What will the company do about greenhouse gas emissions

Hall Beach

- Numerous expressed interest in employment opportunities
- If Mary River soapstone will be available, and if people will need to go through Baffinland for soapstone in the future
- Multiple expressed preference for the easterly shipping route through Foxe Basin, and concern over the westerly route as it affects the area used by Hall Beach and Igloolik
- If there are targets for Inuit employment, with reference to Nanisivik's target of 60% and the actual maximum Inuit employment of 40%
- Questions about the terms of employment and conditions

- Questions about how the company will report to the community, and how often
- Question regarding land ownership at Mary River and royalties
- If there are plans in place to deal with emergency situations and wildlife
- If country food will be available to workers

Iqaluit

- A preference for the easterly shipping route through Foxe Basin
- If there is discussion with Inuit organizations about potential ownership in the Project
- If there are any important wildlife areas around the Project
- If railway options (alternatives, and alternative alignments) have been considered

Baffinland will be returning to each of these communities again in late March through early April 2008, accompanied by representatives of the QIA, to report back regarding feedback received during the September 2007 public meetings and recent permit amendments, and the Company's plans based on the DFS and presented in this Development Proposal.

6.5.2 Government and Inuit Organizations

A Mineral Development Advisory Group (MDAG) meeting, coordinated by INAC in Iqaluit, was held in June 2007. The meeting brought together a number of government agencies and Inuit organizations that may be responsible for issuing permits or approvals, and/or that will be involved in some capacity with the social and environmental assessment process. Those represented at the MDAG meeting included:

- Government of Nunavut (departments of Health and Social Services, Economic Development, Education, Finance, Environment, Community and Government Services, Executive and Intergovernmental Affairs)
- Nunavut Water Board
- NIRB
- Department of Fisheries and Oceans (DFO)
- Environment Canada
- Health Canada
- Canadian Coast Guard
- Transport Canada
- INAC
- QIA
- Nunavut Tunngavik Inc. (NTI)
- Canadian Environmental Assessment Agency (CEAA)
- Natural Resources Canada
- Parks Canada

Baffinland held a number of meetings with Inuit organizations, government agencies, and Institutes of Public Government (IPGs) through the second half of 2007, to provide the groups with an early overview of the Project, and to initiate dialogue regarding the applicable regulatory processes and information needs. Meetings were also held with Mayor and Council of each of the potentially-affected communities. Table 6.2 provides a summary of these meetings. In addition to these activities, the communities of Pond Inlet and Igloolik requested that a Baffinland executive meet with the community leaderships on a bi-monthly basis; this has been ongoing since the summer of 2007.

6.5.3 Site Visits to Mary River

Baffinland has been proactive in bringing community and government representatives to visit the operations at Mary River. As indicated in Table 6.3, representatives of North Baffin hamlets, IQ study working groups, and a number of government representatives and local community members including students have visited the Mary River operations over the past year.

6.6 TOPICS RAISED DURING CONSULTATION

Baffinland has compiled the topics that have been identified through its stakeholder engagement activities and review of the North Baffin Regional Land Use Plan, in tabular format in Table 6.4. These topics, or potential Project issues, have been derived from ongoing dialogue in IQ workshops and various meetings with Inuit organizations, government agencies, and IPGs.

Based on these inputs, along with Baffinland's and its consultants' understanding of the proposed Project, the suggested relevant baseline investigation areas for the purpose of preparing the Environmental Impact Statement consist of the following general disciplines and sub-disciplines:

- Atmosphere
  - Climate
  - Air Quality and Noise
- Land Resources
  - Landscape Terrain
  - Unique Landforms
- Surface Water
  - Water Quality and Quantity
- Groundwater/Permafrost
- Freshwater Aquatics
- Marine Environment
  - Marine Mammals
  - Shoreline/Marine Processes
  - Fish and Lower Trophic Levels
  - Water and Sediment Quality
- Vegetation
- Wildlife
  - Caribou, Birds, Carnivores
  - Critical Habitats
  - Species at Risk
- Archaeology
- Social Conditions
  - Training and Capacity Building
  - Population Demographics
  - Food Security
  - Way of Life
  - Health and Safety
  - Youth and Vulnerable Groups
- Economic Conditions
  - Employment Opportunities
  - Local Businesses
  - Revenues and Benefits
  - Services and Infrastructure
- Land Use
  - Traditional Use Areas
  - Conservation Areas and Sensitive Habitat
  - Recreation and Tourism

6.7 PROJECT ZONES OF INFLUENCE

Defining environmental and social zones of influence is fundamental to delineating the baseline study areas in advance of impact analysis. Based on the social and environmental information collected to date, Baffinland offers the following proposed study area boundaries for the EIS Guidelines:

- **Climate, Air Quality, and Noise** - These conditions are generally characterized using regionally available information coupled with Project-specific baseline data. Regression analysis is often used to correlate and calibrate longer-term regional data with site-specific data to establish a longer-term climatic baseline for use in engineering designs. Predominant wind speed and wind direction is usually used to define air quality and noise baseline study areas and for positioning appropriate monitoring stations. Also, noise and air quality study area boundaries are often defined by receptors and may be established at the Project boundary, closest point of public access, or at the nearest receptor. Given the meteorological information collected to date, Baffinland suggests that the baseline area of influence for air quality be established at a 10 km radius around the Mary River site and 10 km radius around the Steensby port site. Study emphasis should be directed along the predominant wind direction. Because noise attenuates with distance, Baffinland suggests a 3 km radius around the Project footprints as an appropriate study area.

- **Soils, Vegetation, and Physical Features** - Baseline investigations for these areas are typically limited to the immediate vicinity of the proposed Project disturbances. Buffer zones are usually established around proposed disturbance areas to understand the affects of fugitive dust fallout, accidental releases, and other potential Project-induced activities. For soils and vegetation, these zones are also influenced by the sensitivity of the habitat and variability of the species present. Based on the proposed Project footprint, the physical lay of the land, and the relatively homogenous floral habitat, Baffinland suggests that the study area for soils, vegetation, and other physical features include a 1 km buffer around all project infrastructure including camps and ports as well as a 500 m buffer along either side of the road and railway line as permitted by the terrain.

- **Surface Water and Freshwater Aquatics** - Surface water systems are typically evaluated based on watershed limits as they may be affected by Project-related land disturbances and effluent discharges. Baseline investigations should target establishing a defensible water quality and quantity profile both up-stream and down-stream from potential Project activities. Based on surface water resource information collected to date, Baffinland suggests that the study area for surface water and the freshwater aquatic environment in the Mary River area include the Mary and Tom River drainage basins as well as associated lakes and rivers. Similarly, the study area at the Steensby Inlet port site should focus on surface drainage systems upstream and downstream from Project infrastructure locations and land disturbances. For comparison, it is appropriate to obtain background information from other regional freshwater aquatic environments.

- **Groundwater and Permafrost Conditions** - Groundwater flow is typically not an issue where permafrost conditions exist. Given that the average annual temperature in the area is well below zero and site investigations at Mary River have documented permafrost to depths in the ore deposit as low as 700 m below ground surface, groundwater investigations would not be expected to be considered for this Project.

- **Birds and Terrestrial Mammals** - Birds are migratory and may pass through a project area or nest in the area from arrival to the north in the spring and migration south in early September. Direct effects to birds and wildlife are typically related through loss of habitat and sensory disturbance, so buffer zones are usually established around nesting areas, large concentrations of birds, or important wildlife areas such as dens or calving areas. To understand the relative population and distribution of wildlife populations, the study area should include a regional scope. Based on the studies accomplished to date, Baffinland suggests a 50 km wide study area which is centred on the alignments of the Milne Inlet Tote Road and the proposed railway, from Milne Inlet to Steensby Inlet. Bird studies should also be extended into the coastal environment at Milne and Steensby Inlets.

- **Marine Mammals and Aquatics** - The marine aquatic environment has the potential to be affected in the vicinity of the port site. Direct effects to marine wildlife are typically related through loss of habitat and sensory disturbance, so buffer zones are often also established along shipping lanes. To understand the relative distribution of wildlife populations, the study area should also include a regional scope. Based on information collected to date, Baffinland suggests that the study area for year-round shipping cover Northern Foxe Basin from Steensby Inlet to where the shipping route deviates from established shipping lanes accessing Hall Beach and Igloolik. The study area should be inclusive of land use areas of Igloolik and Hall Beach to understand potential Project interactions with land use. Because Milne Inlet is already used for shipping during the open water season, which will also be the case for Project shipments, Baffinland suggests that the study area at Milne be confined to the Inlet area only.

- **Cultural Heritage and Archaeology** - Cultural heritage and archaeology are a blend of Inuit knowledge and physical artifacts that have remained from ancestral use of the land. Physical artifacts are affected by land disturbing activities and as such, Baffinland recommends that the study area for archaeological assessment include the footprint of the mine, camp, and processing facilities surrounded by a 100 m buffer. Regional desk studies may assist with the understanding of local cultural resource finds within the study area and may affect cumulative assessment findings as well as the need and procedures for data collection and recovery where existing resources may conflict with Project development plans. With regard to Inuit traditional knowledge, Baffinland suggests that traditional knowledge be collected from communities which have a historical tie to the Project development area, including Pond Inlet, Arctic Bay, Clyde River, Igloolik, and Hall Beach.

- **Social and Economic Evaluations** - The social and economic conditions of the potentially-affected communities should be profiled so that Project-related impacts and benefits can be evaluated as part of the review. As previously discussed, Baffinland recommends that the communities of Pond Inlet, Arctic Bay, Clyde River, Igloolik, Hall Beach and Iqaluit be included in the Project's social zone of influence.

6.8 PROPOSED DRAFT EIS GUIDELINES

One of the key steps in the Part 5 review process is NIRB's development of guidelines for the development of an Environmental Impact Statement (EIS). Proposed Draft EIS Guidelines have been developed by Baffinland through its own familiarity with the Project and Project site, its own scoping activities, consultation with communities, and referral to EIS guidelines developed for other mining projects. The draft guidelines are based on the Project information presented in Sections 2, 3, and 4; the topics identified through stakeholder engagement as summarized in Table 6.4, and Baffinland's preceding suggestions regarding appropriate social and environmental zones of influence. Baffinland is providing these guidelines for NIRB's, NPC's and the NWB's consideration for adoption in whole or in part, to facilitate scoping and the development of NIRB-issued guidelines for a Part 5 review.

SECTION 7.0 - REFERENCES

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March 14, 2008

Ms. Sharon Ehaloak
Executive Director
Nunavut Planning Commission
P.O. Box 2101
Cambridge Bay NU
X0B 0C0

Ms. Stephanie Autut
Executive Director
Nunavut Impact Review Board
P.O. 1360
Cambridge Bay, Nunavut
X0B 0C0

Ms. Dionne Filiatrault
Executive Director
Nunavut Water Board
P.O. Box 119
Gjoa Haven, Nunavut
X0B 1J0

Dear Ms. Ehaloak, Autut, and Filiatrault

Re: <u>Transmittal - Mary River Project Development Proposal</u>

Baffinland Iron Mines Corporation (Baffinland) is pleased to submit this Development Proposal for the Mary River Project to the Nunavut Planning Commission (NPC), Nunavut Impact Review Board (NIRB) and Nunavut Water Board (NWB). The Development Proposal is being submitted to you concurrently so your respective regulatory processes can proceed in a coordinated manner as contemplated in the *Nunavut Land Claims Agreement* (NLCA).

Included in the Development Proposal are the following core applications that we understand are necessary to initiate the regulatory processes established pursuant to Articles 11, 12 and 13 of the NLCA:

- Water Licence Application, submitted to the NWB
- Application for Access to Inuit Owned Land, submitted to the Qikiqtani Inuit Association (QIA)
- Application for Land Use Permit, submitted to Indian and Northern Affairs Canada (INAC)
- Application for Authorization for Works or Undertakings Affecting Fish Habitat, submitted to the Department of Fisheries and Oceans (DFO)

Additional submissions pursuant to the *Navigable Waters Protection Act*, *Canadian Transportation Act*, and other applicable statutes that are not required to initiate the regulatory processes pursuant to the NLCA will be submitted to the appropriate agencies in due course.

As described in the Development Proposal, the Mary River Project includes the following components:

- An 18 million tonne per year conventional open pit iron ore mine at Mary River
- A railway connecting Mary River to Steensby Inlet
- An all-season deep sea port at Steensby Inlet

Baffinland appreciates the Boards' understanding of the unique challenges associated with northern development and the importance of timely decision-making to facilitate responsible development in Nunavut. Respecting the Boards' authorities, and without pre-supposing process, Baffinland has prepared for your consideration a regulatory "roadmap" (Table 1) outlining the steps and timeframes that we envisage as being necessary to navigate this coordinated regulatory process. This roadmap is based on the regulatory requirements and guidance documents, Baffinland Project plans and logistical needs, and on the previous dialogue we have had with some of your staff members.

Some important highlights presented on the roadmap include the following:

- **Land Use Plan Conformity** – A portion of the Project is located within the North Baffin Planning Region, which is subject to the North Baffin Regional Land Use Plan (the Plan). Accordingly, NPC conformity review is required, and the roadmap contemplates that this process will commence immediately.

- **Land Use Plan Amendment –** A portion of the proposed railway line (approximately 34 kilometres) is within the North Baffin Planning Region. We understand NPC views this as a proposed transportation corridor thereby requiring Plan amendment. The roadmap is consistent with Term 3.5.11 of the Plan, and the NPC's "Interpretation – North Baffin Regional Land Use Plan Terms 3.5.10, 3.5.11 and 3.5.12", both of which require that new corridors under the Plan be subject to a coordinated NPC and NIRB public review.

- **Level of Review** – The Project will utilize proven technologies without the need for chemical ore processing, however, due to the size and scope of the Mary River Project, it is Baffinland's opinion that a Part 5 review is appropriate. An amendment to the Plan, if necessary, would require a review under the NLCA in any event. The roadmap contemplates a timely recommendation to the Minister for a Part 5 review.

- **Pre-construction Staging** – Baffinland proposes the staging of equipment and materials prior to completion of the Part 5 review. This is required to facilitate the timely construction of the Project. Presuming the Minister refers the Project to a Part 5 review, the roadmap shows that Baffinland will formally request an exemption pursuant to Section 12.10.2(b) of the NLCA. This clause of the NLCA contemplates that activities such as staging may need to be carried out as a result of the seasonal limitations in the north prior to the issuance of a Project Certificate.

- **Coordination in Review** – The roadmap is consistent with our impression that the NPC, NIRB and NWB are engaged in discussions towards increased coordination of their regulatory processes. We applaud the Boards for these efforts.

- **Scoping and the Proposed Draft EIS Guidelines -** One of the key steps in the Part 5 review process is NIRB's issuance of guidelines for the preparation of an Environmental Impact Statement (EIS). Proposed EIS Guidelines have been developed by Baffinland through its own familiarity with the Project and Project site, its own scoping activities, consultation with communities, and referral to EIS guidelines developed for other mining projects. Baffinland is providing these guidelines for NIRB's, NPC's and the NWB's consideration for adoption in whole or in part, to facilitate scoping and the development of NIRB-issued guidelines for the Part 5 review as contemplated into the roadmap.

We expect that the above points will be subject to ongoing and further discussion and consultation. Subject to a positive conformity decision by the NPC, the most immediate item requiring NIRB initiated consultation is regarding the appropriate level of review. The roadmap contemplates that further discussion and consultation with respect to the remaining points will take place at appropriate times throughout the process.

Baffinland looks forward to working cooperatively with all parties involved as the Mary River Project advances through the decision-making process. If any questions arise, please do not hesitate to contact the undersigned at 416-844-0903 or derek.chubb@baffinland.com.

Best Regards,
Baffinland Iron Mines Corporation

Derek Chubb
VP, Sustainable Development

Encl. Development Proposal
Table 1 – Tentative Coordinated Review Process Roadmap
Initial Distribution List

Table 1
Tentative Coordinated Review Process Roadmap

<table>
<tr><th>Task ID</th><th>Start Date</th><th>Finish Date</th><th colspan="2">Duration (days)</th><th>BIMC</th><th>NPC</th><th>NIRB</th><th>NWB</th><th>Minister</th></tr>
<tr><td>1</td><td>18-Mar-08</td><td>18-Mar-08</td><td colspan="2">1</td><td>Submit Development Proposal, Core Applications, and Proposed Draft EIS Guidelines</td><td></td><td></td><td></td><td></td></tr>
<tr><td>2</td><td>19-Mar-08</td><td>01-Apr-08</td><td colspan="2">14</td><td></td><td>Conduct Conformity Review</td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">02-Apr-08</td><td rowspan="2">16-May-08</td><td rowspan="2" colspan="2">42</td><td></td><td></td><td>Article 12 Part 4 Screening Process</td><td></td><td></td></tr>
<tr><td></td><td></td><td>NLCA 12.4.4 indication to Minister recommending Part 5 or 6 Review</td><td></td><td></td></tr>
<tr><td>4</td><td>17-May-08</td><td>15-Jun-08</td><td colspan="2">30</td><td></td><td>Input to Draft EIS Guidelines</td><td>Prepare Draft EIS Guidelines</td><td>Input to Draft EIS Guidelines</td><td>Minister refers Project to review</td></tr>
<tr><td>5</td><td>16-Jun-08</td><td>16-Jun-08</td><td colspan="2">1</td><td>Submit request for NLCA 12.10.2 Exception</td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="4">6</td><td rowspan="4">17-Jun-08</td><td rowspan="4">31-Jul-08</td><td rowspan="4" colspan="2">45</td><td></td><td>Input to Draft EIS Guidelines</td><td>Consultation on Draft EIS Guidelines</td><td>Input to Draft EIS Guidelines</td><td></td></tr>
<tr><td></td><td></td><td>Consult on NLCA 12.10.2 Exception</td><td></td><td></td></tr>
<tr><td></td><td></td><td>Issue NLCA 12.10.2 Exception Decision</td><td></td><td></td></tr>
<tr><td></td><td></td><td>Issue Final EIS Guidelines</td><td></td><td></td></tr>
<tr><td>7</td><td colspan="4">December 20, 2008</td><td>Prepare and Submit EIS</td><td></td><td></td><td></td><td></td></tr>
<tr><td>8</td><td>05-Jan-09</td><td>19-Jan-09</td><td colspan="2">15</td><td></td><td>Input to EIS Conformity Review</td><td>Conduct EIS Conformity Review, issue Conformity Decision, and provide direction on EIS Technical Review</td><td>Input to EIS Conformity Review</td><td></td></tr>
<tr><td>9</td><td>20-Jan-09</td><td>08-Feb-09</td><td>20</td><td rowspan="4">90</td><td>Prepare and submit response to IPG EIS Conformity Decision</td><td></td><td></td><td></td><td></td></tr>
<tr><td>10</td><td>09-Feb-09</td><td>23-Feb-09</td><td>15</td><td></td><td colspan="3">Receive Information Requests from Parties</td><td></td></tr>
<tr><td>11</td><td>24-Feb-09</td><td>19-Mar-09</td><td>24</td><td>Prepare and submit response to Information Requests</td><td></td><td></td><td></td><td></td></tr>
<tr><td>12</td><td>20-Mar-09</td><td>19-Apr-09</td><td>31</td><td></td><td colspan="3">Parties review response to Information Requests and complete Technical Review</td><td></td></tr>
<tr><td>13</td><td>20-Apr-09</td><td>04-May-09</td><td colspan="2">15</td><td></td><td colspan="3">Receive written technical comments from Parties</td><td></td></tr>
</table>

Task ID	Start Date	Finish Date	Duration (days)	BIMC	NPC	NIRB	NWB	Minister
14	05-May-09	19-May-09	15	Review written technical comments from Parties	Review written technical comments from Parties			
15	20-May-09	26-May-09	7		Participate in Technical Meetings	Technical Meetings	Participate in Technical Meetings	
16	27-May-09	27-May-09	1		Participate in PHC	Pre Hearing Conference	Participate in PHC	
17	28-May-09	26-Jun-09	30		Issue Recommendation for Plan Amendment	Issue TM/PHC Decision		
18	27-Jun-09	25-Aug-09	60	Prepare and Submit FEIS				Minister approves Land Use Plan amendment
19	26-Aug-09	09-Sep-09	15			Review FEIS for concordance to PHC Decision	Input to FEIS Concordance	
20	10-Sep-09	08-Nov-09	60			Parties conduct technical review of FEIS		
21	09-Nov-09	23-Nov-09	15			Receive written technical comments from Parties		
22	24-Nov-09	08-Dec-09	15	Review written technical comments from Parties		Review written technical comments from Parties		
23	09-Dec-09	15-Dec-09	7			Final Hearing	Participate in Hearing	
24	16-Dec-09	31-Jan-10	30 + Christmas Holiday			Issue Determination to Minister	Staff review of file; recommendation to Board	
25	01-Feb-10	02-Mar-10	30				Board decision	
26	01-Feb-10	31-Mar-10	60					Minister's Decision on NIRB's Determination
27	01-Apr-10	16-Apr-10	15			Project Certificate Meeting		
28	17-Apr-10	01-May-10	15			Issue Project Certificate		
29	03-Mar-10	03-May-10	60					Minister's Decision on NWB Determination
30	04-May-10	04-May-10	1				Issue Water Licence	

Tasks performed by BIMC
Tasks performed by NPC
Tasks performed by NIRB
Tasks performed by NWB
Tasks performed by Minister
Coordinated Tasks

Development Proposal for the Mary River Project

Initial Distribution List

Nunavut Institutes of Public Government
Nunavut Impact Review Board
Nunavut Planning Commission
Nunavut Water Board

Government of Nunavut
Department of Community and Government Services
Department of Culture, Language, Elders and Youth
Department of Economic Development
Department of Education
Department of Environment
Department of Finance
Department of Health and Social Services

Inuit Organizations
Hall Beach Hunters and Trappers Association
Igloolik Hunters and Trappers Association
Ikajutit (Arctic Bay) Hunters and Trappers Association
Namautaq (Clyde River) Hunters and Trappers Association
Nunavut Tunngavik Incorporated
Mittimatalik Hunters and Trappers Organization
Qikiqtani Inuit Association

Federal Departments
Canadian Coast Guard
Canadian Transportation Agency
Department of Fisheries and Oceans
Environment Canada
Health Canada
Indian and Northern Affairs Canada
Natural Resources Canada
Parks Canada
Transport Canada

Local Governments
Hamlet of Arctic Bay
Hamlet of Clyde River
Hamlet of Hall Beach
Municipality of Igloolik
City of Iqaluit
Hamlet of Pond Inlet

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Nunavut Planning Commission
Nunavunmi Parnaiyiit

April 7, 2008

Mr. Derek Chubb
Vice President, Sustainable Development
Baffinland Iron Mines Corporation
Suite 1016, OT., M5H-1T1

Ph. 416.814.3171
Fax 416.364.0193

Dear Mr. Derek Chubb

Re: Baffinland Mary River Project INAC file # N2008T0014, QIA File # LUA – 2008-008, DFO-2008, NWB File # 2AM - MRY

The above-noted proposal has been forwarded to the Nunavut Planning Commission (NPC) for determination of its conformity with the North Baffin Regional Land Use Plan (NBRUP) under the Nunavut Land Claims Agreement and Nunavut Land Claims Agreement Act, S.C. 1993, c. 29. NPC is currently reviewing the proposal and in order to complete its review NPC requires that you undertake to comply with certain terms of the NBLUP.

All project proposals within the region in question are required to comply with the terms of the NBRLUP. I am attaching the conformity requirements relevant to your project and with which it must comply. Also attached, is a copy of the Code of Good Conduct and the Caribou Protection Measures. These documents form part of the Plan.

Reply to each statement in the List of Relevant Conformity Requirements by circling either YES or NO, complete the signature block and fax the form back to us at the following number: (867) 857-2243.

If you would like more information, please contact NPC at the following number: (867) 857-2242.

Yours truly,

Brian Aglukark
Director, Regional Planning

Attachment

APPLICATION: Baffinland Mary River Project INAC file # N2008T0014, QIA File # LUA – 2008-008, DFO-2008, NWB File # 2AM - MRY

NUNAVUT PLANNING COMMISSION

APPLICATION TO DETERMINE CONFORMITY

WITH THE NORTH BAFFIN REGIONAL LAND USE PLAN

NUNAVUT PLANNING COMMISSION
BOX 419, Arviat, Nunavut
X0C-0E0

All applicants for a project proposal shall comply with the requirements listed below. The relevant sections of the plan are noted in each requirement.

Baffinland has completed this questionnaire with respect to proposed project activities within the North Baffin Planning region. A portion of the project outside of this planning region.

GENERAL

1. **Environmental Protection:** *s3.13.8:* The applicant undertakes to prevent any new occurrences of pollution, garbage and contamination at the site of the development.

   Yes No

2. **Removal of Fuel Drums:** *s3.13.8:* The applicant undertakes to remove all drums safely from the site and dispose of the drums in a safe manner.

   Yes No

3. **New Site Restoration and Clean Up:** *s3.13.1 and Appendix H, s1:* The applicant undertakes to clean up the site and restore the site to its natural condition to the greatest extent possible.

   Yes No

3. **Old Site Restoration and Clean Up:** *s3.13.2:* The applicant undertakes to clean up the site and restore the site to its original condition to the greatest extent possible, including any work required due to the applicant's action prior to this application.

   Yes No

4. **Low-Level Air Flights:** *Appendix H, s3:* Will the applicant avoid all low-level flights?

   Yes No

   Low level flights will be avoided to the extent possible.

   i. If not, explain why such flights are or may be absolutely necessary.

   Project development and operations is supported by aircraft. Low level flights may be required in circumstances of poor weather/visibility for example.

ii. If such flights are or may be absolutely necessary, will they avoid disturbance to people and wildlife?

Yes No

The NIRB review will include mitigation measures associated with air traffic

iii. If not, explain why it is not possible to avoid such disturbance.

5. **Caribou Protection Measures.***s3.3.7 and Appendix I:* Will the applicant comply with the Caribou Protection Measures outlined in section 3.3.7 and in Appendix I?

Yes No

Baffinland will comply with Caribou Protection Measures implemented within the North Baffin Planning Region by QIA for activities on IOL and DIAND for activities on Crown Lands. The NIRB review will consider potential protection measures.

6. **Polar Bear Denning Areas and Walrus Haul-outs:** *s3.3.8:* Will the applicant keep its activities away from any polar bear denning area or walrus haul-out?

Yes No

Baffinland will keep its activities away from these areas within the North Baffin Planning Region

APPLICATION: **Baffinland Mary River Project INAC file # N2008T0014, QIA File # LUA – 2008-008, DFO-2008, NWB File # 2AM - MRY**

HERITAGE RESOURCES

7. **Reporting of Archaeological Sites:** *s3.11.3 and Appendix H, s2 and s8*: Will the applicant immediately report the discovery of all suspected archaeological sites to the Department of Culture, Language, Elders and Youth (GN)?

Yes No

MINING

8. **Mining Development:** *s3.6.5:* Is the proposal for mining development?

Yes No

If yes, include with the application a mine closure and restoration plan and the proof of complete financial guarantees for the abandonment and restoration of the site. Closure phase of the project is described in the Development Proposal supporting the referenced applications.

9. **Negative Effects:** *s3.6.6:* Has the applicant planned to minimize the negative effects of its activity on the environment? Baffinland will minimize negative effects to the extent practical. Mitigation measures will be described through the NIRB review.

Yes No

Include with the application the mitigative measures developed.

10. **Hunting Restrictions:** *s3.6.9:* The applicant is informed of any special hunting restrictions that may apply to the area and will strictly enforce them at its mine sites and along transportation routes.

Yes No

11. **Carving Stone Deposits:** *Appendix H, s9.* Will the applicant report any discoveries of carving stone deposits to the Qikiqtani Inuit Association?

Yes No

MARINE AND TERRESTRIAL TRANSPORTATION

21. Corridor: *s3.5.11, s3.5.12 and appendix J & K:* Does the proposal consider the development of a transportation and/or communications corridor?

A rail line is proposed within a portion of the North Baffin Planning region.

Yes No

If yes, include with the application an assessment of alternate routes, the cumulative effects of the preferred route and options for other identifiable transportation and utility facilities.

22. Code of Good Conduct for Land Users: *Appendix H:* The applicant undertakes to adhere to the code of Good Conduct at all times.

Yes No

I, Derek Chubb (name of applicant), certify that the information I have given in this application is true and correct and hereby make the above undertakings which form part of my application for a project proposal within the meaning of the Nunavut Land Claims Agreement.

Date: April 9, 2008 Signature of Applicant: ____________

North Baffin Regional Land Use Plan
Appendix H
Code of Good Conduct for Land Users

1. The landscape of each camp and other land use sites will be restored to its original condition to the greatest degree possible. Water quality will be preserved and no substances that will impair water quality will be dumped in water bodies. When possible and feasible, old sites will be restored to the natural state.

2. All land users shall assist communities and government(s) in identifying and protecting archaeological sites and carving-stone sites, as required by law.

3. Generally, low-level flights by aircraft at less than 300 metres should not occur where they will disturb wildlife or people. If such flights are necessary, they should only take place after consultation with the appropriate communities. All land users are responsible for reporting to the land managers any illegal or questionable low-level flight.

4. All activities on the land will be conducted in such a fashion that the renewable resources of the area in question are conserved.

5. Whenever practicable, and consistent with sound procurement management, land users will follow the practice of local purchase of supplies and services.

6. Land users will establish working relationships with local communities and respect the traditional users of the land.

7. During the caribou calving, post-calving and migrating seasons, land use activities should be restricted to avoid disturbing caribou, in general, and activities will be governed more specifically by caribou protection measures such as those contained in Appendix I.

8. Artifacts must be left where they are found. All land users are responsible for reporting the location of, or any removal or disturbance of artifacts, to CLEY.

9. The mining industry is encouraged to assist in identifying local carving-stone deposits and report any discoveries to the QIA. Industry is also encouraged to identify and report old waste sites that need to be cleaned up.

10. All land users shall obey the laws of general application applying to land use.

APPLICATION: **Baffinland Mary River Project INAC file # N2008T0014, QIA File # LUA – 2008-008, DFO-2008, NWB File # 2AM - MRY**

North Baffin Regional Land Use Plan
Appendix I
DIAND Caribou Protection Measures

1. (a) The Permittee shall not, without approval, conduct any activity between May 15 and July 15 within the Caribou Protection Areas depicted on the map certified by the Engineer as the "Caribou Protection Map" and annexed to this Land Use Permit.
   (b) A Permittee may, upon approval by the Land Use Inspector, operate within the said Caribou Protection Areas beyond the May 15 deadline set out in 1 (a), provided that, when monitoring information indicates that caribou cows are approaching the area of operation, the Permittee will implement 1 (c).
   (c) On cessation of activities pursuant to 1 (a) or 1 (b), the Permittee will remove from the zone all personnel who are not required for the maintenance and protection of the camp facilities and equipment, unless otherwise directed by the Land Use Inspector.
   (d) The Permittee may commence or resume activities prior to July 15 within those parts of the Caribou Protection Areas released by the Land Use Inspector for the reason that caribou cows are not expected to use those parts for calving or post-calving (note 1).

2. (a) In the event that caribou cows calve outside of the Caribou Protection Areas, the Permittee shall suspend operations within the area(s) occupied by cows and/or calves between May 15 and July 15.
   (b) In the event that caribou cows and calves are present, the permittee shall suspend:
      (i) blasting;
      (ii) overflights by aircraft at any altitude of less then 300 meters above ground level; and
      (iii) the use of snowmobiles and ATVs (all-terrain vehicles) outside the immediate vicinity of the camp.
3. (a) During migration of caribou, the Permittee shall not locate any operation so as to block or cause substantial diversion to migration.
   (b) The Permittee shall cease activities that may interfere with migration, such as airborne geophysics surveys or movement of equipment, until the migrating caribou have passed.

4. (a) The Permittee shall not, between May 15 and September 1, construct any camp, cache any fuel, or conduct any blasting within 10 kilometres of any "Designated Crossing" as outlined on the map certified by the Engineer as the "Caribou Protection Map" and annexed to this Land Use Permit.
   (b) The Permittee shall not, between May 15 and September 1, conduct any diamond drilling operation within 5 kilometres of any "Designated Crossing" as outlined on the map certified by the Engineer as the "Caribou Protection Map" and annexed to this Land Use Permit.

Nunavut Planning Commission
Nunavunmi Parnaiyiit

April 30, 2008

Ms. Leslie Payette
Manager, Environmental Administration
Nunavut Impact Review Board
P.O. Box 1360
Cambridge Bay, NU., X0B 0C0
Fax # (867) 983 2594

Mr. John Amagoalik
Director, Lands & Resources
Qikiqtani Inuit Association
P.O. Box 1340
Iqaluit, NU., X0A 0H0
Fax # (867) 979 3238

Mr. Jeffery Holwell
Land Administrator Specialist
Indian and Northern Affairs
P.O. Box 100
Iqaluit, NU., X0A 0H0
Fax # (867) 975 4286

Ms. Phyllis Bealieu
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU., X0B 1J0
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Ms. Amy Liu
Habitat Management Biologist
Fisheries & Oceans Canada
P.O. Box 358
Iqaluit, NU. X0A 0H0
Fax # (867) 979 8039

Dear Ms. Payette, Mr. Amagoalik, Mr. Holwell, Ms. Bealieu, Ms. Liu

Re: Baffinland Mary River Project INAC File # N2008T0014, QIA File # LUA-2008-008 DFO – 2008 MR – NWB File # 2AM - MRY

The NPC has completed its review of the above noted project proposal. The project conforms with the North Baffin Regional Land Use Plan (NBRLUP) and we are forwarding it to NIRB for screening. We draw your attention to the provisions of sections 3.5.11 and 3.5.12 of Appendix “C” of the NBRLUP, a copy of which is enclosed, and note that a joint process to address the prospective transportation corridor is contemplated by those provisions. NPC looks forward to working with NIRB in accordance with those provisions.

The applicant has undertaken to comply with the requirements now enclosed. The authorizing agencies to which this letter is addressed are responsible under the *Nunavut Land Claims Agreement* to implement these requirements by incorporating the requirements directly, or otherwise ensuring that they must be met, in the terms and conditions of any authorizations issued.

My office would be pleased to discuss with these agencies how best to implement these requirements and to review any draft authorizations that the agencies wish to provide for that purpose.

This conformity determination applies only to the above noted application(s) as submitted. Therefore, the proponent must ensure other applications for a permit under this project proposal not listed above are forwarded to NPC for a conformity determination against the NBRLUP. The proponent must also notify the NPC immediately if any material change to the project proposal is made before authorizations are issued.

Yours Truly,

Brian Aglukark, Director Regional Planning
NPC, Arviat

Enclosed

CC. Mr. Derek Chubb, Baffinland Iron Mine Corporation areas during calving season, as well as caribou water crossings in the North Baffin region. The QIA and DIAND shall implement caribou protection measures on Inuit Owned and Crown lands respectively.

3.3.8 Development activities shall be restricted near polar bear denning areas and walrus haul-outs.

3.4 Conservation Areas

3.4.1 The NLCA sets out procedures to guide the establishment of conservation areas in Nunavut. Any agency proposing to create a new - or modify an existing - conservation area shall do so in accordance with the provisions of the NLCA. Proponents are directed to Appendix N of this document. Any proposed conservation or protected area strategy shall involve a thorough community consultation process. The NPC endorses important community-based criteria for any protected area system, such as:

- maintaining wildlife harvesting patterns;
- protecting wildlife and wildlife habitat; and
- preserving cultural identity and traditional use of the land

3.5 Marine and Terrestrial Transportation

3.5.11 All parties wishing to develop a transportation and/or communications corridor shall submit to the NPC a detailed application for an amendment. This application must include an assessment of alternative routes, plus the cumulative effects of the preferred route. It shall provide reasonable options for other identifiable transportation and utility facilities.

3.5.12 The NPC, and either NIRB or a panel acting under section 12.4.7 of the NLCA, shall publicly review the proposed corridor to determine whether the proposal adequately meets the guidelines set out in Appendices J and K. Once it is determined that a proposal does meet the guidelines, the NPC may request the ministers to amend the plan to include the new transportation corridor.

3.6 Mineral Exploration and Production

3.6.5 All proposals for mining developments shall include plans, complete with financial guarantees, for the eventual abandonment and restoration of the site. As a priority, waste sites where risks to human health, safety, the environment or legal obligations exist shall be addressed. Toxic waste shall be removed where possible.

3.6.6 Mining exploration companies and mine operators shall continue to

APPENDIX J

Marine and Terrestrial Transportation/Communications Corridor Alternative Route Assessment

Applicants wishing to develop a transportation and/or communications corridor in the North Baffin region are required to provide the NPC with the following information:

1. A description of the proposed corridor, including its use, its general routing, the possible environmental and social impacts, and any seasonal considerations that may be appropriate.

2. A comparison of the proposed route with alternative routes in terms of environmental and social factors as well as technical and cost considerations.

3. An assessment of the suitability of the corridor for the inclusion of other possible communication and transportation initiatives (roads, transmission lines, pipelines, etc.). This assessment should include:
   - the environmental, social and terrain engineering consequences, and the cumulative impacts of the project, and
   - the environmental and social impact of the project on nearby settlements or on nearby existing and proposed transportation systems.

APPENDIX K

Marine and Terrestrial Transportation/Communications Corridor Guidelines

The following planning guidelines will be used in the assessment of a new transportation / communications corridor proposal:

1. The corridor width shall be a function of:
   - the number and type of identified facilities within the corridor;
   - physical and biophysical conditions;
   - availability of detailed engineering data for one or more transportation modes within the corridor;
   - safe distances between different facilities within the corridor; and
   - aesthetics.

2. Corridors shall:
   - minimize negative impacts on community lifestyles;
   - improve access to other resources having high potential for development, while still maintaining the shortest practicable distance between the primary resource areas and the trans-shipment location;
   - be designed in accordance with existing and prospective land use capability including topography, soil, permafrost and wildlife; and
   - be designed in accordance with the availability of granular supplies.

3. In keeping with existing legal and legislative requirements, including the NLCA, corridors shall not negatively impact:
   - community business, residential and projected expansion areas;
   - important fish and wildlife harvesting areas;
   - key habitat for fish and wildlife species, especially areas used by endangered species;
   - areas of high scenic, historic, cultural and archaeological value.

NIRB File No.: 08MN053
INAC File No.: N2008T0014
QIA File No.: LUA-2008-008
DFO No.: 2008 MR
NWB File No.: 2AM - MRY

May 2, 2008

Baffinland Iron Mines Corporation
c/o Derek Chubb
VP – Sustainable Development
Suite 1016, 120 Adelaide Street West
Toronto, ON M5H 1T1

Via email: Derek.chubb@baffinland.com

Re: Notice of Part 4 Screening for Baffinland Iron Mines Corporation's "Mary River" Project Proposal

Dear Derek Chubb:

On March 20, 2008 The Nunavut Impact Review Board (NIRB or Board) received Baffinland Iron Mines Corporation's (Baffinland) Development Proposal for the Mary River Project. Later, on April 30, 2008, the NIRB received a positive conformity determination for the North Baffin Regional Land Use Plan (NBLUP) from the Nunavut Planning Commission (NPC) noting the provisions of requirements 3.5.11 and 3.5.12 of the NBRLUP. NIRB has assigned this project proposal file number **08MN053.**

The proposed Mary River project is located on Baffin Island, geographically straddling the North Baffin and South Baffin Regions of Nunavut. The nearest communities to the proposed project areas include Pond Inlet, Igloolik, Hall Beach, Arctic Bay, Clyde River, Resolute, Cape Dorset, and Iqaluit:

This project involves the construction, operation, closure, and reclamation of an 18 million tonne-per-annum (Mt/a) open pit mine. High-grade iron ore will be mined and shipped to international markets after crushing and screening processes. A railway system will transport the ore from the mine site to an all-season deep-water port and ship loading facility at Steensby Inlet where the ore will be loaded into ore carriers for overseas shipment through Foxe Basin. A dedicated fleet of cape-sized ore carriers, capable of breaking ice, will be chartered from a consortium of ship owners organized by Fednav. Shipping will be year-round. Some non-icebreaking ore carriers and conventional ships will also be used during the open water season.

In this project proposal, the construction phase is expected to be conducted from 2010 through 2014. The operating life of the proposed project is expected to be about 21 years. However, it is stated that the mining operation could either be extended by increasing mine operational life or the annual ore production volume, or both, which is subject to additional successful exploration results.

With regards to the temporal and spatial scale, the proponent has conceded in the submitted *Development Proposal for the Mary River Project* that a further Review is necessary for this project proposal. The potential concerns acknowledged by the proponent include:

- The Project may have significant adverse effects on the ecosystem, wildlife habitat, or Inuit harvesting activities
- The Project may have significant adverse socio-economic effects on northerners
- The Project will cause significant public concern
- The Project involves technological innovations for which the effects are unknown

All documents received and pertaining to this project proposal can be obtained from NIRB's ftp site at

http://ftp.nirb.ca/SCREENINGS/ACTIVE%20SCREENINGS/08MN053-Baffinland%20Iron%20Mines%20Corporation/1-SCREENING/01-APPLICATION/ including:

- *NPC Conformity Determination*
- *Covering Letter*
- *Development Proposal for the Mary River Project*
- *Figures*
- *Tables*
- *Appendices A-G*

Pursuant to Part 4, Article 12 of the Nunavut Land Claims Agreement (NLCA), NIRB will now screen the Project Proposal. NIRB may request additional information at any time during the process. NIRB will copy you on screening process related correspondence and upload related documents to the above ftp site for public access.

As noted in the conformity determination from the NPC, the NBLUP, in conformity requirement 3.5.12 requires the NIRB and the NPC to jointly review the proposed transportation corridor associated with this project proposal in accordance with the guidelines set out in Appendices J and K of the NBLUP. This public review exercise conducted jointly by the NIRB and NPC seems necessary to guide a potential amendment to the NBLUP.

Also, should a Review be required for this project proposal, in order to avoid unnecessary duplication of effort, the NIRB and the Nunavut Water Board (NWB), at the initial suggestion of the proponent, are prepared to formally coordinate their efforts in processing and reviewing this file from both an impact assessment and water licensing perspective as envisioned in section 13.5.2 of the NLCA. Cooperation with the NPC as outlined in the previous paragraph is consistent with Article 13.6.1 of the NLCA.

NIRB is copying interested Parties and municipalities most affected by Mary River project with this letter, and we invite all to comment directly to the NIRB by **May 23, 2008** regarding:

- Whether the project proposal is likely to arouse significant public concern; and if so, why;
- Whether the project proposal is likely to cause significant adverse eco-systemic and socio-economic effects; and if so, why;
- Whether the project is of a type where the potential adverse effects are highly predictable and mitigable with known technology, (please provide any recommended mitigation measures);
- Any comments related to NIRB's options for coordination with the NPC as per the requirements of the NBLUP, specifically conformity requirement 3.5.12 which requires that NIRB and the

NPC publicly review the transportation corridor component of the project to address a potential amendment to the Plan,

- Any concerns regarding the suitability of a coordinated effort, as envisioned in Section 13.5.2 of the NLCA, with the NIRB and NWB in the review and processing of this application; and
- Any other matter of importance to the Party related to the project proposal.

Please send your comments to the attention of NIRB's Manager of Environmental Administration Leslie Payette by email at lpayette@nirb.ca or via fax at **(867) 983-2594.**

If you have any questions or concerns, feel free to contact the NIRB's Technical Advisor Li Wan at (867) 983-4606 or lwan@nirb.ca.

Sincerely,

Li Wan - Technical Advisor
Nunavut Impact Review Board

Cc: Distribution List

Attachments: Comment Form

SCREENING DECISION REPORT
NIRB FILE NO.: 08MN053

INAC File No.: N2008T0014
QIA File No.: LUA-2008-008
DFO No.: UN 07-0050
NWB File No.: 2AM - MRY

June 27, 2008

Honourable Minister Chuck Strahl
Minister of Indian Affairs and Northern Development
10 Wellington, 21st Floor
Gatineau, QC
K1A 0H4

Via email: Strahl.C@parl.gc.ca

Re: **Screening Decision for Baffinland Iron Mines Corporation's "Mary River" Project Proposal**

Dear Honourable Minister Strahl:

The primary objectives of the Nunavut Land Claims Agreement (NLCA) are set out in Section 12.2.5 of the Land Claims Agreement. This section reads:

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

Subsection 12.4.2 (a) of the NLCA directs the Nunavut Impact Review Board (NIRB or Board), when screening a project, to recommend a public review when in its judgement:

(i) *the project may have significant adverse effects on the ecosystem, wildlife habitat or Inuit harvesting activities,*
(ii) *the project may have significant adverse socio-economic effects on northerners,*
(iii) *the project will cause significant concern, or*
(iv) *the project involves technological innovations for which the effects are unknown*

Pursuant to Subsection 12.4.2 (b), a review is generally not required when, in NIRB's judgement, the project is unlikely to arouse significant public concern and;

(i) *the adverse ecosystemic and socio-economic effects are not likely to be significant, or*

P.O. Box 1360 Cambridge Bay, NU X0B 0C0 Phone: (867) 983-4600 Fax: (867) 983-2594

(ii) the project is of a type where the potential adverse effects are highly predictable and mitigable with known technology

Subsection 12.4.2 (c) instructs the NIRB to give greater weight to the provisions of 12.4.2 (a) in determining whether a review is required or not.

Procedural History and Background

On March 20, 2008 the NIRB received Baffinland Iron Mines Corporation's (Baffinland) Mining Development Proposal for the Mary River Project (see Appendix A for Project Summary). The proposed project is located on Baffin Island, geographically straddling the North Baffin Planning Region and the South Baffin Region. Consequently, the Nunavut Planning Commission (NPC) needed to issue a Land Use conformity determination before the NIRB could commence screening of the project, and on March 20, 2008, the NIRB issued a notice to Baffinland advising them of this.

On April 30, 2008, the NIRB received a positive conformity determination from the NPC for Baffinland's Mary River Project in relation to the North Baffin Regional Land Use Plan (NBRLUP). The correspondence also outlined the provisions set forth in sections 3.5.11 and 3.5.12 of Appendix C of the NBRLUP regarding the requirement for a joint public review process between the NIRB and the NPC which would address the prospective transportation corridor associated with the Mary River project.

On May 2, 2008, the NIRB widely distributed this project proposal to various Federal and Territorial agencies, Inuit Organizations, and those communities and organizations potentially affected by the development.

The Parties were asked to review the application and provide the NIRB with comments by May 23, 2008 regarding:

- Whether the project proposal is likely to arouse significant public concern; and if so, why;
- Whether the project proposal is likely to cause significant adverse eco-systemic and socio-economic effects; and if so, why;
- Whether the project is of a type where the potential adverse effects are highly predictable and mitigable with known technology, (please provide any recommended mitigation measures);
- Any concerns related to requirements of the NBRLUP, specifically regarding conformity requirement 3.5.12 (Appendix C of the NBRLUP) which requires that the NIRB and the NPC publicly review the transportation corridor component of the project to address a potential amendment to the Plan,
- Any concerns regarding the suitability of a coordinated effort, as envisioned in Section 13.5.2 of the NLCA, between the NIRB and Nunavut Water Board (NWB) in the review and processing of this application; and
- Any other matter of importance to the Party related to the project proposal.

Certain Parties requested an extension for the public commenting period, and subsequently on May 22, 2008, the NIRB issued a notification to the Baffinland distribution list, advising Parties that the commenting deadline would be extended to June 4, 2008 to accommodate the request for additional time.

On or before June 4, 2008 the NIRB received comments from several interested Parties and the Proponent as listed below:

- Hamlet of Hall Beach
- Hamlet of Pond Inlet
- Hamlet of Arctic Bay
- Hamlet of Igloolik
- Igloolik Hunters' and Trappers' Organization
- Nunavut Tunngavik Incorporated (NTI)
- Qikiqtani Inuit Association (QIA)
- Fisheries and Oceans Canada (DFO)
- Transportation Canada (TC)
- Natural Resources Canada (NRCan)
- Environment Canada (EC)
- Government of Nunavut (GN)
- Indian and Northern Affairs Canada (INAC)
- Fraser Milner Casgrain LLP (Regulatory Counsel to Baffinland)

Appendix B provides all comments received from Parties.

On June 13, 2008 the NIRB applied for an extension for this screening to the Minister of Indian and Northern Affairs in accordance with Section 12.4.5(b) of the NLCA.

NIRB Assessment and Decision

In determining whether or not a public review is necessary, the NIRB considered a number of factors, in addition to soliciting and reviewing comments received from interested Parties. Upon completion of the internal technical review, consistent with the criteria stated in 12.4.2 (a) of the NLCA, the NIRB determined that:

1. The project may have significant adverse effects on the ecosystem - 12.4.2 (a) (i):

The NIRB and other commenting Parties have identified a number of significant adverse effects that could be associated with this project. Selections of those comments identifying such adverse effects are listed below:

> We feel that a Part 5 review is required as the project may have significant adverse effects on the ecosystem, wildlife habitat or Inuit harvesting activities. (NTI)
>
> As already indicated, the proposal is large and ambitious in scope. In view of the various components of the project, therefore (e.g. tote road, railway, construction camps, mining operations, airport and air traffic, deep sea port, shipping route, and all year shipping activity), we anticipate the proposal will indeed have long lasting adverse eco-systemic and socio-economic impacts that the environmental review and assessment must address. (Hamlet of Igloolik)
>
> It is DFO's opinion that the following works and undertakings related to the development proposal have the potential to cause significant adverse environmental effects, unless appropriate mitigation measures are identified and implemented:
> - Lake encroachments along the railway alignment
> - Water crossings along access roads
> - Quarry sites B5 and B13
> - Marine docks and infrastructure at Steensby Inlet
> - Infill of a waterbody at Steensby Inlet airstrip; and
> - Water withdrawal for the mine development proposal (DFO)

After reviewing the project proposal and supporting documents, Environment Canada (EC) is of the opinion that the proposed project may cause significant adverse effects on the ecosystem and wildlife habitat. This advice is based on the scale of the proposed project and the anticipated environmental impacts that may occur if this project proceeds. (EC)

Given the massive scale of the project, the environmental impacts could be substantially negative if the project is not properly designed, the mine site is not properly managed, and the potential impacts are not mitigated, avoided and monitored. The GN intends to provide a detailed assessment of the proponent's environmental impact statement should the project go to review. (GN)

The Mary River (Nuluyait) project is the largest development project in Nunavut's history. The various components (the tote road, mining sites, the railway, deep seaport, the shipping route, year-around shipping, air traffic, construction camps, greatly increased human activity) when combined, will have very large environmental footprint in the North Baffin. (QIA)

Given the nature of the proposed Mary River Project, a base metal mining project with an estimated production capacity of 18 million tonne-per-annum (Mt/a) for 21 years (or longer), along with related construction, operation, closure, and reclamation activities for mining and transportation of the ore (particularly the proposed railway transportation corridor, all-season deep-water port and ship loading facility at Steensby Inlet, and year-round shipping activities), the department observes that the proposed project has the potential to cause adverse eco-systemic and socioeconomic effects on Northerners and thus may arouse public concern. (INAC)

2. The project may have significant socio-economic effects on Northerners - 12.4.2 (a) (ii):

The NIRB and other commenting parties have identified both positive and negative socio-economic effects that could be caused by this project. Selections of those comments raising major issues are shown below:

The project also has the potential of having significant socio-economic effects on the surrounding communities in particular, and the region as a whole - both positive and negative. (QIA)

The project is already having significant local and regional socio-economic impacts, for instance in the form of increased employment and pressure on Nunavut's limited labour market. Judging from the experience of other, much smaller mining projects, further significant socio-economic impacts are to be expected and will need to be carefully assessed. (GN)

3. The project will caused significant public concern - 12.4.2 (a) (iii):

The Mary River project has raised concerns which the Board considers significant, in particular the proposed railroad and the shipping routes, from Nunavut Settlement area, particularly from the communities potentially impacted by this project. During the screening process, the majority of Parties have expressed in detail for various public concerns. The concerns were raised specifically as follows:

The project will cause significant public concern. (NTI)

The shipping route through Foxe Basin and Hudson Strait will raise major concerns from communities that depend on marine mammals in that enclosed ecosystem. The communities of Cape Dorset and Kimmirut are also concerned about huge ships passing so close to the communities. (QIA)

Significant public concerns have already been expressed at public meetings, in the Legislative Assembly and in the media about the project, particularly the railway's potential to limit caribou migration and the impact of intensive marine shipping on walrus and caribou. (GN)

INAC had the opportunity to attend the Baffinland community consultations as an observer in March 2008, the communities of Hall Beach, Igloolik, Arctic Bay, Pond Inlet and Clyde River were consulted on the project. It is INAC's observation that the project proposal may raise public concern, especially with regard to shipping and railway transportation and their potential impacts on wildlife. (INAC)

A further, but extremely important concern is that the forthcoming guidelines and subsequent EIS must account for the accumulated ecological effects on the environment and on harvesting activities, especially in light of other projects proposed in the Foxe Basin. For Igloolik, while we are concerned about all accumulated effects due to our continued dependence upon the living resources for sustenance, we are particularly concerned about the extent and routes of all shipping activity related to the Mary River Project and any other project that may impact the marine environment and harvesting activities in Foxe Basin. (Hamlet of Igloolik)

4. The project involves technological innovations for which the effects are unknown - 12.4.2 (a) (iv):

The Mary River project includes components which have not been implemented in Canada's Arctic before. Such components include the establishment of a railway on permafrost and operation of year-round deep-sea port as well as year-round marine shipping with ice-breaking. Accordingly, there exists potential uncertainty relating to the effects resulting from technologies being implemented in Arctic environments. The GN has also expressed its concerns on this matter as follows:

The GN has concerns about the large volume of diesel and year-round fuel that will be used and the technology to clean up fuel spills along the shipping routes in broken or solid ice or to contain spills and prevent their flow under solid ice. Additionally, management of the docks and port areas appears largely experimental. (GN)

Most commenting Parties, including the QIA, NTI, the Hamlet of Pond Inlet, GN, DFO, EC, INAC, NRCan, and TC, indicated that a Review was required for this project proposal. Furthermore, the QIA, NTI, the GN, and the Hamlet of Pond Inlet explicitly indicated that a Part 5 Review was most appropriate for this file. However, the NIRB recognizes that the determination of whether the project is referred to a Part 5 Review or a Part 6 Federal Panel is yours alone to make in accordance with Section 12.4.7 of the NLCA.

After examining both the Project Proposal and comments received, the NIRB has determined that, pursuant to Section 12.4.4 (b), the proposal requires a public review under Part 5 or 6 of the NLCA.

Issues of Concern to NIRB

Following the Board's internal technical review of the project and considerations of the project's vast spatial extent, the variety of the project components, in particular the open pit mining, railway, deep sea port and year-round shipping, as well as the public concerns expressed; there are a number of issues which require further attention and clarification by the Proponent. The NIRB thinks this best done through a review process in order that the concerns of those directly impacted are better known and where appropriate, mitigated prior to the project proceeding. These issues, which are caught by different portions of Section 12.4.2 of the NLCA, include:

- Works in and around water such as the construction of bridges, dams and culverts
- Impacts to wildlife, especially caribou, posed by the proposed railway and existing tote road

- Impacts to marine mammals caused by shipping and potential spills along the proposed shipping routes from Milne Inlet though Eclipse Sound and from Steensby Inlet, via Foxe Basin to Hudson Strait
- Potential impacts to traditional land uses in the Ikpikituryuaq area
- Socio-economic impacts to communities in the region
- Potential impacts on surface water quality from the use of explosives; potential acid rock drainage and metal leaching from waste rock stockpiles; construction fills, embankment of roads, and other open quarry sites during both construction and operation of the project
- The effects of construction, closure, and post-closure activities relating to site runoff and road crossings on surface water quality of natural water bodies and adjacent areas
- The anticipated impacts of construction, operation, and closure activities on specific vegetation associations and geomorphologic structures
- The potential of cumulative impacts resulting from ongoing and incremental land use activities associated with mining, terrestrial transportation corridor creation, and marine shipping
- Potential impacts on marine water quality, in particular, the marine water quality in proximity to the sea port
- Potential impacts to air quality
- Potential impacts to wildlife resulting from human activities and habitat loss associated with mining activities
- Potential impacts to species at risk
- Disturbance to waterfowl and seabirds nesting in coastal areas along proposed shipping route
- Shoreline erosion as a result of wake effects along proposed shipping route
- Impacts resulting from accidents or malfunctions which may occur during mining operations, rail transportation, and marine shipping

RECOMMENDATION TO THE MINISTER

The Board has carefully considered the factors set out in sections 12.4.2 (a) and 12.4.2 (b) of the NLCA. The Board has no doubt, based on the submissions of the Parties as set out in the preceding sections of this Screening Decision, that this Project may have significant adverse effects on the ecosystem, wildlife habitat or Inuit harvesting activities; adverse socio-economic effects on northerners; will cause significant public concern; and involves technological innovations for which the effects are unknown. Therefore, pursuant to Section 12.4.4 (b) of the NLCA, the Board recommends to the Minister that the Project Proposal requires reviews under Part 5 or 6.

During the screening process, a jurisdictional issue was raised. On April 30, 2008, as per Section 12.3.1 of the NLCA, the NPC forwarded to the NIRB the project proposal with a positive conformity determination pursuant to Section 11.5.10 of the NLCA. At that time the NPC also advised the NIRB that sections 3.5.11 and 3.5.12 of Appendix C of the NBRLUP requires "…a joint [NPC and NIRB] process to address the prospective transportation corridor contemplated by those provisions."

In their submissions, QIA, INAC and to a lesser extent GN, raised serious issues about the NPC's exercise of its discretion in reaching a positive conformity determination in light of the transportation corridor requirements contained in the NBRLUP:

> In our view, conformity with a land use plan means that the project must be capable of being constructed and operated as proposed under the land use plan currently in place. Based on our

> review of the North Baffin Regional Land Use Plan (NBRLUP), we believe an amendment to the NBRLUP would be necessary to permit the construction and operation of a rail-line in the North Baffin Planning Region. (INAC)
>
> It is difficult for QIA to reconcile the NPC's conformity decision with an outstanding requirement for an amendment to the NBRLUP. (QIA)

Yet, the NIRB has determined that it does not have jurisdiction to question a conformity determination by NPC. Accordingly, NIRB is compelled by Section 12.4.1 of the NLCA to move forward and screen the Project Proposal and to make a determination whether the Project Proposal has significant impact potential, and therefore whether it requires review under Part 5 or Part 6 of the NLCA.

That said, the outstanding issue of concern for the NIRB is that there is still uncertainty around the NBRLUP and the completion and sequencing of the land use planning process. The NIRB agrees with INAC, in its letter of June 4, 2008, that land use planning should be completed prior to impact assessment:

> Land use planning is separate and distinct from project-specific impact assessment. To be consistent with best practices in environmental and natural resource management, land use planning considerations should be addressed prior to impact assessment. This best practice is borne out in the land use planning and impact assessment regime established by the NLCA, particularly Articles 11.5.11 and 12.3.4.

Accordingly, in addition to the Minister's decision on a referral to a Part 5 or 6 review, the Board further seeks the Minister's advice on the dilemma posed by the NPC conformity determination given the outstanding requirements of the NBRLUP.

On the one hand, assuming a Part 5 review referral, the NIRB could proceed with conducting the review without resolution of the outstanding planning issues. You will note the NPC has requested that the information from the Proponent regarding the assessment of alternative routes and cumulative impacts required by Term 3.5.11 and Appendix J of the NBRLUP be provided to the NPC as part of NIRB's information requirements. This could be accomplished through section 12.5.2 (j) of the NLCA which permits the NIRB to include information with respect to "any other matter that NIRB considers relevant" when establishing the guidelines for the preparation of an impact statement. Pursuant to Section 12.5.2 of the NLCA, NIRB could solicit the NPC's advice prior to issuing guidelines to the Proponent to ensure the NPC's information requirements are met. Further, the NIRB could accept a request from the NPC to participate as a party in the NIRB's technical review and pre-hearing review of the Project to facilitate meeting the terms of the NBRLUP.

One risk with the NIRB proceeding this way is that the NIRB may be required to halt the Part 5 review in two circumstances: if the Proponent files an early amendment application as required by the NBRLUP which creates its own Article 12 procedural uncertainty, or, if either the NPC or one or more Ministers determines that it does not wish to amend the land use plan to include the proposed transportation corridor.

On the other hand, to minimize this risk and to meet the Parties' concerns about completing the planning process before impact assessment, NIRB could defer commencing the Part 5 review entirely until NPC's process pursuant to Article 11 is complete. In this case, the NIRB is willing to work within an Article 11 and NBRLUP process as directed by the NPC.

The Board looks forward to the Minister's advice on these options for proceeding and the Board is available to provide further information to the Minister before or after announcing your Part 5 or 6 decision, should this be required.

Finally, the Proponent has advised the Board that upon referral of the Project Proposal to review, it intends to apply for exceptions from the requirements that the Project not proceed until the review is completed as pursuant to Section 12.10.2 (b). If and when the Minister refers the Project Proposal to review, and the Proponent submits an application setting out in full detail the specific exceptions with well documented evidence to justify the request, the Board will at that time make its decision. Prior to making such an important decision, the NIRB will actively consult Parties and, if necessary, add the request to the list of items canvassed at the Pre-Hearing Conference.

Yours truly,

Lucassie Arragutainaq
Acting Chairperson

cc: Stephanie Autut, NIRB
Dionne Filiatrault, NWB
Sharon Ehaloak, NPC
Bev Ross, DFO
John Amagoalik, QIA
Derek Chubb, Baffinland

APPENDIX A
Project Summary

The proposed Mary River project is located on Baffin Island, geographically straddling the North Baffin and South Baffin Regions of Nunavut. The nearest communities to the proposed project areas include Pond Inlet, Igloolik, Hall Beach, Arctic Bay, Clyde River, Resolute, Cape Dorset, and Iqaluit:

This project involves the construction, operation, closure, and reclamation of an 18 million tonne-per-annum (Mt/a) open pit mine. High-grade iron ore will be mined and shipped to international markets after crushing and screening processes. A railway system will transport the ore from the mine site to an all-season deep-water port and ship loading facility at Steensby Inlet where the ore will be loaded into ore carriers for overseas shipment through Foxe Basin. A dedicated fleet of cape-sized ore carriers, capable of breaking ice, will be chartered from a consortium of ship owners organized by Fednav. Shipping will be year-round. Some non-icebreaking ore carriers and conventional ships will also be used during the open water season.

In this project proposal, the construction phase is expected to be conducted from 2010 through 2014. The operating life of the proposed project is expected to be about 21 years. However, it is stated that the mining operation could either be extended by increasing mine operational life or the annual ore production volume, or both, which is subject to additional successful exploration results.

As per the development proposal from Baffinland, the Mary River project will include the following major phases:

- Pre-construction staging: from March 2008 to April 2010 (anticipated)
- Construction phase: from 2010 to 2014
- Operation phase: initially planned for 21 years, subjected to additional exploration results
- Closure and reclamation phase: the closure phase is expected to be 3 years, followed by a minimum of 5 years of post-closure environmental monitoring

The proposed project components associated with the Mary River project include:

- Mine at Mary River
- Railway connecting Mary River mine site and Steensby Inlet all–season deep sea port
- All-season deep sea port at Steensby Inlet
- Milne Inlet facilities and Milne Inlet Tote Road
- Shipping
- Ongoing exploration activities
- The ongoing exploration.

Ministre des Affaires indiennes et
du Nord canadien et interlocuteur fédéral
auprès des Métis et des Indiens non inscrits

Minister of Indian Affairs and
Northern Development and Federal Interlocutor
for Métis and Non-Status Indians

Ottawa, Canada K1A 0H4

FEV FEB 11 2009

Mr. Lucassie Arragutainaq
Acting Chair
Nunavut Impact Review Board
PO Box 1360
CAMBRIDGE BAY NU X0B 0C0

Dear Mr. Arragutainaq:

Thank you for your Screening Decision Report of June 27, 2008, indicating that Baffinland Iron Mines Corporation's Mary River Project proposal (Proposal) requires review under Part 5 or 6 of Article 12 of the Nunavut Land Claims Agreement (Agreement).

I have reviewed the Nunavut Impact Review Board's Screening Decision Report and pursuant to section 12.4.7(b), I am referring the Proposal to the Board for a review under Part 5 of Article 12 of the Agreement. The federal departments of Fisheries and Oceans Canada, Natural Resources Canada, and Transport Canada also have jurisdictional responsibility for authorizing the Proposal to proceed, and concur that a Part 5 review is appropriate.

In its Report, the Board highlighted outstanding issues relating to the land use planning process. Upon receipt of the Proposal and accompanying positive conformity determination from the Nunavut Planning Commission, the Board was advised by the Commission of additional requirements under sections 3.5.11 and 3.5.12 of the North Baffin Regional Land Use Plan (Plan) for a review of the proposed transportation corridor. The Board also outlined concerns raised by some parties, including officials in Indian and Northern Affairs Canada, regarding the Commission's positive conformity determination given the apparent requirement for an amendment to the Plan to permit the construction and operation of the rail line. I appreciate the Board bringing its views on these issues to my attention and would ask the Board to keep me apprised of updates as necessary.

.../2

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

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

I appreciate the work the Board has done in screening the Proposal and look forward to receiving your final report upon completion of the review.

Sincerely,

Chuck Strahl

c.c.: The Honourable John Baird, PC, MP
The Honourable Lisa Raitt, PC, MP
The Honourable Gail Shea, PC, MP
Mr. Ron Roach

NIRB File No: 08MN053

March 13, 2009

To: Mary River Project Distribution List

Re: ***Draft Scope of the Mary River Project***

Dear Parties:

On March 20, 2008 the Nunavut Impact Review Board (Board or NIRB) received Baffinland Iron Mines Corporation's (Baffinland or the Proponent) mining development proposal for the Mary River Project (the Project). On April 30, 2008 NIRB received a positive conformity determination from the Nunavut Planning Commission (NPC) for the Project in relation to the North Baffin Regional Land Use Plan (NBRLUP). NPC's conformity determination also included provisional requirements for satisfying Appendices J and K of the NBRLUP, relating to the proposed rail line transportation component.

The NIRB screened the Mary River Project in accordance with Part 4 of Article 12 of the Nunavut Land Claims Agreement (NLCA), and on June 27, 2008 issued a screening decision report to the Minister of Indian and Northern Affairs Canada (the Minister), recommending a review under Part 5 or 6 of Article 12 of the NLCA. On February 11, 2009 NIRB received correspondence from the Minister, referring the Project to the Board for a review of the ecoystemic and socio-economic impacts under Part 5 of Article 12 of the NLCA (Appendix A). Pursuant to Section 12.5.1 of the NLCA, the Minister highlighted the following specific issues of concern for NIRB to consider during its Review:

- *The NIRB and the NPC's arrangement to satisfy the outstanding requirements of NBRLUP for a timely and efficient Review;*
- *The impact associated with the proposed year round shipping and related ice breaking operation; and*
- *The potential effect to adjacent jurisdictions by the project proposal.*

As outlined in previous correspondence to this distribution list (see NIRB/NPC letter dated February 26, 2009), NIRB's Part 5 Review of the Project will include public review to satisfy the requirements of Appendices J and K of the NBRLUP, and address the prospective transportation corridor proposed by the Project.

NIRB Scoping Process

Pursuant to Article 12, Part 5 of the NLCA, the NIRB's Review process will:

- review the ecosystemic and socio-economic impacts of proposed project;
- gauge and define the extent the impacts will have on regions and communities; and
- determine, on the basis of its review, whether Project Proposals should proceed, and if so, under what terms and conditions, and then report its determination to the Minister.

The first step in the NIRB's Part 5 Review process is to **scope** the project proposal and the potential impacts associated with developing the Project. Scoping is a process that pinpoints significant issues requiring study and analysis. This process aims to identify those components of the biophysical and/or socio-economic environment that may be impacted by the project and/or for which there is public concern. The NIRB will solicit input from the Proponent and interested Parties, including Territorial and Federal Government departments, Regional Inuit Associations, and members of the public, in order to determine:

- Which components of the project to include in the Review;
- The temporal (time-related) and spatial (physical) boundaries of the project;
- The issues and concerns to be considered in the review including, but not limited to, the issues highlighted in the Minister's February 11 , 2009 referral;
    - requirements of the NBRLUP
    - potential impacts related to ice breaking and shipping and potential transboundary impacts relating to shipping
- Any other requirements for the assessment of the project proposal.

The NIRB has drafted a preliminary Scope for the Mary River project, and requests a discussion of the items contained therein (see **Appendix B**). The NIRB invites all parties to review the appended *Draft* Scope and to provide comments based on their area of expertise and/or mandate, on or before **April 9, 2009.**

The NIRB scoping process requires the development of a public participation and awareness program intended to engage the public during the early stages of the review process, in order to facilitate meaningful consultation with those communities potentially affected by the Mary River Project. To this end, NIRB will be conducting public scoping sessions in communities potentially affected by the Project, and/or covered by the NBRLUP, and possibly including communities in the Nunavik Region of Northern Quebec. The Board will consult with the public and interested parties to identify Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) that should be addressed by the Proponent's *Draft* Environmental Impact Statement. Upon finalization of the necessary logistical arrangements, the Board will issue further correspondence formally announcing details on these upcoming community meetings.

As per Section 12.5.2 of the NLCA, the NIRB will issue project specific guidelines to the Proponent for the preparation of an Environmental Impact Statement (EIS) once the scoping process has been completed. Findings of the scoping process will figure prominently in the creation of EIS Guidelines.

Outline of the Mary River Project

The proposed Mary River project is located on Baffin Island, geographically straddling the North Baffin and South Baffin Regions of Nunavut. The nearest community to the proposed project areas is Pond Inlet, approximately 160 km of North of Mary River mine site.

This project involves the construction, operation, closure, and reclamation of an 18 million tonne-per-annum (Mt/a) open pit iron mine. High-grade iron ore will be mined and shipped to international markets after crushing and screening processes. A railway system will transport the ore from the mine site to an all-season deep-water port and ship-loading facility at Steensby Inlet, where the ore will be loaded into ore carriers for overseas shipment through Foxe Basin and Hudson Strait. Year round shipping will be undertaken by a dedicated fleet of cape-sized ore carriers, capable of breaking ice, additional non-icebreaking ore carriers and conventional ships will also be used during the open water season.

The Mary River project proposes the following major phases:

- Pre-construction staging: from March 2008 to April 2010 (anticipated)
- Construction phase: from 2010 to 2014
- Operation phase: initially planned for 21 years, subject to additional exploration results
- Closure and reclamation phase: the closure phase is expected to be 3 years, followed by a minimum of 5 years of post-closure environmental monitoring

The proposed major project components associated with the Project include:

- Mine at Mary River
- Railway transportation of iron ore from Mary River mine site to Steensby Inlet all season deep sea port
- Operation of all-season deep sea port at Steensby Inlet
- Operation of open water shipping at Milne Inlet and Milne Inlet Tote Road
- Marine Shipping:
    - Open water shipping from Milne Inlet, through Eclipse Sound and Pond Inlet, via Baffin Bay and Davis Strait to south Canada and Europe.
    - Open water and year round shipping (ice breaking shipping) from Steensby Inlet through Foxe Basin and Hudson Strait, to Southern Canada, or cross Atlantic Ocean to Europe.
- Air traffic and ongoing exploration.

All information pertaining to the Mary River project proposal can be accessed on the NIRB's ftp site by the following link:

http://ftp.nirb.ca/REVIEWS/CURRENT_REVIEWS/08MN053-BAFFINLAND_MARY_RIVER/

Again, the NIRB requests comments on the *Draft* Scope for the Mary River Project by **April 9, 2009**. Please forward all comments to the NIRB's Manager of Environmental Administration, Leslie Payette, at lpayette@nirb.ca, or via fax to (867) 983-2594.

If you have any questions or comments regarding the NIRB's Part 5 Review of the Project, please contact the NIRB's Technical Advisor, Li Wan, at lwan@nirb.ca or by phone (867) 983-4606.

Sincerely,

Li Wan
Technical Advisor
Nunavut Impact Review Board

Cc: The Honourable Chuck Strahl, Minister of Indian and Northern Affairs Canada
Derek Chubb, Baffinland Iron Mines Inc.
Sharon Ehaloak, Nunavut Planning Commission
Dionne Filiatrault, Nunavut Water Board

Attachments: Appendix A –Minister's Decision (February 11, 2009)
Appendix B: *Draft* Scope List of the Mary River Project.

APPENDIX A

Ministre des Affaires indiennes et
du Nord canadien et interlocuteur fédéral
auprès des Métis et des Indiens non inscrits

Minister of Indian Affairs and
Northern Development and Federal Interlocutor
for Métis and Non-Status Indians

Ottawa, Canada K1A 0H4

FEV FEB 11 2009

Mr. Lucassie Arragutainaq
Acting Chair
Nunavut Impact Review Board
PO Box 1360
CAMBRIDGE BAY NU X0B 0C0

Dear Mr. Arragutainaq:

Thank you for your Screening Decision Report of June 27, 2008, indicating that Baffinland Iron Mines Corporation's Mary River Project proposal (Proposal) requires review under Part 5 or 6 of Article 12 of the Nunavut Land Claims Agreement (Agreement).

I have reviewed the Nunavut Impact Review Board's Screening Decision Report and pursuant to section 12.4.7(b), I am referring the Proposal to the Board for a review under Part 5 of Article 12 of the Agreement. The federal departments of Fisheries and Oceans Canada, Natural Resources Canada, and Transport Canada also have jurisdictional responsibility for authorizing the Proposal to proceed, and concur that a Part 5 review is appropriate.

In its Report, the Board highlighted outstanding issues relating to the land use planning process. Upon receipt of the Proposal and accompanying positive conformity determination from the Nunavut Planning Commission, the Board was advised by the Commission of additional requirements under sections 3.5.11 and 3.5.12 of the North Baffin Regional Land Use Plan (Plan) for a review of the proposed transportation corridor. The Board also outlined concerns raised by some parties, including officials in Indian and Northern Affairs Canada, regarding the Commission's positive conformity determination given the apparent requirement for an amendment to the Plan to permit the construction and operation of the rail line. I appreciate the Board bringing its views on these issues to my attention and would ask the Board to keep me apprised of updates as necessary.

.../2

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

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

I appreciate the work the Board has done in screening the Proposal and look forward to receiving your final report upon completion of the review.

Sincerely,

Chuck Strahl

c.c.: The Honourable John Baird, PC, MP
The Honourable Lisa Raitt, PC, MP
The Honourable Gail Shea, PC, MP
Mr. Ron Roach

APPENDIX B

Draft Scope for the NIRB's Part 5 Review of the Mary River Project

This *Draft* Scope for the Part 5 Review of the Mary River project (the Project) is based on the requirements of Section 12.5.2 of the Nunavut Land Claims Agreement (NLCA), the NIRB's 10 Minimum EIS Requirements, and the project proposal submitted by Baffinland Iron Mine Corporation (Baffinland or the Proponent) on March 30, 2008, as well as the requirements of North Baffin Regional Land Use Land Use Plan (NBRLUP) in respect to the proposed transportation corridor associated with the rail line component.

The process of "scoping" intends to identify the scope of the project (i.e., the physical works and activities proposed), and the factors to be assessed (i.e., ecosystemic and socio-economic factors and environments to be considered in assessing the effects of the project) in the context of spatial and temporal scales at various project stages including preconstruction, construction, operation, modification/maintenance, decommissioning, abandonment or other undertakings. The NIRB will consult with the public and interested parties to identify Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) that should be addressed by the Proponent's Environmental Impact Statement.

1. NLCA Section 12.5.2, items 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 lands 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. The NIRB's Minimum EIS Requirements

1) Statement of Consultation Principles and Practices;

2) Definition of Project

3) Statement of Project's Purpose

4) Anticipated Impacts Analysis

5) Cumulative Effects Analysis (CEA)

6) Significant Effects Analysis

7) Project Alternatives

8) Sustainability Analysis

9) Monitoring and Post-Project Analysis (PPA)

10) Transboundary Effects Analysis

3. Mary River Project Components

The following is a description of the physical works and activities that constitute the Mary River Project proposal, as filed with the Nunavut Impact Review Board (NIRB or Board) on March 30, 2008 by the Proponent. In NIRB's judgement, these components have the potential to:

- cause significant adverse effects on the ecosystem, wildlife, or Inuit harvesting activities;
- cause significant adverse socio-economic effects on northerners;
- cause significant public concern; and
- involve technological innovations for which the effects are unknown.

The Project will include the following major phases:

- **Pre-construction Staging:** March 2008 to April 2010 (originally *anticipated*). The Proponent has indicated its intention to apply for an exception under NLCA Section 12.10.2, to allow for the strategic delivery of materials and supplies during open water seasons to facilitate pre-construction staging.
- **Construction:** 2010 to 2014.
- **Operation:** initially planned for 21 years, subjected to additional exploration results.
- **Closure and Reclamation:** 3 years, followed by a minimum of 5 years post-closure environmental monitoring.

1) <u>Milne Inlet and Tote Road</u>

a) Project Activities

Milne Inlet will be mainly used for facilitating mine construction activities site during pre-construction and construction phases. During mine operation, Milne Inlet area will have a limited role which includes receiving oversized equipment by periodic sealift on an as-required basis. The laydown area established for the bulk sampling program will be used during construction and operation, until closure and reclamation. The existing Milne Inlet Tote Road has previously been updated for Baffinland's bulk sampling program, and will be used to transport the equipment and materials received at Milne Inlet during open water season, to the Mary River mine site during winter conditions.

b) Temporary Facilities during Construction Stage

Temporary floating dock for sealift unloading; Bulk fuel storage facilities (existing and new); Camp facilities (existing); Communication systems; Water supply facility; Power generation unit; Milne Inlet Tote Road (existing and upgraded during bulk sampling program).

c) Permanent Facilities during Operation Stage

Camp facilities; Communication systems; Water supply facility; Power generation; Laydown areas (existing); Airstrip (existing and upgraded); Bulk fuel storage; Waste management; Quarries and borrow sources (existing); Milne Inlet Tote Road.

2) Mary River Mine Site

a) Project Activities

Mary River site will be updated and expanded from the present camp and facilities for exploration and bulk sampling, into fully operational facilities supporting the mining operation. During the operation phase, iron ore will be extracted from ore body in open pit by conventional drilling and blasting, then loaded into mine haul trucks and delivered to crushing and screening unit; crushed and screened ore will then be transport to stacker/stockpile by conveyors, loaded into railway cars and transported to the Steensby Inlet seaport.

b) Temporary Facilities during Construction Stage

Construction camp; Contractor offices; Quarry and borrow sites and related access roads; Temporary fuel storage (iso-containers and manufactured tanks); Aggregate crusher and stockpiles; Concrete batching plants; Power generating station; Portable lighting plants; Construction workshops and maintenance shops; Warehouses/stores; Construction equipment and vehicles; Equipment maintenance facilities.

c) Permanent Facilities during Operation Stage

Ore crushing and screening facilities; Ore stockpiling facilities; Railway loading and unloading facilities (for mine operation supplies transported from the Steensby Inlet seaport); Permanent worker accommodations; Communication systems (including satellite ground station); Site roads; Heavy equipment fleet parking lot; Laydown areas; Airstrip (existing and upgraded) and ancillary facilities; Bulk fuel storage and distribution facilities; Explosive manufacturing and storage; Water supply; Power generation plant; Waste management facilities (incinerators and landfill); railway terminal; wastewater treatment plant; Transportation and service vehicles.

3) Railway from Mary River Mine Site to Steensby Inlet

a) Project Activities

A 143 km railway is proposed to transport iron ore from the mine site to the port located at Steensby Inlet and general freight from the port to the mine site to supply the mining operation. In addition to the ore and freight, a passenger train (for employees) will also operate three times a week on this rail line.

b) Temporary Facilities during Construction Stage

Construction access roads; Quarries and borrow sources; Construction camps (2 to 4); Refuelling depots at camps, and Explosives magazines.

c) Permanent Facilities during Operation Stage

Railway embankment; Train loading and unloading facilities; Communication systems; Tunnels, bridges; Rail sidings, Maintenance aggregate sources and ancillary accesses.

4) Steensby Inlet Seaport

a) Project Activities

Steensby Inlet will be used for positioning of construction materials. It will play an essential role for the construction of seaport infrastructure, railway terminal, ore reclaiming/loading and shipping facilities. When Mary River mine site is in operation, Steensby Inlet will act as a transportation hub designated for shipping out the ore products, and receiving most of fuel and supplies for the mine site. All maintenance of railway equipment will also be carried out at a maintenance centre at Steensby Inlet.

b) Temporary Facilities during Construction Stage

Construction docks; Quarry and borrow sites, and related access roads; Concrete batch plant(s); Construction and maintenance shops; warehouses/stores; Temporary power generators; Portable lighting plants; Laydown areas/freight storage; Parking areas for construction fleet; Temporary fuel storage (iso-containers); Equipment maintenance facilities; Explosives and magazines plant.

c) Permanent Facilities during Operation Stage

Ore management facilities including dual rotary rail car dumper, ore stockpiles and rail-mounted stacker/reclaimer system, secondary screening plant, and an ore loading dock; Ship loading and unloading facilities; Freight and tug docks; Cargo (container) handling facilities; Permanent worker accommodation and office buildings; Corridors/utilidors (used for connecting all buildings at port sites); Railway yard and maintenance facilities; with shops and maintenance infrastructure; Communication systems; Causeway; Laydown areas/freight storage; Airstrip and related access road; Tank farm and distribution facilities; Waste management facilities(include incinerator); Power plant; Navigational aids (shipping lane and port); Potable water desalination plant and supply facilities; Ammonium nitrate storage; Wastewater treatment plant; Site roads and other ancillary facilities.

5) Marine Shipping

a) Project Activities

Shipping is a key component in the Mary River Project, the iron ore products from the mine have to be shipped to markets from Steensby Inlet seaport on a year round basis, and construction material, fuel and other mine re-supply supporting mine construction and operation need to be shipped into Milne Inlet and Steensby Inlet, then transported to Mary River mine site by railway connecting Milne Inlet and Mary River, and/or the Tote Road from Milne Inlet to Mary River.

Baffinland has and will continue engage Fednav (a Canadian ship owner and operator), to manage the shipping operations for the Mary River Project. Baffinland will charter the ships from a shipping consortium organized by Fednav, which consists of different ship owners, to design, finance, build, own, and operate the dedicated fleet of icebreaking cape-sized ore carrier required by the Project.

By conceptual design, the icebreaking cape-sized ore carrier would be Polar Class 4 vessels (equivalent to Canadian classification of CAC 3 and CAC 4), These ships would be 310 m long, 46 m wide with a 135.000 dry weight tonne (DWT) capacity. In addition to the dedicated fleet, supplemental ships will also be chartered for ore shipping during the open water season.

The ship speeds will vary from a maximum speed over 18.5 knots in open water, to 7 knot at 1.2 m thick ice and 3 knots at 2 m thick ice under full power, thus the duration of a round trip from Steensby port to a destination port in Europe in open water is 20 days, and in the heaviest ice conditions during a severe winter, the sailing time may be over 45 days. Taking account the shipping requirement, there will be 141 voyages each year, 282 transits to and from Steensby Inlet, and this numbers will increase when other supplemental market vessels are operated during open water season.

b) Preconstruction/Construction Stage

During preconstruction and construction stage, fuel, construction materials, containerized equipment and other supplies will be shipped to Milne Inlet and Steensby Inlet during open water season (August to early October). A spud barge arrangement will be anchored at the Milne Inlet beach in 2010 to handle cargo transfer for the Mary River site, a rough terrain container handler or similar equipment and would be used at Steensby Inlet to unloading shipping.

c) Operation Stage

During the operations phase, nearly all shipping (and all ice breaking) will be to the Steensby Inlet port. In addition to the year round icebreaking shipping, conventional open water sealifts will also be used for the project to re-supply materials and equipment to Steensby port, including diesel fuel brought in on the dedicated ore carriers as well as fuel tankers if necessary. Other fuels will be delivered by normal sealift tankers to the Steensby port during the open water season. Shipping to Milne Inlet will occur infrequently throughout the operations phase and only during open water seasons when oversized equipment cannot be transported via the railway from Steensby Port to mine site.

d) Shipping Routes

There will be three main shipping routes for the Project:

- Steensby Inlet to Rotterdam, Germany for ore shipping and most re-supply of fuel;
- Steensby Inlet to a southern Canadian port, for re-supply of materials and some fuel and equipment by conventional sealift over the open water; and
- Milne Inlet to a southern Canadian port, which will occasionally receive oversized equipment for the Project via conventional sealift over the open water.

The shipping routes from Steensby port to Europe and southern Canada port start from Steensby Inlet, through Foxe Basin along the east side of Koch and Rowley Islands, join with the established shipping lanes in northern Foxe Basin which accesses Hall Beach and Igloolik, then through Hudson Strait, finally down south to Canada ports, or cross Atlantic ocean to Europe. These two shipping routes will be operated year round by ice-breaking.

The shipping route to Milne Inlet is well established; extending from Baffin Bay and passing through Pond Inlet, Eclipse Sound and to the head of Milne Inlet in open water season.

6) <u>Air Traffic</u>

Currently there are two airstrips, located at Milne Inlet, Mary River, and Steensby Inlet for personnel and cargo shipping. Part of workforce required in both construction and operation stages for the project will be recruited from five communities: Arctic Bay, Clyde River, Hall Beach, Igloolik, and Pond Inlet. The proponent will operate daily flights with small aircraft among these community points-of-hire and project sites. Daily flights with larger aircraft (i.e., Boeing 737) will operate from Ottawa to Mary River or Steensby Inlet, via Iqaluit.

7) <u>Ongoing Geotechnical Exploration</u>

Geological exploration is expected to continue throughout construction and over the life of the mine.

4. NIRB Part 5 Review Scoping List

The scope of the factors to be considered, including the significance, in assessing the impacts of the project, and each project proponent contained in the above section, extending all the project phases (pre-construction staging, construction, operation, modification, decommissioning, reclamation and abandonment) should be referred to the following environmental and socio-economic factors listed below. The scoping of impacts caused by the project components, activities and undertakings to environmental and socio-economic factors shall take account temporal boundaries and spatial boundaries.

a) Meteorology and climate (including climate change)

- Meteorology and climate impacts to project design and planning;
- Effect of climate change on the design of the project components such as: open pit mine and underneath permafrost; waste rock stockpile closures design; rail line and auxiliary facilities;
- Effects of permafrost thawing due to climate change on stability of project components such as: railway embankment, water crossings/tunnels and other sensitive facilitates; and
- Any uncertainty related to climate change predictions.

b) Air quality

- Effects from fossil fuel combustion from project activities on air quality, i.e., greenhouse gases(GHG) emission, increase of concentrations of air contaminants, such as Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), Carbon monoxide (CO), other sulphur and nitrogen compounds, Total Suspended Particulate (TSP) and $MP_{2.5}$ etc;
- Effects on air quality due to incineration of combustible domestic waste, such as food waste on various camp sites; and
- Effects on air quality, in particular the Total Suspended Particulate matter (TSP) due to ore crushing, hauling, transportation, loading and unloading of fine iron ore, potential soil erosion resulting various project disturbances and activities.

c) Noise

- Increased noise level during construction stage resulting from drilling, blasting, hauling and machinery/equipment operations in all construction areas;
- Increased noise levels due to drilling, blasting, hauling, crushing, loading and other activities at Mary River mine site during mine operation;
- Increased atmospheric noise levels from project activities at various locations where air traffic are proposed; along the Milne Inlet Tote Road, the rail line and sea port areas;
- Increased marine noise levels from project activities related to marine shipping at Milne Inlet, Steensby Inlet seaport vicinities and proposed shipping in shipping corridors;
- Noise and impacts to human and wildlife (including marine mammals) from various project components and activities.

d) Hydrology and hydrogeology

- Changes in surface water quantity (lake levels, stream levels, stream flows) from project activities such as: water withdrawal and water crossing works;
- Changes in flows and levels of streams and lakes from diversion of streams;

- Changes in quantity and direction of runoff change in channel regimes from construction and operation of mine facilities;
- Changes in groundwater quantity and flow patterns due to open pit mining; and
- Changes to navigability of watercourses due to water crossing works.

e) Groundwater quality

- Potential for changes in groundwater quality related to acid rock drainage (ARD) from open pit mining, waste rock stockpiles and other mine facilities;
- Potential changes to groundwater quality due to surface rock exposure to oxygen;
- Changes in groundwater quality from escalated contaminants from surface runoffs; and
- Changes in groundwater quality from closure and post closure of the open pits mine.

f) Surface water and sediment quality

- Impacts to surface water quality and sediment quality in surrounding lakes and rivers from runoff from the mine facilities construction, operation, closure and post-closure activities relating to site runoff and road crossings on surface water quality;
- Changes in water quality in Sheardown Lake and other receiving water bodies from discharges of wastewater treatment plants;
- Impacts on water quality from the potential acid rock drainage (ARD) and metal leaching (ML) from waste rock stockpiles, ore stockpiles, open pit mining, construction fills, embankment of roads and railway and open quarry sites.
- Impacts on surface freshwater quality of nearby lakes and streams as a result of nutrient input from blasting activities and chemical leaching from rail sleeper coatings;
- Increases of suspended sediment load of water bodies as a result of construction and maintenance of the mine facilities, Milne Inlet Tote Road, railway and associated water crossings;
- Impacts on water quality from spills, accidents and malfunctions along the Milne Inlet Tote Road, access roads and railway line; and
- Impacts on surface water quality from contact water runoff from landfill sites and other contaminated site.

g) Freshwater aquatic organisms (including fish as defined in the *Fisheries* Act) and habitat

- The potential effects on freshwater fish and aquatic life from works and undertakings in and around water such as the construction of bridges, and culverts at water crossings;
- The potential direct or indirect changes to fish, fish habitat, aquatic life and aquatic species at risk due to project activities in and around water such as the construction of bridges, and culverts at water crossings; and
- The potential direct or indirect impacts to the aquatic life and their habitats due to water use such as water withdrawals.

h) Landforms and soils

- The potential effects on abundance and distribution of unique or valuable landforms (eskers and or fragile landscapes) associated with surface disturbances;

- The potential effects on stability, abundance and distribution of permafrost sensitive landforms from surface disturbance activities; and
- The potential effects on shoreline erosion as a result of wake effects along proposed shipping routes.

i) Vegetation

- The anticipated effects on specific vegetation coverage due to construction, operation, and closure activities in project area.
- The potential effects on abundance and diversity of vegetation due to project activities causing surface disturbance;
- The potential effects on vegetation diversity from introduction of exotic invasive plants to the region; and
- The potential effect on vegetation health from dust fall and airborne contaminants.

j) Terrestrial wildlife and wildlife habitat

Terrestrial wildlife consists of terrestrial mammals (carnivores and herbivores) and birds (raptors, songbirds, waterfowls, shorebirds, etc.), including those species designated as Species at Risk. Wildlife habitat includes but not limited to: Critical Wildlife Areas, Bird Sanctuaries, Key Migratory Bird Habitat and Caribou Calving Grounds, wherever applicable in the project areas. Special consideration should be given to those species of the great importance for Inuit life and culture, such as caribou.

- The potential effects on population size, wildlife behavior, distribution, and abundance from direct and indirect loss of habitat from presence of infrastructure, project activities, and sensory disturbance;
- The potential effects on wildlife from direct mortality to wildlife from project activities especially the operations of existing at Milne Inlet Tote Road, railway line, mine hauling roads and other access roads;
- The potential effects on health of individual animals from project activities that release noise and contaminants;
- The potential effects on migratory birds as a result of habitat loss, disturbance at the proposed site facilities (mine, roads, airstrip, railway corridor, docks), relating noise and human activities associated with various operations on those facilities; and
- Potential effects on waterfowl and seabirds nesting in coastal areas in the vicinities of seaport infrastructure.

k) Marine environment, marine water and sediment quality

Marine environment shall include physical, chemical and biological constitutions, marine physical processes and associated interactions among its various components. Project scoping shall include the following elements and other issues associated with project components and activities in marine environment.

- Physical oceanographic information, including but not limited to bathymetry, tide, surface and subsurface current patterns, currents velocities in proximity to sea port and facilities, timing of ice breakup and freeze up at Steensby Inlet and Milne Inlet and shipping routes;

- Chemical oceanographic information, which includes but is not limited to substrates, chemical parameters, nutrients conditions etc. at vicinities of shipping facilities at Steensby Inlet and Milne Inlet;
- The potential effects on marine water quality, in particular, suspended solid concentrations and sediment quality from off shore construction activities for docks and shipping infrastructure at Steensby Inlet and Milne Inlet;
- The potential effects on marine water quality and sediment quality, in particular, the marine water quality in proximity to the sea port from the operation and maintenance of seaport and other offshore infrastructure;
- The potential effects on marine water quality due to ballast water discharge, in particular the polluted ballast water and/or other contaminants related to ship operations and maintenance;
- The potential effect on marine water quality due to other ice management operations; and
- The potential effects on marine water quality and sediment quality directly or indirectly from marine shipping operations, spills and malfunctions.

l) Marine wildlife and marine habitat

Marine Wildlife will include invertebrates, marine fish, marine mammals and seabirds. Marine Habitat will include, but not be limited to, areas with special designation (e.g. Key Marine Habitat Sites for Migratory Birds) and those identified as important to the natural life cycle of a species, and Inuit harvesting.

- Marine biological communities, ranging from benthic invertebrates, marine fish, coastal birds, to marine mammals in Steensby Inlet and Milne Inlet;
- Marine mammals species (such as seals, bowhead whales, killer whales, walrus, belugas, narwhals), habitats distributions, seasonal migration patterns, potential interactions with offshore facilities and shipping operation;
- The potential effects on marine mammals resulting from marine shipping, particular ice-breaking shipping and escalating noise level on the proposed shipping routes;
- The potential effects on marine wildlife and their habitats resulting from spills, malfunction and other accidents associated shipping operations;
- The potential accidental mortality of marine mammals directly or indirectly from proposed shipping (open water and ice breaking shipping) activities, in particular those marine mammals, such as bowhead whales, which congregate in North Foxe Basin and Hudson Strait where shipping routes pass through; and
- The potential effects on marine wildlife behaviour, distribution, abundance, migration patterns, species health and reproduction from direct and indirect impact resulting from marine shipping, particular ice breaking shipping activities.

m) Human and ecological health

- Potential effects on human health, through air quality, drinking water quality, atmospheric noise levels and traditional foods; and
- Potential impacts on worker health and safety, particularly with respect to working in explosives magazines and factories.

n) Socio-economics

- Socio-economic impacts and benefits analysis;
- Potential impacts to traditional lifestyles;
- Anticipated effects on the following socio-economic aspects:
- Anticipated effects on individual and family well-being as well as community well-being;
- Anticipated effects on public safety; livelihoods and income, employment,
- training and education;
- Aanticipated effects on economic development and self-reliance, housing and community infrastructure, and other municipal and social services;
- Royalties and taxes, contract and business opportunities;
- Anticipated effects on renewable resources, land use and harvesting activities , and cultural sustainability; and
- The anticipated effect on drug use and alcohol abuse, crime.

o) Cultural and paleontological/ archaeological resources

- Potential effects on cultural well-being, cultural and traditional values and heritage coherence in the potentially affected communities;
- Potential effects on burial sites, sacred sites and other cultural and paleontological/archaeological sites in the Project area from ground disturbing activities at Milne Inlet, along the tote road and railway corridor to Steensby Inlet; and
- Potential direct and indirect effects on paleontological/archaeological resources from increased number of human activities using the areas associated with mine, land transportation and Marine transportations.

p) Cumulative effects

A cumulative effect is the impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions. For example, cumulative effects may result from other developments near the project area, or from the interactions of different elements of the project itself. The following areas related to cumulative effects will be addressed:

- Anticipated impacts to communities in the Baffin Region, including cumulative impacts related to employment, food security, retention of traditional culture, etc.
- Anticipated impacts on the distribution, abundance and harvesting of terrestrial wildlife, including habitat loss, changes to migration patterns and population health;
- Anticipated impacts on the distribution, abundance and harvesting of marine mammals, including habitat loss, changes to migration patterns and population health with a focus on cumulative effects related to shipping and icebreaking activities from the Project and other projects in the region;
- Creation of alternative development scenarios and analysis of potential cumulative effects of each; and
- Anticipated impacts related to cumulative effects.

q) Risk management

- Risk assessment of accidents, such as spills, malfunctions of project components including marine shipping;
- Hazardous materials handling and storage;
- Dangerous Goods, Fuel and Explosives;
- Emergency Response and Preparedness;
- Occupational Health and Safety; and
- Natural hazards including: extreme weather events; natural seismic events; fire and slope instability.

r) Transboundary effects

Comprehensive analysis on transboundary effects associated with the Project is required including but not limited to:

- Anticipated transboundary socio-economic effects on the communities potentially impacted by the Project;
- Anticipated transboundary effects of on terrestrial and marine wildlife distribution and abundance and associated harvesting activities; and
- Anticipated effects of shipping, with emphasis on ice-breaking, on current use of land and resources adjacent to shipping routes, which include the hunting, traveling and other activities by both the residents of Nunavut Settlement Area and the residents of other neighbouring jurisdiction, for example the Inuit of Northern Quebec, who traditionally use Foxe Basin and Hudson Strait for hunting, recreation, traveling and other resources- use activities; and

s) Significant effects analysis

- Significant effects analysis shall include the following elements: rating of Magnitude, spatial extent, duration or/and frequency, ecological context (resilience), reversibility, the probability of occurrence and analysis confidence; and
- The analysis shall take into account public health; traditional and current land use; protected areas, habitat, or species; public concern etc.

t) Project alternatives

- All alternative means of carrying out the Project and project components in terms of economically and technically feasibilities, and the environmental effects of those alternative means;
- The assessment of "preferred alternatives", in particular the marine shipping routes and rail alignment; and
- The assessment of the "no-go" or "no-build" alternatives.

u) Sustainability analysis

Analysis of the availability of renewable resources affected by the Project to sustain current and future generations in Nunavut and Canada.

v) Monitoring and Post-Project Analysis (PPA) and

PPAs are meant to serve the following purposes by monitoring activities designed to gauge the impact predictions:

- Establish environmental and socio-economic monitoring program and post-project analysis;

- Measure the relevant effects of projects on the ecosystemic and socio-economic environments of the Nunavut Settlement Area, and adjacent jurisdictions potentially affected by the project;
- 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 impacts statements.

w) Traditional knowledge

- Methodology used to collect TK;
- Format used to communicate with communities;
- Composition of participants;
- Location and type of information provided;
- Summary of the TK collected; and
- How TK used in different stages of project preparation and how the collected TK used in the planning and design of the project.

5. The Requirements of Northern Baffin Regional Land Plan

The Mary River Project includes a component of railway from Mary River to Steensby Inlet port site, which is partially located within Northern Baffin Land Plan Region. Pursuant to 3.5.11 and 3.5.12 under Appendix C of North Baffin Regional Land Use Land Use Plan (NBRLUP), a joint process to address the prospective transportation corridor is contemplated by those provisions. Thus, in coordination with the Nuanvut Planning Commission (NPC), the NIRB's scoping process will also reflect the requirements of the NBRLUP, and ultimately will be included in the EIS Guidelines to direct the proponent to the information required to satisfy the NPC's land use planning requirements, more specifically the information requirements to meet the provisions of Appendix J and K of NBRLUP (attached with this *draft* scope).

APPENDIX J

Marine and Terrestrial Transportation/Communications Corridor Alternative Route Assessment

Applicants wishing to develop a transportation and/or communications corridor in the North Baffin region are required to provide the NPC with the following information:

1. A description of the proposed corridor, including its use, its general routing, the possible environmental and social impacts, and any seasonal considerations that may be appropriate.

2. A comparison of the proposed route with alternative routes in terms of environmental and social factors as well as technical and cost considerations.

3. An assessment of the suitability of the corridor for the inclusion of other possible communication and transportation initiatives (roads, transmission lines, pipelines, etc.). This assessment should include:
   - the environmental, social and terrain engineering consequences, and the cumulative impacts of the project, and
   - the environmental and social impact of the project on nearby settlements or on nearby existing and proposed transportation systems.

APPENDIX K

Marine and Terrestrial Transportation/Communications Corridor Guidelines

The following planning guidelines will be used in the assessment of a new transportation / communications corridor proposal:

1. The corridor width shall be a function of:
   - the number and type of identified facilities within the corridor;
   - physical and biophysical conditions;
   - availability of detailed engineering data for one or more transportation modes within the corridor;
   - safe distances between different facilities within the corridor; and
   - aesthetics.

2. Corridors shall:
   - minimize negative impacts on community lifestyles;
   - improve access to other resources having high potential for development, while still maintaining the shortest practicable distance between the primary resource areas and the trans-shipment location;
   - be designed in accordance with existing and prospective land use capability including topography, soil, permafrost and wildlife; and
   - be designed in accordance with the availability of granular supplies.

3. In keeping with existing legal and legislative requirements, including the NLCA, corridors shall not negatively impact:
   - community business, residential and projected expansion areas;
   - important fish and wildlife harvesting areas;
   - key habitat for fish and wildlife species, especially areas used by endangered species;
   - areas of high scenic, historic, cultural and archaeological value.

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Nunavunmi Parnaiyiit
Nunavut Planning Commission
Commission d'Aménagement du Nunavut

NIRB File No.: 08MN053

March 16, 2009

To: The Mary River Distribution List

Re: **Proposed Process for the Part 5 Review of Baffinland Iron Mines Corporation's Mary River Project and the Implementation Requirements of the North Baffin Regional Land Use Plan.**

Dear Parties:

On March 20, 2008 the Nunavut Impact Review Board (NIRB or Board) received Baffinland Iron Mines Corporation's (Baffinland) mining development proposal for the Mary River Project (the Project). On April 30, 2008, the NIRB received a positive conformity determination from the Nunavut Planning Commission (NPC or Commission) for the Project in relation to the North Baffin Regional Land Use Plan (NBRLUP). The conformity determination also outlined the provisions set forth in sections 3.5.11 and 3.5.12 of Appendix C of the NBRLUP, regarding the requirement for a joint public review by the NIRB and the NPC which would address the prospective transportation corridor proposed by the Project.

The NIRB screened the Project in accordance with Part 4 of Article 12 of the Nunavut Land Claims Agreement (NLCA), and on June 27, 2008 issued a screening decision report to the Minister of Indian and Northern Affairs Canada (the Minister), recommending a review under Part 5 or 6 of Article 12 of the NLCA. Pursuant to Section 12.4.7 of the NLCA, on February 11, 2009 the Minister referred the Project to the NIRB for a review of the ecosystemic and socio-economic impacts under Part 5 of Article 12 of the NLCA. Pursuant to Sections 12.5.1 and 12.5.4 of the NLCA, the Minister also requested the following:

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

The NIRB and NPC are pleased to announce that their respective representatives have now had the opportunity to discuss and formalize arrangements to ensure an efficient Part 5 Review process which will satisfy both organizations requirements for this file. A detailed description of the process to be followed for the Part 5 Review of the Project is provided as **Appendix A**, and a diagram of the process is also provided as **Appendix B** to complement the written description.

If you have any questions or concerns regarding the proposed NIRB Part 5 Review process as outlined in the attached appendices, please submit your comments to the NIRB, on or before **April 9, 2009.** Comments may be submitted to the NIRB's Manager of Environmental Administration, Leslie Payette, at lpayette@nirb.ca or (867) 983-4605.

Sincerely,		Respectfully,
	and	
Lucassie Arragutainaq Chairperson		Ron Roach Chairperson

Cc: Honourable Chuck Strahl - Minister of INAC

Attachments: Appendix A – Part 5 Review Process for the Mary River Project
Appendix B – Process Diagram for the Part 5 Review of the Mary River Project

APPENDIX A - PART 5 REVIEW PROCESS FOR THE MARY RIVER PROJECT

Scoping and EIS Guideline Development

The first step in the Part 5 Review process is to **scope** the project proposal and identify the significant issues requiring study and analysis. The NIRB will release a *Draft* Scope of the project for Public comment. The Draft Scope will include Appendices J and K from the approved NBRLUP. The Appendices are contained in the NBRLUP and cannot be modified as part of this process.

Section 12.5.2 of the NLCA directs the NIRB to issue project specific guidelines to the Proponent for the preparation of an Environmental Impact Statement (EIS). This Section also contains a list of information to be included, where appropriate, in an EIS and grants the NIRB the authority to add, "*any other matters that NIRB considers relevant*". The NIRB will conduct public scoping meetings in potentially affected communities to consult with the public and interested parties to identify Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) that should be addressed by the Proponent's *Draft* Environmental Impact Statement (DEIS).

The NIRB will draw on information obtained during Scoping when developing *Draft* EIS guidelines, and will circulate *Draft* EIS Guidelines to the public, offering an opportunity for comment. The *Draft* EIS Guidelines will also contain the NBRLUP (Appendices J and K). The NIRB will then review the public's comments, integrate those recommendations it considers appropriate, finalize the guidelines, and issue them to the Proponent for the preparation of a DEIS.

Receipt and Review of a Draft EIS (DEIS)

An EIS is a detailed document prepared by the Proponent in accordance with the guidelines issued by the NIRB which identifies, predicts, evaluates, and communicates information about the ecosystemic and socio-economic impacts of a project proposal. Baffinland will develop a *Draft* EIS (DEIS) with the issued with the NIRB-issued EIS Guidelines based on its own timetable, making this section of the review completely proponent-driven. Once the NIRB receives a DEIS submission, the Board will conduct an internal review of the material to determine whether it addresses the provisions of the guidelines.

Following a successful conformity review, the NIRB will distribute the DEIS to the public and commence a technical review period. This technical review period will provide interested parties with an opportunity to analyze the adequacy and quality of the information presented within the DEIS, and provide the NIRB with their technical review comments. Upon receipt of technical review comments, the NIRB will forward all relevant comments to the NPC for its information. The NIRB may also decide to hold a technical meeting at the conclusion of the technical review period, to facilitate further discussions on technical matters related to the DEIS.

Pre-Hearing Conference (PHC)

The NIRB may, immediately following the technical meeting, hold a Pre-Hearing Conference (PHC) to discuss such matters as: timelines for submissions and the Final Hearing, future meetings, evidence, document exchange, Final Hearing venue(s), Final Hearing format and any other matters related to the logistics of the Final Hearing. The PHC provides an opportunity for Parties to present to the NIRB those issues that were resolved during the technical review period, and those issues which remain outstanding. It is also an opportunity for the Board to hear from the public regarding the information contained in the DEIS. At this time, the NIRB and NPC will confirm whether or not the Proponent has supplied sufficient information relating the NBRLUP Appendices J and K.

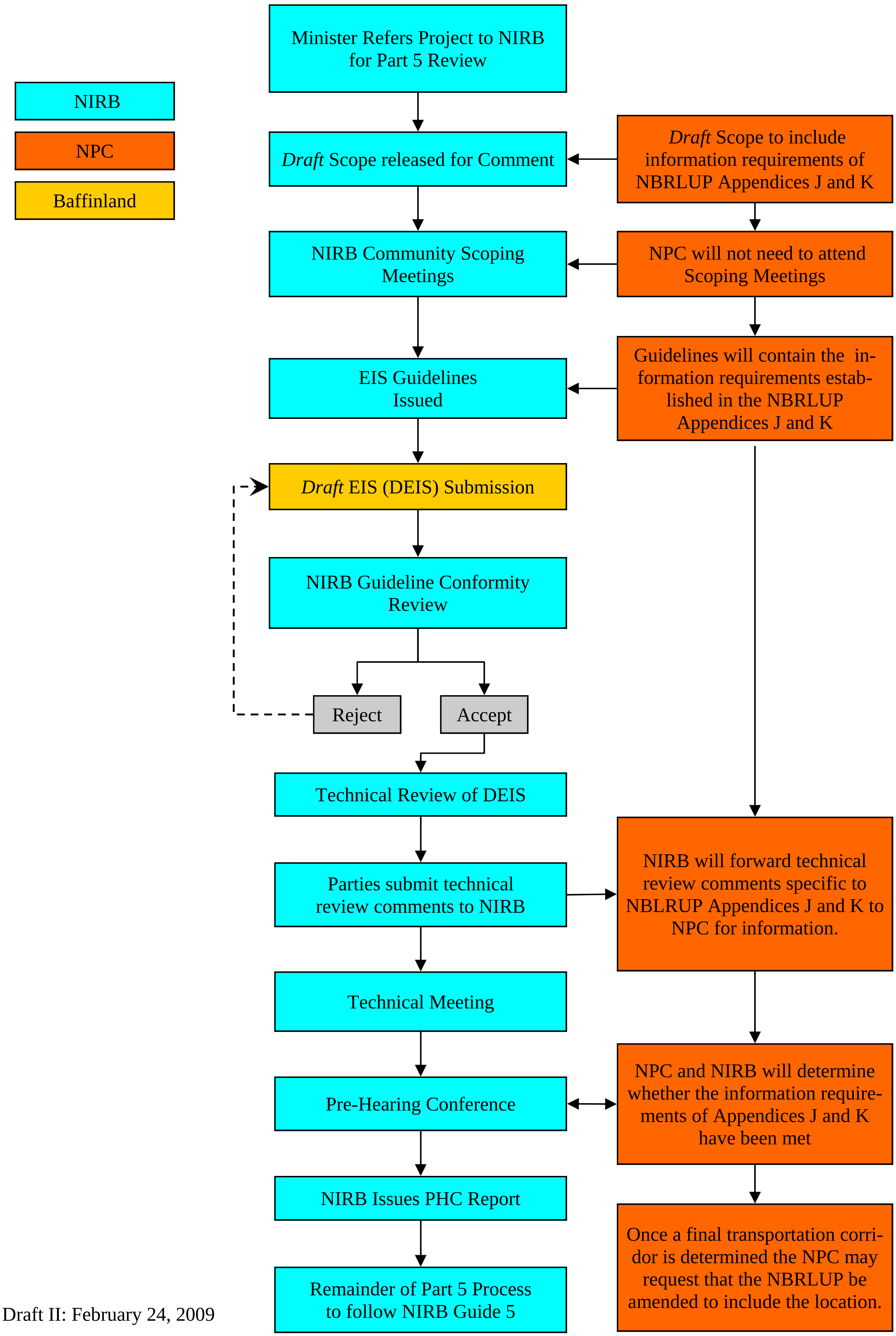
Following the PHC, the Board will issue a PHC decision which provides direction to the Proponent regarding what is required in the *Final* EIS and the procedures for the review of the FEIS and Final Hearing.

A diagram of the process is also provided as **Appendix B** to complement this written description.

The remainder of the Part 5 Review process for the Project is then expected to follow the approximate process as set out in the *NIRB's Guide 5: Guide to the NIRB Review Process* (available at: http://ftp.nirb.ca/GUIDES/). There are plans to coordinate the process further with the Nunavut Water Board (NWB), in accordance with Section 13.6.1 of the NLCA. Details about this procedure will be sent out for public comment under separate cover.

APPENDIX B – PROCESS DIAGRAM

Initial Part 5 Review Process for the Mary River Project with NPC Requirements Highlighted



Draft II: February 24, 2009

NUNAVUT IMPACT REVIEW BOARD
Nunavutmi Kanogilivalianikot Elittohaiyeoplotik Katimayiit

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Nunavunmi Parnaiyiit
Nunavut Planning Commission
Commission d'Aménagement du Nunavut

ᓈᓴᐅᑖ NIRB File No.: 08MN053

ᒫᕐᓯ 16, 2009

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ᐱᔾᔪᑦ: <u>ᑐᑲᓯᕗᑦ ᐱᖁᔭᖅᑎᒍᑦ ᐃᓚᖓᓅᔪᑦ 5-ᑯᑦ ᕿᒥᕐᕈᒍᑎᒃᓴᒃ ᐅᑯᓂᖓ Baffinland Iron Mines Corporation-ᑯᑦ (ᕿᑭᖅᑖᓗᖕᒥ ᓴᕕᕋᔭᒃᓵᔭᓂᒃ ᐅᔭᕋᓂᐊᖅᑏᑦ ᑯᐊᐳᓂᓴᒃᑯᑦ) ᓄᓘᔾᔭᓂ Mary River-ᒥ ᐱᓕᕆᕝᕕᒃᓴᖅ ᐊᒻᒪᓗ ᐋᕿᒃᓯᐃᒍᑕᐅᕆᐊᓖᑦ ᑲᓇᖕᓇᖓᓃᑐᒥᒃ ᕿᑭᖅᑖᓘᑉ ᓄᓇᓕᓐᓂᐊᖓᑎᒃᓴᑦ.</u>

ᐃᓚᐅᖅᑕᐅᔪᓄᑦ:

ᐅᓐᓂ ᒪᕐᓯ 20, 2008-ᒥ ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᓃᑦ ᑲᑎᒪᔩᖏᑦ ᐱᔪᒻᒪᑕ ᐅᑯᐊ ᕿᑭᖅᑖᓗᖕᒥ ᓴᕕᕋᔭᒃᓵᔭᓂᒃ ᐅᔭᕋᓂᐊᖅᑏᑦ ᑯᐊᐳᓂᓴᒃᑯᖏᑦᑕ (Baffinland Iron Mines Corporation) ᑕᐃᔭᐅᕙᒃᑐᑦ ᓇᐃᓈᖅᑕᐅᓪᓗᑎᒃ ᐃᒫᒃ (Baffinland-ᑯᑦ) ᐅᔭᕋᓂᐊᕈᑎᒃᓴᓂᒃ ᑐᒃᓯᕋᖅᓯᒪᔪᑦ ᓄᓘᔭᓂ Mary River-ᒥ ᐱᓕᕆᕝᕕᒃᓴᒥᒃ. ᐅᓐᓂ ᐃᐳᕈ 30, 2008-ᒥ, ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᓃᑦ ᑲᑎᒪᔩᖏᑦ ᐱᔪᒻᒪᑕ ᓴᕿᐅᒪᓂᖅᑲᓯᐊᖅᑐᓂᒃ ᐊᑦᑕᐅᔭᕆᐊᓕᖓᓂᒃ ᒪᓕᒃᑐᓂᒃ ᐅᔾᔨᖅᑑᑎᖏᑦᑎᒍᑦ ᐅᑯᐊ ᓄᓇᕗᑦᒥ ᐸᕐᓇᐃᔩᑦ ᐱᓕᕆᕝᕕᒃᓵᖑᔪᓂᒃ ᑲᓇᖕᓇᖓᓂ ᕿᑭᖅᑖᓘᑉ ᓄᓇᓕᓐᓂᐊᖓᑎᒃᓴᓂᒃ. ᐊᖏᕈᑎᑦ ᐊᑦᑕᐅᕆᐊᓖᑦ ᐅᔾᔨᖅᑐᕈᑎᑦ ᖃᓄᖅ ᐋᕿᒃᓯᒪᓂᖏᑦᑕ ᑐᑭᖏᑦ ᓇᓗᓇᐃᔭᖅᓯᒪᖓᑕ ᐊᑐᐃᓐᓇᑦ ᐱᖁᔭᖅᑎᒍᑦ ᐅᑯᑎᒎᓇ ᐃᓚᖏᓐᓂ sec. 3.5.11-ᒥ ᐅᕝᕙᓗ 3.5.12-ᒥ ᐅᓐᓂ ᐃᓚᕆᓕᐅᑎᓯᒪᔪᓂ C-ᒥ ᑲᓇᖕᓇᖓᓂ ᕿᑭᖅᑖᓘᑉ ᓄᓇᓕᓐᓂᐊᖓᑎᒃᓴᑦ, ᐱᔾᔪᑎᓖᑦ ᒪᓕᒃᑕᐅᖁᔭᓂᒃ ᐊᑦᑕᐅᔭᕆᐊᓖᑦ ᑲᑎᒪᔾᔪᑕᐅᓗᑎᒃ ᐃᓚᐅᑎᓪᓗᒋᑦ ᑭᒃᑯᐃᓐᓇᐃᑦ ᐃᓄᐃᑦ ᕿᒥᕐᕈᑎᓪᓗᒋᑦ ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᓃᑦ ᑲᑎᒪᔩᖏᑦ ᐊᒻᒪᓗ ᓄᓇᕗᑦᒥ ᐸᕐᓇᐃᔩᑦ ᑖᒃᑯᐊ ᐅᔾᔨᖅᑑᑕᐅᑎᓪᓗᒋᑦ ᖃᓄᐃᑦᑐᖅ ᐊᑯᑎᒃᓴᒨᕐᒐᔪᖅ ᐃᖏᕐᕋᕖᐅᖅᑲᑦᑕᕐᓗᓂ ᐊᑯᑎᑯᑖᒃ ᓄᓇᒥ ᑐᒃᓯᕋᖅᓯᒪᔪᖅ ᐱᓕᕆᕝᕕᒃᓴᖅ.

ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᓃᑦ ᑲᑎᒪᔩᖏᑦ ᕿᒥᕐᕈᔪᒻᒪᑕ ᐱᓕᕆᕝᕕᒃᓴᒥᒃ ᒪᓕᒃᑐᓂᒃ ᐃᓚᖓᒍᖕᒐᔪᑦ Part 4-ᒥ ᐱᖁᔭᒃᓴᑦ 12-ᑯᑦ ᓄᓇᕗᑦᒥ ᓄᓇᑖᕈᑕᐅᓯᒪᔪᑦ ᐊᖏᕈᑎᑎᒍᑦ, ᐊᒻᒪᓗ ᐅᓐᓂ ᔫᓂ 27, 2008-ᒥ ᑐᓂᓯᔪᔪᑦ ᕿᒥᕐᕈᓯᒪᔭᒥᒍᑦ ᖃᐅᔨᒃᑐᕈᑎᒥᓂᒃ ᑐᓴᕋᒃᓴᖏᓐᓂᒃ ᒥᓂᔅᑕᐅᑉ ᑲᓇᑕᒥ ᐃᓄᓕᕆᔨᑐᖅᑲᒃᑯᑦ, ᐋᑦᑕᐅᖁᔭᖅᑎᒍᑦ ᒪᓕᒃᑐᑦ ᐃᓚᖓᒍᖓᔪᑦ 5-ᑯᑦ ᐅᕝᕙᓗᑭᐊᖅ 6-ᑯᑦ ᐱᖁᔭᒃᓴᖅ 12-ᑯᑦ ᓄᓇᕗᑦᒥ ᓄᓇᑖᕈᑕᐅᓯᒪᔪᑦ ᐊᖏᕈᑎᑎᒍᑦ. ᐃᒪᐃᓕᖓᔪᑦ ᒪᓕᒃᑐᑦ ᐃᓚᖓ Sec. 12.4.7-ᒥ ᓄᓇᕗᑦᒥ ᓄᓇᑖᕈᑕᐅᓯᒪᔪᑦ ᐊᖏᕈᑎᑎᒍᑦ, ᐅᓐᓂ ᐱᐅᕈᐊᕆ 11, 2009-ᒥ ᒥᓂᔅᑕᐅᑉ ᑲᒪᒋᔭᐅᖁᔭᖏᑦ ᐱᔾᔪᑎᓖᑦ ᐱᓕᕆᐊᒃᓵᒨᕐᒐᔪᓂᒃ ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᓃᑦ ᑲᑎᒪᔩᖏᓐᓄᑦ ᕿᒥᕐᕈᔭᐅᖁᓪᓗᒋᑦ ᓄᓇᒥᐅᑕᓅᕐᒐᔪᑦ ᐊᒻᒪᓗ ᐃᓄᓯᖅᓅᕐᒐᔪᑦ-ᑮᓇᐅᔾᔭᒃᓴᐅᑎᒃᓴᓅᕐᒐᔪᑦ ᐅᑯᓄᕐᒐᕐᒐᔪᑦ ᒪᓕᒃᑐᑦ ᒪᓕᒡᓗᒋᑦ ᐃᓚᖓᓂ Part 5-ᒥ ᐱᖁᔭᒃᓴᖅ 12-ᒥ ᓄᓇᕗᑦᒥ ᓄᓇᑖᕈᑕᐅᓯᒪᔪᑦ ᐊᖏᕈᑎᑎᒍᑦ. ᒪᓕᒃᑐᑦ ᐃᓚᖓᓂ Sec. 12.5.1 ᐊᒻᒪᓗ 12.5.4 ᓄᓇᕗᑦᒥ ᓄᓇᑖᕈᑕᐅᓯᒪᔪᑦ ᐊᖏᕈᑎᑎᒍᑦ, ᒥᓂᔅᑕ ᑐᒃᓯᕋᒻᒥᔪᖅ ᐋᑦᑕᐅᖁᔭᒥᓂᒃ ᒪᑯᓄᖓᖕᒐᔪᓂᒃ:

ᑭᖑᕚᐳᑎᖏᓂᖅᓴᐅᓂᐊᕐᒪᑕ ᑭᓯᑐᐃᓐᓇᐃᑦ ᐃᓘᓐᓇᑎᒃ ᕿᒥᕐᕈᔭᑦ ᑐᒃᓯᑦᔫᕐᒐᔪᑦ, ᐋᑦᑎᖁᑦᑐᒋᑦ ᑎᓕᕆᐊᖅᑕᒃᑲ ᑲᑎᒪᔩᑦ ᐊᒻᒪᓗ ᐸᕐᓇᐃᔩᑦ ᐋᕿᒃᓯᐃᖁᑦᑐᒋᑦ ᐊᑲᐅᓈᖁᑦᑐᒋᑦ ᓯᑕ ᐱᓕᕆᐊᖑᓯᒪᕆᑦᑐᑦ ᑲᒪᒋᐅᓯᒪᕆᑦᑐᑦ ᐋᑦᑕᐅᕆᐊᓖᑦ ᓄᓇᓕᓐᓂᐊᖓᑎᒃᓴᓅᕐᒐᔪᑦ ᐋᕿᒃᓯᐃᒍᑎᒃᓴᑦ, ᐋᑦᑕᐅᑎᓪᓗᒋᑦ ᑭᖑᕚᐳᑎᑎᓇᕆᑦ ᑲᑎᒪᔩᑦ ᐃᓚᖓᒍᖕᒐᔪᑦ 5-ᑯᑦ ᕿᒥᕐᕈᒍᑎᕆᓇᓅᕐᒐᔪᑦ. ᑕᒪᒃᑯᐊ ᐱᔭᕇᖅᑕᐅᓯᒪᓕᖅᐸᑕ, ᑎᓕᒍᒪᕆᔭᒃᑲ ᐋᑦᑎᖁᑦᑐᒋᑦ ᐸᕐᓇᐃᔩᑦ ᐊᒻᒪᓗ ᑲᑎᒪᔩᑦ ᐅᖃᖅᑲᑎᖃᖁᑦᑐᒋᑦ ᐱᔾᔪᑎᓕᕐᓂᒃ ᖃᓄᐃᑦᑐᓂᒃ ᐱᔭᕇᖅᑕᓂᒃ ᐅᔾᔨᖅᑐᕐᑕᐅᔪᓂᒃ ᐋᑦᑕᐅᕆᐊᓕᕐᓂᒃ ᐅᖃᐅᔾᔭᐅᓗᑎᒃ ᐃᓘᓐᓇᑎᒃ ᐃᓚᐅᔪᓕᒫᑦ ᕿᒥᕐᕈᒍᑎᓅᕐᒐᔪᓂᒃ.

ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᔨᑦ ᑲᑎᒪᔨᖏᑦ ᐊᒻᒪᓗ ᓄᓇᕗᑦᒥ ᐸᕐᓇᐃᔨᑦ ᕐᑯᔭᓕᐋᑦ ᓴᕿᒐᒥᒃ ᐅᖃᐅᓯᒃᓴᓂᒃ ᕿᒡᒐᖅᑐᕈᑎᒥᒍᑦ ᒫᓇ ᐱᕕᒃᓴᖃᓚᐅᖁᒥᒃ ᖃᓄᖅᑑᕈᑎᒃᑯᑦ ᐊᒻᒪᓗ ᐱᖁᔭᖅᑎᒍᑦ ᐋᕿᒃᓯᒪᕆᐊᓕᖕᓂᒃ ᒪᓕᒃᑕᐅᕆᐊᓖᑦ ᐋᑑᑕᐅᕝᓯᐊᖁᓪᓗᒋᑦ ᓈᒻᒪᓈᖅᓯᒪᑎᓪᓗᒋᑦ ᐃᓚᖓᓅᖓᔪᑦ Part 5-ᑯᑦ ᕿᒥᕐᕈᒍᑎᑦ ᓈᒻᒪᓈᓖᓕᕐᒪᑕ ᑕᒪᒃᕿᓐᓄᑦ ᑲᑐᔾᔨᖃᑎᒌᓄᑦ ᐋᑑᑕᐅᔭᓇᐊᓖᑦ ᐅᑯᓄᖓᖓᔪᑦ ᐊᓪᓚᒃᓯᒪᔪᓂ. ᐱᑕᖃᒻᒪᑕ ᐊᑕᖏᖅᑐᓂᒃ ᖃᓄᖅ ᐋᑑᑕᐅᕆᐊᓕᖕᓂᒃ ᐱᖁᔭᖅᑎᒍᑦ ᒪᓕᒃᑕᐅᕆᐊᓖᑦ ᐃᓚᖓᒨᖓᔪᑦ Part 5-ᑯᑦ ᕿᒥᕐᕈᒍᑎᑦ ᐱᓕᕆᕝᕕᒃᓵᖓᔪᒥᒃ ᐱᔾᔪᑎᖏᑦ ᐅᕙᓃᑦᑐᑦ **ᐃᓚᒋᓕᐅᑎᓯᒪᔪᓂ A-ᒥ**, ᐊᒻᒪᓗ ᑎᑎᕋᐅᔭᖅᓯᒪᔪᓃᑦᑐᑦ ᐊᑐᐃᓐᓇᑦ ᐅᕙᓃᑦᑐᑦ **ᐃᓚᒋᓕᐅᑎᓯᒪᔪᓂ B-ᒥ** ᑖᒃᑯᓄᖓᖓᔪᑦ ᐊᓪᓚᒃᓯᒪᔪᑎᒍᑦ ᓇᓗᓇᐃᔭᖅᓯᒪᔭᑦ ᖃᓄᐃᑦᑑᓂᖏᓐᓂᒃ.

ᖃᓄᑐᐃᓐᓇᖅ ᐊᐱᕐᑯᑎᒃᓴᖃᕈᑦᓯ ᐅᕙᓗᑭᐊᖅ ᐃᓱᒫᓗᕆᔭᖃᕝᕙᖃᕈᑦᓯ ᐱᔾᔪᑎᓕᖕᓂᒃ ᑐᒃᓯᕌᓂᒃ ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᔨᑦ ᑲᑎᒪᔨᖏᑦ ᐃᓚᖓᓂ Part 5-ᒥ ᕿᒥᕐᕈᑎᑦ ᓇᓗᓇᐃᔭᖅᓯᒪᔪᖅᑕᖏᑦ ᐃᓚᒋᓕᐅᑎᓯᒪᔪᓃᑦᑐᓂᒃ, ᓇᑦᓯᐅᑎᓯᐅᒃ ᐅᖃᐅᓯᒃᓴᖃᕝᕙᓯ ᑐᕌᑦᑐᑦ ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᔨᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ, ᓯᕗᕐᖓᓂ **April 9, 2009.** ᐅᖃᐅᓯᒃᓴᖃᕝᕚᑦ ᓇᑦᓯᐅᔾᔭᐅᕙᓐᓇᖅᑐᑦ ᐅᑯᐊ ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᔨᑦ ᑲᑎᒪᔨᖏᑦᑕ ᑲᒪᔨᐊᓐᓄᑦ ᐊᕙᑎᓕᕆᔾᔪᑎᓂᒃ ᐊᐅᓚᑦᓯᕕᖕᒥ, ᓚᔅᓕ ᐸᐃᔦᑦ/Leslie Payette-ᒧᑦ, ᐅᕙᓂ lpayette@nirb.ca ᐅᕝᕙᓗᑭᐊᖅ (867) 983-4605.

ᑎᑎᕋᖅᑐᖅ,

ᓘᑲᓯ ᐊᕐᕋᒍᑕᐃᓐᓇᖅ
ᐃᒃᓯᕙᐅᑕᖅ

ᐊᒻᒪᓗ

ᐱᔪᑦ ᐅᕙᖓᑦ

Ron Roach

ᕋᓐ ᕉᑦᓯ
ᐃᒃᓯᕙᐅᑕᖅ

ᐊᔾᔨᖏᓐᓂᒃ ᐱᔪᑦ: ᐱᕐᑯᔭᓕᕆᔨ ᓴᒃ ᓯᑐᕋᓪ/Chuck Strahl - ᑲᓇᑕᒥ ᒥᓂᔅᑕ ᐃᓄᓕᕆᔨᑐᖅᑲᒃᑯᓐᓄᑦ

ᑎᑎᖅᑲᑦ: ᐃᓚᒋᓕᐅᑎᓯᒪᔪᑦ A – ᐃᓚᖓᓂ 5-ᒥ ᕿᒥᕐᕈᔾᔪᑎᑦ ᓄᓗᔾᔮᓂ Mary River-ᒥ ᐱᓕᕆᕝᕕᒃᓴᖅ
ᐃᓚᒋᓕᐅᑎᓯᒪᔪᑦ B – ᑎᑎᕋᐅᔭᖅᓯᒪᔪᑦ ᐃᓚᖓᓂ 5-ᒥ ᕿᒥᕐᕈᔾᔪᑎᑦ ᓄᓗᔾᔮᓂ Mary River-ᒥ ᐱᓕᕆᕝᕕᒃᓴᖅ

ᐃᓚᒋᓕᐅᑎᓯᒪᔪᑦ A-ᒥ - ᐃᓚᖓᓂ PART 5 ᕿᒥᕐᕈᒍᑎᑦ ᐅᕝᕙᖓᖓᔪᓂᒃ ᓄᓗᔮᓂ MARY RIVER-ᒥ ᐱᓕᕆᕕᒃᓴᖅ

ᐊᑑᑕᐅᓕᕈᒪᔪᑦ ᐊᒻᒪᓗ ᐊᕙᑎᓕᕆᔾᔪᑎᑦ ᑐᑭᓕᐅᖅᓯᒪᔭᑦ ᒪᓕᒃᑕᐅᒋᐊᓖᑦ ᐱᕙᓪᓕᐊᔪᒃᓴᓄᑦ

ᓯᕗᓪᓕᖅᐸᖅ ᐱᕙᓪᓕᐊᑎᑦᓯᒍᑦ ᐃᓚᖓᓂ Part 5-ᒥ ᕿᒥᕐᕈᒍᑦ **ᐊᑑᑕᐅᓕᕈᒪᔪᓂᒃ** ᐱᓕᕆᕕᒃᓴᒥᒃ ᑐᒃᓯᕋᐅᑎᑦ ᐊᒻᒪᓗ ᓇᓗᓇᐃᔭᖅᓯᒪᔭᑦ ᖃᓄᐃᑦᑐᑦ ᐱᔾᔪᑕᐅᓪᓚᕆᒃᑐᑦ ᐊᑑᑕᐅᔭᕆᐊᓖᑦ ᖃᐅᔨᓴᕈᑎᓄᑦ ᐊᒻᒪᓗ ᖃᓄᐃᑦᑑᒪᖓᓚ. ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᓴᕿᓕᖅᑐᑦ ᑐᓴᒃᓴᓂᒃ *ᑎᑎᖅᑲᐊᖓᖅᓯᒪᔭᓂᒃ* ᐊᑑᑕᐅᓕᕈᒪᔪᓂᒃ ᐱᔾᔪᑎᓖᑦ ᐱᓕᕆᐊᒃᓴᒥᒃ ᑭᒃᑯᑐᐃᓐᓇᐃᑦ ᐃᓄᐃᑦ ᐅᖃᐅᓯᒃᓴᖃᕐᕕᖏᑦ. ᑎᑎᖅᑲᐊᖓᖅᓯᒪᔭᑦ ᐊᑑᑕᐅᓕᕈᒪᔪᓄᑦ ᐃᓚᒋᔭᐅᓗᑎᒃ ᐅᑯᐊ ᐃᓚᒋᓕᐅᑎᓯᒪᔪᓂ J-ᒥ ᐅᕙᓂᓗ K-ᒥ ᐱᔪᑦ ᐊᖏᖅᑕᐅᓯᒪᔪᓂᒃ ᑲᓇᖕᓇᖓᓂ ᕿᑭᖅᑖᓗᑉ ᓄᓇᓕᕆᔾᔪᑎᒃᓴᑦ. ᐃᓚᒋᓕᐅᑎᓯᒪᔪᓃᑦᑐᑦ ᑲᓇᖕᓇᖓᓂ ᕿᑭᖅᑖᓗᑉ ᓄᓇᓕᕆᔾᔪᑎᒃᓴᑦ ᐊᒻᒪᓗ ᐋᕿᒋᐊᖅᑕᐅᒍᓐᓇᖅᑎᑦᑐᑦ ᐊᓯᐊᒍᑦ ᑕᒪᒃᑯᐊ ᐃᓚᒋᔭᐅᒻᒪᑕ ᐅᑯᑎᒎᓇ ᐋᕿᒃᓯᒪᔪᑎᒍᑦ.

ᐃᓚᖓ Sec. 12.5.2 ᓄᓇᕗᑦ ᓄᓇᑖᕈᑕᐅᓯᒪᔪᑦ ᐊᖏᕈᑎᑎᒍᑦ ᐊᑑᑕᐅᑎᑦᓯᖓᒪᑕ ᓄᓇᕗᑦ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᑐᓂᓯᕆᐊᓖᑦ ᐱᓕᕆᐊᒃᓴᒎᖓᔪᓂᒃ ᖃᓄᐃᑦᑐᓂᒃ ᐱᔾᔪᑎᓕᖓᓂᒃ ᒪᓕᒃᑕᐅᒋᐊᓕᖓᓂᒃ ᓇᖏᓂᖁᑦ ᐋᖅᑭᒃᓯᐃᒍᑎᓂᒃ ᐊᕙᑎᓕᕆᔾᔪᑎᓅᖓᔪᑦ ᑐᑭᓕᐅᖅᓯᒪᔪᑎᒍᑦ. ᐅᑯᐊ ᐃᓚᖓᓂᑦᑐᑦ ᐱᑕᖃᒻᒥᖓᒪᑕ ᖃᓄᐃᑦᑐᑐᐃᓐᓇᕐᓂᒃ ᑐᓴᒃᓴᓂᒃ ᐃᓚᒋᓕᐅᑎᓯᒪᔪᓂᒃ, ᓈᒻᒪᓈᖅᑕᐅᓯᒪᓪᓗᑎᒃ, ᐊᕙᑎᓕᕆᔾᔪᑎᓅᖓᔪᑦ ᑐᑭᖏᑦ ᑐᓴᒃᓴᑦ ᐊᒻᒪᓗ ᐊᑑᑕᐅᑎᑕᖏᑦ ᓄᓇᕗᑦ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦᑕ ᐱᔪᓐᓇᕈᑎᖃᖅᑎᑦᓯᒍᑎᖏᑦ ᐃᓚᒋᓕᐅᑦᑐᑦ, "*ᖃᓄᐃᑦᑐᑐᐃᓐᓇᐃᑦ ᐊᓯᖏᑦ ᐱᔾᔪᑎᓖᑦ ᐅᑯᐊ ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦᑕ ᖃᓄᖅᑑᕈᑎᖏᓐᓈᖓᔪᑦ*". ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᐊᐅᓚᑦᓯᓕᖅᑐᑦ ᑲᑎᒪᑎᑦᓯᒍᑎᓂᒃ ᐃᓄᖕᓂᒃ ᐱᔾᔪᑕᐅᑎᓪᓗᒋᑦ ᐊᑑᑕᐅᓕᕈᒪᔪᑦ ᑲᑎᒪᔾᔪᑎᖃᓪᓗᑎᒃ ᒪᑯᓄᖓᖓᔪᓂᒃ ᐊᒃᑐᖅᑕᐅᑐᐃᓐᓇᕆᐊᓕᖓᓂᒃ ᓄᓇᓖᑦ ᖃᐅᔨᒪᑎᑕᐅᒋᐊᖃᕐᒪᑕ ᐃᓚᐅᑎᓪᓗᒋᑦ ᑭᒃᑐᐃᓐᓇᐃᑦ ᐊᒻᒪᓗ ᐃᓚᐅᔪᒪᔪᑦ ᒪᑯᐊ ᐅᖅᑲᖅᑑᑕᐅᑎᓪᓗᒋᑦ ᖃᓄᐃᑦᑐᓪᓚᕆᖕᒋᑦ ᐊᑑᑎᓂᓖᑦ ᓄᓇᒥᐅᑕᓂᑦᑐᑦ ᐊᒻᒪᓗ ᐊᑑᑎᓂᓖᑦ ᐃᓅᓯᕐᓅᖓᔪᑦ ᖀᓇᐅᔭᒃᓴᐅᑎᒃᓴᓄᑦᑐ ᑕᒪᒃᑯᐊ ᑲᑎᒪᔾᔪᑕᐅᑎᑦᑐᑦ ᐊᑑᑎᒋᐊᖃᕐᒪᑦ ᐅᑯᐊ ᓇᖏᓂᖁᑦ *ᑎᑎᖅᑲᐊᖓᖅᓯᒪᔭᖏᑦ* ᐊᕙᑎᓕᕆᔾᔪᑎᓂᑦᑐᑦ ᑐᓴᒃᓴᖅᑎᒍᑦ.

ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᓴᖀᓕᖅᑐᑦ ᑐᓴᒃᓴᓂᒃ ᐱᔭᐅᓯᒪᔪᓂᒃ ᐊᑑᑕᐅᑎᓪᓗᒋᑦ ᐊᑑᑕᒍᒪᔪᑦ ᐱᓕᕆᓗᑎᒃ ᐱᕙᓪᓕᐊᑎᑦᓯᒍᑎᒃᓴᓂᒃ *ᑎᑎᖅᑲᐊᖓᖅᓯᒪᔪᑎᒍᑦ* ᐊᕙᑎᓕᕆᔾᔪᑎᓅᖓᔪᓂᒃ ᒪᓕᒃᑕᐅᒋᐊᓕᖓᓂᒃ, ᐊᒻᒪᓗ ᑐᓂᐅᖃᖅᑕᐅᓕᖅᑲᑕ *ᑎᑎᖅᑲᐊᖓᖅᓯᒪᔭᑦ* ᐊᕙᑎᓕᕆᔾᔪᑎᒃᓴᑦ ᑐᑭᖏᑦ ᒪᓕᒃᑕᐅᒋᐊᓖᑦ ᑭᒃᑯᑐᐃᓐᓇᖃᖅᑐᓄᑦ ᑐᓂᐅᖃᖅᑕᐅᓗᑎᒃ, ᐱᕕᒃᓴᖃᖅᑎᑕᐅᓂᐊᕐᒪᑕ ᐅᖃᐅᓯᒃᓴᖃᕐᕕᖕᓂᒃ. *ᑎᑎᖅᑲᐊᖓᖅᓯᒪᔭᑦ* ᐊᕙᑎᓕᕆᔾᔪᑎᒃᑯᑦ ᒪᓕᒃᑕᐅᒋᐊᓖᑦ ᐱᑕᖃᓕᕐᒥᔪᑦ ᑲᓇᖕᓇᖓᓅᖓᔪᒥᒃ ᕿᑭᖅᑖᓗᑉ ᓄᓇᓕᕆᔾᔪᑎᒃᓴᒥᒃ (ᐃᓚᒋᓕᐅᑎᓯᒪᔪᓂᑦᑐᑦ J-ᒥ ᐅᕙᓂᓗ K-ᒥ). ᓄᓇᕗᑦ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᕿᒥᕐᕈᓕᕐᒪᑕ ᑭᒃᑯᑐᐃᓐᓇᐃᑦ ᐅᖃᐅᓯᒃᓴᖃᕐᕕᖏᓐᓂᒃ, ᐃᓚᒋᓕᐅᑎᓕᖅᑕᕐᒋᑦ ᑕᒪᒃᑯᓄᖓᖓᔪᓄᑦ ᐊᑑᑕᐅᖁᔭᓄᑦ ᑕᐃᒪᓐᓇ ᐊᑲᐅᓈᖅᓯᒪᓂᐊᕐᒪᑕ, ᑭᖑᓪᓕᖅᐹᓅᖓᔪᓄᑦ ᒪᓕᒃᑕᐅᒋᐊᓕᖕᓄᑦ, ᐊᒻᒪᓗ ᑐᓃᖅᑕᖏᑦ ᓇᖏᓂᖕᓄᑦ ᐋᖅᑭᒃᓯᒪᒋᐊᖃᖅᑲᕐᒥᖏᑦ ᑎᑎᖅᑲᐊᖓᖅᓯᒪᔪᑎᒍᑦ ᐊᕙᑎᓕᕆᔾᔪᑎᓅᖓᔪᑦ ᑐᑭᓕᐅᖅᓯᒪᔪᑎᒍᑦ.

ᐱᔭᐅᒃᐸᑕ ᐊᒻᒪᓗ ᕿᒥᕐᕈᔭᐅᓗᑎᒃ ᑎᑎᖅᑲᐊᖓᖅᓯᒪᔭᑦ ᐊᕙᑎᓕᕆᔾᔪᑎᑦ ᑐᑭᖏᑦ ᑐᓴᒃᓴᑦ

ᐊᕙᑎᓕᕆᔾᔪᑎᑦ ᑐᑭᖏᑦ ᐱᑕᓖᑦ ᐊᑕᖏᖅᑐᓂᒃ ᐊᓪᓚᒃᓯᒪᔪᓂᒃ ᐋᖅᑭᒃᓯᒪᔭᖏᓐᓂᒃ ᓇᖏᓂᖕᓄᑦ ᒪᒃᑐᓂᒃ ᐊᑑᑕᐅᖁᔭᓂᒃ ᑐᓂᓯᒪᔭᖏᓐᓂᒃ ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦᑕ ᓇᓗᓇᐃᔭᖅᓯᒪᓪᓗᑎᒃ, ᓇᓚᐅᓯᒪᓯᓐᓇᖅᑕᖏᑦ ᓯᕗᕙᖓᒍᑦ, ᕿᒥᕐᕈᓗᒋᑦ ᐊᒻᒪᓗ ᑐᓴᐅᒪᔭᐅᑎᓪᓗᒋᑦ ᖃᐅᔨᒪᔭᐅᒋᐊᓕᖕᓂᒃ ᐱᔾᔪᑎᓕᖕᒋᑦ ᓄᓇᒥᐅᑕᐅᓂᖓᔪᓂᒃ ᐊᒻᒪᓗ ᐃᓅᓯᕐᓅᖓᔪᓂᒃ ᖀᓇᐅᔭᒃᓴᐅᑎᒃᓴᓄᑦᑐ ᓯᕐᕿᐃᓂᐊᖅᑐᑦ ᐱᔪᓂᒃ ᑐᒃᓯᕋᒎᖓᔪᓂᒃ ᐱᓕᕆᕕᒃᓴᒥᒃ. ᐅᑯᐊ Baffinland-ᑯᑦ ᐋᖅᑭᒃᓯᓕᖅᑐᑦ *ᑎᑎᖅᑲᐊᖓᖅᓯᒪᔪᓂᒃ* ᐊᕙᑎᓕᕆᔾᔪᑎᓅᖓᔪᑦ ᑐᑭᖏᓐᓂᒃ ᐱᔾᔪᑎᒋᔭᖏᓐᓂᒃ ᓄᓇᕗᒻᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦᑕ ᑐᓂᔭᖏᑦ ᐊᕙᑎᓕᕆᔾᔪᑎᓅᖓᔪᑦ ᒪᓕᒃᑕᐅᖁᔭᓂ ᑕᒪᒃᑯᐊ ᐱᔪᑦ ᖃᖓᒃᑯᑦ ᐊᑑᑎᒍᓐᓇᖅᑕᕐᒥᓂᒃ, ᑖᒃᑯᓇᖓᖓᔪᑦ ᕿᒥᕐᕈᔭᑦ ᐱᔾᔪᑎᖃᓪᓚᑕ ᓇᖏᓂᖕᓂᒃ ᐊᐅᓚᑕᖕᖓᓂᒃ. ᑭᖑᕙᖓᒍᑦ ᓄᓇᕗᑦ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᐱᓯᒪᓕᖅᐸᑕ ᑎᑎᖅᑲᐊᖓᖅᓯᒪᔭᓂᒃ ᐊᕙᑎᓕᕆᔾᔪᑎᑦ ᑐᑭᖏᓐᓂᒃ, ᑲᑎᒪᔩᑦ ᐊᐅᓚᑦᓯᓕᖅᑐᑦ ᐱᖁᔭᑦ ᐃᓗᐊᒍᑦ ᖃᓄᐃᑦᑐᑦ ᐅᔾᔨᖅᑑᑎᓕᕈᑦ ᖃᓄᐃᑦᑐᓗ ᖃᓄᖅᑑᕈᑎᓕᕈᑦ.

ᐊᓱᐃᓪᓛᒃ ᑕᒪᒃᑯᐊ ᐊᑑᑕᐅᑦᓯᐊᓂᖅᐸᑕ ᒪᓕᒃᑕᐅᒋᐊᓖᑦ ᖃᐅᔨᓴᕈᑦ, ᓄᓇᕗᑦ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᑐᓂᐅᖃᐃᓛᖅᑐᑦ ᑎᑎᕋᕐᕕᖓᖅᓯᒪᔪᑦ ᐊᕙᑎᓕᕆᔾᔪᑎᒃ ᑐᑭᖏᓐᓂᒃ ᑭᒃᑯᓕᒫᓅᖃᓪᓗᒋ ᑦ ᐊᒻᒪᓗ ᐊᑏᑎᓗᑎᒃ ᐱᓕᕆᐊᒃᓴᓕᕆᔾᔪᑎᓂᒃ ᐱᖁᔭᖅᑎᒍᑦ ᑲᑎᒪᑎᑦᓯᓗᑎᒃ. ᐅᓇ ᐱᔾᔪᑎᓕᒃ ᐃᒫᒃ ᐱᓕᕆᐊᒃᓴᓕᕆᔾᔪᑎᓅᖓᔪᑦ ᐱᖁᔭᖅᑎᒍᑦ ᖃᐅᔨᓴᕐᓂᖅ ᐱᕙᒃᓴᖃᖅᐸᐅᕐᒪᑦ ᑭᒃᑐᐃᓐᓇᖅᓄᑦ ᐃᓚᐅᔪᓄᑦ ᖃᐅᔨᓴᕐᓯᐊᖁᓪᓗᒋᑦ ᓈᒻᒪᒃᑐᒥᒃ ᐊᒻᒪᓗ ᓈᒪᓈᖅᓯᒪᔪᓂᒃ ᖃᐅᔨᒫᔾᔪᑎᒃᓴᓂᒃ ᑐᓴᒃᓴᓂᒃ ᓴᕿᖅᑕᓂᒃ ᐃᓗᐊᒍᑦ ᑎᑎᕋᕐᕕᖓᖅᓯᒪᔪᑦ ᐊᕙᑎᓕᕆᔾᔪᑎᓅᖓᔪᑦ ᑐᑭᓯᑎᒍᑦ, ᐊᒻᒪᓗ ᐱᕙᒃᓴᖃᓂᐊᕐᒪᑕ ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᐱᓕᕆᐊᒃᓴᓕᕆᔾᔪᑎᒃᑯᑦ ᐱᖁᔭᖅᑎᒍᑦ ᖃᐅᔨᓴᕐᒍᑎᓅᖓᔪᓂᒃ ᐅᖃᐅᓯᒃᓴᖃᕐᕕᖕᓂᒃ, ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᑐᓂᓯᓗᑎᒃ ᐃᓘᓐᓇᖏᓐᓂᒃ ᐅᖃᐅᓯᒃᓴᖃᕐᕕᖕᓂᒃ ᓄᓇᕗᑦᒥ ᐸᕐᓇᐃᔩᒃᑯᑦ ᖃᐅᔨᒪᓂᐊᖅᒪᑦᑕ ᑐᓴᒃᓴᑦ. ᓄᓇᕗᑦ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᖃᓄᖅᑑᕈᑎᖃᑐᐃᓐᓇᓇᐊᖃᒥᔪᑦ ᑲᑎᒪᑎᑦᓯᒍᒪᒍᑎᒃ ᐱᓕᕆᐊᒃᓴᓕᕆᔾᔪᑎᓅᖓᔪᓂᒃ ᐱᖁᔭᖅᑎᒍᑦ ᑲᑎᒪᔪᖃᖅᑲᖅᑐᓂ ᑭᖑᕚᕆᓂ ᐱᓕᕆᐊᒃᓴᓕᕆᔾᔪᑎᓅᖓᔪᑦ ᐱᖁᔭᖅᑎᒍᑦ ᖃᐅᔨᓴᕈᑦ ᐊᑑᑕᐅᑎᓪᓗᒋᑦ, ᐊᐅᓚᑦᓯᒐᓂᖅᑐᑎᒃ ᓱᓕ ᖃᓄᖅᑑᕈᑎᓂᒃ ᐱᔾᔪᑎᓕᖕᓂᒃ ᐱᓕᕆᐊᒃᓴᓕᕆᔾᔪᑎᓅᖓᔪᓂᒃ ᐅᑯᓇᖓᖓᔪᓂᒃ ᐱᔾᔪᑎᓕᖕᓂᒃ ᑎᑎᕋᕐᕕᖓᖅᓯᒪᔪᑦ ᐊᕙᑎᓕᕆᔾᔪᑎᓅᖓᔪᑦ ᑐᑭᖏᓐᓂᒃ.

ᓯᕗᓪᓕᖅ ᑲᑎᒪᑦᓯᒍᑦ

ᓄᓇᕗᑦ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᐊᑏᑎᒍᓐᓇᖅᑐᑦ, ᖃᓚᒥᒃᑯᑦ ᑭᖑᕚᖑᒍᑦ ᐱᓕᕆᐊᒃᓴᓕᕆᔾᔪᑎᓅᖓᔪᑦ ᑲᑎᒪᔾᔪᑕᐅᓗᑎᒃ, ᓯᕗᓪᓕᖅᐹᒥ ᑲᑎᒪᑎᑦᓯᓗᑎᒃ ᐋᔩᕈᑎᖃᓪᓗᑎᒃ ᒪᑯᓄᖓᖓᔪᓂᒃ: ᖃᖓᒃᑯᑦ ᐊᑑᑕᐅᔾᔪᓐᓇᖅᑐᑦ ᑐᓂᔭᐅᕆᐊᓖᑦ ᐊᒻᒪᓗ ᑭᖑᓪᓕᖅᐹᖅᓯᐅᑦ ᑲᑎᒪᑎᑦᓯᒍᑎᒃᓴᖅ ᐃᓄᖕᓂᒃ, ᑲᑎᒪᔾᔪᑕᐅᖁᔭᖅᑐᑦ ᑭᖑᓪᓕᕐᒥ, ᖃᐅᔨᒪᔾᔪᑎᑦ, ᐊᓪᓚᒃᓯᒪᔪᑎᒍᑦ ᑎᑎᕋᖅᑕᐅᑎᒍᑕᐅᓃᑦ ᑭᐅᖃᑕᐅᑎᓪᓗᑎᒃ ᑎᑎᖃᒥᒍᑦ, ᑭᖑᓪᓕᖅᐹᒥ ᑲᑎᒪᑦᓯᒍᑎᒃᓴᑦ, ᑭᖑᓪᓕᖅᐹᖅᓯᐅᑎᑦ ᑲᑎᒪᑦᓯᒍᑎᑦ ᐋᖅᑭᒃᓯᒪᔾᔪᑎᕐᒥᑦ ᐊᒻᒪᓗ ᖃᓄᐃᑦᑐᑐᐃᓐᓇᐃᑦ ᐊᓯᕐᒥᑦ ᐃᒃᐱᓇᖅᑐᑦ ᐱᔾᔪᑕᐅᔪᑦ ᐱᖁᔭᖅᑎᒍᑦ ᐊᑏᑕᐅᓲᑦ ᑭᖑᓪᓕᖅᐹᖅᓯᐅᑎᒃᑯᑦ ᑲᑎᒪᑦᓯᒍᑏᑦ ᐃᓄᖕᓂᒃ. ᓯᕗᓪᓕᖅᐹᖅᓯᐅᑦ ᑲᑎᒪᑦᓯᓂᖅ ᐊᑐᐃᓐᓇᐅᑎᑦᓯᕙᐅᓲᖑᒻᒪᑦ ᐱᕙᒃᓴᖅᑎᑕᐅᓪᓗᑎᒃ ᐃᓚᐅᔪᑦ ᓴᕿᓂᐊᕐᒪᑕ ᓄᓇᕗᑦ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᐱᔾᔪᑕᐅᓚᐅᖅᑐᑦ ᐋᖅᑭᒃᓯᒪᔭᐅᓕᖓᐊᕐᒥᓐᓂᒃ ᑲᑎᒪᔦᖅᑎᓪᓗᒍ ᐱᓕᕆᐊᒃᓴᓕᕆᔾᔪᑎᓅᖓᔪᓂᒃ ᐱᖁᔭᖅᑎᒍᑦ, ᐊᒻᒪᓗ ᑕᒪᒃᑯᐊ ᐱᔾᔪᑕᐅᔪᑦ ᓱᓕ ᐊᑏᑕᐅᓯᒪᕐᒥᑦᑐᓂᒃ ᐱᔾᔪᑎᓖᑦ. ᐱᕙᒃᓴᖅᕚᕆᓂᐊᖅᒥᕐᒪᕆᑦ ᑲᑎᒫᑦ ᓈᓚᒍᓐᓇᖅᓯᓂᐊᖅᒪᑦ ᑭᒃᑯᐃᓐᓇᐃᑦ ᐅᖃᐅᓯᒃᓴᖅᐹᕆᓐᓂᒃ ᑐᓴᕆᐊᓕᕐᒥᓂᒃ ᐅᑯᓇᓃᑦᑐᓂᒃ ᑎᑎᕋᕐᕕᖓᖅᓯᒪᔪᑦ ᐊᕙᑎᓕᕆᔾᔪᑎᑦ ᑐᑭᖏᑦᑎᒍᑦ. ᒦᓇᓕ, ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦ ᐊᒻᒪᓗ ᓄᓇᕗᑦᒥ ᐸᕐᓇᐃᔩᑦ ᐅᖃᐅᓯᖃᓂᐊᕐᒪᑕ ᓇᓗᓇᐃᖅᓯᓗᑎᒃ ᓇᓪᓕᐊᒃᑯᐃᓐᓇᖅ ᐅᕙᑉᐳᑭᐊᖅ ᐊᑐᐃᓐᓇᐅᑎᓯᖕᒋᒪᖔᑕ ᓇᖕᒥᓂᓖᑦ ᓈᒪᒃᑐᓂᒃ ᖃᐅᔨᒪᔭᕆᐊᓕᖕᓂᒃ ᑐᓴᒃᓴᓂᒃ ᐅᕝᕙᖓᖓᔪᓂᒃ ᑲᓇᖕᓇᖓᓂ ᕿᑭᖅᑖᓅᑉ ᓄᓇᓕᖕᔪᐊᖏᓐᓂᒃ ᐃᓚᒋᓕᐅᑎᓯᒪᔪᓐᑐᓂᒃ J-ᒥ ᐅᕙᓂᓗ K-ᒥ.

ᑭᖑᓪᓕᖅᐹᖅᓯᐅᑦ ᓯᕗᓪᓕᖅᐹᒥᒃ ᑲᑎᒪᑦᓯᕐᐸᑕ, ᑲᑎᒪᔩᑦ ᑐᓂᓯᓛᖅᑐᑦ ᓯᕗᓪᓕᖅᐹᒥᒃ ᑲᑎᒪᑦᓯᓚᐅᖅᑎᓪᓗᒋᑦ ᖃᐅᔨᓴᕐᑎᓂᒃ ᑎᓕᔭᐅᔾᔪᑎᖏᓐᓂᒃ ᓇᒥᓂᓛᑦ ᐊᑑᑕᐅᖁᔭᐅᓪᓗᑎᒃ ᒪᓕᒐᓕᖏᓐᓂᒃ ᐅᑯᑎᖑᓇ *ᑭᖑᓪᓕᕇᑦ* ᐊᕙᑎᓕᕆᔾᔪᑎᓅᖓᔪᑦ ᑐᑭᖏᑦᑎᒍᑦ ᐊᒻᒪᓗ ᑭᖑᓪᓕᖅᐹᖅᓯᐅᑎᒥᒃ ᑲᑎᒪᑦᓯᓗᑎᒃ ᐃᓄᖕᓂᒃ.

ᑎᑎᕋᐅᔭᖅᓯᒪᔭᖅ ᐊᑐᐃᓐᓇᐅᕐᒥᒪᑕ **ᐃᓚᒋᓕᐅᑎᓯᒪᔪᓂ B-ᒥ** ᐅᑯᓇᓃᑦᑐᑦ ᐊᓪᓚᒃᓯᒪᔪᑦ ᖃᓄᐃᑦᑐᓂᒃ ᐱᔾᔪᑎᓖᑦ.

ᐊᒥᐊᒃᑯᑦ ᐃᓚᖓᓂ 5-ᒥ ᖃᐅᔨᓴᕐᒍᑎᑦ ᐱᓕᕆᕝᕕᒃᓴᒥᒃ ᓂᕆᐅᒋᔭᐅᓂᐊᖅᑐᑦ ᒪᓕᒋᐊᖃᓂᕆᓂᐊᕐᓂᒃ ᒥᒃᓴᐅᓴᒃᑐᓂᒃ ᐋᖅᑭᒃᓯᒪᔭᓂᒃ *ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦᑕ ᒪᓕᒋᐊᓕᕆᑦ 5-ᖏᑦ: ᒪᓕᒋᐊᓕᕆᑦ ᐊᑏᑎᓗᒋᑦ ᓄᓇᕗᑦᒥ ᐊᕙᑎᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦᑕ ᖃᐅᔨᓴᕐᒍᑎᕆᑦ (ᐊᑐᐃᓐᓇᑦ ᐅᕙᓂ:* http://ftp.nirb.ca/GUIDES/). ᐱᑕᖃᒻᒪᑦ ᐸᕐᓇᓯᒪᔭᓂᒃ ᐃᓚᒋᓕᐅᑎᓯᒪᔪᓂᒃ ᐊᑏᑕᐅᒃᑲᓂᖅᑎᖅᑐᓄᑦ ᓱᓕ ᐅᑯᐊ ᓄᓇᕗᑦᒥ ᐃᒥᓕᕆᔩᑦ ᑲᑎᒪᔨᖏᑦᑕ, ᒪᓕᒃᑐᑦ ᐃᓚᖓᒍ Sec. 13.6.1 ᓄᓇᕗᑦᒥ ᓄᓇᑖᕈᑕᐅᓯᒪᔪᑦ ᐊᖏᕈᑎᑎᒍᑦ. ᐱᑕᖄᑦ ᐃᓘᓐᓇᖏᓐᓂᒃ ᐱᔾᔪᑎᓕᖕᓂᒃ ᑖᒃᑯᓇᓂ ᐊᑑᑕᐅᒋᐊᓕᖕᓂᒃ ᓇᑦᓯᐅᔾᔭᐅᓛᖅᑐᑦ ᐅᖃᐅᓯᒃᓴᖅᕚᕆᑦ ᑭᒃᑯᐃᓐᓇᐃᑦ ᐊᓱᐊᒍᑦ ᐃᕐᒥᒃᑰᓕᕆᔭᐅᔪᑦ ᐋᖅᑭᒃᓯᒪᔪᑦ.

ᐃᓚᒋᓕᐅᑎᓯᒪᔪᑦ B – ᑎᑎᕋᐅᔭᖅᓯᒪᔭᑦ

ᐊᐆᑕᐅᒥᐊᕐᖓᓚᐅᖅᓯᒪᔪᑦ ᐃᓚᖓᓅᖓᔪᑦ 5-ᑯᑦ ᕿᒥᕐᕈᒍᑎᑦ ᐅᕗᖓᖓᔪᒥᒃ
ᓄᓗᒃᓴ Mary River-ᒥ ᐱᓕᕆᕕᒃᓴᖅ ᐅᑯᐊ ᓄᓇᕗᑦᒥ ᐸᕐᓇᐃᔩᑦ
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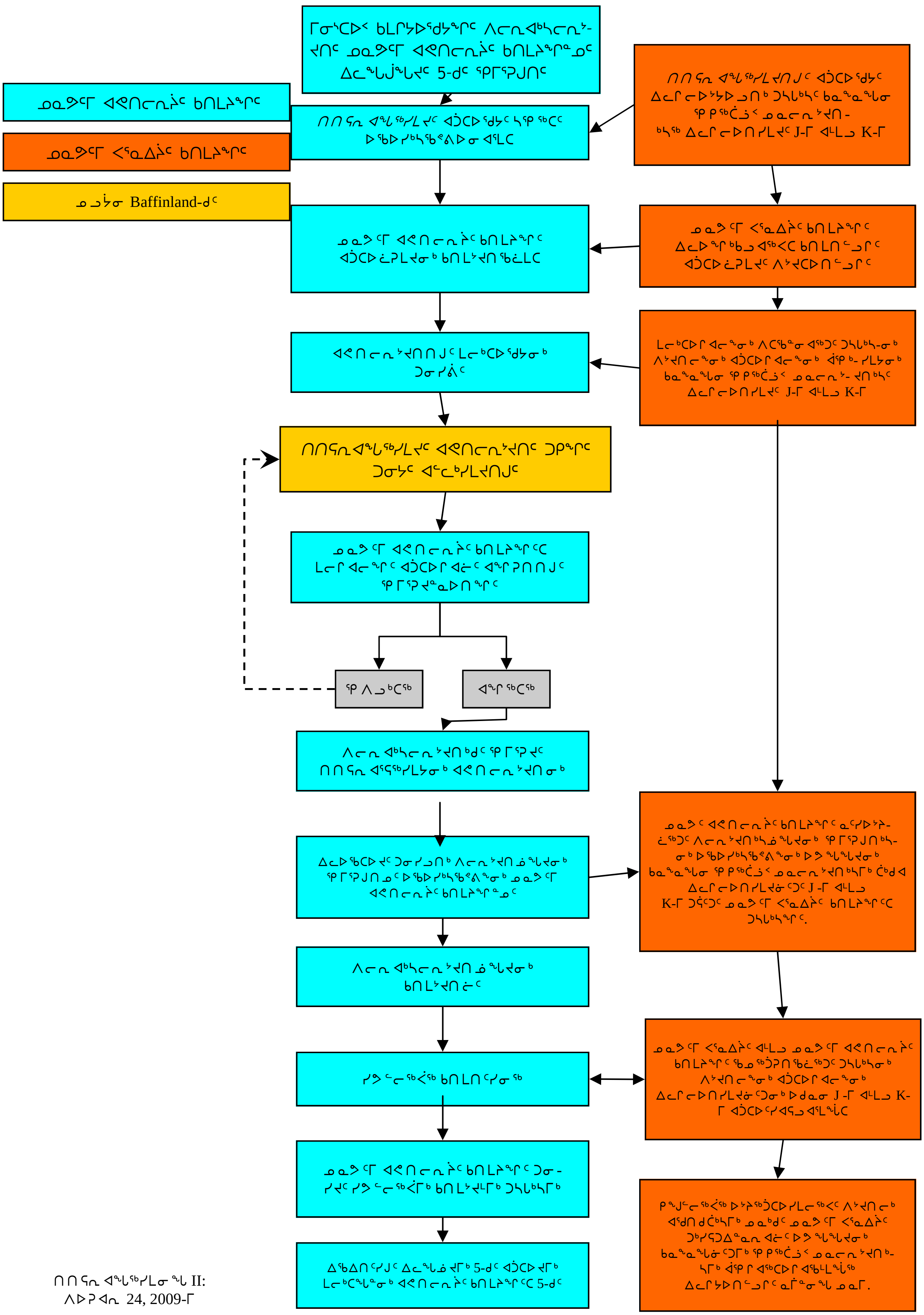

ᑎᑎᕋᕐᓇ ᐊᖓᖅᓯᒪᓂᖓ II:
ᐱᐅᕈᐊᕐᓇ 24, 2009-ᒥ

NIRB File No. 08MN053

September 4, 2009

To: The Mary River Distribution List

Via Email and/or Fax

Re: *Revised Draft* Environmental Impact Statement Guidelines for the Part 5 Review of Baffinland Iron Mines Corp.'s Mary River Project

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Dear Parties,

On June 24, 2009 the Nunavut Impact Review Board (NIRB or Board) distributed *Draft* Guidelines for the Preparation of the Environmental Impact Statement (*Draft* EIS Guidelines) for Baffinland Iron Mines Corporation's (the Proponent) Mary River project (the Project), with a request for comments from interested parties by July 23, 2009 (later extended to August 4, 2009). Having now reviewed comment submissions and revised the document where appropriate, the NIRB would like to provide the public with an opportunity to review the attached *Revised Draft* EIS Guidelines prior to finalization by the Board.

Pursuant to Section 12.5.2 of the Nunavut Land Claims Agreement:

> "*…NIRB shall, upon soliciting any advice it considers appropriate, issue guidelines to the proponent for the preparation of an impact statement. It is the responsibility of the proponent to prepare an impact statement in accordance with any guidelines established by NIRB.*"

It is the NIRB's intention to provide comprehensive project-specific EIS Guidelines to the Proponent which gives clear direction on the information requirements of all reviewers for the impact assessment of the Project. The Board asks that parties with jurisdictional authority over any aspect of the project and/or with technical expertise to offer pertaining to the assessment of the project now review the *Revised Draft* EIS Guidelines and provide their comments to the Board on or before **Monday, September 21, 2009**. Comment submissions should reference the relevant section of the guidelines (please include page and section numbers), the issue and the comment or proposed change to the document. Those parties requiring a hardcopy of the Proponent's future *Draft* EIS submission should also include mailing addresses and the number of copies requested within their comment submission.

As previously announced, the NIRB's staff will also be hosting a guideline development workshop at Nova Inn in Iqaluit on September 29-30, to further resolve any outstanding issues pertaining to the *Revised Draft* Guidelines prior to finalization. The Board asks that parties planning to attend this workshop provide a list of their planned representatives and the key issues they wish to have included in the agenda for the workshop. Any parties requiring interpretation for the workshop are also asked to indicate this to the NIRB as soon as possible to permit proper planning.

Finally, the NIRB would like to acknowledge the requests from parties for clarification on the NIRB and Nunavut Planning Commission (NPC) joint review process for the transportation corridor proposed by this project, as well as the ongoing coordination efforts between the NIRB and the Nunavut Water Board (NWB) for the Part 5 Review process used for this and other files. The NIRB has been working closely with both the NPC and the NWB and will be issuing joint correspondence to this distribution list under separate cover, with a clear process map and corresponding written descriptions speaking to both of these initiatives. Further opportunity for discussion of these coordination efforts will be provided at the upcoming guideline development workshop.

The Board would like to thank all parties for their continued commitment to ensuring an efficient and thorough Part 5 Review of the Mary River project. The NIRB asks that interested parties please forward their comments regarding:

- The *Revised Draft* EIS Guidelines;
- Hardcopies required of the future *Draft* EIS submission; and,
- Planned attendance at the guideline development workshop, key issues for discussion, and requirement for interpretation.

All comments should be submitted directly to the NIRB at info@nirb.ca or via fax at **(867) 983-2594**, on or before **Monday September 21, 2009**.

If you have any questions or concerns, please don't hesitate to contact me directly at (867) 983-4606 or via email at lwan@nirb.ca.

Best regards,

Li Wan
Technical Advisor
Nunavut Impact Review Board

Nunavut Impact Review Board
Nunavutmi Kanogillvalianikot Elittohaiyeoplotik Katimayiit

ᓄᓇᕘᒥ ᐊᕙᑎᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔩᑦ ᓈᓴᐅᑎᖓᑦ. 08MN053

ᓯᑎᐱᕆ 4, 2009

ᐅᑯᓄᖓ: ᓄᓘᔾᒃᓂ ᐅᔭᕋᒃᓯᐅᕐᕕᓕᐅᕐᕕᐅᕙᒪᔩᑉ ᒥᒃᓵᓄᑦ ᑐᓴᐅᒪᖅᑲᑕᐅᔭᓇᐊᖅᑲᖅᑐᐃᓐᓇᖅᓄᑦ

ᖃᓇᑕᐅᔭᐅᑉ ᑎᑎᖅᑲᑦᑕᐅᑎᖓᖅᑎᒍᑦ ᐅᕝᕙᓘᓐᓃᑦ ᓯᑲᔫᒃᑯᑦ

ᐱᔾᔪᑎᖃᖅᑐᖅ: ᐊᓯᔾᔨᖅᑐᖅᑕᐅᓯᒪᓂᓚᖅᑕᖓᓄᑦ ᓯᕗᓪᓕᖅᐹᒥᑦ ᐊᑐᐊᒐᒃᓴᓕᐊᕕᓂᐅᑉ ᐊᕙᑎᒥᐅᑕᓃᑦᑐᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᖃᓯᐅᔾᔭᐅᖁᑐᐃᓐᓇᓚᓴᓇᐊᖃᖅᓂᖏᓐᓄᑦ ᐅᓂᒃᑳᓕᐅᕐᓂᐊᕐᓂᕐᒧᑦ ᓄᓇᑖᕐᓂᕐᒥᑦ ᐊᖏᕈᑏᑦ ᐃᓚᖓᑦᑕ 5-ᑯᑎᒎᓇ ᖃᐅᔨᒋᐊᕈᑕᐅᒋᐊᒃᑲᓐᓂᕈᑕᐅᓂᓇᓂᐊᖅᑕᖓᓄᑦ ᓄᓘᔾᒃᓂ ᐅᔭᕋᒃᓯᐅᕐᕕᓕᐅᕐᕕᐅᕙᒪᓂᓇᔭᖓᓄᑦ ᐸᕕᓐᓈᓐᑯᓐᓄᑦ

ᑎᒥᕆᔭᐅᔪᓄᑦ,

ᔫᓐ 24, 2009-ᖑᑎᓪᓗᒍ ᓄᓇᕘᒥ ᐊᕙᑎᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔩᑦ (NIRB-ᑯᑦ ᐅᕝᕙᓘᓐᓃᑦ ᑲᑎᒪᔩᑦ) ᑐᓂᐅᕋᐃᔪᖕᒪᑕ *ᓯᕗᓪᓕᖅᐹᒥᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓂᓇᔭᖏᓐᓂᒃ ᐊᑐᐊᒐᒃᓴᐅᓂᐊᖅᑐᓂᒃ* ᐋᖅᑭᒃᓱᖅᑕᐅᕙᓪᓚᐊᓂᓇᓂᐊᖅᑕᖓᓄᑦ ᐊᕙᑎᒥᐅᑕᓃᑦᑐᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᖃᓯᐅᔾᔭᐅᑐᓯᐃᓐᓇᓇᐊᖅᑲᖅᓂᖏᓐᓄᑦ ᐅᓂᒃᑳᒃᓴᓕᐊᓇᔭᐅᓂᐊᕐᓂᖓᓄᑦ (EIS) ᐸᕕᓐᓈᓐ ᑯᐊᐳᓈᓴᒃᑯᑦ ᓄᓘᔾᒃᓂ ᐅᔭᕋᒃᓯᐅᕐᕕᓕᐅᕐᕕᕆᔦᒪᔭᖓᓄᑦ (*ᓯᕗᓪᓕᖅᐹᒥᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓂᓇᔭᖏᓐᓂᒃ* ᐊᑐᐊᒐᒃᓴᐅᓂᐊᖅᑐᓂᒃ), ᑐᒃᓯᕐᑑᑎᑦᑲᖅᓱᓂᓗᑕᒪᒃᑯᐊ ᑎᒥᕆᔭᐅᔦᑦ ᐅᖃᐅᓯᒃᓴᖃᕈᒪᔦᑦ ᐅᖃᐅᓯᒃᓴᖅᑎᑕᐅᕕᖃᕈᓇᖅᓂᐊᖅᓯᑎᒃ ᔦᓚᐃ 23, 2009-ᒧᖖᒐᖅᓯᐊᓇᓗᒍ (ᑭᖑᓂᐊᓂ ᑭᖑᕙᓇᐊᖅᑕᐅᓂᑲᔦᔦᖅ ᐊᐅᒡᒍᓯ 4, 2009-ᒧᖕᒑᖅᑕᐅᓯᒪᓕᖅᓱᓂ). ᐅᖃᓕᒫᖅᓯᒪᓕᖅᓱᒋᑦ ᐅᖃᐅᓰᑦ ᖃᐃᑕᐅᓂᑯᐃᑦ ᐊᒻᒪᓗ ᐋᒃᑭᕆᐊᒃᑲᓂᖅᓯᒪᓕᖅᓱᒍᓗ ᑖᓐᓇ ᑎᑎᕋᖅᑕᐅᓯᒪᔪᖅ ᐋᖅᑭᒋᐊᖅᓯᒪᕕᒋᓴᓇᐊᖅᑲᖅᑕᖏᓐᓂ, ᑕᐃᒪ ᓄᓇᕘᒥ ᐊᕙᑎᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔩᑦ ᐃᓄᖕᓂᒃᐅᒃᑯᐃᖑᖅᑎᑦᓯᓯᒪᔦᑦ ᐅᖃᓕᒫᕈᓇᖅᑯᑦᓗᒋᑦ ᐊᑕᔦᒥᑦ ᐋᖅᑭᒃᓱᖅᑕᐅᓯᒪᓂᓚᖅᑕᖅᑭᖏᓐᓂᒃ *ᓯᕗᓪᓕᖅᐹᒥᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓂᓇᔭᖏᓐᓂᒃ ᐊᑐᐊᒐᒃᓴᐅᓂᐊᖅᑐᓂᒃ ᐋᖅᑭᒃᓯᐃᔾᔪᖅᑕᐅᕙᓪᓚᐊᓂᓇᓂᐊᖅᑕᖓᓄᑦ ᐊᕙᑎᒥᐅᑕᓃᑦᑐᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᖃᓯᐅᔾᔭᐅᑐᓯᐃᓐᓇᓇᐊᖅᑲᖅᓂᖏᓐᓄᑦ ᐅᓂᒃᑳᒃᓴᓕᐊᓇᔭᐅᓂᐊᕐᓂᖓᓄᑦ* ᑭᖑᓪᓕᖅᐸᒥᑦ ᖃᓄᐃᖏᑦᑐᖅᑕᖅᑲᐅᖏᒃᑲᓗᐊᓇᐊᖑᓂᒃ ᖃᐅᔨᓇᓯᐊᕈᑕᐅᓂᐊᔮᖅᑎᓪᓗᒍ ᑲᑎᒪᔨᓄᑦ.

ᒪᓕᒡᓗᒍ ᐃᓚᖓᑦᑕ ᐃᓚᖓᓐᓃᑦᑐᖅ 12.5.2 ᓄᓇᕘᒥ ᓄᓇᑖᕐᓂᕐᒥᑦ ᐊᖏᕈᑎᓃᑦᑐᖅ:

> *"…ᓄᓇᕘᒥ ᐊᕙᑎᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔩᑦ ᐃᒪᐃᓕᐅᖅᑲᑦᑕᕐᓂᐊᖅᐳᖅ, NIRB ᐊᐱᕆᓚᐅᖅᑳᖅᓗᑎᒃ ᐅᖃᐅᓯᒃᑯᑦ ᐃᑲᔫᑕᐅᕙᓪᓕᕈᓇᑎᕆᔭᓇᕋᔭᖅᑕᒥᓂᒃ, ᑐᓂᐅᕋᐃᖅᑲᑦᑕᕐᓂᐊᖅᐳᑦ ᐱᓕᕆᐊᖅᑭᒪᔩᑉ ᐊᑐᐊᒐᒃᓴᕆᓂᐊᖅᑕᖏᓂᒃ ᐋᖅᑭᒃᓱᖅᑕᐅᕙᓪᓚᐊᓂᓇᓂᐊᖅᑕᖓᓄᑦ ᐊᕙᑎᒥᐅᑕᓃᑦᑐᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᖃᓯᐅᔾᔭᐅᑐᓯᐃᓐᓇᓇᐊᖅᑲᖅᓂᖏᓐᓄᑦ ᐅᓂᒃᑳᒃᓴᓕᐊᓇᓂᐊᖅᑕᖓᓄᑦ. ᑕᒪᓐᓇ*

ᐱᓕᕆᐊᖃᕈᒪᔪᑉ ᐱᓕᕆᐊᕆᔭᕆᐊᖃᖅᑕᖓ ᐋᖅᑭᒃᓱᖅᑕᐅᕙᓪᓕᐊᓂᕆᓂᐊᖅᑕᖓᓄᑦ
ᐊᕙᑎᒥᐅᑕᓃᑦᑐᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᖃᓯᐅᔾᔭᐅᑐᓯᐃᓐᓇᕆᐊᖃᖅᓂᖏᓐᓄᑦ
ᐅᓂᒃᑳᒃᓴᓕᐅᕆᐊᖃᖅᑯᓂᖅ ᓄᓇᕗᒥ ᐊᕙᑎᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔩᓄᑦ ᓇᓕᐊᑐᐃᓐᓇᖏᑦ
ᐊᑐᐊᓚᓕᐊᕙᓂᖏᑦ ᒪᓕᒡᓗᓂᒋᑦ.”

ᓄᓇᕗᒥ ᐊᕙᑎᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔩᑦ ᐊᑐᐃᓐᓇᐅᑎᑦᓯᓇᓯᐊᕋᓗᐊᖅᐳᑦ ᑕᒪᒃᑭᐅᒪᑦᓯᐊᖅᑐᓂᒃ ᐊᑕᐅᓯᖂᕐᖓᔪᒧᑦ ᐱᓕᕆᐊᕆᔭᐅᔪᒪᔪᒨᓕᕐᖓᔪᓄᑦ ᐊᕙᑎᒥᐅᑕᓃᑦᑐᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᖃᓯᐅᔾᔭᐅᑐᓯᐃᓐᓇᕆᐊᖃᖅᓂᖏᓐᓄᑦ ᐅᓂᒃᑳᒃᓴᓕᐊᖑᖃᑦᑕᕐᓂᐊᖅᑐᓄᑦ ᐊᑐᐊᓚᒃᓴᕆᓂᐊᖅᑕᐃᓂᒃ ᐸᕕᓐᓚᓐ ᐊᐃᔾᓐᒪᐃᓐᔅ (ᐱᓕᕆᐊᖃᕈᒪᔪᖅ) ᑐᑭᓯᓐᓇᑦᓯᐊᕐᓂᐊᖅᑐᓂᒃ ᖃᓄᐃᑦᑑᑎᓂᒃ ᑐᓴᒃᓴᐅᑎᒃᓴᓂᒃ ᖃᐃᑦᓯᒋᐊᖃᖃᑦᑕᕐᓂᐊᕐᒪᖔᑕ ᑕᒪᐃᓐᓄᑦ ᑎᒥᖁᔭᐅᔪᓕᒪᓄᑦ ᑲᑐᔾᔨᖃᑎᒋᒋᔭᐅᔪᓄᓪᓗ ᐊᒻᒪᓗ ᐊᕕᒃᑐᖅᓯᒪᐅᕐᓂᖃᐅᖅᑐᓄᓪᓗ ᓇᓗᓇᐃᖅᑑᑕᐅᓂᕆᔭᖓᓐᓄᑦ ᓄᑖᔾᔭᒃᓯ ᐅᔭᕐᒃᓯᐅᕐᕕᓕᐅᕐᕕᐅᔪᒪᓂᖓᓐᓄᑦ ᐱᔾᔪᑎᖃᖅᑐᓂᒃ. ᑲᑎᒪᔩᑦ ᐊᐱᕆᔪᒪᓕᖅᐳᑦ ᑎᒥᖁᔭᐅᔪᑦ ᓵᖓᓂᖅᑕᖅᑎᑕᐅᓯᒪᔪᑦ ᓇᐅᒃᑯᑐᐃᓐᓇᖅ ᐱᓕᕆᐊᕆᔭᐅᔪᒪᔪᒨᓕᕐᖓᔪᒧᑦ ᐊᒻᒪᓗ/ᐅᕝᕙᓘᓐᓃᑦ ᖃᐅᔨᒪᓂᖅᑕᖅᑐᓪᓗ ᐃᑲᔪᖅᑕᐅᖁᔭᐅᓕᖅᐳᑦ ᐱᓕᕆᐊᕆᔭᐅᔪᒪᔫᑉ ᓇᓗᓇᐃᖅᑑᑕᐅᓂᕆᕙᓪᓕᐊᓂᕆᔭᖓᓐᓄᑦ ᕿᒥᕐᕈᖁᔭᐅᓪᓗᑎᒃ *ᓯᕗᓪᓕᖅᐹᒥᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓂᕆᔭᕆᐊᓂᒃ* *ᐊᕙᑎᒥᐅᑕᓃᑦᑐᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᖃᓯᐅᔾᔭᐅᑐᓯᐃᓐᓇᕆᐊᖃᖅᓂᖏᓐᓄᑦ ᐅᓂᒃᑳᒃᓴᓕᐊᕆᔭᐅᓂᐊᖅᑐᓄᑦ ᐊᑐᐊᓚᒃᓴᐅᓂᐊᖅᑐᓂᒃ* ᐅᖃᐅᓯᒃᓴᖏᓪᓗ ᐅᖃᐅᓯᖃᖁᔭᐅᕗᑦ ᐅᓪᓗᐊᓂ ᓯᕗᓂᐊᓂᓘᓐᓂᑦ ᑲᑎᒪᔨᓄᑦ **ᓇᖕᖓᔾᔭᐅᑦ**, ᓯᑎᐱᕆ 21, 2009. ᐊᑐᓚᓕᕆᓂᖁᓕᕐᖓᔪᓄᑦ ᐅᖃᐅᓯᖏᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᔪᑦ ᓇᒥᓪᓚᕆᒃ ᐊᑐᐊᓚᓃᑦᑐᓂ ᐅᖃᐅᓯᖃᒪᖔᕐᒥᒃ ᑎᑎᕋᐅᓯᖄᔪᖃᑦᑕᕆᐊᖏᑦ (ᒪᒃᐱᖄᖓ ᐃᓚᖃᓯᐅᑎᖃᑦᑕᕐᓗᒋᑦ ᐊᒻᒪᓗ ᐊᕙᒃᑐᖅᓯᒪᐅᕐᓂᖏᑦᑕ ᓇᓴᐅᑎᖏᑦ ᑎᑎᕋᖃᑦᑕᕐᒥᓗᑎᑦᑕᐅᖅ), ᐅᖃᐅᓯᐅᕆᐊᒃᑲᓐᓂᕐᑯᔭᐅᔪᕐᓗ ᐊᒻᒪᓗ ᐅᖃᐅᓯᐅᔪᕐᓗ ᐅᕝᕙᓘᓐᓃᑦ ᐊᓯᔾᔨᖅᑐᖅᑕᐅᓯᒪᖃᓯᐅᔾᔭᐅᖁᔭᐅᔪᕐᓗ ᑎᑎᕋᖅᓯᒪᓂᕆᔭᕆᐊᓂ. ᑕᒪᒃᑯᐊ ᑎᒥᖁᔭᐅᔪᑦ ᑎᑎᕋᖅᓯᒪᓪᓚᒃᑖᖅᑐᓂᒃ ᐱᔪᒪᔪᑦ ᐱᓕᕆᐊᖃᕈᒪᔫᑉ ᓯᕗᓂᒃᓴᒥ ᓯᕗᓪᓕᖅᐸᒥᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓂᕆᔭᖓᓐᓂᒃ *ᐊᕙᑎᒥᐅᑕᓃᑦᑐᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᖃᓯᐅᔾᔭᐅᑐᓯᐃᓐᓇᕆᐊᖃᖅᓂᖏᓐᓄᑦ ᐅᓂᒃᑳᒃᓴᓕᐊᕆᓂᐊᖅᑕᖓᓐᓂ ᑐᕌᕆᑎᑦᓯᖕᓂᒃ ᖃᓯᓂᓪᓗ ᐊᔾᔨᓕᐅᖅᓯᒪᓂᖏᓐᓂᒃ ᐱᔪᒪᓇᔭᕆᐊᒥᖕᓂᒃ ᐃᓚᖃᓯᐅᔾᔨᔭᕆᐊᖏᑦ ᐅᖃᐅᓯᒃᓴᓯ ᑎᑎᕋᓕᕈᑦᓯᐅᒃ ᐃᓚᖃᓯᐅᑎᓗᒋᑦ ᑖᑦᓯᔫᖓ.*

ᐅᖃᖅᓯᒪᔭᓃᖅᒪᑕ, ᓄᓇᕗᒥ ᐊᕙᑎᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔩᑦᑕ ᐃᖅᑲᓇᐃᔭᖅᑎᖏᑦ ᑲᑎᒪᑎᑦᓯᒃᑲᐃᑖᕐᓂᖏᓐᓂᒃ ᐊᑐᐊᓚᖁᐅᓕᐅᖅᑎᑏᖏᓂᕐᒥᑦ ᐱᔾᔪᑎᖃᖅᑐᓂ ᓅᕙ ᐃᓐᒥ ᐃᖅᑲᓗᐃᓂ ᓯᑎᐱᕆ 29-ᒥᑦ 30-ᒧᑦ, ᐋᖅᑭᒃᓯᐃᖅᑎᕉᓯᐊᖅᑕᐅᓗᑎᓪᓗ ᐅᖃᐅᓯᐅᒃᑲᓐᓂᕆᐊᖅᑐᓇᔭᐅᔪᓂᒃ *ᓯᕗᓪᓕᖅᐹᒥᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓂᕆᔭᕆᐊᓂᒃ ᐊᑐᐊᓚᒃᓴᐅᓂᐊᖅᑐᓂᒃ* ᑭᖑᓪᓕᖅᐸᒥᑦ ᖃᓄᐃᖏᑦᑐᖅᑕᖅᑕᐅᖏᒃᑲᓗᐊᓇᐊᖑᓂᒃ ᖃᐅᔨᓇᓯᐊᕈᑕᐅᓂᐋᖅᑎᓪᓗᒍ ᑲᑎᒪᔨᓄᑦ. ᑲᑎᒪᔩᑦ ᐊᐱᕆᕗᑦ ᑎᒥᖁᔭᐅᔪᓂᒃ ᑲᑎᒪᔭᖅᑐᖅᑲᑕᐅᓂᐊᖅᑐᓂᒃ ᑭᒃᑯᓐᓂᒃ ᑭᓪᓚᖅᑐᐃᓐᓂᖅᑲᓂᐊᕆᐊᕐᒥᑦᑕ ᐊᖑᒧᑦ ᐊᑎᖏᓐᓂᒃ ᑎᑎᕋᖅᑯᐃᓐᓗᑎᒃ ᐊᒻᒪᓗ ᑲᑎᒪᔾᔪᑎᒃᓴᓄᐊᖅᑕᐅᔪᓂᓪᓗ ᐃᓚᖃᓯᐅᔾᔭᖅᑯᔭᕐᓗᑎᒃ. ᑎᒥᖁᔭᐅᔪᑦ ᑐᓵᔨᖃᖅᑐᑦ ᐅᖃᖅᑐᔪᕗᑦ ᑲᑎᒪᔨᓄᑦ ᓯᕗᓂᐊᓂ ᑐᓵᔨᖃᖅᑐᑦ ᑐᓴᔪᓐᓂᒃ ᕿᓂᖅᐸᓪᓚᐊᒍᓐᓇᖅᓂᐊᖅᒪᑕ.

ᑭᖑᓪᓕᖅᐹᖅᑐ, ᑲᑎᒪᔩᑦ ᖃᐅᔨᒪᖁᔨᕗᑦ ᖃᐅᔨᒪᓕᕆᐊᒥᓂᒃ ᑎᒥᖁᔭᐅᔪᑦ ᑐᒃᓯᖅᑑᑎᖃᓚᐅᖅᑐᓂᒃ ᑐᑭᓯᒋᐊᖅᑎᑕᐅᔪᒪᓕᕆᐊᒃᑲᓐᓂᕈᒪᓪᓗᑎᒃ ᓄᓇᕗᒥ ᐊᕙᑎᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔩᑦ ᐊᒻᒪᓗ ᓄᓇᕗᒥ ᐸᕐᓇᐃᔩᑦ ᑲᒥᓴᓐᑯᖅᑎᖏᓐᓄ ᖃᓄᖅ ᑲᑐᔾᔨᖃᑎᒌᒍᓯᕐᓂᒃᑯᑦ ᐃᓄᖕᓂᒃ ᐃᓄᒋᐊᒃᑎᓐᓄᒍ ᑲᑎᒪᑎᑦᓯᒃᑲᐃᑖᕈᓐᓇᕐᓂᐊᕐᒪᖔᑕ ᐃᒃᑭᖅᓴᕙᐅᓂᐅᑉ ᒥᒃᓵᓂᖕᓄᐊᖅᑐᑎᒃ ᐱᔾᔪᑎᖃᓕᕐᓗᒍ ᑖᑦᓯᔫᖓ ᐱᓕᕆᐊᖃᕈᒪᔪᒧᑦ, ᐊᒻᒪᓗᑦᑕᐅᖅ ᓄᓇᕗᒥ ᐊᕙᑎᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔩᑦ ᐊᒻᒪᓗ ᓄᓇᕗᒥ ᐃᒪᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔩᑦ ᐱᓕᕆᐊᖃᑎᒋᓚᐅᕐᓂᐊᖏᓐᓂᒃ ᐊᖏᕈᑎᓃᑦᑐᖅ ᐃᓚᖓᑦᑕ ᐃᓚᖓᓃᑦᑐᖅ 5 ᐃᓄᖕᓂᒃ ᐃᓄᒋᐊᒃᑎᓪᓗᒍ ᑲᑎᒪᑎᑦᓯᒃᑲᐃᑖᕐᓂᐊᖏᓐᓂᒃ ᐱᓕᕆᔭᐅᓯᐅᑏᖅᑐᓂᒃ ᑲᒪᖃᑎᒋᑏᓐᓂᐊᖏᓐᓄᑦ ᐅᓇ ᐱᔭᕆᑎᓪᓗᒍ ᐊᓯᖏᓐᓄᓪᓗ ᐱᓕᕆᐊᕆᔭᐅᔪᒪᔪᑦ

ᑎᑎᕐᑲᕐᑯᑎᓃᓕᖅᑐᓄᓪᓗ.ᓄᓇᕗᒥ ᐊᕙᑎᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔩᑦ ᐱᓕᕆᐊᕐᑲᑎᕐᑲᕐᑲᑦᑕᖅᓕᖅᑐᑦ ᓄᓇᕗᒥ ᐸᕐᓇᐃᔩᑦ ᑲᒥᓭᓐᑯᖕᒋᓐᓂᒃ ᐊᒻᒪᓗ ᓄᓇᕗᒥ ᐃᒪᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔩᓂᓪᓗ ᐊᒻᒪᓗ ᑎᑎᕋᕐᑲᑦᑕᖅᑕᒥᖕᓂᒃ ᑐᓂᐅᕋᐃᕐᑲᑦᑕᕐᓂᐅᓭᔾᑦ ᑐᓴᐅᒪᕐᑲᑕᐅᔭᕆᐊᕐᑲᖅᑐᓄᑦ ᐊᓯᒍᖕᒐᒍᑦᑕᐅᖅ, ᐱᓕᕆᔾᔪᓯᐅᓂᐊᖅᑐᓪᓗ ᐃᓚᕐᑲᓯᐅᑎᓗᓂᒋᑦ ᑐᑭᓕᖅᑐᖅᑕᐅᓯᒪᑦᓯᐊᖅᑐᓂᓪᓗ ᑖᒃᑯᓈᖕᒐ ᑕᒪᒃᑮᖕᓄᑦ ᐱᓕᕆᐊᕆᔭᐅᓇᓱᐊᖅᑑᓄᑦ. ᐅᕐᑲᐅᓯᕐᑲᕐᕕᕐᑲᖅᑎᑕᐅᕕᕐᑲᕐᑲᑦᑕᕐᓂᐊᖅᑐᑦ ᐱᓕᕆᐊᕐᑲᑎᒌᖕᓂᐊᕐᓂᖕᒋᓐᓄᑦ ᐱᔾᔪᑎᕐᑲᖅᑐᓂᒃ ᐊᑐᐊᒐᓕᐅᕐᑲᑎᒌᖕᓂᖅ ᑲᑎᒪᔾᔪᑕᐅᓕᖅᐸᑦ.

ᑲᑎᒪᔩᑦ ᑎᒥᖏᔭᐅᔪᓂᒃ ᕐᑯᔭᓕᔪᒪᕗᑦ ᐱᓕᕆᐊᕐᑲᑎᒌᕐᑲᑕᐅᖕᒋᓐᓇᓱᐊᕐᓂᕆᕐᑲᑦᑕᖅᑕᐃᓄᑦ ᕐᑭᓚᒻᒥᐅᓂᖅᐸᒃᑯᑦ ᐊᑲᐅᓂᖅᐸᒃᑯᓪᓗ ᐃᓚᖕᒐ 5 ᕐᑲᐅᔨᒋᐊᕈᑕᐅᒋᐊᒃᑲᓐᓂᕈᑕᐅᓂᕆᓂᐊᖅᑕᖕᒐᓐᓄᑦ ᓄᑰᔾᒃᓂ ᐱᓕᕆᐊᕆᔭᐅᔪᒪᓂᕆᔭᖕᒐᓐᓄᑦ. ᑲᑎᒪᔩᑦ ᑎᒥᖏᔭᐅᔪᓂᒃ ᐅᕐᑲᐅᓯᒃᓴᕆᓂᐊᖅᑕᒥᖕᓂᒃ ᕐᑲᐃᑦᓯᕐᑯᔭᐅᑲᓗᐊᖅᐳᑦ ᐅᑯᓄᖔ ᐱᔾᔪᓯᑎᕐᑲᖅᑐᓂᒃ:

- *ᓯᕗᓪᓕᖅᐹᒥᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓂᕆᔭᖕᒋᓐᓂᒃ ᐊᕙᑎᒥᐅᑕᓃᓪᑐᑦ ᐊᒃᑐᖅᑕᐅᓯᒪᕐᑲᓯᐅᔾᔭᐅᑐᓯᐃᓐᓇᕆᐊᕐᑲᖅᓂᖕᒋᓐᓄᑦ ᐅᓂᒃᑳᒃᓴᓕᐊᕆᔭᐅᓂᐊᖅᑐᓄᑦ ᐋᖅᑭᒋᐊᖅᑕᐅᓯᒪᓕᖅᑐᑦ ᐊᑐᐊᒐᒃᓴᐅᓂᐊᖅᑐᕐ;*
- ᑎᑎᕋᖅᓯᒪᔪᓂᒃ ᐊᔾᔨᖕᒋᓐᓂᒃ ᐱᑎᑕᐅᔪᒪᔪᑦ ᑖᓐᓇ ᖕᒍᓄᓪᓕᖅ ᑎᑎᕋᐅᑕᐅᕋᑖᑦᓯᐊᖅ ᕐᑯᑖᓃᑦᓯᐊᖅ ᑎᑎᕋᖅᓯᒪᔪᖅ ᐱᔾᔪᑎᒋᓪᓗᒍ; ᐊᒻᒪᓗ
- ᑭᒃᑯᓐᓂᒃ ᑭᒡᒐᖅᑐᐃᔨᕐᑲᕐᓂᐊᕆᐊᖕᒋᑦᑕ ᐊᖕᒍᑦ ᐊᑎᖕᒋᓐᓂᒃ ᑎᑎᕋᕐᑯᔨᓪᓗᑎᒃ ᐊᒻᒪᓗ ᑲᑎᒪᔾᔪᑎᒃᓴᓄᐊᖅᑕᐅᕐᑯᔭᐅᔪᓂᓪᓗ ᐃᓚᕐᑲᓯᐅᔾᔨᕐᑯᔨᓗᑎᒃ. ᑎᒥᖏᔭᐅᔪᑦ ᑐᓵᔨᕐᑲᕐᑯᔨᔪᑦ ᐅᕐᑲᕐᑯᔭᐅᕗᑦ ᑲᑎᒪᔨᓄᑦ ᓯᕗᓂᐊᓂ ᑐᓵᔨᕐᑲᕐᑯᔨᔪᑦ ᑐᓴᔾᒃᓴᓂᒃ ᕐᑭᓂᖅᐸᓪᓕᐊᒍᓐᓇᕐᓂᐊᕐᒪᑕ.

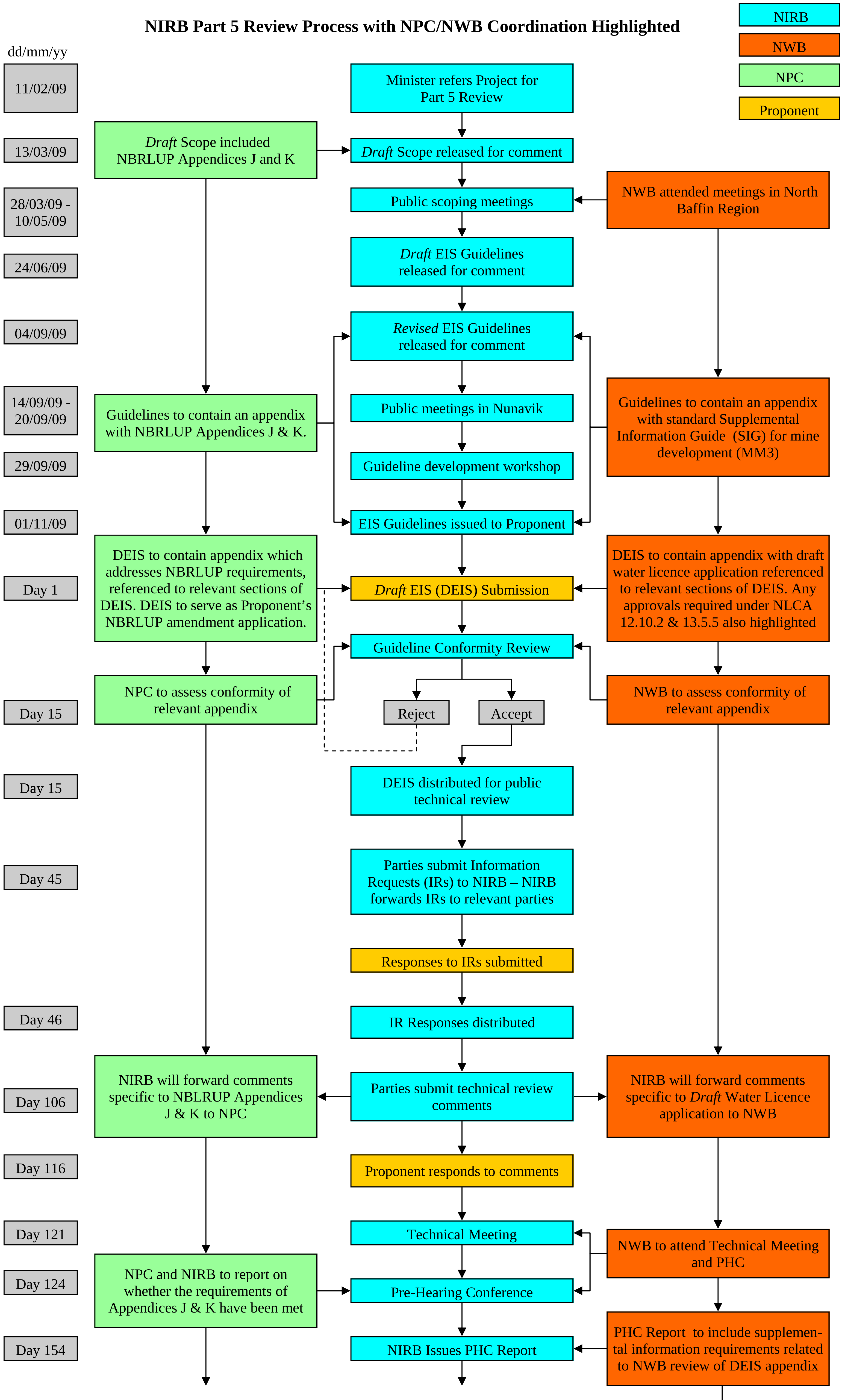
ᐅᕐᑲᐅᓯᐅᔪᒪᔪᑦ ᑎᑎᕋᖅᑕᐅᓯᒪᓂᕆᔭᖕᒋᓐᓂᒃ ᓄᓇᕗᒥ ᐊᕙᑎᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔨᓄᐊᖅᑕᐅᔭᕐᑭᐊᓖᓪ ᐅᕗᓇ ᕐᑲᓕᑕᐅᔭᖅᑎᒍᑦ info@nirb.ca ᓱᑲᔪᒃᑯᓪᓘᓐᓃᑦ (867) 983-2594, ᐅᓪᓗᐊᓂ ᓯᕗᓂᐊᓂᓘᓐᓃᑦ ᓇᒡᒐᔭᐅᑦ, ᓯᑎᐱᕆ 21, 2009.

ᐊᐱᕐᑯᑎᒃᓴᕐᑲᕐᓂᕈᓯᐊ ᐃᓱᒫᓗᑎᕐᑲᕐᓂᕈᓯᐊᓘᓐᓃᑦ ᑐᕋᐃᓐᓇᖅ ᐅᕐᑳᓚᕕᐅᔾᔪᓇᖅᑐᖕᒐ ᐅᕗᖕᒐ (867) 983-4606 ᕐᑲᓕᑕᐅᔭᐅᓪᓗ ᑎᑎᕐᑭᕐᑲᑦᑕᐅᑎᒃᑯᓪᓗᓐᓂᑦ lwan@nirb.ca.

ᐃᓱᒪᒋᑦᓯᐊᖅᐸᑦᓯ,

ᓖ ᕗᐊᓐ
ᐊᕙᑎᓕᕆᓂᕐᒨᓕᖕᒐᔪᓄᑦ ᐅᕐᑲᐅᔾᔪᐃᔨᐊᖅᑎ
ᓄᓇᕗᒥ ᐊᕙᑎᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔨᓄᑦ

NIRB Part 5 Review Process with NPC/NWB Coordination Highlighted



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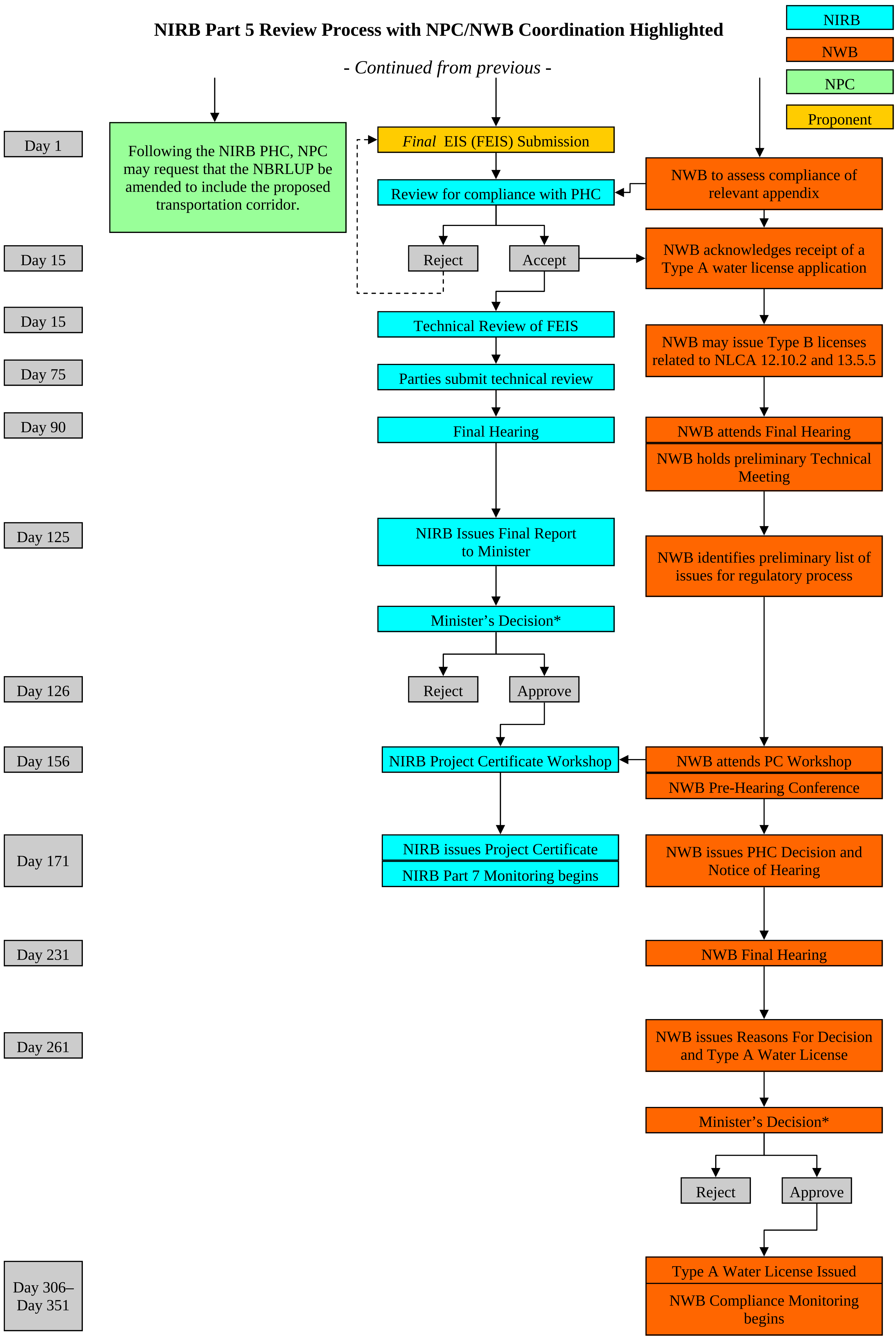
NIRB Part 5 Review Process with NPC/NWB Coordination Highlighted

- Continued from previous -



* Note: The timeline for the Minister's Decision is independent of the NIRB and NWB

APPENDIX B – NIRB/NPC JOINT REVIEW PROCESS FOR THE MARY RIVER PROJECT

Please note, this written description is meant to accompany the process map provided in **Appendix A** of this document, and speaks only to the coordination between the NIRB and NPC as it pertains to the Part 5 Review process; a more detailed discussion of each step in the Part 5 Review process can be found in the NIRB's *Guide 5: Guide to the NIRB Review Process*, available at http://ftp.nirb.ca/GUIDES.

Scoping and EIS Guideline Development

The first step in the NIRB's Part 5 Review process is to scope the project proposal and the potential impacts associated with developing the project. On March 13, 2009 the NIRB released the *Draft* Scope of the review of the Mary River Project (the Project) for public comment. This *Draft* Scope included Appendices J and K of the North Baffin Regional Land Use Plan (NBRLUP), unmodified from their published form, to be used in the assessment of the transportation corridor proposed by the Project.

Beginning on March 28, 2009 the NIRB conducted public scoping meetings in communities potentially affected by the Project and/or the proposed amendment to the NBRLUP. Public scoping meetings were held in the following communities: Pond Inlet, Arctic Bay, Resolute Bay, Grise Fiord, Igloolik, Hall Beach, Coral Harbour, Cape Dorset, Kimmirut, Iqaluit and Clyde River. The requirements of the NBRLUP and details on the NIRB/NPC joint review process were emphasized at the public scoping meetings in Grise Fiord, Resolute Bay, Arctic Bay, Pond Inlet and Clyde River (communities included in the NBRLUP). Following the public meetings, NIRB released a summary report, detailing the comments and concerns raised in each community.

Section 12.5.2 of the NLCA directs the NIRB to issue project specific guidelines to the Proponent for the preparation of an Environmental Impact Statement (EIS). This Section also contains a list of information to be included, where appropriate, in an EIS and grants the NIRB the authority to add, "*any other matters that NIRB considers relevant*". Drawing upon information contained within the summary report mentioned above, the NIRB released *Draft* Guidelines for the preparation of an Environmental Impact Statement (*Draft* EIS Guidelines) for the Project on June 24, 2009 requesting interested parties supply their comments to the NIRB on or before July 23, 2009 (later extended to August 4, 2009). After reviewing the comment submissions and integrating those recommendations it considered appropriate, on September 4, 2009 the NIRB released *Revised Draft* EIS Guidelines for a second round of public comment.

It has been noted that many issues pertaining to the NIRB's impact assessment of the railway and of the Project are closely related to the information requirements of the NBRLUP, and may also aid in the NIRB/NPC joint review of the prospective transportation corridor. Section 1.4.1 of the *Revised Draft* EIS Guidelines document speaks to the requirement of the Proponent's future *Draft* EIS (DEIS) submission to address the information required by Appendices J and K of the NBRLUP, with cross-referencing to relevant sections of the DEIS. The DEIS will then serve as the Proponent's formal application to the NPC for an amendment to the NBRLUP, minimizing unnecessary duplication.

A guideline development workshop has been scheduled for September 29-30 in Iqaluit, and will provide additional opportunity to discuss how best to ensure all information requirements pertaining to the proposed transportation corridor are met appropriately and with minimal duplication. Following the receipt of comments on the *Revised Draft* EIS Guidelines and the guideline development workshop, NIRB will make final revisions and then issue *Final* EIS Guidelines to the Proponent; this is anticipated to occur following the NIRB's scheduled Board meeting October 26-27, 2009.

Receipt and Review of a Draft EIS (DEIS)

An EIS is a detailed document prepared by the Proponent in accordance with the *Final* EIS Guidelines issued by the NIRB which identifies, predicts, evaluates, and communicates information about the ecosystemic and socio-economic impacts of a project proposal. The Proponent will develop a DEIS with the NIRB-issued *Final* EIS Guidelines based on its own timetable, making this section of the review completely proponent-driven.

Once the NIRB and the NPC are in receipt of a DEIS submission, the NIRB will conduct an internal review of the submission to determine whether it addresses the provisions of the guidelines (*i.e.* conformity review). The NPC will assist the NIRB in the conformity review of the DEIS against the information requirements of the NBRLUP, as included in the *Final* EIS Guidelines. This conformity review will be conducted within 15 days, and is a presence or absence analysis only; it is not intended to evaluate the quality of the information presented, although it may point out significant deficiencies encountered.

If the DEIS submission is deemed to be satisfactory, the NIRB will distribute the DEIS to the public and commence a technical review period. This technical review period will provide interested parties with an opportunity to analyze the adequacy and quality of the information presented within the DEIS, and provide the NIRB with their technical review comments. During the technical review period, the NIRB and the NPC will evaluate the information in the DEIS pertaining to Appendices J and K of the NBRLUP, and will request that interested parties also provide their analysis within their technical review comments. Upon receipt of technical review comments, the NIRB will forward copies of those comments pertaining to the joint review of the transportation corridor to the NPC.

Pre-Hearing Conference (PHC)

The NIRB may decide to hold a Technical Meeting at the conclusion of the technical review period, to facilitate further 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). Immediately following the technical meeting, NIRB will hold the PHC to discuss such matters as: timelines for submissions and the Final Hearing, future meetings, evidence, document exchange, Final Hearing venue(s), Final Hearing format and any other matters related to the logistics of the Final Hearing. At this time, the NIRB and NPC will discuss the results of the joint review of the transportation corridor and whether or not the requirements of the NBRLUP have been satisfied.

Following the PHC, the Board will issue a PHC decision which provides further direction to the Proponent regarding what is required in its *Final* EIS (FEIS) and the procedures for the review of the FEIS and the Final Hearing. The remainder of the Part 5 Review process for the Project is then expected to follow the process map as set out in **Appendix A**, with no further coordination between the NIRB and the NPC required.

Please note that during most of the above noted stages in the review process, the NIRB will also be coordinating its efforts with the Nunavut Water Board (NWB), as illustrated in the process map and described in the Coordinated Process Framework in **Appendix C**. The NIRB's coordination efforts with the NWB are independent of the NIRB/NPC joint review process, and are not anticipated to affect one another.

Nunavut Impact Review Board (NIRB)

and

Nunavut Water Board (NWB)

Detailed Coordinated Process Framework

for NIRB Part 5 Reviews and NWB Licensing

Original Document Date:	September 2009		
Prepared By:	D. Filiatrault		
Approved NIRB:		Motion:	
Approved NWB:		Motion:	

AMENDMENTS

	Description	**Date**	**Motion**
(1)			
(2)			
(3)			
(4)			
(5)			
(6)			
(7)			
(8)			
(9)			
(10)			

Important Notes

1. *This Guide presents information about the NIRB and NWB and their process in a plain language format for the purpose of public education and assistance to parties involved in the process. For a more comprehensive understanding of the legal requirements of the process consult the Nunavut Land Claims Agreement, the Nunavut Waters and Nunavut Surface Rights Tribunal Act, and the Northwest Territories Waters Regulations.*

2. *The abbreviations 'NWB' and 'NIRB' are used throughout this document to refer to the Nunavut Water Board and Nunavut Impact Review Board, respectively.*

CONTENTS

INTRODUCTION

The Nunavut Impact Review Board (NIRB) and Nunavut Water Board (NWB) are Institutions of Public Government (IPGs) created under the *Nunavut Land Claims Agreement (NLCA)*, responsible for development impact assessment and the use, regulation and management of freshwater respectively.

The NIRB has responsibilities for the environmental assessment of project proposals in the Nunavut Settlement Area (NSA) as defined in Article 12 of the NLCA.

In carrying out its functions, NIRB is directed to act fairly and in such a way that at all times, it protects and promotes the existing and future well being of residents of Nunavut, and protects the ecosystemic integrity of the NSA. The NLCA also instructs NIRB to take into account the well being of residents of Canada outside the NSA.

Pursuant to Article 13 of the NLCA and the Federal *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA or the Act)[1], the NWB has responsibilities and powers over the regulation, use, and management of fresh water in Nunavut, with some exceptions, such as the use of water in National Parks, and for navigational and domestic purposes set out in the NWNSRTA. The NWB's objective is to provide a means for the conservation and utilization of waters in Nunavut, except in a National Park, in a manner that will provide the optimum benefit from those waters for the residents of Nunavut in particular and Canadians in general.

The NWB's primary function is to license uses of water and deposits of waste.

The NIRB and NWB have developed the Detailed Coordinated Process Framework to address project specific requests from proponents to proceed in a coordinated manner commencing at the development impact review phase. The Detailed Coordinated Process Framework has been developed to provide clarity, transparency, and timelines for a coordinated approach to impact assessment and water licencing to NIRB, the NWB, Proponents and other parties participating in the process. It is important to note that the Detailed Coordinated Process Framework is intended to respect the individual mandates of NIRB and the NWB, and it does not provide for a "joint" review or hearing process.

[1] Assented to on April 30, 2002

RELATIONSHIP BETWEEN NIRB AND THE NWB

Sections 12.10.1 and 13.5.4 of the NLCA prohibit the NWB from issuing a licence to use waters or deposit waste until the NIRB has completed screening the project in accordance with Part 4 of Article 12 of the NLCA. Furthermore, if the project requires a review under Part 5 or Part 6 of Article 12 of the NLCA, the NWB may not issue a licence until NIRB has completed the review in accordance with Article 12 of the NLCA.

Sections 12.10.2 and 13.5.5 of the NLCA provide an exception to this prohibition during a review period:

> 12.10.2 Notwithstanding Section 12.10.1, where a project proposal has been referred for review pursuant to Part 5 or 6, approvals or licences for exploration or development activities related to that project may be issued if:
>
> a) the activity falls within Schedule 12-1 [Types of Project Proposals Exempt From Screening]; or the activity can, in the judgement of NIRB, proceed without such a review.
>
> 13.5.5 Notwithstanding Section 12.10.1, the NWB shall not be precluded from issuing interim, short approvals for water uses related to exploration or developmental work for a proposal under development impact review.

The NWB also has a duty to implement the terms and conditions of a NIRB project certificate in accordance with its authority and jurisdictional responsibility.

LEGISLATIVE BASIS FOR COORDINATION

The NLCA specifically provides for coordination between NIRB and the NWB:

> 13.5.2 Where the water application is referred for review under Article 12, the NWB and the review body shall coordinate their efforts to avoid unnecessary duplication in the review and processing of the application. Legislation may provide for joint hearings or authorize the NWB to forego public hearings on any water application where it has participated in a public review of the relevant water application pursuant to Article 12.[2]
>
> 13.6.1 The NPC, NIRB and the NWB shall co-operate and co-ordinate their efforts in the review, screening and processing of water applications to ensure they are dealt with in a timely fashion.

In light of projected estimates for major mine development projects in Nunavut, the NIRB and NWB share the view that a coordinated process is important to ensure each organization has the capacity to fulfill the respective mandates in a timely and efficient manner. **However, at this time the detailed coordinated process framework does not provide for a fully joint review regulatory process or joint hearing process.** Given the nature of the information and the different levels of detail required between impact assessment and water licensing, further assessment is required prior to proposing a fully joint review process.

[2] Related relevant sections of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* are:

37. (1) In order to avoid unnecessary duplication and to ensure that projects are dealt with in a timely manner, the Board shall cooperate and coordinate its consideration of applications with the Nunavut Impact Review Board or any federal environmental assessment panel referred to in section 12.4.7 of the Agreement in relation to the screening of projects by that Board and the review of projects by that Board or panel.

(2) The Board may, in lieu of conducting a separate public hearing in respect of a licence in connection with a project for which a public hearing is to be held by the Nunavut Impact Review Board or the panel referred to in subsection (1), as the case may be, conduct, in relation to the project, a joint hearing with that Board or panel or participate in the hearing of that Board or panel.

DETAILED COORDINATED PROCESS (DCP)

The DCP is led by the NIRB and no changes to NIRB's standard process, operations and timelines are proposed. The NIRB will maintain established protocols for the promotion and solicitation for public input and participation.

Through the DCP, NWB technical staff remain employees of the NWB and will work cooperatively with the NIRB and engage in the process only in so far as their specific expertise is required on issues related the use of water and disposal of waste into water and associated activities related to NWB's mandate. The NWB Technical Advisors (TA) assigned to the project will review the Environmental Impact Statement (EIS), giving consideration to components of the EIS that overlap the following NWB requirements:

a) The description of the use of waters, deposit of waste or appurtenant undertaking, as the case may be;
b) The qualitative and quantitative effects of the use of waters or the deposit of waste on the drainage basin where the use is to be undertaken or the deposit is to be made, and the anticipated impact of the use or deposit on other users;
c) The measures the applicant proposed to take to avoid or mitigate any adverse impact of the use of waters or the deposit of waste;
d) The measures the applicant proposes to take to compensate persons, including the Designated Inuit Organization, who are adversely affected by the use of waters or deposit of waste;
e) The program the applicant proposes to undertake to monitor the impact of the use of waters or the deposit of waste;
f) The interests in and rights to lands and waters that the applicant has obtained or seeks to obtain;
g) The options available for the use of waters or the deposit of waste; and
h) Any other matters the NWB considers relevant.

A. NIRB Review Process

The following description of the NIRB's Part 5 Review process is reproduced from NIRB's *Guide 5: The NIRB Review Process*, available on NIRB's ftp site at http://ftp.nirb.ca/GUIDES/. Areas of coordination between NIRB and NWB are highlighted in bold, as are the requirements of the proponent and other parties in the review process.

1. Scoping

The first step in NIRB's Part 5 review process is to **scope** the Project Proposal and the potential impacts associated with developing the project. Scoping is a process that pinpoints significant issues requiring study and analysis. This process aims to identify those components of the biophysical and/or socio-economic environment that may be impacted by the project and for which there is public concern. NIRB will solicit input from the Proponent, and interested Parties comprising of Federal and Territorial Government departments, Regional Inuit Associations and members of the public, and evaluate what it considers appropriate in order to determine:

- Which components of the project to include in the review;
- The temporal and spatial boundaries of the project;
- The issues and concerns to be considered in the review; and
- Any other requirements for the assessment of the Project Proposal.

NIRB will also consult with the public and interested Parties to identify Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) that should be addressed by the Proponent's DEIS. NIRB develops a public participation and awareness program, in which the community's participation in the review process, among other items, is discussed (See Guide 6a – NIRB's Public Awareness and Participation Programs: The Review Process). Scoping usually includes a meeting with the Proponent and interested Parties and is facilitated by NIRB.

NIRB will develop a Draft Scope of the project and distribute it for public comment. Public scoping sessions facilitated by NIRB may be scheduled in potentially affected communities as part of the public participation and awareness program.

The Proponent, the NWB and Parties may choose to attend scoping sessions as observers, and to speak to their role in the regulatory process if necessary.

The NWB will participate in scoping of the communities most affected by the project as it relates to water use and waste disposal activities or where issues pertaining to water use and waste disposal activities are anticipated to arise.

Following public scoping sessions, and receipt of comments on the Draft Scope, NIRB will issue a Summary Scoping Report which details the results of each, as well as a Final Scope. The Summary Scoping Report will be used in the NIRB's creation of Draft Guidelines for the Preparation of an Environmental Impact Statement (EIS Guidelines).

2. Issuing Guidelines

Section 12.5.2 of the NLCA directs NIRB to issue project-specific guidelines to the Proponent. A Draft Environmental Impact Statement (DEIS) is a detailed document prepared by the Proponent, in accordance with the guidelines issued by NIRB, that identifies, predicts, evaluates and communicates information about the ecosystemic and socio-economic impacts of a Project Proposal. A DEIS includes the identification and development of mitigation measures, measures designed to control, reduce or eliminate potentially adverse impacts of an activity or project. In the development of guidelines, NIRB will draw on information obtained from the scoping stage and circulate draft guidelines to interested Parties, offering an opportunity for comment. NIRB will integrate those recommendations it considers appropriate and will then finalize the guidelines and issue them to the Proponent for the preparation of a DEIS.

For more information on the preparation of Environmental Impact Statements (EIS) and a list of requirements that Proponents must comply with, please see Guide 7 – The Preparation of Environmental Impact Statements.

The NIRB will release Draft EIS Guidelines for public comment. The objective of the public comment period is to allow NIRB to solicit expertise and advice from parties in accordance with NLCA Section 12.5.2., in the most transparent way possible.

The NWB will provide the generic Supplemental Information Guide (SIG)[3] for Mine Development (MM3) to the NIRB for incorporation into the Draft EIS Guidelines as an appendix. This appendix will serve as instructions to the Proponent to aid in its development of a Draft Water License Application.[4]

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[3] **Supplemental information** is required as part of the water licence application in accordance with section 48of the NWNSRTA "To provide guidance on fulfilling the requirements of section 48 and related requirements in the regulations, the NWB has developed a Technical Guide containing Supplemental Information Guidelines (SIG) for specific classifications of undertakings. It is anticipated that the provision of supplemental information requested by the guidelines will reduce delays that may arise from the NWB having to solicit required information after an application is submitted. Further information on SIGS may be found in the NWB's Guide 4 - *Completing and Submitting a Water Licence Application for a New Licence* and the *Mining and Milling Undertaking Supplemental Information Guideline (SIG) for Mine Development (MM3).*

[4] A water licence application is a written request to the Board to exercise its powers under the *Nunavut Waters Nunavut Surface Rights Tribunal Act* (NWNSRTA or Act) and the *Northwest Territories Water Regulations* (NTWR or Regulations). A complete application consists of the specific forms and supporting documents that adequately address the NWB's information requirements. A complete application must be submitted to the NWB to allow the Board to process the application.

The completeness of an application directly impacts the length of time to process a water licence application. Further information on the information requirements and completing the water licence application may be found in the NWB's Guide 4 - *Completing and Submitting a Water Licence Application for a New Licence.*

The Proponent, NWB and Parties are expected to provide comments on the Draft EIS Guidelines and appendices relevant to their mandates.

Following receipt of comments on the Draft EIS Guidelines, NIRB will revise the document and release a Revised Draft for a second round of public comment. NIRB may also schedule a Guidelines Development Workshop (GDW) to resolve any substantive issues.

The Proponent, NWB and Parties will be consulted on the agenda for the GDW.

The NWB will participate in the GDW to provide clarification of needs and level of information required for the subsequent water licensing (i.e. SIG) early in the process will work toward identifying information needs and expectations.

3. DEIS

It is the responsibility of the Proponent to prepare the DEIS in accordance with the guidelines and requirements established by NIRB. The Proponent is responsible for circulating electronic and hardcopies of the DEIS to all Parties involved in the review. In some cases, where the original Project Proposal submitted by the Proponent for screening contains the information required for a DEIS, NIRB may accept the original Project Proposal document as a DEIS[5].

The DEIS shall also include all details to support consideration of exceptions in accordance with section 12.10.2 and subject to 13.5.4 and 13.5.5.

Sections 12.10.2 and 13.5.5 of the NLCA provides for exceptions to the general prohibition that the NWB cannot issue a licence prior to the completed of a review pursuant to Part 5 or 6 of the NLCA:

> 12.10.2 Notwithstanding Section 12.10.1, where a project proposal has been referred for review pursuant to Part 5 or 6, approvals or licences for exploration or development activities related to that project may be issued if:
>
> a) the activity falls within Schedule 12-1 [Types of Project Proposals Exempt From Screening]; or
> b) the activity can, in the judgement of NIRB, proceed without such a review.

[5] Nunavut Land Claims Agreement – Section 12.5.2.

> 13.5.5 Notwithstanding Section 12.10.1, the NWB shall not be precluded from issuing interim, short-term approvals for water uses related to exploration or development work for a proposal under development impact review.

Accordingly, NIRB and NWB will consider requests for any pre-development activities or short term approvals to be considered. Although, any exceptions approved by NIRB and the NWB will not preclude the proponent from obtaining any other licence/permit/authorizations that may be applicable to the activities (e.g. DFO authorizations).

Furthermore, the inclusion of consideration of exceptions **does not** pre-suppose a positive EA decision by NIRB and/or the Minister.

The NIRB will make specific determinations on exceptions as applied for by the Proponent on a case-by-case basis.

The Proponent will also highlight within the Draft water licence application pre-development activities or short term approval options to be considered by the NWB.[6] The Proponent shall provide an implementation schedule for submission of final "exceptions" application water licence information. Detailed engineering[7] (where applicable) for

[6] Note that generally public hearings are not required for type B water licence applications. However, the Board may decide to hold a public hearing in connection to any matter relating to its objects where it is satisfied that it is in the public interest to do so.

[7] Further to the provisions of the Regulations, the applicant must provide plans where the use of water and/or the deposit of waste is proposed, including where there is a potential impact on water through the deposition of waste. The applicant should provide measures to avoid or mitigate any adverse impact of the use of waters or the deposit of waste, as well as monitoring and management plans where appropriate. Site specific study reports must also be provided to support design and management plans.

Generally the NWB requires final plans to be submitted for review and approval. Submissions may be approved either as part of the water licence application or prior to construction as a condition of an approved water licence. Depending upon the complexity of the technical issues associated with a proposed undertaking, the NWB may request final plans to be submitted as part of the water licensing approval process.

The NWB requires plans, including design drawings and reports requiring the application of engineering principles to be developed to professional engineering standards and under the professional responsibility of individuals and firms registered with the Northwest Territories and Nunavut Association of Professional Engineers and Geoscientists (NAPEG).

When submitting engineering plans, including drawings and reports, the NWB encourages applicants to reference the NAPEG document entitled "*A Guideline to the Use of Stamps*". As such, final drawings required by the NWB must be considered complete and include the statement "Issued for Construction" or other similar statement. Final drawings developed by a single engineering discipline must be signed, stamped and dated by a responsible design engineer and/or approving engineer registered with NAPEG. Final drawings developed by multiple engineering disciplines must be

exception pre-development activities will be required at time of final submission.

The Parties may be asked to comment on the activities proposed for "exception" consideration.

4. Guideline Conformity Review of DEIS

Once NIRB receives the hardcopy of the DEIS, NIRB will conduct an internal review of the material to determine whether the DEIS addresses the provisions of guidelines. The guideline conformity review is focused on identifying any if information requested in NIRB's project-specific guidelines and NIRB's 10 Minimum EIS Requirements 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 NIRB may point out significant deficiencies encountered. Should any omissions be identified, the Proponent is responsible for submitting supplementary information or may be required to revise and resubmit the DEIS.

If the DEIS is deemed by NIRB to be satisfactory, the Proponent will be instructed to provide copies to interested Parties and to submit any outstanding information. Once Parties have received their DEIS copies NIRB will proceed to the next step in the process and give public notice.

The NIRB will review the DEIS for conformity to the NIRB Final EIS Guidelines.
The NWB will review the Draft water licence application for conformity[8] to the SIG (MM3) Mine Development Guidelines. Additional project

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signed and stamped by a design engineer for each discipline and an approving engineer registered with NAPEG. Detailed drawings containing information from more than one discipline should be stamped by the working level professional for each discipline and the stamps should be qualified by the professionals involved. Registered firms must also include their NAPEG permit stamp on final drawings.

Final reports, including letter reports, required by the NWB, must be signed, stamped and dated by the responsible engineer and/or approving engineer and include the NAPEG permit stamp of the registered firm where appropriate.

Preliminary plans including drawings and reports are not normally stamped by a professional engineer, but should include the
Statement "Preliminary – Not for Construction" or other similar statement. The Board will not grant approval to proceed with a component of the undertaking for which only preliminary plans have been submitted.

[8] The water licence application must also include a concordance table that cross references the requirements of the SIG(s) with the documents that make up the water licence application. This will direct reviewers to the specific location in the water licence application package where the information required by the SIG can be found. The reference locations must

specific guidelines related to pre-development activities may be provided to the Proponent where applicable.

5. Technical Review of DEIS

A technical review is a more detailed review of the DEIS than the guideline conformity review. Its intent is to analyze the quality of the information presented by the Proponent. A technical review of a DEIS by interested Parties comprises the following:

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

Both project-specific and cumulative environmental assessments are included in the technical review. All technical reviews are project-specific, and NIRB may advise interested Parties of additional requirements to be included in the technical review phase of the DEIS.
During the preliminary phase of the DEIS technical review phase NIRB will invite Parties to submit Information Requests (IRs) to the Proponent and/or to other Parties. At the same time the Proponent may submit IRs to the Parties as well. The process for submitting and receiving IRs is generally as follows:

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be indicated by document and section number as appropriate. All documents referenced in the concordance table must be submitted as part of the overall water licence application and it is critical that information provided in all documentation is consistent.

Once the NWB receives a copy of the water licence application, it conducts a concordance assessment to determine whether the application documents address the provisions of the guidelines such that the NWB may issue a public notice of application. For clarity, the concordance assessment is an analysis of the presence or absence of the required information. It is not intended as a step to evaluate the quality of the information presented.

In conducting the assessment, the NWB may, depending upon the expected level of public concern, request comments from interested parties on application concordance. The applicant will be notified by the NWB of the results of the assessment and any deficiencies identified. Upon receiving the results, it is the responsibility of the applicant to respond accordingly, with the submission of additional information, if necessary.

- Parties submit their IRs to NIRB;
- The IRs must contain the following information:
- To whom the IR is directed;
- Identification of the issue;
- The concern associated with the issue; and
- A clear rational of the issue's importance to the environmental assessment of the project.
- NIRB may make a decision on whether or not the Party to whom the IR is directed to must respond. In most cases, however, the IRs will be forwarded to the relevant Party;
- NIRB will set a timeframe for Parties to respond; and
- NIRB will post all responses on the ftp-site (http://ftp.nirb.ca) and notify the distribution list.

At the end of the DEIS technical review period, written submissions are solicited from the Parties prior to holding a technical meeting. NIRB will provide direction on the format of written submissions.

The NWB will work cooperatively with NIRB on technical review of water and waste disposal and pre-development activities.

The Proponent and Parties will submit IRs, provide response to IRs, and submit technical review comments in accordance with timelines and requirements of the NIRB.

6. Technical Meetings

NIRB may decide to hold a technical meeting involving 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). As such the Board is not present and the meeting is facilitated by NIRB staff. Breakout sessions are often used and each break out group (whether related to engineering, wildlife or socio-economic issues) is facilitated by NIRB staff.

The Proponent and interested Parties are invited to attend the Technical Meeting which usually takes place over the course of a few days, depending on the scope of the project and concerns submitted by Parties.

During the technical meeting, NIRB staff will compile a list of commitments made by the Proponent. The list of commitments is then carried forward to the PHC for incorporation into the Board's PHC decision.

The NWB will have staff in attendance at any Technical Meetings facilitated by NIRB.

The NIRB and NWB will work cooperatively with Parties to delineate EA issues to be addressed in the FEIS and regulatory issues to be addressed in the Type A water licence application. In addition the NIRB and NWB will seek clarification of Parties comments on pre-development activities.

7. Pre-Hearing Conference (PHC)

NIRB may, immediately following the technical meeting, hold a PHC in order to discuss such matters as: timelines for submissions and the Final Hearing, future meetings, evidence, document exchange, Final Hearing venue(s), Final Hearing format and any other matters related to the logistics of the Final Hearing.

The PHC provides an opportunity for Parties to present to the Board the issues that were resolved during the technical meeting, and those issues which remain outstanding. It is also an opportunity for the Board to hear from the public regarding the information contained in the DEIS.

Following the PHC, the Board will issue a PHC decision which provides direction to the Proponent regarding what is required in the Final Environmental Impact Statement (FEIS) and the procedures for the review of the FEIS and Final Hearing. In some instances, if the DEIS is determined to contain quality information and analyses which requires only minor additions and modifications, the Board may elect to accept the DEIS as the FEIS.

The NWB will have staff in attendance at the PHC.

The NWB will issue a conformity determination applicable to the Draft Water Licence and SIR's related to the water license application and pre-development activities as an Appendix to the NIRB PHC Decision. The EA process will proceed regardless of the conformity determination made by the NWB.

8. FEIS

It is the responsibility of the Proponent to prepare the FEIS in accordance with the PHC decision and list of commitments formulated at the technical meeting and approved by the Board. Once complete, the Proponent is responsible for circulating electronic and hardcopies of the FEIS to all Parties involved in the review.

The NWB will acknowledge receipt of the Type B and/or Type A water licence application (if applicable).

The Proponent will submit a FEIS which includes final water licence applications for pre-development activities to be considered as "exceptions". The FEIS shall include as appendix water licence application(s) with cross referencing to the FEIS to eliminate or reduce duplication and for ease of Parties review. The Proponent may elect to submit a stand-alone Type A water licence directly to the NWB (with no cross referencing to the FEIS). The Proponent shall submit to the NIRB and the NWB a concordance table to NIRB's PHC Decision and NWB SIG (MM3) Guidelines and subsequent project specific guidelines issued for pre-development or "exception" activities. Should the Proponent decide not to submit a Type A water licence the EA process will proceed.

The Parties will review the FEIS in accordance with NIRB's standard review process.

9. FEIS Compliance Review

Following receipt of a hardcopy FEIS submission, NIRB will conduct an internal review of the material to determine whether the FEIS addresses the direction provided by the Board in its PHC decision, including the list of commitments. The PHC compliance review is a presence or absence analysis; it is not intended to evaluate the quality of the information presented – although NIRB may point out significant deficiencies encountered. Should any omissions be identified, the Proponent is responsible for submitting supplementary information, and if the FEIS is found to be significantly non-compliant with the PHC decision it may be returned to the Proponent.

The NIRB will issue compliance review determination and issue Notice of Final Hearing upon acceptance of a FEIS.

The NWB will assist in compliance EA review as it relates to water use, waste disposal and associated activities. The NWB will issue decisions on conformity for "exception" activities and the Type A water licence application (if applicable). [9]

[9] Once the Board deems the application complete, a public notice is issued to the council of each municipality in the area affected by the application, and the NWB publishes the notice in a newspaper of general circulation in the area affected or, if there is no such newspaper, in such other manner as the Board considers appropriate. Typically, the NWB also gives notice via email by referring the application to a distribution list comprised of interested parties including the applicant, federal and territorial government departments, community representatives, DIOs, Hunter and Trapper Organizations (HTOs), as well as other agencies or individuals that the Board deems appropriate.

10. Technical Review of the FEIS

Like the DEIS technical review, the FEIS technical review is a detailed analysis of the FEIS. Its intent is to review the quality of the new and/or revised information presented by the Proponent and to reconsider the pre-existing information and the overall project in light of the information contained in the FEIS. A technical review of a FEIS by interested Parties comprises the following:

- Determination of whether Parties agree/disagree with the conclusions regarding the alternatives assessment, environmental impacts, proposed mitigation, significance of impacts, and monitoring measures – and all **evidence** supporting the Parties' position;
- Determination of whether or not conclusions are supported by the analysis – and all **evidence** supporting the Parties' position;
- Determination of whether appropriate methodology was utilised to develop conclusions – and all **evidence** supporting the Parties' position;
- An assessment of the quality of the information presented; and
- Determination regarding the appropriateness of proposed monitoring measures – and **evidence** to support the determination, along with any proposed alternative monitoring measures which may be more appropriate (if applicable).

Interested Parties prepare a written submission in advance of the Final Hearing in which the above are addressed. All technical reviews are project-specific, and NIRB may advise interested Parties of additional requirements to be included in the technical review phase of the FEIS.

NIRB will also facilitate a second round of IRs at the beginning of the FEIS technical review phase as per the process outlined in the section, above.

The Parties will comment on activities to be considered as "exceptions".

The notice also invites persons to provide representations within a specified time period advising of the consequences of any failure to respond to the notice (i.e. the applicant may not need to compensate an existing or other user, as discussed in the NWB's *Guide 4 – Completing and Submitting a Water Licence Application for a New Licence,* part 1 section 5 Block 17, if that person fails to respond within the time period specified in the notice).

Information and correspondence related to the application is uploaded to the NWB electronic public registry in an application specific directory identified by the application number.

The NIRB will make final decision related to "exceptions" proposed by the Proponent. The NIRB will pay particular attention to ensure that project-splitting does not occur and decisions are consistent with any previous Ministerial guidance.

The NWB may begin to identify a preliminary list of issues for consideration in the regulatory process. The NWB may issue Type B water licenses (dependent upon consultation feedback).[10]

11. Final Hearing

A NIRB Final Hearing provides a public forum for the discussion of proposed projects. Interested Parties, including members of the public affected by a Project Proposal, are given the chance to voice their comments and present information to the Board. Significantly, the Final Hearing gives due regard and weight to the opinions of Elders and community members, and to the tradition of Inuit oral communication and decision-making. With respect to Parties, Designated Inuit Organizations (DIOs) are allowed full standing, which means they have the right to participate as a party in any proceedings before NIRB.

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[10] The technical review involves a more detailed review of the water licence application than the concordance assessment with the intent of analysing the quality of the information presented in the application. Interested parties must consider the following in conducting a technical review:

a) Determination of whether Parties agree/disagree with the conclusions in the application regarding the following as they relate to the use of water or the deposit of waste on the drainage basin where the use is to be undertaken or the deposit is to be is to be made:
   - Qualitative and quantitative effects;
   - Anticipated impact of the use or deposit on other users;
   - Mitigation measures;
   - Compensation measures;
   - Monitoring program; and
   - Options available

   as well as any proposed alternative mitigation and/or monitoring measures which may be more appropriate, and evidence supporting the parties position;
b) Determination of whether the conclusions in the application are supported by the analysis, and evidence supporting the parties' position;
c) Determination of whether the appropriate methodology was used in the application to develop conclusions, any proposed alternative methodologies which may be more appropriate and evidence supporting the parties' position;
d) Assessment of the quality of the information presented; and
e) Any additional information that would be useful.

Throughout the technical review phase interested parties are encouraged to work cooperatively with the applicant to address minor issues in advance of the proposed technical meetings. The NWB appreciates receiving notice on issues clarified between the parties for inclusion on the public registry.

Please refer to the document "NIRB: Rules of Procedure" for complete details on the hearing process.

Note: NIRB may conduct its review by means of correspondence, public hearings or such other procedures as it deems appropriate to the nature of the project and range of impacts, as outlined in Section 12.5.3 of the NLCA. The venue(s) for the Final Hearing are decided upon by the Board through its PHC decision.

The Proponent and Parties will participate in the NIRB Final Hearing.

Immediately following the NIRB final hearing, the NWB will hold a preliminary technical meeting[11] with all interested Parties to define regulatory issues related to the Type A water licence or outstanding water licence issues related to Type B water licenses. Project Specific Guidelines (PSG) for the Type A water licence will include but may not be limited to information requirements specifically identified in the NIRB final hearing as appropriate to defer to the water licencing process. Draft PSG's will be issued shortly after the final hearing for Parties review.

12. NIRB Determination – Report to the Minister

Following the Final Hearing, NIRB will issue a report on the Project Proposal to the Minister of Indian and Northern Affairs Canada. The report contains the Board's assessment of the project and its impacts, and based on this assessment, a determination of whether or not the project should proceed.
Where NIRB concludes that the project should proceed, terms and conditions will be included to ensure the integrity of the development process. Any terms and conditions added by NIRB will reflect the primary objectives set out in Section 12.2.5 of the NLCA – *to protect and promote the existing and future well-being of the residents and communities of the NSA, and to protect the ecosystemic integrity of the NSA, taking into account the well-being of residents of Canada outside the NSA.*

[11] The purpose of the TM is to informally resolve technical matters between interested parties and the applicant, prior to the PHC, particularly those matters that could affect the Board's determination on any PHC issues. Given the informal nature of the meeting, the NWB Board members are not present at the TM, and the meeting is facilitated by NWB staff. Depending on time constraints and the nature and extent of technical issues to be addressed, the TM may be divided into specific break-out groups (for example water quality, geotechnical, other issues) with each group chaired by a NWB staff member. During the TM, a list of commitments made by the various parties may be compiled and carried forward to the PHC.

The Board's determination will be forwarded to the Minister, the Proponent and the Parties and is usually issued within 30 days following the closing of the Final Hearing record.

The NWB will issue final PSGs. Upon receipt of the supplemental information, the NWB shall confirm conformity of the information to the PSG's and MM3 guidelines. If complete, the NWB shall acknowledge receipt and issue notice of Technical Meeting (if needed) and Pre-hearing conference.

The Proponent is required to file a submission of supplemental information. A final revised stand alone application may be submitted if needed.

The Parties will undertake technical review of the supplemental information or revised stand alone Type A application.

13. Minister's Decision

Although NIRB makes a determination on projects under review, it is the Minister who makes the final decision. Upon receipt of the NIRB report, Section 12.5.7 of the NLCA directs the Minister to take one of the five following courses of action:

Option One Accept the report of NIRB as to whether or not the project should proceed, including any attached terms and conditions.

Option Two Reject the determination that a project should proceed on the basis that the proposal is not in the national or regional interest.

Option Three Reject the determination that a project should proceed on the grounds that:

a) any of the terms and conditions are more onerous than necessary or insufficient to mitigate to an acceptable level the ecosystemic and socio-economic impacts; or
b) the terms and conditions are so onerous that they would undermine the viability of a project that is in the national or regional interest.

In this situation NIRB must reconsider the terms and conditions in light of reasons put forth by the Minister.

Option Four Reject the determination that a project should not proceed on the grounds that the project should have been approved because of its importance to the national or regional interest. In this situation, the Minister will refer the report back to NIRB to determine appropriate terms and conditions.

Option Five Refer the report back to NIRB for further review or public hearings where the Minister determines that the report is deficient with respect to ecosystemic and socio-economic issues. After additional review or hearings, NIRB will submit another report to the Minister, which shall be accepted or rejected in accordance with the above reasons.

The NIRB, NWB, Proponent and Parties await the Minister Decision. Once received, NIRB schedules a Regulators Meeting.

Timing of the NWB PHC is dependent upon receipt of Minister's Decision.

14. Regulators Meetings

If the project is approved by NIRB and the Minister, NIRB will convene a meeting with project regulators. This meeting facilitates the discussion of how project-specific terms and conditions will be implemented.

All government departments and agencies in accordance with their authorities and jurisdictional responsibilities are required to implement the terms and conditions of NIRB project certificates. This general requirement is subject to NLCA Section 12.9.3, which deals with situations where an independent decision of a regulatory board contains terms and conditions at variance with the terms and conditions of a NIRB project certificate. NIRB terms and conditions are to be incorporated in relevant permits, certificates, licenses or other government approvals that the Proponent may require. This, however, does not preclude any regulatory or government agency from reviewing a project and imposing additional or more stringent terms and conditions, or from refusing to issue a license or approval that would be required in order to allow a proposed project to proceed.

The NWB will participate in NIRB's Regulators Meeting to assist with the development of the Project Certificate.

Regulatory Agencies will participate in NIRB regulators meeting.

Immediately following the Regulators Meeting, the NWB holds final Technical meeting (if needed) and the PHC meeting.

The Proponent will participate in the NWB PHC and Technical Meeting (if needed).

All interested Parties will participate in the NWB Technical Meeting and PHC meeting.[12]

15. Issuance of Project Certificate

In situations where it has been determined that a project should proceed, NIRB will issue a Project Certificate to the Proponent, including any terms and conditions which have been accepted or varied by the Minister.

At any time after the issuance of a Project Certificate, NIRB may, on its own account, or upon application by a Designated Inuit Organization, the Proponent, or other interests, reconsider the terms and conditions contained in the NIRB Project Certificate if it is established that:

a) The terms and conditions are not achieving their purpose;
b) The circumstances relating to the project or the effect of the terms and conditions are significantly different from those anticipated at the time the Project Certificate was issued; or
c) There are technological developments or new information which provides a more efficient method of accomplishing the purpose of the terms and conditions[13].

The NIRB will issue the Project Certificate.

The NWB will identify all terms and conditions in the Project Certificate applicable to water licensing and request confirmation from the

[12] The purpose of the PHC is to deal with administrative matters related to the public hearing including:
a) The timetable for the exchange of information;
b) The list of issues to be dealt with at the hearing;
c) The identification of interested parties;
d) The desirability of amending an application for the purpose of clarification;
e) The procedures to be following in a hearing; and
f) Any other matters that may aid in the simplification and disposition of the application at the Hearing, such as site visits.

The PHC is an opportunity for parties to present any issues that were unresolved during the technical meeting and for the Board (or its staff) to hear comments from the public. If appropriate, a community session is held to facilitate discussion and address concerns from the public.

[13] Nunavut Land Claims Agreement – Section 12.8.2.

proponent that all terms and conditions information requirements have been fulfilled in the Type A application.

The Proponent will confirm terms and conditions applicable to the water licence are contemplated in the Type A application. The NWB will issue a PHC decision[14] and provide a minimum of sixty (60) day notice of Final NWB Hearing.[15]
The Parties will submit final interventions[16] to the NWB final hearing.

The NWB shall hold a Type A Water Licence Hearing.

B. NWB Type A Water Licensing Process

1. Public Hearing

Hearings usually take place in person, but may occur via teleconference, or in writing.

The Board may consider a written hearing for applications that elicit limited public concern and issues with a relatively low level of complexity which can be dealt with in a written format. While written hearings require less travel and may be less costly than in-person hearings, they do not necessarily require less time. The principle of procedural fairness (see section 4 of *Guide 1: The Nunavut Water Board*) must be adhered to, and can cause a written hearing to take more time than an in-person hearing. Typically a written hearing will take six (6) weeks to complete. If a written hearing is contemplated, the Board will issue specific direction in its PHC decision.

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[14] Following the PHC, the Board issues a PHC decision containing the Board's decision on the matters discussed at the PHC and often includes the list of commitments generated during the TM. The Board's decisions as well as any documents received during the TM or PHC are posted on the NWB's electronic public registry in an application specific directory.

[15] Following the PHC, the Board issues a formal notice of public hearing. The notice of public hearing must be issued at least sixty (60) days before the commencement of the hearing outlining the location, date, and time of the hearing. In determining appropriate hearing locations, the Board takes into consideration the community or communities within Nunavut most affected by the application.

The notice of public hearing is issued to the council of each municipality in the area affected by the application, and published in a newspaper of general circulation in the area affected, or if there is no such newspaper, in such other manner as the Board considers appropriate. The NWB also gives notice via email to a distribution list comprised of interested parties including the applicant, federal and territorial government departments, community representatives, DIOs, HTOs, as well as other agencies or individuals that the Board deems appropriate. In some cases the formal public hearing notice is issued prior to the PHC and confirmed at the PHC.

[16] The PHC Decision and Notice will set out the timelines and requirements for the NWB Final Hearing. For additional information refer to the NWB's *Rules of Practice and Procedure for Public Hearing* and the NWB's Guide 5 – *Processing Water Licence Applications*.

The purpose of the public hearing is to provide an open public forum for the discussion of the application in front of the Board. Interested parties, including members of the public, are identified and introduced, the application and interventions are presented, and questions are asked and directed in an orderly fashion.

Typically, unless there are outstanding issues, at the end of the public hearing, the Board will close its record, meaning that no new evidence or information is permitted for the Board's consideration in making a decision.

Significantly, the hearing gives due regard and weight to the opinion of Elders and community members, Inuit culture and knowledge, and to the tradition of Inuit oral communication and decision making.

For complete details on the hearing proceedings and format, refer to the NWB's *Rules of Practice and Procedure for Public Hearings*.

2. NWB Decision to the Minister

Following the public hearing the Board will issue its decision to the Minister of Indian and Northern Affairs Canada (INAC) for approval. The Board typically strives to issue its decision within 30-45 days following the hearing, however the length of time to issue its decision depends upon the capacity of the Board and its staff.

The Board will not issue its decision if issues respecting water rights have not been resolved. Refer to the NWB's *Guide 4: Completing and Submitting a Water Licence Application for a New Licence* part 1 section 5 Blocks 17 and 18 for more information.

3. Minister Approval

The time required for approval by the Minister of INAC is 45 days. This time may be extended for a further 45 days if the Minister notifies the Board of the extension within the first 45 days. If the Minister does not respond within this time period, the Minister is deemed to have approved the Board's decision.

Once the Minister has made its decision on whether to approve the NWB decision, the Minister sends a copy of its decision and, in the case of a decision to withhold approval, the reasons for the decision, to the Board, the applicant, and if required to the DIO and any other person with a right to compensation.

The Minister's disagreement with the amount of compensation determined by the Board for Inuit Water Rights as discussed in part 1 section 5 Block 18 of the NWB's *Guide 4-Completing and Submitting a Water Licence Application for a New Licence*, is not sufficient reason for the Minister to withhold approval.

Applicants are advised to consider the timeframe associated with the Minister's decision when planning work schedules.

It is important to note that these timeframes are approximate. Actual timeframes are determined on a project specific basis and are dependent upon the nature and quality of information contained in the initial application, the responsiveness of the applicant to requests for additional information, the public notification process, the complexity of the project, as well as the number of other applications requiring the attention of the Board.

C. Detailed Coordinated Process Flowchart

The DCP Flowchart is provided as a separate standalone document.

CLOSING

The DCP allows proponents who choose to meet the NWB's detailed information requirements during the NIRB Part 5 Review an opportunity to save time in the overall impact assessment and water licensing process, as well as seek approval of pre-development activities which may allow for greater opportunities to actively mobilize or prepare a mine site. However, it should be noted that early licensing pre-development activities is a risk to proponents as impact assessment has not yet been completed and the project approved to proceed. Where a proponent has chosen to proceed on the basis of the DCP, the option remains to withdraw from the coordinated process without hampering the ongoing Part 5 review.

At the conclusion of the regulatory process, the NIRB and NWB will conduct a review of the DCP.

DCP PILOT PROJECT – Summary of Timeline

BAFFINLAND IRON MINES CORPORATION (BIMC)
MARY RIVER PROJECT
MINE DEVELOPMENT

NIRB FILE NO: 08MN053
NWB FILE NO: 2AM-MRY----

Receipt of Project Proposal

The NIRB acknowledged receipt of BMIC project proposal on March 20, 2008. Within the project proposal BMIC requested that the Boards consider a coordinated process. The preliminary water licence application submitted at this point and is one of the authorizations that triggered the review.

Nunavut Planning Commission Conformity Determination

The NPC confirmed conformity to the North Baffin Land Use Plan on April 30, 2008. In addition NPC advised the NIRB that section 3.5.111 and 3.5.12 of Appendix C of the North Baffin Regional Land Use Plan (NBRLUP) required "…a joint [NPC and NIRB] process to address the prospective transportation corridor contemplated by those provisions."

Screening

Following receipt of the NPC conformity determination, on April 30, 2008 the NIRB commenced Screening the project proposal. The NIRB distributed the project proposal to various Federal and Territorial agencies, Inuit Organizations and those communities and organizations potentially affected by the development on May 2, 2008.

The NIRB set a deadline of May 23, 2008 for the submission of comments from the various Parties. Certain parties requested an extension for the public commenting period which NIRB then extended to June 4, 2008. As a result on June 13, 2008, the NIRB applied for an extension for the screening decision to the Minister of INAC in accordance with Section 12.4.5(b) of the NLCA.

On or before June 4, 2008 the NIRB received comments on the project proposal from various Parties. All comments were attached as Appendix B to the NIRB June 27, 2008 Screening Decision report to the Minister.

NIRB issued Screening Decision to the Minister

On June 27, 2008, the NIRB issued a Screening Decision for BIMC's Mary River Project Proposal to the Minister of Indian Affairs and Northern Development. Pursuant to Section 12.4.4 (b) of the

NLCA, the NIRB indicated to the Minister that the Project Proposal required review under Part 5 or 6. In addition NIRB requested advice from the Minister on the dilemma posed by the NPC conformity determination given outstanding requirements of the NBRLUP.

Minister Final Screening Decision

On February 11, 2009 the NIRB received the Minister's final decision pursuant to section 12.4.7(b) to refer the Project Proposal to the Board for a review under Part 5 of Article 12 of the NLCA. The Minister advised NIRB that the federal departments of Fisheries and Oceans Canada, Natural Resources Canada and Transport Canada also have jurisdictional responsibility for authorizing the Project Proposal to proceed and concur that a Part 5 review is appropriate.

In addition, the Minister encouraged the NIRB and NPC to develop an arrangement that will satisfy the outstanding requirement of the land use planning process, which would not unduly encumber the NIRB Part 5 review process. Once finalized and agreed upon by the NIRB and NPC, the Boards were encouraged to communicate the process to all parties involved in the review.

Also, the Minister identified the particular issue of year-round shipping, specifically the rate, route and impacts of this component to adjacent jurisdictions potentially affected by the project. The Minister encouraged NIRB to carry out a very thorough assessment of these impacts and involve the participation of adjacent jurisdictions in the review.

See Summary of Screening Process on next page.

NIRB PART 5 REVIEW PROCESS - ONGOING

NIRB and the NWB will continue to map process as the project proceeds and update parties as needed.

Project Proposal / Screening

Step		Timeline*	NIRB Screening Process	Proponent	Notes/Issues
				Proponent develops a Project Proposal	
	NPC	20/03/08	Project Proposal submitted to NPC for Land Use Plan conformity determination (if applicable)		
		30/04/08	NPC Conformity determination Issued		
2	NIRB Screening	20/03/08	NIRB acknowledges receipt of Project Proposal		
		30/04/08	NIRB Screening Begins		
			Internal completeness check		
		2/05/08	Project Proposal released for comment		
		23/05/08 13/06/08	Comments received from Parties on Project Proposal		Party request extension;
		27/06/08**	NIRB Screening Decision Report submitted to the Minister		NIRB request extension to Minister
		11/02/09	Minister's Referral for Review		

Note: * All timelines dd/mm/yy. ** NIRB has the ability to request form the Minister an extension to the 45 days deadline.

Review

Step		Timeline	NIRB Review Process	Proponent	Notes/Issues
		11/02/09	Direction from Minister Received		
1	Scoping	13/03/09	*Draft* Scope of Project proposal Released for Comment Community Scoping begins		Delayed as details of NIRB/NPC joint review process were developed
		16/03/09	NIRB/NPC joint review process map released		
		09/04/09	Comments received from Parties on *Draft* Scope		
		18/06/09	Scoping Meeting Summary Report issued		
2	Issue Guidelines	24/06/09	*Draft* EIS Guidelines released for comment		
		04/08/09	Comments received from Parties on *Draft* EIS Guidelines		
		04/09/09	*Revised* EIS Guidelines released for comment		
		21/09/09	Comments received from Parties on *Revised* EIS Guidelines		
		29/09/09 30/09/09	EIS Guideline development workshop held		
			EIS Guidelines issued to Proponent		
3	Draft EIS	Proponent Driven		Proponent develops a Draft EIS	

Step		Timeline	NIRB Review Process	Proponent	Notes/Issues
4	Conformity Review of DEIS		*Draft* EIS submission received Conformity review of submission with issued EIS Guidelines **OR** Application to accept project proposal as a *Draft* EIS considered.		
			Positive/Negative Guideline conformity decision issued **OR** Acceptance/rejection of application to accept project proposal as a *Draft* EIS issued		
			Draft EIS is distributed to Parties Parties given 30 days to submit Information Requests (IRs)		
			Deadline for Parties to submit IRs to NIRB		
			NIRB forwards approved IRs to Proponent		
		Proponent Driven		Proponent develops response to IRs	

Step		Timeline	NIRB Review Process	Proponent	Notes/Issues
5	Technical Review of DEIS		Proponent submits response to IR's Technical Review of DEIS begins Tentative Dates for Technical Meeting and Preliminary Hearing Conference (PHC) announced		
			NIRB receives technical review reports from Parties		
			Proponent submits response to technical review reports		
6	Technical Meeting		Technical meeting is held		
7	Pre-Hearing Conference		Preliminary hearing Conference is held		
			Board issues PHC decision on administrative issues and direction for submission of *Final* EIS		
8	FEIS	Proponent Driven		Proponent develops a *Final* EIS	

Step		Timeline	NIRB Review Process	Proponent	Notes/Issues
9	Compliance Review of FEIS		Proponent submits *Final* EIS PHC compliance review begins Tentative date(s) and location(s) for Final Hearing announced		
10	Technical Review of FEIS		NIRB issues PHC compliance determination Parties receive *Final* EIS and Technical review begins		
			NIRB receives final written submissions from Parties		
11	Final Hearing		Final Hearing is held		
12	NIRB Determination – report to Minister		NIRB's Final Hearing Report is submitted to the Minister		
		Government driven	Minister Review		

Step		Timeline	NIRB Review Process	Proponent	Notes/Issues
13	Minister's Decision		Minister's Final Decision (1) Accept NIRB report (2) Reject positive determination by NIRB (project not in national or regional interest) (3) Reject positive determination by NIRB with direction to reconsider onerous terms and conditions (4) Reject negative determination by NIRB (project important to national or regional interest) (5) Refer deficient report back to NIRB for additional Hearings		
			NIRB acknowledge receipt of Minister's Decision and announces date(s) and location(s) for Regulators Meeting		
14	Regulators Meeting		Regulators Meeting held		
15	Issuance Project Certificate		Issuance of the Project Certificate		

Note: * additional time will be required if Ministers decision (3), (4) or (5).

NIRB File No. 08MN053

November 16, 2009

Mr. Rod Cooper
VP – Sustainable Development
Baffinland Iron Mines Corporation
Suite 1016, 120 Adelaide Street West
Toronto, ON M5H 1T1

Via email: rod.cooper@baffinland.com

Re: Final guidelines for the preparation of an Environmental Impact Statement for the Part 5 Review of the Mary River Project

---

Dear Mr. Cooper:

The attached guidelines are issued by the Nunavut Impact Review Board (the NIRB or Board) for the preparation of an Environmental Impact Statement (EIS) for the Part 5 Review of the Mary River Project (the Project) by Baffinland Iron Mines Corporation (the Proponent). Pursuant to Section 12.5.2 of the Nunavut Land Claims Agreement, it is the responsibility of the Proponent to prepare an EIS in accordance with the guidelines issued by the NIRB. The EIS developed in accordance with these guidelines will serve as the basis for the NIRB's review of the Project, and will enable the Board and interested parties to understand and assess the potential for Project-related ecoystemic and socio-economic effects.

The NIRB respectfully requests that you review the attached guidelines and supply the Board with an anticipated date for the submission of a *draft* EIS at your earliest convenience. Please be advised that the NIRB, the Nunavut Planning Commission, and the Nunavut Water Board will require hard copies of the Proponent's future *draft* EIS submission to be sent to the following addresses:

Nunavut Impact Review Board
4 copies EIS w/all appendices
9 copies EIS only
P.O. Box 1360
Cambridge Bay, NU
X0B 0C0

Nunavut Planning Commission
1 copy EIS w/all appendices
1 copy EIS only
P.O. Box 419
Arviat, NU
X0C 0E0

Nunavut Water Board
2 copies EIS w/all appendices
P.O. Box 119
Gjoa Haven, NU
X0B 1J0

David Hohnstein, Nunavut Water Board
1 copy EIS w/all appendices
18831-81 A Avenue
Edmonton, AB
T5T 5B4

On September 4, 2009 the NIRB requested that those parties which would require hard copies of the Proponent's future *draft* EIS provide mailing addresses and the required number of copies to the Board. However, to date only Natural Resources Canada[1] has indicated it will require hard copies for review purposes. The Board expects the Proponent will follow up with any additional parties responsible for authorizing components or activities proposed by the Project to determine if hard copies of the future *draft* EIS submission are required.

If you have any questions or require further clarification, please do not hesitate to contact the NIRB's Technical Advisor, Li Wan, at (867) 983-4606 or via email at lwan@nirb.ca.

Sincerely,

Stephanie Autut
Executive Director
Nunavut Impact Review Board

Cc: Honourable Chuck Strahl (strahl.c@parl.gc.ca)
Dionne Filiatrault, NWB (dionne@nunavutwaterboard.org)
Sharon Ehaloak, NPC (sehaloak@npc.nunavut.ca)
Mary River Distribution List

Attachment: Final EIS Guidelines for the Mary River Project – NIRB File No. 08MN053

[1] Correspondence from John Clarke, Natural Resources Canada (NRCan), indicating that NRCan requires 2 copies of the *draft* EIS, to be sent to 580 Booth St Ottawa ON K1A 0E4

GUIDELINES

FOR THE PREPARATION OF AN

ENVIRONMENTAL IMPACT STATEMENT

for

BAFFINLAND IRON MINES CORPORATION'S

MARY RIVER PROJECT

(NIRB File No. 08MN053)

NOVEMBER 16, 2009

Nunavut Impact Review Board

P.O. Box 1360

Cambridge Bay, NU X0B 0C0

Telephone: (867) 983-4600

Fax: (867) 983-2594

E-mail: info@nirb.ca

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GLOSSARY

This glossary is provided for the Proponent's greater certainty; the onus is on the Proponent to request clarification from the NIRB on any term it feels has not been made clear. Please note that, where possible, a reference has been provided for each of the terms below.

Archaeology	The scientific study of prehistoric people and their cultures.
Bioaccumulation	The process in which certain pollutants gather in living tissue (Theodore *et. al*, 1997).
Biodiversity	The diversity of plant and animal life in a particular habitat or ecosystem.
Borrow pit	Excavated areas used to provide low quality fill for construction activities such as roadbed building and landscaping. Fill of this type is usually removed from a nearby borrow pit and then compacted on the site as a base for other construction (DIAND, 1999).
Climate Change	Any long-term change in statistics of weather over periods of time that range from decades to millions of years. It can express itself as a change in the mean weather conditions, the probability of extreme conditions, or in any other part of the statistical distribution of weather. Climate change may occur in a specific region, or across the whole Earth. Climate change includes global warming.
COSEWIC	Committee on the Status of Endangered Wildlife in Canada is a committee of experts that assesses and designates which wildlife species are in some danger of disappearing from Canada.
Cumulative impacts	The impact on the environment that results from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions (Tilleman, 2005). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.
Demography	The statistical study of populations, with particular reference to births, deaths, migratory movements, age and sex.
Dust	Airborne particulate matter ranging in diameter from 10 to 50 microns. Dust can be emitted into air from anthropogenic sources and natural sources.
Ecosystemic	Relating to the complex of a natural community of living organisms and its environment functioning as an ecological unit in nature.
Ecosystem	A functional unit consisting of all living organisms (plants, animals and microbes) in a given area, and all the nonliving physical and chemical factors of their environment linked together through nutrient cycling and energy flow. An ecosystem can include humans and be of any size, but it always

	functions as an integrated unit. Ecosystems are commonly described according to the major type of vegetation, e.g. forest ecosystems or grassland ecosystems (Tilleman, 2005).
Esker	A ridge of sand and gravel deposited by a receding glacier.
Faulting	Cracks or breaks within a body of rock, causing one part of the body of rock to slip or slide relative to the other.
Fines	The portion of a powder composed of particles [of rock, mineral or sediment] which are smaller than a specified size (Theodore *et. al*, 1997).
Fish	Includes (a) parts of fish, (b) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and (c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals (*Fisheries Act*, 2009).
Fish habitat	Spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes (*Fisheries Act*, 2009).
General circulation model	A mathematical or statistical model describing atmospheric movements over the Earth. Among other things, such models are used to predict how the climate of the Earth may evolve over the years to come as a result of, for example, changes in atmospheric pollution.
Geochemistry	The study of the chemical composition of the earth and the physical and chemical processes responsible for it.
Geology	The study of Earth in terms of its development as a planet, commonly thought of as the study of rocks.
Geomorphology	The scientific discipline that studies the surface features of the Earth, including land forms.
Geotechnical	Relating to the application of engineering to geology.
Greenhouse Gases (GHGs)	Greenhouse gases (GHGs) are gases in the atmosphere that trap energy from the sun. Naturally occurring GHGs include water vapour, ozone, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) (EC, 2008). By United Nations Framework Convention on Climate Change (UNFCCC), GHGs of interest may include: carbon dioxide (CO_2) methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6), perfluorocarbons (PFCs) and hydrofluorocarbons (HFCs).
Harvest	The reduction of wildlife into possession, and includes hunting, trapping, fishing, as defined in the *Fisheries Act*, netting, egging, picking, collecting, gathering, spearing, killing, capturing or taking by any means (GC and TFN, 1993).
Hydrocarbons	Any organic chemical compounds that consist entirely of carbon and hydrogen (e.g., gasoline and oil).

Hydrogeology	The science that deals with the occurrence, circulation, distribution, and movement of water below the surface of the earth (groundwater), with emphasis on geological aspects.
Hydrology	The science that deals with water, its properties, distribution and circulation on or below the earth's surface.
Inuit	Aboriginal peoples of northern Canada and Greenland. In the context of Nunavut, for the purpose of these Guidelines, meaning those people to whom NLCA Beneficiary status is ascribed.
Inuit Owned Lands	Means (a) those lands that vest in the DIO [Designated Inuit Organization] as Inuit Owned Lands pursuant to Section 19.3.1 [of the NLCA], and (b) any lands that are vested in, acquired by or re-acquired by the DIO as Inuit Owned Lands from time to time pursuant to the [NLCA], so long as they maintain such status pursuant to the [NLCA] (GC and TFN, 1993).
Inuit Qaujimajatuqangit	Means traditional, current and evolving body of Inuit values, beliefs, experience, perceptions and knowledge regarding the environment, including land, water, wildlife and people, to the extent that people are part of the environment (QIA, 2009).
Inuit Qaujimaningit	Means (a) Inuit Traditional Knowledge and variations of Inuit Traditional Knowledge; (b) Inuit epistemology relating to: Inuit Societal values (including the legal obligations set out in the NLCA regarding Inuit Participation, Inuit employment and training, etc.); and Inuit knowledge (both contemporary and traditional) (QIA, 2009).
Leaching	The process by which a liquid (e.g., water) passes through a substance, picking up some of the material and carrying it to other places. Leaching can occur underground in soil and rock, or above ground through piles of material.
Limnology	Limnology is the study of the structural and functional interrelationships of organisms of inland waters as they are affected by their dynamic physical, chemical, and biotic environments" (Wetzel, 2001).
Lithology	The description of rocks on the basis of their physical and chemical characteristics (Tilleman, 2005). This often includes colour, structure, mineral components, and grain size.
Local Study Area	That area where there exists the reasonable potential for immediate impacts due to project activities, ongoing normal activities, or to possible abnormal operating conditions.
Mitigation	Actions taken for the purpose of reducing the negative impacts on the environment of a particular land use or activity (Tilleman, 2005). Actions may include considerations in design, construction, schedule, and restorative measures. Mitigation may also include restitution for any damage to the environment caused by a land use or activity through replacement, restoration, compensation, or any other means.

Nunavummiut	Residents of Nunavut.
Nunavut Land Claims Agreement (NLCA)	The "Agreement Between the Inuit of the Settlement Area and her Majesty the Queen in Right of Canada", including its preamble and schedules, and any amendments to that agreement made pursuant to it (Tilleman, 2005).
Ore	A mineral or aggregate containing a precious or useful substance in a quantity and form that makes its extraction/mining profitable.
Overburden	Material that must be removed to allow access to an ore body, particularly in a surface mining operation.
Permafrost	A permanently frozen layer of soil or subsoil, or even bedrock (INAC, 2007),
Palaeontology	The study of life in the past as recorded by fossil remains.
Periphyton	Very small plants that live attached to a surface in freshwater but do not move around.
Phenology	The study of periodic phenomena in plants, such as the time of flowering in relation to climate.
Phytoplankton	Very small plants that float or drift in lakes (Tilleman, 2005).
Plume	A visible or measurable discharge of a substance from a given point of origin. Plumes may occur in water or air.
Post-closure	The period of time following the shut-down of a mine or other facility, during which monitoring of its effects should be continued.
Post-project audit	An evaluation occurring after a development which assesses the environmental and social impacts of a project and the mitigation measures applied to them.
Potentially affected communities	A community or communities with the potential to be impacted, either positively or negatively, by a proposed project or development. Such communities may be defined physical entities or comprised of dispersed populations in the area of influence of a development or project.
Precautionary principle	Where there are threats of serious or irreversible damage, lack of full scientific certainty must not be used as a reason for postponing cost-effective measures to prevent environmental degradation (UN, 1972).
Proponent	The organization, company, or department planning to undertake a proposal (Tilleman, 2005).
Quarries	Are any sites used for the extraction of building products or construction material from bedrock, such as limestone, shale, sandstone, or granite. Quarries may also be used as to manufacture crushed rock or other specific types of aggregate (DIAND, 1999).
Raptor	A bird that feeds wholly or chiefly on meat taken by hunting or on carrion.

Reasonably foreseeable future development	Projects or activities that are currently under regulatory review or that will be submitted for regulatory review in the near future, as determined by the existence of a proposed project description, letter of intent, or any regulatory application filed with an authorizing agency (NIRB, 2007).
Regional Study Area	The area within which there is the potential for indirect or cumulative biophysical and socio-economic effects.
Rock heave	The movement of rock as a result of freezing and thawing.
Run-of-mine	This term applies to mined ore prior to it undergoing crushing or any other form of processing and treatment.
Sacred site	A place on the land created or used by Inuit spiritual leaders in the past for religious ceremonies, such as: a platform or formation leading to an "altar"; a hill, mountain, stone, boulder, river, lake, or Inukshuk designated as a sacred site; an offering place where people might plead for good fortune and well-being, often found along the coast, but also inland; a place where an unusual event might have happened, or an event that led to a death or a story of survival; a place known to Elders in legend where a significant story occurred (Ittarnisalirijiit Katimajiit, 1996).
Scoping	A process that pinpoints significant issues requiring study and analysis. This process aims to identify those components of the biophysical and/or socio-economic environment that may be impacted by the project and for which there is public concern (NIRB, 2008).
Seismicity	The phenomenon of earth movements, in extreme cases in the form of earthquakes, and their geographic distribution.
Significant	Significance is a consideration of the context of the project and the intensity of adverse effects, by giving particular regard to the following: a) the environmental sensitivity of the geographic area likely to be affected by the project; b) the historical, cultural and archaeological significance of the geographic area likely to be affected by the project; c) the extent of the effects of the project, including the geographical area that will be affected, the size of the affected human populations, and the size of the affected wildlife populations and related habitat; d) the extent of the effects of the project on other regional human populations and wildlife populations, including the extent of the effects on Inuit Harvesting activities; e) the magnitude and complexity of adverse effects; f) the probability of adverse effects occurring; g) the frequency and duration of adverse effects; h) the reversibility or irreversibility of adverse effects; i) the potential for cumulative adverse effects given past, present and future relevant events; and j) any other factors NIRB considers relevant to assessing significance (NIRB, 2007).

Species at Risk	In this document, Species at Risk includes a): those species listed on Schedule 1 of the Species at Risk Act (SARA), b): species assessed as "at risk" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and c): species with territorial, regional, or local "at risk" status.
Sustainable development	Development that meets the needs of the present generation without compromising the ability of future generations to meet their needs.
Talik	Permanently unfrozen ground in regions of permafrost. Usually applies to a layer that lies above the permafrost but below the active layer, often occurs below water bodies.
Thermal stability	The degree to which something, such as permafrost, has the capacity to remain at the same temperature over time.
Toxic substance	A poisonous substance.
Transboundary impacts	Any impact, not exclusively of a global nature, within an area under the jurisdiction of a Party caused by a proposed activity, the physical origin of which is situated wholly or in part within the area under the jurisdiction of another Party (UN, 1991).
Transportation corridor	The general routing for an area containing a road (winter or permanent), a pipeline, transmission line or any combination of the three, within Nunavut but outside community boundaries (NPC, 2000). In the current context, routings or tracts utilized for regular marine shipping activities are also considered to be transportation corridors.
Valued Ecosystem Components (VECs)	Those aspects of the environment considered to be of vital importance to a particular region or community, including: a) resources that are either legally, politically, publically, or professionally recognized as important, such as parks, land selections, and historical sites; b) resources that have ecological importance; and c) resources that have social importance (NIRB, 2007).
Valued Socio-Economic Components (VSECs)	Those aspects of the socio-economic environment considered to be of vital importance to a particular region or community, including components relating to the local economy, health, demographics, traditional way of life, cultural well-being, social life, archaeological resources, existing services and infrastructure, and community and local government organizations (NIRB, 2007).
Waste rock	All rock materials, except ore and tailings that are produced as a result of mining operations.
Water crossing	An area used for the purpose of crossing a water body. Water crossings may consist of naturally occurring areas, or installed structures such as pipelines, bridges, culverts, or roads, etc.
Zooplankton	Very small animals that float or drift in lakes.

LIST OF ACRONYMS

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

PART I – THE ASSESSMENT

1.0 INTRODUCTION

1.1 OBJECTIVE OF NIRB GUIDELINES

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

1.2 EIS GUIDELINE DEVELOPMENT

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

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

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

The NIRB has also conducted public scoping sessions in the following potentially-affected communities in the Nunavut Settlement Area (NSA): Pond Inlet, Arctic Bay, Resolute, Grise Fiord, Igloolik, Hall Beach, Coral Harbour, Cape Dorset, Kimmirut, Clyde River and Iqaluit. The objective of these meetings was to allow NIRB staff to effectively engage the public and interested parties on the proposed scope of the assessment, while soliciting their advice on Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) that should be addressed by the Proponent in its EIS. A *Public Scoping Meeting Summary Report* (NIRB, 2009) was developed following these community visits in the NSA, taking into account all comments received from community members.

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

1.3 PREPARATION AND REVIEW OF THE EIS

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

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

The NIRB will conduct an internal review of the material presented in the Proponent's submission of an EIS to determine whether the document conforms to these Guidelines (conformity review). The guideline conformity review is focused on identifying whether any information requested in the Guidelines or in the NIRB's Minimum EIS Requirements (Appendix A) has been omitted from the EIS. Guideline conformity review is a presence or absence analysis rather than an evaluation of the quality of the information presented, although the NIRB may point out significant deficiencies encountered. Should any omissions be identified, the Proponent is responsible for submitting supplementary information and may be required to revise and resubmit the draft EIS.

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

- Determination of whether Parties agree/disagree with the conclusions in the EIS regarding the alternatives assessment, environmental impacts, proposed mitigation, significance of impacts, and monitoring measures – and reasons to support the determination;

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

1.4 COOPERATION IN THE NIRB REVIEW OF THE MARY RIVER PROJECT

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

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

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

1.4.1 Joint Review of Transportation Corridor

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

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

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

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

In keeping with the Minister's direction and the provisions of the NBRLUP noted above, NIRB and the NPC have developed an arrangement to jointly review the transportation corridor (railway) proposed by the Project. The Proponent is required to include the project-specific information stipulated in Appendices J and K of the NBRLUP (see Appendix B), within its EIS. Given that much of the required information pertains directly to the impact assessment of the Project, the Proponent should cross reference where the required information can be found within the body of the EIS. It is recommended that an appendix be included in the EIS, with references to all the information required by Appendix B, which will then serve as the Proponent's formal application for an amendment to the NBRLUP.

1.4.2 NIRB and NWB Coordination

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

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

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

1.5 REASSESSMENT OF THE GUIDELINES

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

2.0 GUIDING PRINCIPLES

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

2.1 NIRB'S IMPACT REVIEW PRINCIPLES

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

- **An ecosystem-based approach must be adopted for the review** - In order to gain an adequate understanding of the effects of the Project, an ecosystem-based approach must be adopted to ensure that the review addresses both the direct impacts that the Project will have on the various ecosystem components, as well as the interactions that will occur between components.
- Socio-economic issues, such as the Project's potential to affect economic development within the region, must be included in the review - Members of the community constitute a critical part of the environment, and their concerns relating to the Project need to be to be assessed by the NIRB. As such, adverse and beneficial effects of the Project on

members of the community with respect to health, recreation, and other aspects of social well-being need to be addressed in the EIS, in order to ensure a culturally holistic understanding of the Project's effects.

- An understanding of past and potential future environmental, economic, and social trends in the Baffin Region of Nunavut, and how the Project will influence these trends is required - The inclusion of a time perspective, from the early planning of the Project through to its operation and possible closure over the next two decades (20 years), is important in order to provide the NIRB with a full understanding of the cumulative environmental effects of the Project in combination with other past, present and reasonably foreseeable projects.
- **The well-being of residents of Canada outside the Nunavut Settlement Area must be taken into account** – Significant transboundary bio-physical and socio-economic effects directly related to this Project must be included in the EIS in order to ensure the NIRB's assessment of the well-being of Canadians outside of the Nunavut Settlement Area.

2.2 PUBLIC PARTICIPATION AND ENGAGEMENT

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

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

Meaningful involvement in the environmental impact assessment process takes place when all parties involved have a clear understanding of the proposed project as early as possible. The NIRB Part 5 Review process requires the development of a public participation and an awareness program to initiate engagement of the public during the initial stages of the review, to facilitate meaningful consultation with those communities potentially affected by a proposed project. To this end, NIRB staff has conducted public scoping sessions in the following potentially affected communities: Pond Inlet, Arctic Bay, Resolute, Grise Fiord, Igloolik, Hall Beach, Coral Harbour, Cape Dorset, Kimmirut, Clyde River, and Iqaluit (NIRB, 2009). The objective of these meetings was to allow NIRB staff to effectively engage the public and interested parties on the proposed scope of the assessment, while soliciting their advice on VECs and VSECs that should be addressed by the Proponent in its EIS. Throughout the community visits, concerns were voiced about the necessity for meaningful consultation about this proposed project. Therefore, the Proponent is required to:

- Continue to provide up-to-date information describing the project to the public, particularly residents of communities likely to be most affected by the Project;
- Involve the public in determining how best to deliver that information, *i.e.* the types of information required, translation and interpreting needs, different formats, the possible need for community meetings; and
- Explain the results of the EIS in a clear direct manner to make the issues comprehensible to as wide an audience as possible.

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

2.3 PRECAUTIONARY PRINCIPLE

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

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

2.4 SUSTAINABLE DEVELOPMENT

Sustainable development is defined as "meets the needs of the present without compromising the ability of future generations to meet their own needs" (UN, 1987). The central task of environmental impact assessment is to contribute to sustainable development by safeguarding the sustainability of VECs in the face of development that might compromise that sustainability (Duinker and Greig, 2006). Promotion of the principle of sustainable development is fundamental to the NIRB's primary objectives laid out in Section 12.2.5 of the NLCA:

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

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

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

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

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

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

2.5 TRADITIONAL KNOWLEDGE

The phrase "Traditional Knowledge" (TK) refers to Inuit Qaujimajatuqangit (*i.e.* Inuit TK) restrictively, while Inuit Qaujimaningit refers to Inuit knowledge without reference to temporality. Inuit Qaujimaningit encompasses Inuit TK (and variations thereof) as well as Inuit epistemology as it relates to Inuit Societal Values and Inuit Qaujimaningit (or Inuit Knowledge-both contemporary and traditional) (QIA, 2009). In this document, TK broadly refers to Inuit Qaujimaningit and is meant to encompass local and community based knowledge, ecological knowledge (both traditional and contemporary), which is rooted in the daily life of Inuit people, and has an important contribution to make to an environmental assessment (Stevenson, 1996). This knowledge represents experience acquired over thousands of years of direct human contact with the environment (Berkes, 1993) and is rooted in personal observation, collective experience and oral transmission over many generations. TK relates to factual information on such matters as ecosystem function, social and economic well-being, and explanations of these facts and casual relations among them. It plays a significant role in the EIS development in term of acquisition of adequate baseline information, identification of key issues, prediction of the effects, and assessment of their significance, all of which are essential to the EIS and its review. Recognizing TK as indispensible element both as baseline information and as an Inuit lens through which impact analyses can be better understood can also result in more active and meaningful community engagement.

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

2.6 STUDY STRATEGY AND METHODOLOGY

The Proponent is expected to observe the intent of these Guidelines and to identify all significant environmental effects that are likely to arise from the project (including situations not explicitly identified in these Guidelines), the mitigation measures that would be applied, and the significance of any residual effects. It is possible that the EIS Guidelines include matters that, in the judgement of the Proponent, are not relevant or significant to the project. If that definition of such matters results in omissions from the EIS they must be clearly indicated, so that the public and other interested parties have an opportunity to comment on this judgement. Where the NIRB disagrees with the Proponent's decision, it may require the Proponent to provide the additional information. The Proponent is advised to consult with the NIRB on any issues within these Guidelines on which it plans significant deviation.

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

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

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

2.7 USE OF EXISTING INFORMATION

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

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

3.0 SCOPE OF THE NIRB ASSESSMENT

Based on the information contained within the Project Description and the NIRB's requirements for the Proponent's development of an EIS, the following subsections comprise the focus and scope of the NIRB review. In preparing the draft EIS, the Proponent must follow these Guidelines closely, while paying specific attention to the requirements of the NLCA, the NIRB's Minimum EIS Requirements (Appendix A), and the General EIS Principles as listed below. In addition, the Proponent should note that directions regarding the EIS Format are a further submission requirement of the NIRB. A detailed discussion of EIS format requirements may be found in Subsection 4.4.

3.1 NLCA – SECTIONS 12.5.2 AND 12.5.5

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

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

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

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

3.2 SCOPING LIST

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

3.2.1 Mary River Project Components

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

- Milne Inlet
- Milne Inlet Tote Road
- Mary River Mine Site

- Railway
- Steensby Inlet Port
- Marine Shipping
- Air Traffic
- Ongoing Geotechnical Exploration

3.2.2 Environmental Factors

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

3.2.2.1 Biophysical Components

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

3.2.2.2 Socio-Economic Components

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

PART II – THE ENVIRONMENTAL IMPACT STATEMENT

4.0 OVERVIEW OF THE ENVIRONMENTAL IMPACT STATEMENT

4.1 PRESENTATION

The Proponent shall provide an EIS that is complete, including scientific works, subject-specific studies and all other sources of information covering all aspects of the Project in regards to ecosystemic and socio-economic perspectives. For clarity and ease of reference, the EIS should be presented in the same order as the EIS Guidelines. However, in certain sections of the EIS, the Proponent may decide that the information is better presented following a different sequence. The EIS must include a guide that cross-references the Guidelines with the EIS such that requirements of the EIS Guidelines are easily located within the EIS. In the interest of brevity, the EIS should make reference to, rather than repeat, information that has already been presented in other sections of the document. A key subject index would also be useful and should reference locations in the text by volume, section and sub-section.

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

4.2 CONFORMITY

The Proponent is expected to observe the intent of the Guidelines, which will then lead to the preparation of an EIS. Specific issues or directions described in the Guidelines must be easily identifiable in the EIS. In accordance with the NIRB's *Guide 7: Guide to the Preparation of Environmental Impact Statements* (NIRB, 2006), the EIS shall contain a concordance table directing reviewers to the location (document, section, and page number) where specific information addressing the Guidelines and the NIRB's Minimum EIS Requirements may be found. The Proponent is cautioned that any significant deviation from these Guidelines could result in a negative conformity decision and subsequent requirements for revision. Where any differences in direction are encountered between the NIRB's *Guide 7* and these EIS Guidelines issued under NLCA Section 12.5.2, these Guidelines shall prevail.

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

4.3 LENGTH

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

4.4 FORMAT

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

- Cover sheet with project description;
- Plain language summary (in English, French and Inuktitut);
- Executive summary (in English, French and Inuktitut);
- Table of Contents;
- Concordance table which lists each of the Guideline requirement and location within the EIS;
- Purpose of and need for the Project;
- Detailed Project description including potential future development;
- Alternatives considered in the development of the Project proposal;
- Discussion of the public consultation initiatives with the communities potentially affected by the Project. Provide the results of the public consultation, as well as, evidence that community concerns where addressed in the planning of the Project activities;
- Baseline of the existing environmental and socioeconomic information, based upon proper studies, given the environment in the region;
- Anticipated ecosystemic and socio-economic impacts of the Project proposal, including its impacts on the valued ecosystem components (VECs) and valued socio-economic components (VSECs) potentially affected by the Project (and as identified by public consultation process);
- Anticipated accidents and malfunctions, effects on the environment, contingency plans and mitigation measures;
- Anticipated effects of the environment on the Project;
- Anticipated cumulative effect of the Project on the region/regions;
- Anticipated transboundary effects;
- Steps which the Proponent proposes to take to avoid and mitigate adverse impacts, including any Contingency Plans (spills, fires, floods, etc.) and adaptive management;
- Statement of residual impacts and significance;
- Steps which the Proponent intends to undertake in order to restore the area affected by the Project activities during operation and upon project closure and abandonment, including Abandonment and Reclamation Plan;
- Steps which the Proponent proposes to take to optimize benefits of the Project, with specific consideration being given to expressed community and regional interests;
- The monitoring program that the Proponent proposes to establish with respect to ecosystemic and socio-economic impacts;
- The interests in lands and waters which the Proponent has secured, or seeks to secure;
- List of permits, licenses and authorizations required to undertake the Project proposal;
- List of consultants or individuals who assisted in preparation of the EIS;
- List of agencies, organizations, and persons to whom copies of the EIS will be sent;
- Index; and
- Supporting documentation and appendices.

4.5 DATA PRESENTATION

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

4.6 SUMMARIES

4.6.1 Executive Summary (in English, French and Inuktitut)

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

4.6.2 Popular Summary (in English, French and Inuktitut)

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

4.7 TRANSLATION

In addition to the Popular Summary, Executive Summary and Glossary, being presented in English, French and Inuktitut within the EIS, the summary for each thematic volume shall also be translated into Inuktitut. Maps shall indicate common and accepted place-names usually referred to by the local populations in their own language, in addition to their official toponyms, especially where traditional Inuit place-names have been made official through the process outlined in Section 33.9 of the NLCA.

5.0 EIS CONTENT

5.1 THE PROPONENT

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

The Proponent shall describe its past experience in exploration, mining, railway and shipping operations, with particular reference to:

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

The Proponent shall identify and describe any obligations or requirements that it must meet to post a bond or other form of financial security to ensure payment of compensation in the event of accidents that directly or indirectly result in major damage by the Project to the environment, as well as to cover the cost of planned or premature closure, whether temporary or permanent.

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

5.2 REGULATORY REGIME

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

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

5.3 REGIONAL CONTEXT

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

5.4 ASSESSMENT BOUNDARIES

5.4.1 Spatial Boundaries

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

- The physical extent of project activities;
- The extent of ecosystems potentially affected by the Project;
- The extent to which traditional land use and Inuit harvesting could potentially be affected by the Project; and
- The size, nature and location of past, present, and reasonably foreseeable projects and activities which could interact with the items listed above.

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

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

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

The following general spatial boundaries are suggested:

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

5.4.2 Temporal Boundaries

Like spatial boundaries, temporal boundaries may vary with, among other things, the type of impact being considered and with seasonal changes. The establishment of temporal boundaries has two aspects: the time-horizon that will be used in predicting change; and the temporal variability and periodicity that characterize the predicted impacts (Whitney and Maclaren, 1985).

The time-horizon used for predicting change must be a function of the anticipated duration of the Project, including the final closure and post-closure phases, the predicted impacts, and the predictive capability of the various disciplines at play.

The EIS shall determine the temporal boundaries separately for the construction, operation, final closure, and post-closure periods, including planned exploration to be undertaken in conjunction with the Project. The closure period covers decommissioning, abandonment, and reclamation; post-closure covers the period after the mine has been decommissioned and the site reclaimed and returned as much as possible to its natural state. The temporal boundaries of the post-closure period may encompass many years, depending on the site and on the methods of closure. The Proponent shall also consider where applicable, the temporal bounds of Project alternatives under assessment, noting where they differ from those for the preferred option.

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

The description of the existing baseline and the environmental trends should include a consideration of past projects and activities carried out by the Proponent and/or others within the RSA. As is the case for the determination of spatial boundaries, the temporal boundaries must indicate the range of appropriate scales at which particular baseline descriptions and the assessment of environmental effects are presented.

For all temporal boundaries, the EIS shall give a rationale and justification for the boundaries chosen, including a description of any consultation with members of the public or technical experts. In doing so, the Proponent shall recognize increased global warming rates which might influence the some of the impact assessment, for example, there may be no immediate danger of permafrost degradation, but the Proponent must incorporate that possibility into the design of Project components where applicable.

5.5 LAND TENURE

The Proponent shall delineate on a map of suitable scale the legal boundaries of any areas to which it will acquire rights through lease or other tenure arrangements, to include Crown land, Inuit Owned Land, and Commissioner's land. It shall further describe those areas by providing such information as file numbers, start and end dates, fees, name of right holder, renewals, etc.

5.6 ANALYSIS OF NEED AND PURPOSE

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

- General feasibility from an economic perspective, including how this Project will benefit communities in Nunavut, either directly or indirectly;
- An assessment of the longer term strategic implications of the Project, and how it may affect or lend to transportation networks (existing and proposed) in Nunavut;
- Identification of past, current and potential future users of the LSA, RSA, and project infrastructure, including commercial, government, public, and private;
- Analysis of community support for and opposition to the Project, with particular emphasis on the proposed shipping route through the Foxe Basin and Hudson Strait, with a description of how the Proponent has sought input from a broad range of socio-economic groups and members of the public both within and outside of NSA, and any efforts undertaken to relieve public concern;
- An analysis of the overall net benefit of the Project in terms of Nunavut and of Canada as a whole, which includes considerations that are not related to economics; and

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

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

6.0 PROJECT COMPONENTS AND ACTIVITIES

The description of the Project components and activities shall address all phases of the Project in sufficient detail to allow the Proponent to predict potential adverse environmental effects and address public concerns about the Project. The Proponent shall describe the Project as it is planned to proceed through the site preparation, construction, operation and maintenance, and any potential modifications, closure, reclamation and post closure monitoring. The description must include a timeline for all phases of the Project. This section must include a discussion of the planned uses of the railway sea port as related to the Project and any potential use other than for the Project.

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

6.1 ALTERNATIVES

The EIS shall include an explicit analysis of all alternative means of carrying out the Project components, including a "no-go" alternative, the identification and application of criteria used to determine the technical feasibility and economic viability of the alternatives to the Project (e.g. transportation, natural, social, economic and cultural environment). This analysis must be done to a level of detail which is sufficient to allow NIRB and the public to compare the Project with the alternatives in terms of the economic costs and the environmental, social and economic impacts and benefits. The Proponent must include reasons for selection of the Project as the preferred alternative, and the reasons for rejection of other alternatives.

The EIS shall present alternatives for the following project elements:

- Alternatives for the routing of the railway and the location of the sea port, including:
    - Routing the rail line from the Mary River mine site to a seaport at Milne Inlet.
    - Using/updating existing shipping facilities at Nanisivik and routing the railway from the Mary River mine site to Nanisivik across the lower portion of Borden Peninsula.
    - Routing the rail line from the Mary River mine site to a seaport on the east coast of Baffin Island.
    - Locations of docks at preferred seaport site with consideration of bathymetric studies, minimizing underwater blasting and dredging and other factors.
- Alternatives to year round shipping from Steensby Inlet, including:
    - Year round shipping, with periodic suspensions during critical life periods of relevant marine wildlife species.
    - Shipping during periods of open water only through Foxe Basin and Hudson Strait.

- Decreasing the shipping frequency by extending mine life and/or decreasing the production rate.

- Alternative iron ore mining methods rather than conventional drilling and blasting;
- Alternatives to diesel power generation, including solar energy, wind energy, hydro and geothermal energy, etc;
- Alternative closure and reclamation options;
- Options of ballast water treatment and discharge;
- Alternatives to antifouling coatings of ore ships; and
- Any other alternatives to Project components.

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

Furthermore, as indicated in public consultation (Subsection 7.4), the public opinions and preferences shall also be taken into consideration as a criterion in the assessment all the alternative options. Therefore, the alternative analyses shall include a discussion on how public consultations by the Proponent have influenced the Project planning, and how public preferences have been considered by the Proponent in determining the preferred project alternatives.

6.2 Project Design

General Project design issues discussed in the EIS shall include:

- An explanation of how the environment has influenced the design of the Project. This should include consideration of relevant geographical, geological, meteorological, hydrological, and oceanographic conditions;
- A discussion on global climate change and it must describe and assess, on the basis of current knowledge, how the potential of climate change could affect permafrost and soils with high ice content, the hydrological regime, as well as marine ice flow regimes, and the long-term impacts of such changes on the Project. In addition, the Proponent shall identify the Project sensitivity to changes in specific climate-related parameters (CEAA, 2003);
- The Proponent should design and apply multiple scenarios on impacts assessments, where these scenarios span the range of possible future climates, rather than designing and applying a single "best guess" scenario (EC, 2007);
- A discussion of how design, engineering, and management plans will maintain/enhance the existing eco-systemic integrity, focusing on various wildlife habitats, including freshwater habitat, marine habitat, and terrestrial habitat;
- A demonstration of how the Proponent has applied the precautionary principle in its Project planning, design and management;
- How potential impacts to wildlife (e.g. caribou and peregrine falcons) have influenced the design of the Project, including the geographical location of project components, special attention should be paid to the influence of peregrine falcon habitat on the selection of land farms, borrow pits and quarry sites, etc.;

- How regional socio-economic conditions have influenced the Project design. For example, how local preferences and labour capacity, etc., have influenced the design of work rotations, pace of construction, employment policy, etc.
- How project design, particularly project infrastructure and site preparation, has been influenced by the distribution of archaeological resources and sites used for harvesting of wildlife and quarrying of soapstone;
- How public consultation and TK have influenced the planning and design of the Project; and
- The considerations for future development.

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

6.3 PROJECT PHASES

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

6.4 FUTURE DEVELOPMENT

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

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

6.5 DETAILED PROJECT PROPOSAL DESCRIPTION

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

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

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

6.5.1 Milne Inlet

The Proponent shall describe the followings aspects of facilities or activities at Milne Inlet:

- Barge Handling facilities:
    - All possible uses.
    - Design and construction plans, including how precautionary principles have been incorporated into the port design.
    - Operational plans including: listing of equipment and materials to be brought into port; unloading and transport of materials and equipment.
    - Security and safety management.
- Laydown areas;
- Oil Handling Facility (OHF), bulk fuel storage facilities and management;
- Camp facilities operation;
- Water supply and associated water intake sources and facilities;
- Waste (including shipping waste generated on board and hazardous waste) management facilities:
    - Including but not limited to industrial waste segregation, recycling and management facility.
    - Inert waste landfills, camp incinerator, and sewage treatment facilities.
- Communication systems; and
- Power generation unit.

6.5.2 Tote Road

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

- The relationship of the Milne Tote Road with existing hunting and traveling routes (including those routes using the Tote Road, in close proximity to the Tote Road, or intersecting the Tote Road);
- Milne Inlet Tote Road upgrades:
    - Quarrying borrow sites.
    - Modifications to sea container crossings.
    - Watercourse crossing installations.
    - Earthworks (grading, roadbed, re-alignments).
- Milne Inlet Tote Road operation and maintenance:
    - Traffic volume.
    - Road and water crossings maintenance.
    - Dust suppression.
    - Snow and surface runoff management, including total suspended solids (TSS) control and consideration of acid rock drainage (ARD) potential of sediment.
    - Wildlife management.

6.5.3 Mary River Mine Site

6.5.3.1 Geology/Mineralogy of the Ore Deposit

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

- Deposit locations, including detailed maps of the mine site area;

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

6.5.3.2 Ore Mining, Transport and Processing

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

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

- Measures and management plans to control natural hazards and/or mitigate their impacts on the Project, such as rock falls and collapses, extreme climate events, and other geological or geomorphological events (e.g., storm, flooding, and earthquake).

6.5.3.3 Overburden and Waste Rock Disposal

The Proponent shall present:

- Description of overburden and waste rock handling, including the design and location of the storage sites, describing the options for each, with references to similar operations in a comparable conditions, and results of research on the long-term thermal stability of the underlying permafrost;
- Description of the physical and chemical stability of the types of materials to be stored and those to be used for containment construction, with regard to the long-term acid-generation and metal-leaching potential of the waste rock. Consideration should be given to the latest monitoring results from mines in the same general climatic conditions;
- Explanation of the relationship between the timing of acid generation and permafrost encapsulation in cold weather conditions, with consideration for potential climate change;
- Description of the physical and chemical characteristics of seepage and runoff from the waste rock piles and appropriate control measures;
- Description of the water balance, and how it was considered in the design of control measures to ensure that runoff from the pile does not result in impacts on water quality in the surrounding environment;
- Description of the potential for rock heave phenomena and any resulting implications to ground stability; and
- Description, in qualitative and quantitative terms (where appropriate), of the chemistry of frozen groundwater from joints and fractures in the waste rock disposal area.

6.5.3.4 Water Supply and Water Treatment Facilities

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

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

6.5.3.5 Natural Drainage Diversion

The Proponent shall present:

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

6.5.3.6 Mine De-Watering

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

- Description of proposed de-watering methods, with estimates of volumes to be pumped based on the meteorological baseline data;
- Description of proposed geotechnical works, the areas that may be affected, the quantities of bottom sediment requiring disposal, and the proposed disposal methods;
- Estimates of mine water volumes, methods used to calculate volumes, and discussion of potential uses for mine water; and
- The contingency plan should the mine water volumes be significantly larger than estimated.

6.5.3.7 Landfills or Landfarms

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

- Research results for effectiveness of similar landfarm operation facilities in comparable geological regions and climate condition;
- Locations of any landfills and landfarms, with estimates of containment capacities, associated design basis and considerations to minimize impact on the surrounding environment;
- An inventory of materials to be land filled, taking into account the Project stages;
- Design considerations and criteria, engineering features and facilities layout drawings in relation to nearby roads, water courses and water bodies; and
- Proposed management of contact and noncontact water, and how the design of these components incorporates the consideration of climate change, especially when water diversions are proposed (i.e. increased or decreased flows).

6.5.3.8 Other Facilities at the Mary River Mine Site

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

a) Temporary Facilities during Construction Stage

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

b) Permanent Facilities during Operation Stage

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

6.5.4 Air Traffic

The Proponent shall provide information on:

- Description of all air traffic and types of aircraft to be used, regardless of whether an airstrip is required or not (e.g. helicopter);
- Estimates of the number of passengers to be transported and the volume of goods to be shipped through the airport facilities;
- Estimates of the number of flights and types of aircraft at each airstrip on a daily or weekly basis covering all phases of the Project;
- Description of all airport/airstrip facilities and construction methods;
- The infrastructure, service roads, fuel storage and transfer, de-icing and containment systems, methods of dust suppression;
- Identification of water bodies and watercourses that may be in-filled or encroached upon by the airstrips or airport infrastructure;
- The duration, frequency, and extent of use of each airport facility/airstrip;
- Accident/incident response reporting; and
- Estimated flight impact zones, based on flight routes, types of aircraft and traffic volumes.

6.5.5 Ground Traffic and Access Roads (excluding Rail Transportation)

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

- Permitting regime and land tenure of all access roads (designations of accessibility to public);
- Locations, connectivity of roads and speed limits;
- Relationship of access roads with existing hunting and traveling routes (including those routes in close proximity or intersecting planned access roads.
- Terrain conditions along the road alignments, design specification, construction methods, estimates and types of materials required for construction and maintenance; design features of all access roads, including laydown areas, temporary construction camps; types of water crossing, quantity and locations of each kind, and diversions of watercourses;
- Sediment control measures during construction and operation;
- The duration, frequency and extent of use of all facilities, including allowances for public or hunter access;
- Estimates of traffic volumes, types of vehicles, and seasonal or annual fluctuations;

- Roads management related to daily operation and maintenance, including snow removal, de-icing, snow drifts/banks management and dust suppression methods;
- Procedures and structures designed to mitigate/manage potential impacts to wildlife and wildlife movement during construction and operation (e.g. caribou crossings);
- Accident/incident response procedures and reporting; and
- Site reclamation, especially temporary construction camp and quarry sites which are used for extracting construction materials; disposal of construction waste materials and options of final closure and reclamation.

6.5.6 Rail Traffic

6.5.6.1 Railway Corridor

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

- Description of the proposed corridor, including a discussion of the intended uses and general routing, with consideration for the possible environmental and social impacts, and any seasonal considerations that may be appropriate. The description should also include:
    - All infrastructure and railway facilities and respective locations of the proposed railway corridor. Infrastructure should include water crossings, bridges, tunnels and other facilities.
    - Relationship of proposed routing with existing hunting and traveling routes (including those routes in alignment, at close proximity or intersecting the planned routing);
    - The distance between the railway line and associated facilities (e.g. the railway yard at Steensby Inlet), to communities or outpost camps;
    - General characteristics of the surrounding ecosystem and terrain conditions along the proposed corridor, including surficial materials (thermal condition, ground ice/moisture content, etc.), topography, drainage conditions, and other factors influencing landscape stability;
    - Identified locations and types of water bodies and watercourses that may be encroached upon by the railway, proposed watercrossings, and associated measures to minimize potential impacts on those water bodies and watercourses; and
    - Wildlife resources and associated habitat uses, and relation to ecosystem health.
- A comparison of the proposed route with alternative routes in terms of environmental and social factors as well as technical and cost considerations. This comparison should be in reference to the Proponent's alternatives analysis (Subsection 6.1) where relevant, and shall also include:
    - Potential impacts on the ecosystem, and current and future land use within the railway corridor from proposed railway construction and operations;
    - Presence of identified cultural and spiritual sites, archaeological and palaeontological sites, and associated impacts; and
    - Advantages of the preferred route, in terms of potential for environmental impacts, technical feasibility and economic viability as compared to other routes considered.

6.5.6.2 Railway and Train Operation

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

This information shall include:

a) Design and Construction:

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

- Description of proposed settlement prevention technology and measures to be used to ensure slope/bank stability at bridge locations;
- Details regarding the construction technology and machinery required to build railway track, bridges, and tunnels in arctic conditions and permafrost terrain conditions;
- Description of signalling and communication technology and equipment to be used to ensure safe operations;
- Details regarding the safety monitoring systems to be used (including those measures to ensure safe passage of wildlife), and related inspection and maintenance procedures for railway equipment;
- Description of braking technology and equipment to be used, with corresponding procedures and response times for emergency situations;
- Projected vibration and noise levels, and associated vibration damping and noise reduction technologies and equipment to be employed;
- Description of the railway alert or alarm systems and response mechanisms for natural disasters;
- Description of design considerations and construction methods for construction of sidings, bridges, other water crossing works, railway yards and terminals, etc.;
- Description of erosion control measures along the rail line for all drainage facilities, including bridges, culverts, ditches, dikes and berms, etc; and
- Discussion of lessons learned from other railway operations in comparable climatic conditions, and how those lessons/technological adaptations have been incorporated in the proposed railway design.

b) Operation:

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

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

6.5.7 Steensby Inlet

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

6.5.7.1 Steensby Site Facilities

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

6.5.7.2 Port Facilities

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

6.5.8 Marine Shipping (including Ice Breaking Shipping)

The Proponent shall describe:

- Applicable environmental legislation, including:

- International legislation, such as: MARPOL Convention, Protocols and Annexes as set out by the International Maritime Organization (IMO, 2008);
  - Canadian legislation, such as: Canada Shipping Act, Arctic Waters Pollution Prevention Act (e.g. the Zone/Date System, the Arctic Ice Regime Shipping System, Ice Navigators if applicable); and
  - How the Proponent and its shipping contractors/partners intend to either meet or exceed these requirements.
- Description of the proposed shipping fleet (types, sizes, and numbers of ships used), associated frequency and timing for all project activities from both Steensby Inlet and Milne Inlet during each phase of the Project;
- Description of proposed shipping routes both for open water and year round operations, with corresponding maps and details regarding bathymetry, navigational aids, other marine traffic using these routes, etc.
- Discussion of how TK has been considered in the selection of the routing and timing of shipping activities;
- Discussion of study results related to bathymetry, rock and sediment geotechnical properties, sediment thickness, tides, currents and sea ice for the proposed barge landings, and anchoring sites, with emphasis on the relation to overwintering of vessels in Milne Inlet and Steensby Inlet;
- Description of the results from bathymetric studies undertaken along the proposed shipping routes, seaport site, and dock sites with details on consideration made to minimize required underwater blasting and dredging. Additional discussion of study results should also be included for identified areas where shallow waters and/or strong current exist, with consideration given to the size of ore carriers, and the implications for shipping safety;
- Details regarding all undertakings/works required to make the selected port site accessible for shipping, including as relevant, details regarding under water blasting/dredging and installation of land-based or sea-based navigational;
- Methods of disposal of dredging material, including the proposed sites for disposal of dredged materials, site selection criteria, and means of offshore and on-shore transport;
- Disposal plans for onboard solid waste and waste water (*i.e.*, onboard sewage and grey water);
- Ballast water management plan for all Project shipping, with indication of the proposed ballast water exchange locations in mid-ocean, at the port site in Steensby Inlet, and alternative exchange zones within waters under Canadian jurisdiction;
- Proposed measures to ensure the fuel used for shipping conforms with Canadian regulations (*Benzene in Gasoline Regulations*, 1997; *Contaminated Fuels Regulations*, 1991; *Gasoline Regulations*, 1990; *Fuel Information Regulations, No. 1*, 1999; *Sulphur in Diesel Fuel Regulations*, 2002; *Sulphur in Gasoline Regulations*, 1999);
- Proposed measures to eliminate or reduce the risk of invasive aquatic and non aquatic species being introduced into Canada waters as a result of shipping;
- Measures and technologies to be adopted in the design and manufacturing of ore carriers to reduce the noise and GHG emissions;
- Discussion of required measures to prevent smuggling, illegal immigration, and other illegal activities related to international shipping;
- Description of loading and offloading procedures for dangerous goods, fuel and explosives if applicable;

- Identification of all parties responsible for ensuring safe shipping beyond the immediate port site;
- Discussion of proposed safety measures, including:
    - Measure to prevent the ship from being beset in pack ice, or being carried into rocks, shoals and small islands where the proposed shipping is close to the shoreline (e.g. in the Cape Dorset near-shore area).
    - Considerations for hiring personnel with local knowledge of the areas and weather conditions to act as ship-board monitors;
- Discussion of whether the shipping route or part of the proposed shipping route is a compulsory or non-compulsory pilotage area, and associated implications for regulatory compliance (APAR, 2009) if applicable;
- Details regarding the proposed procedures for accident, malfunction and incident management and reporting; and
- Other details as relevant which may be cross-referenced from the Shipping Management Plan (Subsection 9.4.15).

6.5.9 Borrow Pits and Quarry Sites

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

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

6.5.10 Access Roads

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

- Permitting regime and land tenure of access roads;

- Relationship of access roads with existing hunting and traveling routes (including those routes aligned with existing or proposed access roads, and in close proximity or intersecting access roads;
- Discussion of public access for Project access roads;
- Discussion of design features planned to protect and facilitate wildlife (e.g. caribou crossings) and humans that might across the roads during operations (including ATVs, snow machines and sledges), and prevent/minimize collision related mortalities
- Proposed construction methods for access roads, including requirements for laydown areas temporary construction camps, water crossings and diversions of watercourses;
- Estimates of quantities and types of materials required for construction and maintenance;
- Types of water crossings, quantity of each kind and locations;
- Measures for controlling sedimentation and runoff during construction;
- Projected traffic volumes, including the types, and numbers of vehicles to be used, fluctuations on a seasonal or annual basis, and speed limits;
- Discussion of plans for controlling public access to Project access roads, including considerations relevant to design and traffic management;
- Methods for disposal of construction waste materials and options for use in final closure and reclamation; and
- Other details as relevant which may be cross-referenced from the Road Management Plan (Subsection 9.4.18).

6.5.11 Power Generation

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

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

6.5.12 Fuel and Explosives Facilities

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

- Applicable federal and territorial legislation and regulations;
- The location and characteristics of fuel and explosives storage and/or manufacturing infrastructure and facilities (e.g. explosives and detonator magazines, fuel storage, ammonium nitrate storage, maintenance/wash area, process trucks and their parking area, any offices, warehouses, buildings). This will include distances to vulnerable features

(dwellings, roads, camps, railways, bodies of water, etc.), and distances between explosives facilities and fuel storage/handling areas;

- Types and estimate of quantities of fuel, explosives, and other similar materials required for the duration of the Project;
- Operational plans (without duplication of the plans noted above) including Oil Pollution Prevention/Emergency Plans in connection with the Spill Contingency, and Oil Handling Facility Contingency Plan. This addresses fundamental requirements for the fuel transfer to ships from port and should be approved by Transport Canada;
- Methods of fuel transfer and transportation from source(s) to and around site;
- Safe handling and spill containment prevention methods and liquid effluent disposal plans;
- Evaluation of worst case scenarios (i.e. accidental explosion);
- Security measures to be implemented, if applicable;
- Accident/incident response reporting, spill response training and contents of spill kits.

6.5.13 Waste Management Facilities

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

- Waste rock:
  - An inventory of waste rock generated during construction of Project infrastructure, for example: overburden, waste rock, off grade iron ore, low grade mineralized material, processing wastes, excavated material, and any other related wastes if applicable;.
  - Details regarding the ARD and ML characterization of waste rock, the method of testing in terms of both static and kinetic tests, the number of samples and sampling protocols, the company and personnel to carry out the tests, and implications to possible use and disposal;
  - Description of analyses implemented in the development of the proposed pile design and runoff management plans, including any analysis related to the water balance of the waste rock pile, as well as the thermal condition of the pile and surrounding ground;
  - Proposed management plans regarding stockpile design, locations and capacities, with reference to the predicted volumes/tonnage of waste rock, physiochemical characteristics, stockpile methods and procedures, runoff management, progressive reclamation plans, and other details as deemed relevant; and
  - Discussion of proposed management plans for accommodating the projected volumes of materials at waste rock facilities; with a discussion of measures for contingency situation in which the designed facility is not adequate to accommodate waste rock really generated.
- Sewage/grey water treatment:
  - Description of proposed sewage/grey water treatment facilities to be used during construction and operations, including a discussion of the technology to be employed, the locations of the facilities, point(s) of discharge, solids (sludge) disposal methods, and the volumes and quality of the effluent, as well as the applicable discharge standards;

  - Contingency measures for the disposal of sewage/grey water during periods of sewage plant malfunction and/or disturbances, with details regarding the associated disposal and treatment technologies and facilities; and
  - Description of the proposed collection, handling, storage, treatment, and disposal or treatment methods for contaminated soil, snow, ice and surface runoff.
- Hazardous waste management:
  - Inventory of the types and predicted volumes/quantities of hazardous wastes to be generated or produced by Project activities, including shipping operations;
  - Description of proposed storage, transport and disposal methods to be employed;
  - Details regarding the destinations for each type of hazardous waste, including the disposal of containers used to transport or store hazardous materials;
  - Description of the facilities to be used for incineration of domestic waste;
  - Inventory of domestic waste, including both land-based and ship-based generated wastes;
  - Description of incineration technologies, equipment and applicable emission regulations;
  - Methods of disposal of incineration ash; and;
  - Details regarding training programs for operations personnel.

6.5.14 Exploration

The Proponent shall describe:

- Areas proposed for ongoing geotechnical investigations and mineral exploration, including drilling, over the duration of the various Project areas (e.g. rail line, potential hydro power site, mineral deposits, etc.);
- Temporary/field facilities, equipment to be used, and required ground and air transport frequencies;
- Proposed wildlife mitigation and monitoring measures associated with exploration program (e.g. compliance with the minimum flight altitudes if aerial surveys are planned/conducted, timing and type of surveys, etc.);
- Proposed mitigation and monitoring measures designed to protect archaeological and cultural resources from being impacted by ongoing exploration; and
- Management plans for drilling waste disposal and drill site reclamation.

6.5.15 Other Project Facilities and Infrastructure

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

7.0 IMPACT ASSESSMENT APPROACHES

7.1 BASELINE INFORMATION COLLECTION

The Proponent shall present baseline data, including TK, about the existing biophysical and socio-economic environments relevant to the assessment of potential impacts from the Project in all proposed phases. Potential for changes in baseline conditions due to exploration activities related to the Project must be taken into consideration. The Proponent shall explain methodologies for baseline data collection, evaluation of the adequacy of data, confidence levels associated with baseline data, and identification of significant gaps in knowledge and understanding. The associated uncertainties and the steps to be taken to fill information gaps should be discussed.

The Proponent should consider other available information containing baseline data related to the Project region, including a review of grey literature, technical scientific reports, and peer-reviewed scientific literature to present a complete picture of baseline conditions.

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

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

7.2 VALUED ECOSYSTEM COMPONENTS AND SOCIO-ECONOMIC COMPONENTS

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

The Proponent should justify the methods used to predict potential adverse and beneficial effects of the Project on the VECs and VSECs, on the interactions among these components, and on the relations of these components with the environment. In particular, the Proponent should validate the selected VECs/VSECs, especially those VECs/VSECs that will be used to assess the significance of Project component interactions, through consultation with the potentially affected communities. Any uncertainties in the validation must be documented. The NIRB strongly recommends that the Proponent continue to seek input from communities, government agencies and other parties, as well as incorporate the use of TK to identify the VECs and VSECs. All VECs and VSECs used in the assessment should have clearly identified indicators as outlined in Subsection 7.10.

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

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

The following list of biophysical components and socio-economic components related to the Project, identified by NIRB through scoping, with full consideration of public input, should be considered in the Proponent's selection of VECs and VSECs. This list is not meant to be comprehensive nor exhaustive, and should give the Proponent an appropriate starting point for the identification of relevant VECs and VSECs. The Proponent shall provide a rationale for the selection of communities and relevant studies for which baseline data are provided. The Proponent shall describe the interactions between the socio-economic and bio-physical environments. If components identified in these Guidelines are not included in the EIS, the Proponent must clearly discuss its rationale for the omission.

7.2.1 Valued Ecosystem Components

- Air quality;
- Climate change;
- Noise and vibration;
- Landforms, soil, and permafrost;
- Surface water include freshwater quality and quantity;
- Freshwater fish, fish habitat and other aquatic organisms;
- Vegetation;
- Terrestrial wildlife and habitat, including representative terrestrial mammals including: caribou (including habitat, migration, and behaviour), foxes, wolverines, and wolves;
- Migratory birds and habitat (nesting areas);
- Marine and coastal habitats including sea ice and seabed sediments;
- Marine fish and invertebrates; and
- Marine mammals including such representative species as polar bears, seals, bowhead whales, walrus, beluga whales, narwhals.

7.2.2 Valued Socio-economic Components

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

7.3 METHODOLOGY

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

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

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

7.3.1 Acquisition Methodology and Documentation

The Proponent shall specify and justify all sampling protocols and statistical processes employed in both the biophysical and social contexts. The reliability and scope of the results, the possibility of reproducing the analyses, and quality control of laboratory analyses shall be analyzed. All data based on environmental sampling necessarily involve some variability, which must be determined to assess the reliability and scope of the data. The Proponent shall, for all data obtained from environmental sampling, provide a dispersion or variability coefficient (variance, standard deviation, confidence interval, etc.) and indicate the size of the sample used. The sampling methods and standards should be in accordance with those prescribed by regulators in Nunavut. Similarly, when using mathematical models the Proponent shall indicate the inputs and assumptions employed, the prototype used, the accuracy, and the inherent limits of interpretation.

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

7.3.2 Data Analysis and Presentation

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

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

7.4 PUBLIC CONSULTATION

Public consultation is required when:

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

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

A summary of key dialogues between the Proponent, consultants, community members and organizations as indicated in Section 11 of this document must be presented in the EIS and will enable responsible agencies to:

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

7.5 TRADITIONAL KNOWLEDGE

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

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

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

The Proponent shall discuss how it weighed and incorporated TK in baseline data collection, impact prediction, and significance assessment, and the development of mitigation and monitoring programs. It shall explain how it integrated TK and popular science, including the manner in which it reconciled any apparent discrepancies between the two. It shall also include incidences where TK is being used to address gaps in currently available scientific data should be clearly identified as such. All assumptions shall be justified

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

7.6 IMPACT ASSESSMENT APPROACH

The required impact assessment, including the significance analysis, should describe: the effect considered, the significance of the effect and justification for that determination, and if applicable, how the effect fits into a cumulative effects analysis and transboundary effects analysis. In this assessment, more emphasis should be placed on those significant impacts on VECs and VSECs, extending across all the Project phases if applicable. The biophysical elements and socio-economic elements potentially impacted by the Project components, activities and undertakings should be referred to in the categories listed in the Subsection 8.1 and Subsection 8.2. Based on the predicted potential adverse effects, the proposed mitigation measures shall be addressed in the corresponding management plans as listed in Section 9.

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

7.7 IMPACT PREDICTION

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

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

The Proponent shall assess the direct, indirect, short-term, and long-term impacts of the Project on the biophysical and socio-economic environments, and the interactions between them, focusing on the anticipated response of the VECs and VSECs. It shall also assess the degree of uncertainty associated with each predicted effect. Where potential cumulative effects are identified, a discussion should be provided related to the CEA as outlined in Subsection 7.8 of these Guidelines.

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

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

7.8 CUMULATIVE EFFECTS ASSESSMENT

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

The Proponent is expected to carry out its cumulative effects assessment (CEA) with consideration for the following factors:

- A larger spatial boundary (RSA rather than LSA): This will enable the Proponent to assess the project impacts in relation to other activities in the geographical region, and implies that spatial assessment boundaries may cross jurisdictional boundaries for a better understanding of additive and interactive pathways of different types of cumulative effects (NIRB, 2007);
- A longer temporal scale: This will enable the Proponent to consider all from the present time into the past and the reasonably foreseeable future for a more accurate analysis of variability and significant long-term effects;
- Alternatives analysis: CEA requires the explicit creation of alternative development scenarios and analysis of potential cumulative effects associated with each option (Greig *et al.*, 2002). Therefore, the Proponent should endeavour to ensure its CEA addresses the alternatives presented under Subsection 6.1 of these Guidelines.
- Consideration of effects on VECs and VSECs: An effective CEA will allow the Proponent to more accurately assess how the interaction of impacts from the various Project components and activities, and from other past, present and reasonably foreseeable projects, might impact in a cumulative fashion on selected VECs/VSECs;
- Evaluation of significance: Effective CEA requires identifying and predicting the likelihood and significance of potential cumulative effects, including direct, indirect and residual impacts. The Proponent shall consider and determine the significance of the cumulative effects using the criteria described in Subsection 7.11.

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

- Effects of other past, present and reasonably foreseeable future projects and activities, including former mining operations at Nanisivik and Polaris mines, Baffinland's most recent bulk sampling program and ongoing geotechnical and exploratory drilling program, and present shipping activities in the RSA (including community and resource development re-supply and cruise ships). Reasonably foreseeable projects may include the proposed federal naval facility at Nanisivik, proposed at the Roche Bay Mining development project, as well as associated shipping activities in the RSA;
- Effects of potential future development of other identified deposits (#2, #3 and #4), and possible new deposits to be identified from the ongoing exploration program at or near Mary River;
- Effects of an increased lifetime for the railway and port facilities resulting from possible expansion of the currently proposed project;
- Effects of the Project that would provide for or contribute to the overall use of larger marine transportation corridors, taking into account the improved accessibility (e.g. navigational aids, improved mapping, etc.) for other marine traffic;
- Effects on the distribution, abundance and harvesting of both terrestrial and marine wildlife (including migratory birds), in terms of habitat loss, changes to migration patterns, population health, etc. from escalated project activities, establishment of a long-term transportation network and marine shipping routes with ice breaking at the proposed rate;
- Effects on "Species at Risk";

- Effects related to different temporal scenarios for shipping (including an option for no ice breaking in winter and spring); and
- Cumulative effects of monitoring programs planned for identifying and mitigating effects of the Project on wildlife; and Consideration of potential cumulative effects (positive and/or negative) on human health, economy, culture of the nearby communities and the region.

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

- Justify the environmental components that will constitute the focus of the CEA. The Proponent's assessment should emphasize the cumulative effects on the main VECs/VSECs that could potentially be most affected by the Project;
- Present a justification for the spatial and temporal boundaries for the CEA. It should be noted that these boundaries can vary depending on the VECs or VSECs assessed;
- Discuss and justify the choice of projects, components and selected activities for the CEA. These shall include past activities and projects, those currently being carried out and any reasonably foreseeable project or activity; and
- Discuss the mitigation measures that are technically and economically feasible, and determine the significance of the cumulative effects. If any impact is identified and verified beyond the Proponents sole responsibility or capacity, the Proponent shall make best efforts to identify other responsible parties in order to mitigate the impact collectively.

7.9 TRANSBOUNDARY IMPACTS

Transboundary impacts, for the purpose of the current Guidelines, are defined as those effects linked directly to the activities of the Project inside the NSA, which occur across provincial, territorial, international boundaries or may occur outside of the NSA. The Project's proposed shipping route runs through the Hudson Strait within the boundaries of the NSA, however, the potential for impacts in neighbouring jurisdictions outside of the NSA must be duly considered. The Proponent shall give due consideration to the potential for transboundary impacts which may be resulted from interactions between the effects of the Project in the NSA, and the effects of projects located outside Nunavut. The potential for transboundary impacts related to cumulative effects associated with this Project shall be defined.

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

7.10 INDICATORS AND CRITERIA

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

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

7.11 SIGNIFICANCE DETERMINATION

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

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

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

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

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

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

- Ecological/socio-economic context/value;
- The environmental sensitivity of the area likely to be affected by the project;
- The historical, cultural and archaeological significance of the geographic area likely to be affected by the project;
- The size of the affected human populations, and the size of the affected wildlife populations and related habitat;
- The extent of the effects of the project on other regional human populations and wildlife populations, including the extent of the effects on Inuit Harvesting activities;

- The potential for cumulative adverse effects given past, present and future relevant events;
- Effects on ecosystem function and integrity;
- The effect on the capacity of resources to meet present and future needs; and
- The value attached to the impacted VEC or VSEC by those who identified them.

7.12 CERTAINTY

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

7.13 IMPACTS OF THE ENVIRONMENT ON THE PROJECT

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

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

Longer-term effects of climate change must also be discussed up to the projected closure phase of the Project. The sensitivity of the Project to long-term climate variability and effects shall be identified and discussed. The Canadian Environmental Assessment Agency Procedural Guide, "*Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners*" (CEAA, 2003) provides guidance for incorporating climate change considerations into an environmental assessment, and may be useful for the Proponent.

8.0 PROJECT ENVIRONMENT AND IMPACT ASSESSMENT

The EIS shall provide a complete analysis of the effects from the Project on the biophysical and socio-economic environments, which will serve as a basis for developing various mitigation and monitoring plans to eliminate or minimize the potential impacts from the Project.

8.1 BIOPHYSICAL ENVIRONMENT AND IMPACT ASSESSMENT

The Proponent shall present relevant information pertaining to the biophysical environment and associated processes to be assessed, to serve as a baseline against which the potential impacts of the Project can be measured. In describing the biophysical environment, the Proponent shall take an ecosystemic approach that takes into account both scientific and TK perspectives regarding ecosystem health and integrity. In its impact assessment, the Proponent should identify and justify the thresholds or indicators, and further relate them to Project monitoring and follow-up measures. For each predicted negative impact in this section, associated mitigation measures should be discussed to extent possible, with references to project design (Subsection 6.2) and environmental management systems (Section 9.0).

8.1.1 Meteorology and Climate (including Climate Change)

8.1.1.1 Baseline Information

- A description of the baseline meteorological and climatic conditions at the LSA and RSA, including methods of determination (with a discussion of how data from outside the project area may have been utilized) and uncertainties encountered;
- Meteorological data including but not limited to: air temperature, precipitation, evaporation and sublimation rates, wind directions and velocity, and prevailing wind directions at areas of key project components and along proposed shipping routes;
- Annual, seasonal, monthly and daily average/mean values of above noted meteorological parameters; seasonal and yearly fluctuations and variability; and extreme climate events over the same period of time in which the data are collected in the RSA of the Project;
- Prevalent trends related to key climate parameters in the Project area and any resulting implications to the Project;
- Impacts from climate change on sensitive ecosystem features within the terrestrial and marine ecosystems; and
- Predicted effects of climate change on mean and extreme climate parameters, and meteorological phenomena including flooding, storms, etc.

8.1.1.2 Impact Assessment

- Effects of climate condition on the Project, with a focus on the design and planning of Project components and activities including: upgrades to the Milne Inlet Tote Road and related water crossings; railway embankment, water crossings (bridges) and auxiliary facilities; port facilities; open pit mine; waste rock stockpile; airstrips and access roads;
- Impacts of extreme meteorological events on the Project, and related considerations for Project design and planning, including the following: extreme temperature and precipitation events; high winds and waves; ice-ride up and pile-up events; extreme ocean water levels (high and low); and severe fog or white out conditions. Potential changes to the timing of ice formation, active layer thickness, and frequency of storms should also be taken into consideration;
- Discussion of the likelihood of all possible climate changes based on various possible scenarios, rather than designing and applying a single "best guess" scenario, and corresponding long term implications to the Project under each scenarios;
- Discussion of the relationship between climate change and greenhouse gas emissions from the Project;
- Potential effects of climate change on permafrost thawing in the Project area, with discussion of the related implications on the stability of project components and sensitive land features, including: railway embankment; water crossings and tunnels; and waste rock stockpiles; and
- Uncertainties related to climate change predictions, and the related effect on other predictions in the EIS, including water quantity and permafrost thawing.

8.1.2 Air Quality

8.1.2.1 Baseline Information

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

8.1.2.2 Impact Assessment

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

8.1.3 Noise and Vibration

8.1.3.1 Baseline Information

- Description of baseline noise levels in the Project area, including a discussion on variability, and if applicable, their relationship with local weather conditions, seasonal variations, etc.;
- Review of available studies/research the potential impacts of noise and vibrations on wildlife behaviours and health in both terrestrial and marine environments, with a focus on noise from similar railway and shipping operations, in comparable climate and

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

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

8.1.3.2 Impact Assessment

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

8.1.4 Geology and Geomorphology

8.1.4.1 Baseline Information

- Description of the bedrock, surface/subsurface geology, petrology, topography, geochemistry, hydrogeology and geomechanics of the areas that will be disturbed by major project components;
- Description of structural geology, such as fractures and faults, at major project infrastructure areas and where earthworks are proposed (e.g. Mary River Mine site, Steensby Inlet infrastructure, cutting and tunnelling locations along the railway route, etc.); and
- Description of the geotechnical properties of bedrock, and the characteristics of soil, including ground ice and thermal conditions, as relating to slope stability and bearing capacity of facility foundations and the railway line route under both static and dynamic conditions.

8.1.4.2 Impact Assessment

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

- Potential effects on foundation stability of major Project components from geological fractures and faults, and associated implications of these features on project planning and engineering design. Those Project components assessed shall include, but are not limited to, docks facilities, railway embankments, tunnels, major watercourse crossings, open pit, and equipment pads; and
- Risk assessment and predictions, with proposed management measures.

8.1.5 Hydrology and Hydrogeology

8.1.5.1 Baseline Information

- Description of hydrology of the LSA (e.g., streams, surface water flows, subsurface water movement, ice formation, and melt patterns);
- Description of relevant hydrological regimes, drainage basins, watershed boundaries and site water balance in the RSA;
- Description of natural fluctuations, variability, and sources of variability in flow rates, including seasonal fluctuations and year-to-year variability, and the interactions between surface water and groundwater flow systems;
- Description of the timing of freeze/thaw cycles, flood zones, ice cover (seasonal patterns and spatial variation), and ice conditions and typical thicknesses, formations and melt patterns; and
- Description of hydrological characteristics of streams, rivers, and lakes in each watershed of the RSA. Items listed should be considered within the context of the range of climate conditions expected (include both climatic variability such as potential for extreme events, seasonal changes).

8.1.5.2 Impact Assessment

- Discussion of the potential impact of variable and extreme stream-flows on Project design and planning, including proposed water crossings;
- Potential impacts to existing water sheds from surface water diversions required by mine site development and other Project components (e.g. waste rock stockpiles);
- Evaluation of storm water run-off throughout the Project area, with consideration for potential impacts to receiving waters (e.g. flow rates and flow patterns);
- Potential impacts to natural drainage patterns from the construction and operation of proposed mine facilities;
- Potential impacts on terrestrial and aquatic wildlife habitat resulting from the modification or redirection of natural flows;
- Potential for ice damming and resultant effects on other resources;
- Potential impacts to the navigability of watercourses from proposed water crossings; and
- Potential impacts of the railway on the hydrology regime in the LSA, resulting from drainage diversions, ditching and rechanneling, as well as sediment runoff.

8.1.6 Groundwater/Surface Waters

8.1.6.1 Baseline Information

- Description of the physical and chemical characteristics of surface, sub-surface, ground waters in the LSA, with discussion of seasonal variations of water flow and quality;
- Description of interactions between permafrost, surface water and ground water, and topography, as well as rock fractures and talik zones between different surface/ground waters;

- Description of permafrost/talik distribution, permeability and hydraulic conductivity of the underlying materials;
- Description of existing groundwater regimes, distribution characteristics and flow paths in the Project area, including any instances of frozen groundwater within/around the identified deposits;
- Discussion of waters in the LSA of importance to local harvesting activities by surrounding communities;
- Description of lake bathymetry and limnology in the LSA; and
- Discussion of fluvial geomorphology and stability as related to proposed water crossings.

8.1.6.2 Impact Assessment

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

8.1.7 Landforms, Soils and Permafrost

8.1.7.1 Baseline information

- Description of existing unique or valuable landforms (e.g., eskers, fragile landscapes, wetlands), including details regarding their ecological functions and distribution in the LSA;
- Description of existing or proposed protected areas, special management areas, and conservation areas in the RSA;
- Discussion of the geomorphologic and topographic features at areas proposed for construction of major project components, including the type, thickness, and distribution of soils as applicable;
- Description of the bedrock lithology, morphology, geomorphology and soils (including sediments and the thermal and ground ice conditions) at proposed borrow and quarry sites, and other areas where earthworks are proposed. If eskers are identified as a potential source of granular material then a description of granular material properties, including thermal condition and ice content, should also be described;
- Discussion of the potential for ground and rock instability (e.g., slumping, landslides, and potential slippage) at at areas planned for Project facilities and infrastructure;
- Discussion of the relationship between permafrost processes and active layer, surface water bodies and topography;
- Details regarding the suitability of topsoil and overburden for use in the re-vegetation of surface-disturbed areas;
- Description of permafrost distribution in the LSA, including areas of discontinuous permafrost, high ice-content soils, ice lenses, thaw-sensitive slopes, and talik zones;
- Description of permafrost temperatures at areas planned for Project facilities and infrastructure, including discussion of sensitivity to climate change, and implications for stability and safety of infrastructures; and
- Sites of paleontological or palaeobotanical significance within the LSA.

8.1.7.2 Impact Assessment

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

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

8.1.8 Vegetation

8.1.8.1 Baseline Information

- Description of ecological zones, and other relevant classifications of plant associations and phenologies in the LSA;
- Description of the vegetation types in the LSA, including estimated percentage cover and height for principal species, with a discussion of their importance to wildlife;
- Details regarding associations between vegetation cover types and soil types in the Project area;
- Description of rare or regionally unique plant species or species assemblages, including species with federal or territorial designated status (e.g., vulnerable, threatened, endangered, extirpated, of special concern – as designated by the COSEWIC or other agencies);
- Discussion of the health status of plant species/communities in the LSA, including baseline information on contaminant levels in representative species consumed by humans, either directly or indirectly (i.e., through harvesting of foraging wildlife);
- Identification of plants in the LSA that perform particularly significant ecological functions, and/or are of importance to wildlife;
- Details regarding species that are valuable for cultural reasons known to Inuit;
- Any other issues related to vegetation and identified through public consultation; and
- Description of TK collected related to plants and plant use in the RSA.

8.1.8.2 Impact Assessment

- Potential impacts to abundance and diversity of vegetation due to Project activities causing surface disturbance;
- Potential impacts to specific vegetation coverage and species composition from construction, operation, and reclamation activities in the Project area;
- Assessment of the potential loss, disturbance, and/or changes to vegetation abundance, diversity, and forage quality as a result of Project components and activities, including potential effects from airborne fugitive dust fall, airborne contaminants from emission sources, and changes to water quality and quantity, permafrost, or snow accumulation;
- Potential impacts on vegetation abundance and diversity from the transfer/introduction of invasive or exotic species into the LSA via Project equipment and vehicles, including aircraft and ships;
- Potential impacts to vegetation of cultural or practical value to Inuit;

- Potential direct and indirect loss of vegetation and associated habitat from construction of the railway;
- Potential impacts on vegetation quality due to dust fall from soil erosion, surface disturbance, fine iron ore transport, etc;
- Discussion of proposed vegetation quality monitoring, specifically contaminant loadings of species directly consumed by humans (e.g. lichen) and/or indirectly consumed through food chain associations; and
- Discussion of the management measures for minimizing/mitigation of disturbances to plant associations, including progressive reclamation/re-vegetation plans for disturbed areas, and measures to reduce the potential for establishment of invasive species in the area.

8.1.9 Freshwater Aquatic Environment Including Biota and Habitat

8.1.9.1 Baseline Information

- Description of the limnology, freshwater biota, presence of fish and other freshwater species (with emphasis on species that perform particularly significant ecological functions), associated habitats and habitat distribution in the RSA and the LSA. This description should be based on the results of baseline information collected from studies, available published information and/or information resulting from community consultation.
- Description of the biological composition of freshwater aquatic environments in the LSA, including: trophic state, periphyton, phytoplankton, zooplankton, fish, and the interactions and relative significance of each species within identified food chains;
- Description and population distribution of fish species in the LSA with a focus on arctic char, and including the potential seasonal and annual trends in abundance and distribution of species, their migratory patterns, routes and preferred corridors, and the corresponding sensitive periods when routes include habitats potentially affected by the Project;
- Characterization of habitat requirements for each fish species, including areas used for spawning, rearing, feeding and over-wintering, and any sensitive times for these activities;
- Description of existing freshwater habitat in water bodies and watercourses (including littoral zones, aquatic and riparian vegetation, lake bottom characteristics, fish overwintering areas, the estimated productive capacity, etc.) within the LSA;
- Description of the habitats and populations of any rare, or regionally unique fish species habitats of any rare or regionally or locally unique species, species designated in Species at Risk, species listed as vulnerable, endangered, or a species of special concern by COSEWIC; species with federal or territorial(e.g., vulnerable, threatened, endangered, extirpated, of special concern), and species of the great importance for Inuit life and culture;
- The health of fish VEC species populations and their contaminant loadings;
- Discussion of any other issues relating to freshwater aquatic species or habitat identified through public consultation.

8.1.9.2 Impact Assessment

- Potential impacts to fish, invertebrates and freshwater habitat including potential impacts to water and sediment quality and quantity. Consideration should be given to impacts associated with the following: water withdrawals; discharge; redirection of natural flows; explosives use; nutrient and toxin inputs; and sewage and grey water effluent discharge;

- Potential impacts of alteration, disruption, or destruction of fish and invertebrate biota habitat, with consideration for Project activities in close proximity to water bodies such as the noise and vibration from blasting as a result of the construction of bridges and other water crossings;
- Potential impacts to freshwater fish, invertebrates and habitat from planned containment structures (e.g., sediment control structures and fuel containment structures) and potential accidental spills;
- Potential impacts on identified fish habitat critical for spawning, rearing, nursery and feeding, seasonal migration, winter refuges and migrations corridors;
- Evaluation of the ability of fish to pass at water crossings along access roads and the railway;
- Potential impacts to fish health, distributions and populations; and
- Evaluation of the potential for elevated contaminant loadings in freshwater VECs resulting from the uptake of contaminants released to freshwater habitat as a result of the Project.

8.1.10 Terrestrial Wildlife and Habitat

8.1.10.1 Baseline Information

- Description of wildlife populations, distributions and ecologies in the RSA, with emphasis on identified wildlife VECs and species with special designation (e.g., Species at Risk and species listed as vulnerable or endangered by the COSEWIC). This description should include reference to the significance of ecological functions, and the importance for Inuit life and culture of wildlife VECs;
- Description of biodiversity within the RSA, and associated food chain relationships among terrestrial wildlife species;
- Details regarding habitats within the LSA which are important for forage, shelter and reproduction of wildlife VECs, including terrestrial and aquatic habitats (e.g., sea ice, freshwater and marine waters);
- Identification of key wildlife habitats in the LSA and RSA as applicable, including: National Parks , Critical Wildlife Areas and other areas with legislated protection; eskers; caribou calving and nursing areas; denning sites; staging areas; and special locations as salt licks, insect relief habitats, and areas used by females and their young. Related discussion should also include migration routes, water course crossings, travel corridors and areas important for Inuit harvesting;
- Identification of habitats of any rare or sensitive species, such as Species at Risk, or those with similar designations or federal and territorial status;
- Description of historic and current seasonal/annual trends in range or habitat use, movements, and distribution of all identified terrestrial wildlife VECs, with reference to scientific reports and TK;
- Description of the migratory patterns and routes of terrestrial wildlife VECs and the corresponding periods when these routes affected by the Project;
- Discussion of the relative health of VEC populations, including contaminant loading in representative wildlife VEC species, for example caribou;
- Description of the distribution and population levels of caribou in the RSA and LSA. Consideration should be given to the cyclic nature of caribou, with baseline information collection covering appropriate temporal and spatial scales for an accurate understanding of current population health;

- Details regarding available information on potential impacts to wildlife associated with noise and vibrations, from relevant scientific research and TK; and
- Discussion of other pertinent issues as identified through public consultation.

8.1.10.2 Impact Assessment

- Potential general impacts on terrestrial wildlife in the LSA, including: interference with migratory routes; alienation from important habitat (e.g., denning sites, calving and post-calving areas); and general disturbance or disruption caused by Project activities;
- Potential impacts on population size, abundance, distribution and behaviour of wildlife VECs from:
    - Direct and indirect loss of habitat from the presence of and use of infrastructure, the conduct of project activities and associated sensory disturbances;
    - Direct and indirect impacts from potential degraded water quality and ground contamination, as well as airborne contaminants resulting from project facilities and associated activities;
    - Direct and indirect impact from dust fall and accumulation on forage resulting from anthropogenic sources, and natural sources influenced by anthropogenic activities;
    - Direct and indirect impacts from ice-breaking associated with shipping and ice management at seaport (with special attention to caribou migration, if applicable);
- Potential impacts on wildlife from ground traffic and air traffic disturbance, particularly low level flights (i.e., lower than 610 metres) during critical periods (caribou calving and post-calving). For this impact assessment, a delineated Flight Impact Zone could be useful in determining the potential impact of flights on wildlife, with a particular focus on critical life cycle periods and planned air traffic volume and routes;
- Potential impacts on wildlife from injury or mortality caused by Project activities, particularly the use of the Milne Inlet Tote Road, railway line, mine hauling roads and other access roads, as well as intentional killing of wildlife to defend human life or property by mine personnel;
- Potential impacts on wildlife from increased hunting pressure resulting from improved access due to Project infrastructure;
- Potential impacts of noise and vibration on wildlife from drilling, blasting and other activities as results of Project construction and operation. In particular, consideration should be given to potential impacts on caribou and other wildlife VECs from frequent noise and vibration associated with railway operations, with a focus on disturbance/disruption to caribou calving and migration;
- Assessment of the potential for Project activities to act as an attractant to wildlife species, and associated effect/changes to behaviour and condition;
- Evaluation of the potential for contaminants to be released to the environment as a result of the Project and be taken up by VEC species.

8.1.11 Birds

8.1.11.1 Baseline Information

- An overview of bird species, populations, distributions and ecologies in the RSA, with emphasis on identified bird VECs and species with special designations by the COSEWIC). This description should include reference to the significance of ecological functions, and/or the importance for Inuit life and culture of bird VECs;

- Description of current habitat use by VECs, including the use of Migratory Bird Sanctuaries, Key Migratory Bird Sites, and other important habitats (e.g. breeding and nesting sites and staging areas) in the RSA and along the proposed shipping routes.
- Description of the relative seasonal/annual abundances, distributions and trends in range or habitat use, movements and population status of bird VECs;
- Description of migratory patterns and routes of VECs potentially impacted by the Project, with a discussion of corresponding sensitive periods;
- Identification of key migratory bird sites and important bird areas along the shipping route, including those which could potentially be affected by marine spills as a result of current and/or wind patterns; and
- Other issues as identified through public consultation.

8.1.11.2 Impact Assessment

- Description of the potential loss, alteration or alienation of habitat (e.g. staging and nesting habitats) as results of Project development. Special consideration should be give to Species at Risk, species with designations by the COSEWIC, species having significant ecological functions, and /or of importance for Inuit life and culture;
- Potential disruption or alteration of migration routes due to the Project;
- Potential impacts on birds and bird habitat use from air contamination, ground contaminants or degraded water quality;
- Potential disturbances to birds from noise and vibrations as a result of blasting, and land and marine transportation;
- Potential impact from pre-determined Flight Impact Zones, and potential for collision with aircraft;
- Potential for Project facilities to attract wildlife such as foxes, ravens and gulls that may prey upon migratory birds and resulting impacts on the migratory bird populations;
- Potential attraction of birds by domestic waste at camp sites; and
- Potential effects of shipping and port operation on coastal birds and habitat, as well as potential disturbance on key migratory bird habitat areas and sanctuaries in proximity of shipping routes in the NSA.

8.1.12 Marine Environment, Marine Water/Ice and Sediment Quality

8.1.12.1 Baseline Data

- Description of marine physical processes, biological diversity and composition, and associated interactions in the RSA, including the proposed shipping routes within the NSA;
- Description of baseline information regarding climatic conditions at the port site, coastal hydrology, marine and coastal ecology air quality and noise levels;
- Description of the bottom sediment quality and thickness at the port site, including grain size, mobility, and the presence of subsea permafrost. A corresponding discussion of coastal and sea bottom stability at Steensby Inlet and Milne Inlet.
- Description of physical and chemical oceanographic properties including temperature, salinity, suspended solids and dissolved solutes. The information will be required to be sufficient enough to assess the impacts of discharges of ballast water and other potential discharges or effects from shipping at the proposed port site;
- Details regarding marine surface and subsurface current patterns, currents velocities, waves, storm surges, long shore drift processes and water levels from tide gauge at

Steensby port site and in proximity to port and facilities areas, and along shipping routes if applicable;

- Presentation of available bathymetric information for the port site at Steensby Inlet, Milne Inlet and along the proposed shipping route through Foxe Basin and Hudson Strait;
- Description of ice climate in the RSA, including ice formation, thickness, ridging, break-up, and movement. Ice conditions along shipping routes should also be discussed using scientific studies as well as TK if possible, with consideration for predicted climate change and its possible effect on the timing of ice formation in the future;
- Description of land fast ice characteristics, including the extent and seasonal duration at the proposed port site and along shipping routes;
- Identification of sensitive habitat areas for marine mammals in the vicinity of the port site and along the shipping routes; and
- Presentation of TK collected related to coastal areas and ice conditions.

8.1.12.2 Impact Assessment

- Potential risks and impacts to the marine ecosystem through the introduction of exotic species, including pathogens, through year-round shipping with frequent voyages;
- Potential impacts on marine resources and habitat, particularly the effects from increased turbidity due to transportation and disposal of spoils from construction of the marine terminal and dredging of shallow marine areas;
- Assessment of potential contaminant loading in sea water and ice from dust plume settlement at the port site;
- Potential indirect effects on marine water and sediment quality due to alteration of circulation by off shore structures;
- Potential impacts to marine water quality due to changes in sediment transport regime as a result of wake effects from shipping and other undertakings;
- Potential impacts to marine water quality, in particular suspended solid concentrations and sediment quality, from offshore construction and Project activities (e.g. docks and shipping infrastructure) at Steensby Inlet and Milne Inlet, including under water blasting and dredging along shipping routes;
- Potential impacts to marine water quality from waste and brine discharge (from desalination plant, if applicable), sediment and contaminant input from surface runoff;
- Potential impacts of propeller wash effects to the surficial sediment and seabed;
- Potential impacts on marine water quality from ballast water discharge within Canadian waters, in particular contaminated ballast water and/or other contaminants related to ship operations and maintenance;
- Potential impacts on marine water quality from: near shore fuel storage facilities; accidental spills of fuel and chemical at the port site or along shipping routes; and from the accidental grounding/stranding of ships along the shipping routes;
- Potential effects of shipping on the integrity of the landfast ice, with consideration for the importance of landfast ice as critical habitat for marine mammals; and
- Potential impact on marine environment and bio accumulation in marine food chains, in particular on benthic organisms, from antifouling toxins (e.g. tributyltin) leaching from ships.

8.1.13 Marine Wildlife and Marine Habitat

8.1.13.1 Baseline Data

- An overview of the marine biological communities occurring within Steensby Inlet and Milne Inlet, and along shipping routes to a lesser extent, including benthic and plankton communities (infauna, and epifauna), pelagic fish, benthic invertebrates, marine fish, coastal birds, and marine mammals.
- Description of marine wildlife populations, distributions and ecologies in the RSA, with emphasis on identified marine wildlife VECs and species with special designations by the COSEWIC. This description should include reference to the significance of ecological functions, and/or the importance for Inuit life and culture of identified marine wildlife VECs;
- Description of habitat of marine VECs, including fish habitat as defined by the Fisheries Act, and existing and proposed areas with special designation (*i.e.*, Sirmilik National Park of Canada, potential National Marine Conservation Areas in the North Baffin region, and Key Marine Habitat Sites for Migratory Birds). Emphasis should be placed on those habitats identified as important to the natural life cycle of a species, and also to Inuit harvesting activities potentially impacted by port and shipping operation;
- Characterization of marine mammal habitat in the LSA, including habitat used by VECs for feeding, calving, nursing, over-wintering, and other critical activities;
- Identification of habitats of any rare or sensitive species, such as Species at Risk, or those with similar designations or status, as well as species important for Inuit harvesting;
- Identification of marine mammals species (e.g. ringed seals, beard seals, bowhead whales, walrus, belugas, narwhals, killer whales), historical and current habitats distributions, seasonal migration patterns, critical areas (feeding area, calving areas, over winter areas, etc.), and potential interactions with offshore facilities and shipping operation;
- Presentation of available published information and/or information resulting from community IQ studies regarding identified VECs, including: the relative seasonal and annual trends in abundance and distributions; the estimated productive capacity; migratory patterns and associated corridors/routes; critical habitats on or in proximity of shipping routes; and sensitive periods; and
- Description of the population health of identified VECs, with a discussion of contaminant loadings in representative species important to Inuit as a food source, such as seals and walrus.

8.1.13.2 Impact Assessment

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

- Potential habitat loss or deterioration during critical lifecycle stages of marine wildlife VECs, including feeding, calving and nursing due to ashore and offshore infrastructure related to sea port and shipping routes. Special consideration should be given to Species at Risk, and species listed as endangered or threatened by the COSEWIC;
- Potential impacts to coastal processes and stability from near shore dredging of sediments and bedrock blasting;

- Potential direct and indirect impacts to marine fish and marine habitat from Project activities at Steensby Inlet and Milne Inlet, during construction, operation, modification/maintenance and decommissioning;
- Potential impact on marine wildlife and their habitat from under water blasting and dredging, and potential disposal of spoils within Steensby Inlet;
- Incidental spills, malfunctions and other accidents associated with shipping operations;
- Ballast water discharge, with discussion for the potential for discharge of contaminated ballast waters and related effects
- Risk assessment of the potential introduction and intrusion of non-native, nuisance and exotic species due to ballast water discharge and ship wash;
- Potential effects on marine mammals as a result of marine shipping, particular ice-breaking shipping and escalated noise levels at the port sites and proposed shipping routes;
- Potential interactions, accidental injuries and mortality of marine mammals directly or indirectly from proposed shipping (open water and ice breaking shipping) activities, in particular those marine mammals, which congregate in North Foxe Basin and Hudson Strait where shipping routes pass through;
- Potential direct and indirect effects on marine wildlife behaviour, distribution, abundance, migration patterns, species health and reproduction from marine shipping, particular ice breaking activities;
- Potential impacts on polar bears and polar bear habitat from year-round shipping, particularly frequent ice-breaking in winter and spring. This discussion should include potential impacts on other associated wildlife and wildlife habitat (*i.e.*, polar bear prey species such as seals, walrus, and narwhals), from increased noise and repeated disturbances;
- Potential for marine wildlife habitat loss (including seal dens) and related impacts, as a result of marine shipping, particularly ice-breaking and the elevated noise levels;
- Evaluation of the potential for contaminants to be released to the environment and taken up by VECs as a result of the Project;
- Assessment of potential cumulative effects on marine wildlife VECs resulting from escalated marine traffic in the RSA over the mining lifecycle (and including the potentially extended mine operation period). Consideration should be given to the possible significant increase of ship traffic along shipping routes; and
- Potential social-economic impacts from shipping, taking into account the impact on marine species on which local residents rely on as food sources.

8.2 SOCIO-ECONOMIC ENVIRONMENT

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

The Proponent shall provide a clear rationale for its selection of communities, the public consultation carried out, and relevant reference studies and reports from which baseline data is collected. The Proponent shall describe the interactions between the socio-economic and biophysical environments, including the roles of the land- and wage-based economies and the nature of the mixed economy of the North. This is not to meant to suggest that the Proponent is responsible for the current socio-economic situation of the Baffin Region or of Nunavut, or that it is expected to resolve any problems that are identified. Nevertheless, a proper understanding of the structure and functioning of the potentially affected societies is needed in order to identify the potential of the Project to affect them, whether positively or negatively, and to ensure that any socio-economic mitigation measures put in place by the Proponent have a reasonable likelihood of attaining their objectives.

Whenever relevant and appropriate, data shall be disaggregated by age, gender, and ethnic affiliation. Socio-economic indicators are used to present baseline information and subsequent measure impacts related to the proposed project, those indicators selected must be adequate to address all types of foreseeable impacts, including cumulative and residual impacts. The EIS shall clearly identify and justify the Proponent's selection of indicators. Finally, the Proponent is expected to clearly identify limitations and knowledge gaps encountered in its efforts to collect the information required by the following sections of these Guidelines.

8.2.1 Population Demographics

8.2.1.1 Baseline Information

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

8.2.1.2 Impact Assessment

- Potential for Project-induced demographic changes in population, migration, re-distribution and the effects of those changes, including interactions between local residents and non-residents;
- Potential effects on community and family stabilities, and culture integrity due to the demographic changes;
- Potential effects from various Project phases, including unemployment as a result of temporary suspension of operations or mine closure; and
- Potential effects on lifestyle, including the effects of a major employment base away from the communities.

8.2.2 Education and Training

8.2.2.1 Baseline Information

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

- Requirements for education levels, skills and experiences of labour force from the Project in short, medium term and foreseeable future, taking account the vision of expansion for the Project lifespan, and regional economy development.

8.2.2.2 Impact Assessment

- Assessment of local labour force sources to satisfy the needs of the Project development, and identified gap between availability and project needs;
- Discussion of potential need of local labour force training to meet the needs of the Project. Those training can be specific required by the Project, or for universally applicable skills that improve workers' opportunities in other sectors of the economy, this assessment shall include predicted training resources to meet the designed training programs if applicable;
- Evaluation of training programs, if necessary and planned by the Proponent, associated challenges and likelihood of success to satisfy the Project needs and regional economy development with consideration of cultural and language barrier;
- Discussion of the potential for longer term community capacity building programs, if any of those program have been planned or will be planned and anticipated to be implemented by the Project, regarding how mine training plans can enhance the transferability of skills after the mine closure (e.g. management and HR skills, computer skills, heavy equipment experience, finance skills); and
- Discussion of other possible solutions to fill up the gap between requirements of project needs, and education level and qualifications of local labour force, in conjunction of the minimum Inuit employment percentage in entire labour force which will be determined by IIBA.

8.2.3 Livelihood and Employment

8.2.3.1 Baseline Information

- Description of household social structures within the Project RSA, and where possible, the prevalent representative household social structure, including: the prevalent composition (family/kin-relations co-existing, generations in the household), the gender roles, the prevalent division of household labour based upon existing gender roles, the dominant consumption patterns, access to credit, and how resources are shared/divided within the household as well as how decisions are made in the household;
- Local household incomes, income sources, and compositions of income within the Project RSA;
- Local and regional economy characteristics in term of relation to traditional land use activities and wage incomes;
- Descriptions of the significance of, and level of dependence on country food as major nutrients sources by local residents within the Project RSA;
- The employment status in terms of relative genders, ages and other demographic categories;
- Existing local employment opportunities and labour supply status; and
- Expectations and perceptions to the employment at the Project by the residents in the Project RSA.

8.2.3.2 Impact Assessment

- Assessment of the potential for development of local labour force;

- Estimation of the number of jobs to be created directly and indirectly by the Project, with consideration of local business and supplying contracting;
- Discussion of the requirements for employment (e.g., education levels, criminal records, drug and alcohol policies, language abilities), and the potentials of needs to be met by local recruitment, as well as the extent to which the skills of the available workers match job requirements;
- Assessment of opportunities afforded to women;
- Discussion of the commuting arrangements for local hired workers, especially those who live in the communities without proposed direct air transport to mine sites;
- Evaluation of the possible effect of changes in income earnings on patterns of savings, expenditure and consumption values; and
- Assessment of the barriers and incentives to healthy financial management;
- Evaluation of the effects of competition for labour between the Project and existing businesses, institutions, and traditional activities.

8.2.4 Economic Development and Self-Reliance

8.2.4.1 Baseline Information

- the traditional economy, current economic structure and development trends in the Project RSA and variability in potential impacted communities;
- The economic development levels in the Project RSA comparing to other regions in Nunavut, advantages and constraints of economy development;
- The roles of renewable resources exploit (e.g. subsistence and commercial hunting and fishing) plays in economy and its significance for local economy; and
- Community and resident self-reliance.

8.2.4.2 Impact Assessment

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

8.2.5 Human Health and Well-being

8.2.5.1 Baseline Information

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

8.2.5.2 Impact Assessment

- Discussion of the standards, guidelines and regulations that the Project will incorporate during construction and operations, at various project sites to minimize the impacts and protect workers' health;
- Assessment of the health, safety and security of workers at the job sites taking account different project phases and locations (e.g. explosive manufacturing plant, drilling and blasting operation, and heavy equipment operations);
- Potential impacts on human health from air contamination, fugitive dusts resulting from air and ground traffic, potential impacts to potable water quality, and exposure to escalated noise and extreme weather conditions;
- Potential impacts on human health from bioaccumulation and take-up of contaminants associated with changes to the level of contaminants loadings in country foods (i.e., wildlife and vegetation consumed by humans);
- Potential impacts of workplace discipline and cultural conflicts among Nunavummiut and Southern workers;
- Potential impacts on human health and wellbeing within the RSA resulting from indirect effects of the Project (e.g. substance abuse, family violence, sexually transmitted infections and other communicable diseases and gambling);
- Potential impacts on community safety and security with consideration for a potential influx of Project personnel into local communities during the life of the Project;
- Discussion of concerns relating to human safety due to potential railway accidents, malfunctions (e.g., derailment)and natural disasters (e.g. earth quakes and hazardous weather events); and
- Potential impacts to community well-being in the RSA.

8.2.6 Community Infrastructure and Public Services

8.2.6.1 Baseline Information

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

- Discussion of demand for community infrastructure and public services from the Project directly and indirectly.

8.2.6.2 Impact Assessment

- Assessment of incremental costs imposed by the needs from the Project directly or in directly on public infrastructure and services;
- Evaluation of the effect on services and/or infrastructure in public and private sectors, due to the potential use by the Project directly or indirectly;
- Assessment of public health and environmental health needs and implications to the Proponent's community initiatives;
- An assessment of potential increased demand for health care system, including standard medical system, emergency response and emergency medical care, medivac and other emergencies, as well as challenges brought by the increased demand;
- A discussion of the potential to bring in freight for communities by return shipping, and likelihood to share shipping costs with local communities, which will likely reduce the life expenditure of local communities;
- Discussion of building new and updating the existing structures (e.g. weather shields, outposts) beyond of communities on hunting/traveling routes, and/or at hunting grounds to facilitate local hunting activities/traveling in Project areas; and
- A discussion of community access to Project infrastructure upon closure, including the Milne Inlet tote road, railway and sea port facilities.

8.2.7 Contracting and Business Opportunities

8.2.7.1 Baseline Information

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

8.2.7.2 Impact Assessment

- Assessment of both negative and beneficial economic effects from the Project's contracting and business opportunities through Project lifespan;
- Opportunities for local, regional, and territorial businesses to supply goods and services both directly to the Project, and indirectly to meet the demand created by the expenditure of new income by employment in the Project;
- Assessment of the Project effects on other local and regional economic sectors, in particular the competition to other business' needs due to limited capacity of local business;
- Assessment of the contributions made to public, communities and Inuit from the Project;
- Assessment of the of project-related procurement, and potential the capacity to meet the Project needs;
- Discussion on barriers to local business capacity building;

- Assessment of existing country food supply sources from the Project region and Nunavut, and opportunities to supply for Inuit worker in Project;
- Assessment of opportunities for local communities to diversify their economic sources and to supply new goods and services to meet the need from the Project; and
- Potential impacts on local businesses and services, which developed for the Project and depend on the operation of the Project after temporary suspend and final closure.

8.2.8 Culture, Resources and Land Use

8.2.8.1 Baseline Information

The Proponent shall present:

- Summary description of known archaeological/paleontological, burial, cultural and historic, sacred and spiritual sites within the LSA, based on TK and scientific baseline studies. Each site shall be described on a map with a corresponding scale; large scale maps should be sent to the Government of Nunavut, Department of Culture, Language, Elders and Youth upon request, to assist in its review;
- Description of regulatory requirements and procedures for recovery and removal of artifacts and/or fossils in areas of proposed development;
- Description of the relationship between cultural sites and social lives of local communities in the LSA;
- Overview of local and regional land use activities in the LSA, including national parks and similar areas, as well as areas potentially impacted by shipping activities;
- Description of current and traditional land use areas and the importance of those areas to Inuit culture and social well beings;
- Description of known land use activities and relation to the local economy, self-reliance, food supplies and livelihood; and
- Description of identified and anticipated overlapping zones and/or areas where the land use activities co-exist or interact with project components or/and activities.

8.2.8.2 Impact Assessment

- Potential impacts to archaeological and paleontological resources (e.g. burial sites, sacred sites), and other cultural sites within the LSA from development of the Project infrastructure in particular in proximity to Milne Inlet, along the Milne Inlet Tote Road and railway corridor to Steensby Inlet, and Mary River mine site;
- Potential impacts on paleontological/archaeological resources from increased Project activity in the area associated with mine including ground and marine transportations and ongoing exploration as well as non mine related activities;
- Potential impacts to archaeological resources as a result of borrow pit and quarry construction and operation, as well as construction and use of access roads. Discussion of how considerations for potential impacts have been incorporated in the road routing and design should also be presented;
- Potential impacts on cultural well-being, religious and spiritual activities which are related to cultural and historic, sacred and spiritual sites.
- Discussion of anticipated interactions between project development and land use activities by local residents in the Project RSA, in particular at mine site, railway corridor and shipping routes;
- Potential impacts related to accessibilities to areas for hunting, fishing, marine harvesting, traveling , recreational and religious activities as results of the Project development;

- Potential effects on sustainable resources use, such as country food availability, accessibility of carving stones; traditional clothing in context of general impacts to wildlife and substantive harvesting, taking account the CEA thought entire lifespan of the Project;
- Potential impact on cultural and traditional values, traditional lifestyles and heritage coherence in the potentially affected communities, which are closely related to land use activities, taking account the changes to economy structure, shift of consumption fashions, alteration of diet habit, and other social aspects; and
- Discussions of the conflict and possible solutions between the need of economic development and traditional land use activities in the project region, taking consideration of governments' role to deal with the issue.

8.2.9 Benefits, Royalty and Taxation

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

8.2.10 Governance and Leadership

8.2.10.1 Baseline Information

- A description of current social and governmental regime in the Project region, structure and functions of the governments, Inuit organizations, other co-management organizations and interactions among those organizations;
- A description of the Proponent's understanding on the roles of governments play in the process of the Project development, and associated requirements and obligations for proponents by policies and regulations;
- A description of the roles of the various parties in socio-economic monitoring programs and the Qikiqtani Socio-Economic Monitoring Committee;
- The leadership of GN in policies making responsibilities on contracting, operation and management of community infrastructure, community and regional development planning; mechanism, processes and structures for conflict resolution; and

- Other social and economic responsibilities of governments in the Project impacted regions.

8.2.10.2 Impact Assessment

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

9.0 ENVIRONMENTAL MANAGEMENT SYSTEM

9.1 ENVIRONMENTAL MANAGEMENT PLAN

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

The Proponent shall discuss the flexibility of the proposed EMP to respond to changes in the mining development plan, the regulatory regime, the biophysical and socio-economic environments, technology, research results, and the understanding of TK. It shall discuss how the results from the EMP will be used in applying adaptive environmental management throughout all phases of the Project, and identify threshold/criteria and indicators to trigger management actions in each sub plan.

The EMP shall be comprised of individual monitoring and mitigation plans, specific to various aspects, components, activities and phases of the Project. Although the information requirements of the following sections are intended to be as comprehensive as possible, it is recognized that various items may be dependent on the Proponent's development plans for the project, which will continue to be refined throughout the NIRB's review process. While some information required under these plans might not be available for the Proponent's Draft EIS submission, the Proponent shall include a scheduled timeline relating to stages of NIRB's review process or the later licensing/regulatory processes when this information will become available (i.e., Technical Meeting, Final EIS, Final Hearing, and Water Licensing).

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

9.2 ENVIRONMENTAL PROTECTION PLAN

The Proponent shall, based on its impact predictions for identified VECs and VSECs, prepare an Environmental Protection Plan (EPP) in accordance with its EMP for major aspects of construction and operations, prior to the commencement of construction. The EPP shall be integrated into construction and operation procedure documents which target the site foreperson, the Proponent's occupational health, safety and environmental compliance staff, as well as government departments and agencies tasked with environmental and regulatory compliance monitoring/surveillance. If appropriate, a table of contents and an annotated outline for the EPP is to be presented in the EIS which shall address the major construction and operational activities, permit requirements, mitigation measures and contingency planning in combination with other management plans.

9.3 MONITORING AND MITIGATION PLANS

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

These plans will also help the Proponent ensure that the Project is conducted as proposed, the predicted adverse environmental effects are promptly mitigated at the earliest possible time, and that the conditions set at the time of the Project's authorization and the requirements pertaining to the relevant laws and regulations are met. The plans will also make it possible to ensure the proper operation of works, equipment, and facilities connected to the Project. If necessary, the plans will help reorient the work and possibly make improvements at the time of construction and implementation of the various elements of the Project.

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

Each of the monitoring and mitigation plans shall include:

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

- Discussion of the relationship between monitoring plans and the EMP; and
- Quality assurance and quality control measures to be applied to monitoring programs.

9.4 BIOPHYSICAL ENVIRONMENTAL MANAGEMENT PLANS

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

9.4.1 Risk Management and Emergency Response Plan

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

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

- Assessment of potential natural hazards in the LSA and shipping corridors, including frequency, magnitude and possibilities of occurrence. Natural hazards to be considered should include extreme weather events, natural seismic events, landslides, and flooding;
- Analysis of the potential for malfunctions and accidents associated with Project facilities and activities, including land based and marine transportation, occurring independent of or associated with natural hazards;
- Alerting, notification and reporting procedures, and associated responsible organizations and personnel;
- Contingency responding procedures corresponding to each risk, and associated security systems and prevention measures, such as monitoring systems, hazard and leak detection systems, fire-control systems, and standby emergency systems;
- Discussion of options for the medical transport of injured staff or persons both within and beyond the Project area;
- Discussion of the constraints resulting from logistics and time frames for prompt reaction, with consideration for the potential distance to an accident or emergency site, and possible weather conditions which might cause considerable delays or obstacles;
- Description of how relevant government agencies, Inuit organizations and local communities will be involved in the development of the plans if applicable; and
- Any other contemplated loss prevention practices, including insurance.

9.4.2 Spill Contingency Plans

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

a. Land Based Spill Contingency Plan

- Requirements of federal and territorial regulations;

- Substances covered by the plan (e.g. oil, hazardous materials, chemicals and other deleterious substances), and potential spill scenarios (on land, water and ice if applicable);
- Training for emergency response staff, including distributing MSDS to designated emergency response and health centre staff;
- Alerting, notification and reporting procedures;
- Duties and responsibilities of key spill response organizations and personnel;
- Cleanup strategies, technologies and corresponding inventory of spill response equipment and kits based on different substances of spills and environment conditions where spills might occur; and
- Spill site restoration and remediation.

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

c. Shipboard Oil Pollution Emergency Plans (SOPEPs)
   - Requirements of National laws and regulations, as well as international regulations and standards for proposed shipping operation of the Project;
   - Major components which cover iron ore carriers, fuel tankers and other ships to be used for the Project;
   - Discussion regarding the relationship between SOPEPs and the Canadian Coast Guard's Regional Response Plan, including identification of potential for the Regional Response Plan to be adapted to the Project;
   - Procedures for accident/incident reporting and principle emergency response; and
   - Parties (e.g., the Proponent, ships operators and possible third party) who carry out emergency actions.

9.4.3 Air Quality Monitoring and Management Plan

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

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

9.4.4 Noise Abatement Plan

The Proponent shall develop a Noise Abatement Plan to provide information on monitoring and mitigating of noise impacts based its impact assessment in Subsection 8.1.3. This plan should discuss:

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

9.4.5 Site Water Management Plan

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

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

9.4.6 Sewage/Grey Water Management Plan

- The Proponent shall develop a Sewage/Grey Water Management Plan with consideration for the following:
- Sewage/grey water treatment technologies and facilities, and estimated volumes and treatment targets of the effluent, as well as the applicable discharge standards;
- Sewage/grey management in the construction stage at construction camps, including treatment/disposal methods, associated facilities;
- Conceptual operation and maintenance plans, including options for sewage sludge; and
- Contingency measures for sewage plant malfunction and/or disturbances, associated spill response measures, as well as treatment technologies and facilities.

9.4.7 Incineration Management Plan

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

- Standards/requirements for emissions from incinerator operation;

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

9.4.8 Waste Rock Management Plan

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

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

9.4.9 Hazardous Materials Management Plan

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

- Hazardous materials discussed should include: fuel and lubricants, chemical reagents used for site laboratory, solvents and paints, medical wastes, batteries, and other office-generated hazardous waste;
- Inventory of the types and volumes of hazardous wastes generated or produced by Project activities;
- Characterization of potential environmental hazards posed by these materials, and the management of these through the environmental management system;
- Purchasing controls, shipment tracking procedures;
- Fuel storage monitoring program;
- Safe handling and storage procedures;
- Discussion of the allocation of responsibilities for managing shipments, storage, handling and use of potentially hazardous materials;
- Methods for transport, storage, handling, and use;
- Identification of disposal methods for potentially hazardous waste generated;
- Contingency and emergency response plans associated with hazardous materials;
- Type and delivery of training for management, workers, and contractors whose responsibilities include handling potentially hazardous materials;

- Procedures for the maintenance and review of records of hazardous material consumption and incidents in order to anticipate and avoid impacts on human health and the environment; and
- Procedures to track and manage wastes generated through use of these products, including regular shipments of potentially hazardous waste to licensed disposal facilities.

9.4.10 Explosives Management Plan

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

- Applicable federal and territorial Regulations and Acts;
- Methods and procedures for the manufacture, transport, storage, handling, and use of explosives;
- Details on the manufacture and storage facilities for Ammonium Nitrate and Fuel Oil (ANFO);
- Best practices to minimise usage and loss rate;
- Spill reporting and clean up procedures;
- Personnel training program; and
- Internal audit and inspection.

9.4.11 Landfill Management Plan

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

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

9.4.12 Borrow Pits and Quarry Management Plan

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

- Regulations and guidelines to be complied with;
- A description of how the Proponent will minimize the overall impact on surrounding environments by maximizing the use of existing pits and quarry sites to the extent possible, to minimize the number of opened pits, and minimizing haul distances and surface disturbance;
- Erosion prevention and control measures;
- Results of ARD potential testing for quarried materials and pit walls, and associated mitigation measures;
- Aggregate extraction and quarry methods, with associated mitigation measures for potential impacts on the environment, including archaeological resources and wildlife;
- Proposed methods for handling ice, with plans to manage water released by the thawing of permafrost and ground ice; and

- Progressive reclamation strategy and associated technologies.

9.4.13 Aquatic Ecosystem Management Plan

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

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

9.4.14 Railway Management Plan

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

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

9.4.15 Shipping Management Plan

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

- Applicable legislation, regulations, Acts and guidelines;
- Discussion of shipping operations associated with the Voisey's Bay and Raglan mine developments, with a focus on any applicable lessons learned, and implications to the proposed shipping for the Project, if any;
- Protocols for the transport of fuel and other dangerous goods;
- Ballast water management plan;

- Onboard waste management plan (including solid waste, sewage, and other domestic waste);
- Marine wildlife mitigation and onboard monitoring plans, including:
    - Applicable guidelines, monitoring protocols, and reporting/action procedures;
    - Qualifications and training plans for marine mammal monitors;
    - Measures to minimize the potential interactions between marine mammals and ships; and
    - Description of how interactions between marine mammals and shipping operations will be dealt with.
- Smuggling prevention measures;
- Identified third party liabilities;
- Contingency plans for accidental spills of fuel and chemicals, extreme weather conditions, and malfunctions during shipping operations, with reporting/action procedures. This should include a discussion of the preparedness of adequate resources to respond to a large fuel spill from a cargo vessel in transit, with reference to the SOPEPs;
- Measures to mitigate potential impacts to the safety of persons traveling by snow mobiles, sledges, and boats along Project shipping routes; and
- Measures intended to mitigate potential socio-economic impacts as results of shipping.

9.4.16 Wildlife Mitigation and Monitoring Plan

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

- Description of the LSA and the RSA for wildlife mitigation and monitoring programs;
- Selection criteria and rationales for wildlife species selected for monitoring and mitigation;
- Description of how TK collected by the Proponent has been integrated into baseline data collection, impact predictions and significance determinations, and the development of mitigation and monitoring programs;
- Details regarding plans for involvement of local hunters in wildlife baseline studies and monitoring program if applicable, including the mechanisms and resources allocated for local participation;
- Plans for coordinating wildlife studies/monitoring activities with other organizations, institutions, government departments and individual researchers which carry out wildlife studies in the RSA, to minimize the impacts on wildlife from studies/survey activities;
- Discussion of how terrestrial wildlife surveys, particularly low elevation caribou surveys, and monitoring protocols (including data confidentiality) will be designed to mitigate potential impacts on terrestrial mammals, in particular caribou;
- Description of monitoring study design and field methods, including indicators to be measured, sampling frequency and methods, timing, spatial extent, and Universal Transverse Mercator (UTM) coordinates of transect lines if applicable, for each wildlife species to be monitored;

- Measures to be applied to avoid or reduce the disturbance, harassment, injury or mortality of marine mammals due to shipping or ice breaking activities;
- Measures to minimize noise disturbance to wildlife and hunters/travellers when conducting aerial wildlife surveys;
- Plans to facilitate the safe passage of wildlife across the railway, and associated mitigation measures to prevent collisions with wildlife;
- Description of data analysis methods, triggers/thresholds for adaptive management plans, and proposed mitigation measures;
- Mechanism for the evaluation of effectiveness of mitigation measures;
- Quality assurance and quality control measures; and
- Reporting and the plan updating procedures.

9.4.17 Fish Habitat No Net Loss Plan

The Proponent shall present No Net Loss Plan to discuss measures to be implemented for compensation of the loss of aquatic habitat. This plan should include the principle of No Net Loss for fish habitat, policies for the Management of fish habitat (DFO, 1986), habitat replacement options where appropriate, and compensation plans developed in consultation with DFO and QIA. This plan should discuss the following:

- Requirements of related DFO policies;
- The estimate of total fish habitat loss and methods used for estimations;
- Compensation plans to achieve "No Net Loss" of fish habitat productive capacity; and
- Details regarding the proposed compensation program, including locations and conceptual designs for implementation (e.g., rearing habitat, migration channels, etc.).

9.4.18 Roads Management Plan

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

- General company policies for private roads and roads accessible for public;
- Speed limits of various types of roads;
- Operational procedures for dust suppression, snow removal and snow drift management, control of surface runoff including spring freshet and flooding, and sediment control measures during maintenance and operation;
- Discussion of public access and related management, associated mitigation or safety measures if relevant;
- Mitigation measures and protocols to be implemented during construction and operations to mitigate potential impacts to wildlife, including collisions and follow-up procedures;
- Safety procedures, emergency reporting and procedures for fuel/chemical spills, and other emergency events; and
- Plans for closure and reclamation, including a discussion of potential future uses (e.g., potential public use).

9.5 SOCIO-ECONOMIC ENVIRONMENTAL MANAGEMENT PLANS

The Proponent shall present plans, policies and programs to minimize potential negative socio-economic effects and to optimize the potential positive effects of the Project. These Socio-

Economic Environmental Management Plans shall correspond to the socio-economic impacts assessment described in Subsection 8.2. Also these monitoring plans should be developed to reflect the complete life span of the Project, and contain appropriate monitoring and evaluation techniques (e.g., indicators) that will allow regulators to intervene in a timely and constructive manner.

In this section, the Proponent shall describe its socio-economic monitoring plans and mitigation programs, including how they will identify, react and mitigate potentially adverse socio-economic impacts and augment positive socio-economic impacts. In consultation with the Qikiqtaaluk Regional Socio-Economic Monitoring Committee (SEMC), the Proponent should clearly identify the role it will take in regional monitoring initiatives, including how its monitoring plans will align with those of the regional SEMC.

The general areas that shall be considered by the Proponent's socio-economic monitoring include human resources, occupational health and safety, community and public involvement, implementation of benefits agreements (IIBA), and if applicable, development partnership agreements. The Proponent shall outline how the predominant regional language/dialect in the RSA will be incorporated into each respective plan. The management plans shall include, but are not limited the following individual plans:

9.5.1 Occupational Health and Safety Plan

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

- Policies and guidelines regarding interaction with Nunavut's medical health system ;
- Best safety practices and safety awareness programs;
- Employee involvement and related training programs for ensuring awareness of employee responsibilities in environmental and health and safety management, including roles pertaining to safety orientation, hazard analysis, first-aid training, etc.;
- Risk management and safety management Details regarding the preparedness of mine safety equipment and devices;
- Procedures for emergency incidence reporting and actions;
- Details regarding workplace monitoring and control; and
- First aid training and occupational medical surveillance.

9.5.2 Community Involvement Plan

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

- Mechanisms for providing information to the public and potentially affected communities regarding regular updates of Project's progress, initiatives and future work plans (e.g. training opportunities, hiring information, etc.);
- Methods and procedures for the establishing effective two-way communications for collecting and addressing public concerns;
- Measures to assist communities with addressing potential social needs and problems related to the Project, including proposed counselling services for employees and their families regarding matters such as substance abuse, work-related stress management, family support, etc.;
- Approach to promoting the participation of Nunavummiut in Project employment, including any preferential recruitment policies or practices;

- Plans for promoting local contracting opportunities and purchasing of local products (e.g., country foods);
- Discussion of how input from communities has influenced the design and implementation of monitoring plans and initiatives; and
- Discussion of procedures for community-based monitoring of social, cultural, and ecological conditions to determine if, when, and how the Project contributes to community sustainable development.

9.5.3 Cultural and Heritage Resources Protection Plan

The Proponent shall present a Cultural and Heritage Resources Protection Plan which includes the following:

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

9.5.4 Human Resources Plan

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

- Applicable human resources legislation and the Proponent's policies regarding compensation and benefit programs (e.g., health care plan, insurance, vacation/maternity leave, etc.);
- Recruitment strategies to overcome potential entry barriers, education and training programs both for Project specific and universally applicable skills (e.g., partnerships with local schools and other educational institutions, on-the-job learning, and apprenticeships).A discussion of associated with regular information updates to public regarding employment/training opportunities, hiring plans and time schedules, etc. should also be included;
- Education and Orientation Plan to assist employees to understand their responsibilities in environmental protection and health and safety management;
- Worker rotation and pay schedules, health and safety programs, preferential recruitment policy, gender equality, skills and entry requirements, training and career development;
- Discussion of how the planned work schedules that are adapted to traditional activities, whether the Proponent will provide no-cost commuting to allow workers to continue to live in their own communities and to participate in their traditional economic and cultural activities;
- Considerations of the following issues: on-site public safety and well being; cross-cultural orientation; firearms control; sexual and gender harassment; alcohol and drugs control measures; and supply of country food to Inuit workers at the mine site;
- Recognition and management plans regarding the rights and needs of hunting activities and traveling through Project areas by the residents from adjacent communities;
- Strategies for communicating relevant information of IIBA terms and conditions to employees;

- Policies and regulations regarding hunting and fishing by non-Inuit employees, while respecting the rights and needs of Inuit employees to harvest and pursue traditional activities, with a discussion of how such policies or regulations were designed to manage potential impacts to fisheries or wildlife resources; and
- Discussion of any proposed policies or regulations regarding the prohibition of recreational hunting, fishing and other related activities by employees at specific locations and timing in Project area.

9.6 MINE CLOSURE AND RECLAMATION PLAN

The Proponent shall develop a preliminary Mine Closure and Reclamation Plan for the Project which outlines how the various components set out in Section 6.0 will be closed and reclaimed following mine closure. The plan can be preliminary with key issues addressed for the Environmental Assessment in NIRB's Part 5 Review, and NWB Type A water license application, with the following targets:

- To ensure that issues associated with the effective closure and reclamation of all Project components are considered at the earliest possible stage in the mine development process, thereby influencing mine design to take into account environmental issues related to mine closure and reclamation.
- To establish major targets for reclamation of lands potentially affected by the Project;
- Description of reclamation methods, time frames and schedules, including proposed notice periods to employees and public;
- Description of temporary closure measures and a discussion of at what point a temporary closure should be considered permanent for the purposes of requiring implementation of aspects of the Mine Closure and Reclamation Plan;
- Discussion of research programs to address challenges to reclamation, given the local conditions;
- Considerations for the protection of public health and safety;
- Description of closure and post-closure monitoring of environmental components including, but not limited to, wildlife, vegetation, air quality, landform stability and water quality;
- Discussion the need for long-term monitoring and maintenance by establishing physical and chemical stability of reclaimed areas;
- Discussion on reduction or elimination of environmental effects once the mine ceases operation;
- Discussion regarding re-establish conditions that permit the land to return to a similar pre-mining land use;
- Considerations for ARD and/or ML potential of rocks, in association with related waste rock management strategies;
- Any considerations for the restoration the natural aesthetics of the project; and
- The Plan is considered to be a "living" document; the level of detail should undergo further revision to reflect the progress of the Project as well as changes in technology and/or standards or legislation. Future revisions should also consider input from consultations with communities and other stakeholders on methods to be used, and potential uses for project infrastructure, etc.

9.7 FOLLOW-UP AND ADAPTIVE MANAGEMENT PLAN

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

- The need for such a follow-up and adaptive plan and its objectives;
- How this plan will be structured including, enforcement and penalties for non-compliance;
- Which elements of the monitoring program described in Section 9, would incorporate;
- The mechanisms, through which monitoring results will be analysed, and if necessary, adjusted mitigation measures or adaptive plan will be employed. in addition, how the effectiveness of the new mitigation measure will be assessed and verified;
- The roles to be played by the Proponent, regulatory agencies, and others in such a plan, and possible involvement of independent researchers; and
- The sources of funding for the plan and reporting.

9.8 SIGNIFICANCE OF RESIDUAL IMPACTS

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

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

The determination of significance of residual impact shall take into account the attributes of each impact in accordance with the criteria established in Subsection 7.11.

10.0 CONCLUSION

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

11.0 LIST OF CONSULTANTS AND ORGANIZATIONS

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

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APPENDIX A

NUNAVUT IMPACT REVIEW BOARD'S 10 MINIMUM EIS REQUIREMENTS

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

1. Statement of Consultation Principles and Practices

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

2. Definition of Project

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

3. Statement of Project's Purpose

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

4. Anticipated Impacts Analysis

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

5. Cumulative Effects Analysis (CEA)

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

6. Significant Effects Analysis

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

- the Project setting, taking into account the location's unique Ecosystemic characteristics, and
- the severity of the impacts, taking into account, but not limited to public health, land use plans, protected areas, habitat, or species, public concern, etc.

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

7. Project Alternatives

This requirement includes, but goes well beyond, Alternative Means of carrying out the Project that might be economically and technically feasible and the environmental effects of those Alternative Means. This assessment must include the “no-go” or “no-build” alternative, as well as the “preferred” alternative. The “no-go” alternative is not only a potentially stand-alone option; it also serves as a Baseline for comparison with other development alternatives that might reasonably be proposed in the circumstances.

8. Sustainability Analysis

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

9. Monitoring or Post-Project Analysis (PPA)

The purposes of a PPA are to:

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

10. Trans-Boundary Effects Analysis

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

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

APPENDIX B

APPENDICES J AND K OF THE NORTH BAFFIN REGIONAL LAND USE PLAN

APPENDIX J

Marine and Terrestrial Transportation/Communications Corridor Alternative Route Assessment

Applicants wishing to develop a transportation and/or communications corridor in the North Baffin region are required to provide the NPC with the following information:

1. A description of the proposed corridor, including its use, its general routing, the possible environmental and social impacts, and any seasonal considerations that may be appropriate.

2. A comparison of the proposed route with alternative routes in terms of environmental and social factors as well as technical and cost considerations.

3. An assessment of the suitability of the corridor for the inclusion of other possible communication and transportation initiatives (roads, transmission lines, pipelines, etc.). This assessment should include:
   - the environmental, social and terrain engineering consequences, and the cumulative impacts of the project, and
   - the environmental and social impact of the project on nearby settlements or on nearby existing and proposed transportation systems.

APPENDIX K

Marine and Terrestrial Transportation/Communications Corridor Guidelines

The following planning guidelines will be used in the assessment of a new transportation / communications corridor proposal:

1. The corridor width shall be a function of:
   - the number and type of identified facilities within the corridor;
   - physical and biophysical conditions;
   - availability of detailed engineering data for one or more transportation modes within the corridor;
   - safe distances between different facilities within the corridor; and
   - aesthetics.

2. Corridors shall:
   - minimize negative impacts on community lifestyles;
   - improve access to other resources having high potential for development, while still maintaining the shortest practicable distance between the primary resource areas and the trans-shipment location;
   - be designed in accordance with existing and prospective land use capability including topography, soil, permafrost and wildlife; and
   - be designed in accordance with the availability of granular supplies.

3. In keeping with existing legal and legislative requirements, including the NLCA, corridors shall not negatively impact:
   - community business, residential and projected expansion areas;
   - important fish and wildlife harvesting areas;
   - key habitat for fish and wildlife species, especially areas used by endangered species;
   - areas of high scenic, historic, cultural and archaeological value.

APPENDIX C

NUNAVUT WATER BOARD INFORMATION REQUIREMENTS FOR TYPE A WATER LICENCE APPLICATION

P.O. Box 119
Gjoa Haven, NU X0B 1J0
Tel: (867) 360-6338
Fax: (867) 360-6369

NUNAVUT WATER BOARD
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NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

Draft

Mining and Milling Undertaking
Supplemental Information Guideline (SIG)
for
Mine Development (MM3)

Date of Issuance: September 2009

TABLE OF CONTENTS

1.0 Introduction

Supplemental information is required as part of the water licence application in accordance with section 48 (2) of the *Nunavut Waters Nunavut Surface Rights Tribunal Act* (NWNSRTA or Act) which states:

> *"An application, except in relation to a cancellation, shall be accompanied by the information and studies concerning the use of waters or the deposit of waste that are required for the Board to evaluate the qualitative and quantitative effects of the use or the deposit on waters."*

Also, in accordance with section 48 (3) of the Act, on the filing of an application, the Board may provide guidelines to the applicant respecting the information to be provided by the applicant in respect of any matter that the Board considers relevant including the following:

a) The description of the use of waters, deposit of waste or appurtenant undertaking;

b) Confirmation that the Nunavut Planning Commission's (NPC) requirements under the Nunavut Land Claims Agreement (NLCA) regarding land use plan conformity (Article 11 of the NLCA) have been addressed;

c) Confirmation that the Nunavut Impact Review Board's (NIRB) requirements under the Nunavut Land Claims Agreement (NLCA) regarding development impact assessment (Article 12 of the NLCA) have been addressed;

d) The qualitative and quantitative effects of the use of waters or the deposit of waste on the drainage basin where the use is to be undertaken or the deposit is to be made, and the anticipated impact of the use or deposit on other users;

e) The measures the applicant proposes to take to avoid or mitigate any adverse impact of the use of waters or the deposit of waste;

f) The measures the applicant proposes to take to compensate persons, including the Designated Inuit Organization (DIO), who are adversely affected by the use of waters, or the deposit of waste;

g) The program the applicant proposes to undertake to monitor the impact of the use of waters or the deposit of waste;

h) The interests in and rights to lands and waters that the applicant has obtained or seeks to obtain;

i) The options available for the use of waters or the deposit of waste;

j) Abandonment and Restoration;

k) Financial Responsibility; and

l) Specific Undertaking Information Requirements.

To provide further guidance for these requirements, as well as the requirements of section 6 (2) of the *Northwest Territories Water Regulations* (NTWR or Regulations) which outlines more specific information requirements for proposed undertakings, the NWB has developed Supplemental Information Guidelines (SIGs or Guidelines).

The SIGs are designed in spreadsheet format to facilitate the development of a concordance table that cross references the requirements of the SIG with the documents that make up the water licence application. The tables in the following eight (8) worksheets include columns for the applicant to enter information regarding the applicability of the requirement to the proposed undertaking; the title, author, and date of the document where information to address the requirement can be found; the electronic file name of the document; as well as the section of the document where the information can be found. Specific information about the proposed undertaking should not be inserted into these spreadsheets.

The applicant must complete the yellow sections of the SIG and submit the completed SIG along with the documents that address the requirements of the SIG to the NWB.

This SIG is for applicants seeking a water licence for water use, waste disposal, works and associated activities for Mine Development which is an undertaking classified as Mining and Milling in accordance with the Regulations. Further to these Guidelines, the applicant is referred to the NWB's *Guide 4 - Completing and Submitting a Water Licence Application for a New Licence*.

Following submission of a water licence application, the NWB will determine whether the application is complete. If the NWB determines that an application is materially incomplete, meaning that items included in Section 2: Minimum Application Requirements are missing, the applicant will be informed by the NWB that their application has been rejected. In other cases, NWB staff will correspond with the applicant to resolve deficiencies before proceeding.

The NWB cannot issue, amend, or renew a licence where there is an applicable, approved land use plan unless the NPC's requirements under the NLCA have been addressed regarding land use planning (Article 11). In addition, the NWB cannot issue, amend, or renew a licence where the appurtenant undertaking requires screening by NIRB in accordance with Part 4 of Article 12 of the NLCA until NIRB has completed its screening. Furthermore, notwithstanding sections 13.5.5 or 12.10.2 of the NLCA, where the appurtenant undertaking requires a review under Part 5 or Part 6 of Article 12 of the NLCA, the Board may not issue, amend, or renew a licence until NIRB has issued a project certificate.

The Board expects that following completion of development impact requirements in accordance with Article 12 of the NLCA, additional Project Specific Information Requirements (PSIRs) may be issued to the applicant. See section 9.0 of the SIG.

The applicant is referred to Appendix A of these Guidelines for a list of additional documents, guidelines, legislation and standards that may be of use to the applicant in preparing the information to address this SIG.

Submission of the information required by this SIG does not relieve the applicant from confirming and following up on other information requirements which may be required during the regulatory process.

2.0 Minimum Application Requirements (Application Checklist)

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert <u>Title, Author and Date of Document</u> where information is provided	Insert <u>electronic file name of document</u> where information is provided	Insert <u>Section of document</u> where information is provided	NWB Concordance Assessment
Minimum Application Requirements	1	General Water Licence Application Form (see the NWB's *Guide 4: Completing and Submitting a Water Licence Application for a New Licence*) or Application for Water Licence Amendment Form, if appropriate (see NWB's *Guide 7: Licensee Requirements Following the Issuance of a Water Licence*).						
	2	Information required to satisfy the requirements of the SIG including plans, reports and designs.						
	3	Executive summary in english.						
	4	Translated executive summary in appropriate language and dialect.						
	5	Application fee.						
	6	Water use fee.						
	7	A table indicating concordance of the application and supporting documents to the Guidelines. These generic Guidelines are provided in excel as a tool for applicants to provide the necessary concordance table.						

Qualifications:

1. Applications that do not include all of the items listed above will be returned to the applicant as incomplete with a request for the deficient information.
2. The application must address the entire scope of the project including not only the primary undertaking, but also related activities for all phases of the project.
3. Information between all documents that make up the application package must be consistent and must be accurately cross referenced.
4. The application must distinguish between recommendations or options and actual commitments to chosen alternatives.
5. For additional guidance regarding the submission of electronic documentation, see the NWB's *Guide 6: Electronic Documentation: Submissions and Registry* .
6. The applicant, where practical, may combine components of the information requested in the SIG into more concise plans to provide clarity and eliminate duplication. If this practice is considered, then the applicant must clearly outline, through proper referencing and clearly detailed statements, how the NWB should consider the documents that have combined elements of information. Information management is the responsibility of the applicant.
7. The applicant must submit a concise executive summary of the application package. In addition, the Applicant shall submit an executive summary for each separate supporting document, report or study. All executive summaries shall be provided in English, Inuktitut and/or Inuinnaqtun (where applicable).

<u>**The applicant must complete the yellow columns of the worksheet(s). Blue columns are for NWB use only.**</u>

3.0 General Water Licence Application

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
Applicant	**1**	Provide the full name of the applicant and contact information (including phone number, address, fax number and email address).							
Applicant Representative	**2**	Provide the name and contact information of any party submitting the application on behalf of the applicant.							
	3	Provide a signed letter authorizing a party to be its representative in the licensing process.							
Name of Project	**4**	Provide the name of the project.							
Location of Undertaking	**5**	Provide coordinates of the project extents taking into account the Local Project Area (LPA) and the Regional Project Area (RPA), where applicable.							
	a	Provide location by Latitude and Longitude.							
	b	Provide location by UTM coordinates, if available.							
	c	Provide the distances to the nearest communities.							
Map	**6**	Provide a map at a 1:50,000 scale based on the National Topographic series indicating the location of the undertaking, watercourses and the location of waste deposits. Additional maps at various scales may be provided if those maps will provide additional information or clarification. All additional maps must indicate the scale, and map sheet number.							
Nature of Interest in the Land	**7**	Provide the nature of the interest in the land associated with the proposed undertaking, including:							
	a	Sub-surface leases from Nunavut Tunngavik Incorporated (NTI) and/or Indian and Northern Affairs Canada (INAC) as well as surface authorizations from INAC for crown land use, a Designated Inuit Organization (DIO) for Inuit Owned Land (IOL) use, or the Government of Nunavut for Commissioner's land use.							
	b	The date or expected date of issuance of any authorization and the date of expiry.							
	8	Indicate whether the applicant is the name of the entity holding the authorization for the interest in the land and if not, provide the name of the entity holding the authorization.							
NPC Determination	**9**	Provide written confirmation from the NPC confirming that NPC's requirements under the NLCA regarding land use plan conformity (Article 11 of the NLCA) have been addressed.							
NIRB Determination	**10**	Provide written confirmation from the NIRB confirming that NIRB's requirements under the NLCA regarding development impact assessment (Article 12 of the NLCA) have been or are in the process of being addressed. Documentation may include:							
	a	NIRB's screening determination;							
	b	NIRB's recommendation to the Minister regarding the type of review;							
	c	Minister's written decision regarding the review of the development proposal;							
	d	List of activities requested for exception in accordance with NLCA s. 12.10.2;							
	e	Type B water application for any activities to be considered for interim, short term approval in accordance with NLCA s. 13.5.5.							

3.0 General Water Licence Application

	Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
See Section 4.0 of this SIG for Specific Requirements	**Description of Undertaking**	**11**	Provide a complete description of the undertaking with detailed site plan(s) of all project infrastructure for the Local Project Area (LPA) and/or the Regional Project Area (RPA), where applicable, and differentiate temporary components from permanent components.							
	Options (Alternatives)	**12**	Provide a brief explanation of the alternative methods or locations that were considered to carry out the project.							
See Section 6.0 of this SIG for Additional Requirements	**Water Use**	**13**	Provide a detailed description of all types of water uses, including:							
		a	Obtain water for domestic purposes							
		b	Obtain water for industrial purposes							
		c	To cross a water course							
		d	To alter the flow of water, or store water							
		e	Flood control							
		f	To divert a watercourse							
		g	To modify the bed or bank of a watercourse							
		h	Others:							
	Water Use: Quality and Quantity	**14**	Provide for each type of water use:							
		a	The source of water including the name of the water body and the location of the water source as shown on a map;							
		b	A description of the quality of the water from the source as well as the capacity of the water source;							
		c	The estimated amount of water taken from each source and the method of extraction including specific pumping rates, pumping procedures and potential for draw down;							
		d	The estimated amount of water to be returned to the source;							
		e	Methods to ensure the quality of water returned to the source is of an acceptable quality.							
See Section 7.0 of this SIG for Additional Requirements	**Waste Disposal**	**15**	Provide a detailed description of all forms of waste disposal indicating the type of waste(s) generated and/or to be deposited.							
	Waste Disposal: Quality and Quantity	**16**	Provide a description for each type of waste generated, its composition, quantity (cubic meters per day), method of treatment and disposal, including:							
		a	System for the treatment and/or disposal of solid waste, liquid effluent, and gaseous materials expected from the operations, including any measures proposed to minimize the production of wastes;							
		b	Substances and their amounts that will be released to the environment, methods of release and any associated control technology.							
	Other Authorizations	**17**	Provide a list of any authorizations required in addition to the water licence and a description of how those authorizations may affect the NWB's water licensing process.							
		18	Provide an indication of whether any other authorizations are required in relation to the project. Provide the name of the authorization, the administering agency, the project activity requiring the authorization, the date or expected date of issuance and the date of expiry.							

3.0 General Water Licence Application

	Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
		19	Provide an overview of and a description of the status of any existing water licences currently held with the NWB and future plans for the administration of existing licences.							
		20	Provide formal applications to the Navigable Waters Protection Program (NWPP) for any works.							
		21	Provide a timetable for filing the appropriate plans and procedures required by government parties.							
See Sections 6.0 and 7.0 of this SIG for Additional Requirements	Predicted Environmental Effect and Proposed mitigation measures	22	Identify the potential effect of water use and waste disposal on the following components:							
		a	Groundwater and Surface Water including:							
			changes in flow (including seasonal rate of flow)							
			quantity and quality							
		b	Land including:							
			geologic structure change							
			soil contamination							
			compaction, settling and erosion							
			alteration of the permafrost regime							
			riparian zone loss							
		c	Vegetation including:							
			species composition and abundance							
			non-native species introduction							
			accumulation of toxins and heavy metals (in relation to remediation objectives for closure)							
		d	Aquatic Ecosystems including:							
			fish							
			benthic invertebrates							
			plankton							
		23	Identify effects separately for each project phase.							
		24	Describe the methods used to predict effects.							
		25	Provide a cumulative effects assessment of the project's water use and waste disposal activities in relation to other activities in the same drainage basin. Predict the effects of the activities in combination with other past, present, and reasonably foreseeable future projects.							
		26	Identify effects arising from accidental events or malfunctions.							
		27	Provide a description of all proposed mitigation, management and monitoring programs to mitigate adverse impacts.							
		28	Provide a description of the measures to be taken to mitigate impacts on historical resources or traditional uses of water and procedures to be followed should artifacts be discovered.							
	Existing and Other User Water Rights	29	Provide the names, addresses, and nature of use for any known persons or properties that may be adversely affected by the proposed undertaking, including those that that hold licences for water use in precedent to the application, domestic users, in-stream users, authorized waste depositors, owners of property, occupiers of property, and/or holders of outfitting concessions, registered trapline holders, and holders of other rights of a similar nature.							
		30	Indicate whether compensation has been paid and/or agreement(s) for compensation have been reached with any existing or other users.							
		31	Provide a description of the applicant's consultation plan and the concerns expressed during consultation.							

3.0 General Water Licence Application

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
	32	Describe how the results of consultation were incorporated into the determination of effects.							
	33	Describe how the results of consultation were incorporated into the design of mitigation, management and monitoring programs.							
	34	Provide a description of any potential effects of the project on other licensees or pre-existing applicants, domestic users, in-stream users, authorized waste depositors, owners of property, occupiers of property, and/or holders of outfitting concessions, registered trapline holders or holders of other rights of a similar nature.							
	35	Provide a description of the measures incorporated into the project design to mitigate effects of the project on other licensees or pre-existing applicants, domestic users, in-stream users, authorized waste depositors, owners of property, occupiers of property, and/or holders of outfitting concessions, registered trapline holders or holders of other rights of a similar nature.							
Inuit Water Rights	**36**	Provide a description of any potential effects of the project on the quality, quantity, or flow of waters flowing through Inuit Owned Land (IOL).							
	37	Advise the Board of any substantial affect of the quality, quantity or flow of waters flowing through IOL, and indicate whether negotiations have commenced or an agreement to pay compensation for any loss or damage has been reached with one or more DIO.							
	38	Provide a description of the measures incorporated into the project design to mitigate effects of the project on the quality, quantity, or flow of waters flowing through IOL.							
	39	The applicant and/or DIO shall advise the Board in writing, if either party is unable to reach an agreement on compensation.							
Security	**40**	Provide a financial security assessment that is prepared in a manner consistent with principals respecting mine site reclamation and implementation found in the *Mine Site Reclamation Policy for Nunavut*, Indian and Northern Affairs Canada, 2002. The financial security assessment must include:							
	a	An estimate of the total financial security for final reclamation equal to the total outstanding reclamation liability for land and water combined sufficient to cover the highest liability over the life of the undertaking;							
	b	The cost of having the necessary reclamation work done by a third-party contractor if the operator defaults;							
	c	Contingency factors appropriate to the particular work to be undertaken.							
Abandonment and Restoration	**41**	Provide plans for the abandonment and restoration of the project. Plans must address all phases of the project including construction, operation, care & maintenance, final closure and post closure.							
	42	Provide a description of all remediation plans and remediation objectives. Discuss the results of any human health and ecological risk assessment used to establish remediation objectives.							
	43	Provide a list and description of any existing abandoned or restored site facilities.							
	44	Provide details regarding the timing of the removal of any dewatering dikes (if applicable) and the implications of this action on water quality.							

3.0 General Water Licence Application

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
	45	Provide detailed information regarding the method used to remove/breach any dewatering dykes (if applicable), including details of any mitigation measures for any adverse impacts.							
Financial Information	46	Provide a statement of financial responsibility.							
	47	If the applicant is an entity for which audited financial statements are issued, a copy of the most recent audited financial statements must be attached to the statement of financial responsibility.							
	48	Provide the name of the corporation, limited company or other business entity, with a list of the officers of the company and a copy of the Certificate of Incorporation or evidence of registration of the company name.							
Studies and Designs	49	Provide a list of studies, reports and plans relevant to the application that have been undertaken to date including:							
	a	Design rational, design requirements, design criteria, design parameters, design standards/analysis/method;							
	b	Design assumptions and the limitations associated with such design assumptions;							
	c	The inclusion of clear, definable engineering qualifiers with all design drawings and reports;							
	d	Site specific data and analysis to support the design and management decisions made;							
	e	Materials that appropriately delineate the particulars of a design or plan.							
	50	Provide construction methods and procedures regarding how infrastructure will be put in place on-site.							
	51	Provide a timetable for submission of preliminary and final-for-construction engineered designs (note: for construction designs are required for NWB approvals).							
Proposed Time Schedule	52	Provide the proposed start and completion dates for each phase of development (construction, operation, closure and post closure) and any anticipated periods of seasonal shut down.							
Proposed Term of Licence	53	Provide a proposed term of licence including the expected date of licence issuance and the expected date of licence expiry.							
Annual Reporting	54	Provide detailed information regarding the content of annual reports and a proposed outline or template of the annual report. The annual report should include the following:							
	a	Water related monitoring results;							
	b	Comparison of water quality and quantity monitoring data with the water quality and quantity predictions presented in the application;							
	c	A description of how the conditions in the NIRB project certificate related to the NWB mandate have been implemented;							
	d	Project changes under adaptive management;							
	e	Any actions taken in response to direction provided by the Inspector.							
Renewals and Amendments	55	If the application is for a renewal or amendment of an existing licence, provide a status report. This report must document for each condition of the existing water licence, what action the licensee has taken.							

3.0 General Water Licence Application

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
	56	If the application is for a renewal or amendment of an existing licence, provide a compliance assessment. This assessment must indicate when facilities were inspected by regulatory agencies such as INAC or GN and which agencies. The compliance assessment must include any inspection reports and/or directions issued by the Inspector and any responses provided by the licensee. The compliance assessment must also list any spills that have occurred including a description, location shown on a map, and the action taken to address the affected area.							

4.0 Project Description

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
Description of Undertaking	**1**	Provide a complete description of the undertaking with detailed site plan(s) of all project infrastructure for the Local Project Area (LPA) and/or the Regional Project Area (RPA), where applicable, and differentiate temporary components from permanent components. Consider the following in providing the description:							
	a	Raw water intake;							
	b	Water storage and treatment facilities including distribution systems;							
	c	Existing water bodies/courses and any changes to these water bodies/courses that may have or may occur as a result of water use or waste disposal facilities. Provide an outline of the drainage basin within the RPA;							
	d	Location of receiving water bodies and drainage pathways;							
	e	Transportation access routes and details of water course crossings;							
	f	Locations of environmental monitoring sites;							
	g	Traditional water use and land use areas that may be impacted by the project;							
	h	Sewage treatment facilities;							
	i	Wastewater treatment area and discharge outlet locations;							
	j	Solid waste disposal areas and drainage patterns;							
	k	Landfarm;							
	l	Waste rock piles (PAG and non-PAG);							
	m	Stockpiles;							
	n	Tailings containment areas;							
	o	Laydown areas;							
	p	Quarries;							
	q	Hazardous waste disposal area;							
	r	Waste discharge distribution lines;							
	s	Fuel and chemical storage;							
	t	Explosives manufacturing and storage;							
	u	Abandoned and/or restored facilities;							
	v	Existing on site infrastructure							
	w	Others:							
	2	Provide a Mine Plan Overview including:							
	a	Description of the location, physical nature, geology and minerology of the ore deposit and host rock.							
	b	Mine development plan and methods.							
	c	Description of any existing mine shafts or openings.							
	d	Description of earthworks for mine development.							
	e	Milling operations including capacity of the mill.							
	f	Predicted rate of production.							
	g	Expected life of the mine.							
	h	Camp and mine site population projections for each phase of the project.							

5.0 Baseline Information

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
Environmental Setting	**1**	Provide a description of the regional and local setting.							
	2	Provide a description of the regional and local surface water regime.							
	3	Provide a description of receiving lakes (lake id, hydrology, water quality).							
	4	Provide a description of the groundwater regime.							
	5	Provide a description of the usual break-up and freeze-up periods.							
	6	Provide a description of the site conditions, including the location, topography, geologic and hydrologic characteristics, climate conditions and predicted future climate trends, seismicity, permafrost conditions and soil and rock conditions (provide test pit/ drill hole logs and laboratory test results).							
	7	Provide a description of the ground condition for design and engineering of earthwork infrastructure, including:							
	a	Interim and permanent waste rock facilities							
	b	Tailings containment area							
	c	Landfills							
	d	Landfarms							
	e	Fuel and chemical storage facilities							
	f	Explosives management areas and facilities							
	g	Quarries or borrow pits							
	h	Hazardous waste facilities							
	i	Wastewater treatment facilities							
	j	Ore stockpiles and waste rock piles							
	k	Overburden piles							
	l	Dewatering dikes							
	m	Mine rock geochemistry							
	8	Provide a description of the historical uses of the waters affected by the project.							
	9	Provide a description of any traditional uses of water in the project area.							
	10	Indicate whether fish, shellfish, or other wildlife are present and harvested in or near discharge areas and, if applicable, indicate the species harvested and the level of harvest.							
	11	Provide the following streamflow data in cubic metres per second for each watercourse included in the application:							
	a	mean annual flow;							
	b	mean summer flow;							
	c	minimum summer flow;							
	d	minimum annual flow;							
	e	mean annual flood;							
	f	maximum summer flood;							
	g	mean summer flood;							
	12	Provide bathymetric information for each water body in the application.							
	13	Provide results of any assessment of the permeability of any faults and taliks beneath water bodies.							
	14	Provide baseline data and an evaluation of baseline data describing surface and groundwater quality in the project area (physical, chemical, and biological characteristics).							
Fisheries	**15**	Provide baseline data and an evaluation of baseline data describing fish and fish habitat in the project area.							
	16	Provide a fisheries assessment including:							
	a	Detailed area description (including photographic record);							
	b	Description of fish habitat (including river or lake bottom substrates such as silt, sand, or cobble);							
	c	Presence of sensitive habitats (spawning, migration corridors etc.);							
	d	Description of aquatic and riparian vegetation;							
	e	Fish community and lifestage present;							
	f	Depth and width of watercourse;							
	g	Max/min water flows, currents, tides;							

5.0 Baseline Information

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
	h	Turbidity and sediment loads (total suspended solids);							
	i	Sport, commercial, subsistence fishery present.							
Studies	17	Provide a list of baseline studies, reports and plans relevant to the application that have been undertaken to date including:							
	a	Geotechnical studies;							
	b	Geochemical studies;							
	c	Water quality studies;							
	d	Hydrological and hydrogeological studies;							
	e	Traditional use studies;							
	f	Aquatic studies;							
	g	Meteorological studies;							

6.0 Water Use: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
Water Use	1	Provide a detailed description of all types of water uses. (See the NWB definition of "use" in the NWB Guide 2: Terminology and Definitions). Categorize water consumption use(s) as either mining/industrial use and/or domestic use.							
Water Use: Quality and Quantity	2	Provide the name of the primary water source as well as the name of any alternative water source(s).							
	3	Provide a description of the source of water and the location of the water source as shown on a map.							
Water Intake	4	Indicate the type of water source(s) as lake, river, well, or other type.							
	5	Provide a description of the quality of the water from the source for each season (summer, fall, winter, spring).							
	6	Provide the capacity of the water source.							
	7	Indicate the amount of water taken from each source and provide a description of the method of extraction including specific pumping rates, pumping procedures and potential for draw down.							
	8	Provide the acquisition rate in cubic metres per day and cubic metres per year.							
	9	Provide a description of the water intake method including the intake facility, the operating capacity of the pump used, the details of any screening to exclude fish, and the distance the pump will be placed from the ordinary high water mark of the watercourse.							
	10	Provide a description of the general condition of any existing water intake facility. Rate the condition of the facility as satisfactory or unsatisfactory and explain the rating.							
	11	Indicate whether water is drawn from the source intermittently or continuously and if intermittently indicate during what months it is drawn and for what period it is drawn (days/weeks/months).							
	12	Indicate the amount of water to be returned to the source.							
	13	Provide a description of the methods to ensure water returned to source is of an acceptable quality.							
	14	Provide a description of any hydrostatic testing programs, including water sources, and treatment/disposal requirements.							
	15	Indicate the quantities of water required for ice road construction and provide a description of the methods of ice road construction.							
	16	Describe measures to reduce water consumption.							
Water Storage	17	Provide a description of any water storage facilities including the type (reservoir/pond, storage tank), location, design, and the water storage volume in cubic meters.							
	18	If the water storage facility is a reservoir, indicate whether the reservoir is lined, the type of liner and when it was or will be installed.							
	19	Provide a description of the general condition of any existing water storage facility and provide an explanation if it is unsatisfactory.							
Water Distribution	20	Provide a description of water distribution systems (ie. piped water, trucked)							
	21	For each phase of development, calculate the total water consumed per day (L/day) by multiplying the estimated number of persons on the system by the estimated average water consumption (Litres/ capita/day). Calculate the total water consumed for each individual distribution system if more than one is used (ie. piped water, trucked water).							
	22	Provide a description of the general condition of any existing water distribution system and provide an explanation if it is unsatisfactory.							

6.0 Water Use: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
Watercourse Crossings and/or Trainings	**23**	Provide a description of any watercourse crossings including pipelines, bridges, culverts or roads.							
	24	Provide a description of any watercourse trainings including channel and bank alterations, culverts, spurs, erosion control, and artificial accretion.							
Flood Control	**25**	Provide a description of any flood control structures.							
Diversions	**26**	Provide a description of any diversions including ditches and dikes.							
Alterations in flow	**27**	Provide a decsription of any activities or structures that could alter the flow of a watercourse including dams, spillways, berms, cofferdams, and dikes.							
Dewatering	**28**	Provide a description of dewatering programs, if planned, including estimated quantities, qualities, methods and schedule of withdrawl, end use or discharge location.							
	29	Provide an estimate of the quality and flow of groundwater that will flow into any open pits.							
Water works	**30**	For each water work component provide the design plans stamped for construction. Design plans shall consider the following:							
	a	Name of the water body(s) affected.							
	b	Site photos, site map, or air photos of the location.							
	c	Description of the existing condition of the site (see section 5).							
	d	Details of structures that will be placed in water on a temporary or permanent basis.							
	e	In water work timing restriction for fisheries.							
	f	Start and completion dates for construction.							
	g	Construction sequence taking into account any timing restrictions.							
	h	Methods of installation.							
	i	Machinery to be used.							
	j	Sedimentation and erosion control measures.							
	k	Construction monitoring plans.							
	l	Assessment of impacts to fish and fish habitat (see Section 6 item 39).							
	m	Bank stabilization measures (size range of material).							
	n	Operation and maintenance plans including instrumentation, monitoring and inspection requirements.							
	o	Contingency plans.							
	p	Remediation plans.							
	31	Final plans and drawings for construction must be stamped by a Professional Engineer licensed to practice in Nunavut. (See Section 7 of the NWB's Guide 4: Completing and Submitting a Water Licence Application for more information regarding design drawings).							
Predicted Environmental Effects and Proposed mitigation measures	**32**	Provide a description of the effects of water usage on the river or lake from which water will be drawn.							
	33	Provide a description of any expected changes in surface water flow or storage.							
	34	If the cross-section of any watercourse is changed, provide a description of the change and its effect on the flow capacity of the channel.							
	35	If the course of any channel is changed, provide a description of measures to maintain stream bed and bank stability.							
	36	Provide a description of mitigation measures that will be implemented when working in close proximity to water.							
	37	Describe measures of preventing surface water from coming into contact with waste and measures of managing surface water that does come into contact with waste (surface water management plan).							

6.0 Water Use: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
	38	Describe measures of preventing groundwater from coming into contact with waste and measures of managing groundwater that does come into contact with waste (groundwater management plan).							
Fisheries	39	Provide a description of any potential impacts to fish and/or fish habitat. (Indirect effects may include project effects, water quality, or aquatic organisms. Direct effects may include degradation or alteration of fish habitat). The applicant is advised to consult with DFO regarding fish and fish habitat related issues.							
	a	Potential effects on fish or fish habitat;							
	b	The area in square metres to be impacted;							
	c	Measures to avoid sensitive periods and habitat areas (i.e., spawning beds, migration corridors);							
	d	Measures to avoid physical impacts on habitat;							
	e	Measures to maintain flows and fish passage;							
	f	Measures to avoid sedimentation;							
	g	Measures to avoid spills;							
	h	Detailed habitat no-net-loss plan and site restoration plan;							
Studies	40	Provide a list of studies, reports and plans relevant to the application that have been undertaken to date, including:							
	a	Water management plan including water balance;							
	b	Construction plan and construction schedule for water works;							
	c	Operation and maintenance plan;							
	d	Implementation schedule for construction of works, submission of studies and mitigation plans for operations and closures;							
	e	Remediation plans for water works infrastructure;							
	f	Fisheries assessment;							
	g	Monitoring plan.							

7.0 Waste Disposal: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
Waste Disposal	**1**	Provide a detailed description of all forms of waste disposal (see the NWB definition of Waste in the NWB *Guide 2: Terminology and Definitions*) indicating the type of waste(s) generated and/or to be deposited.							
Waste Disposal: Quality and Quantity	**2**	For each type of waste, provide the composition and quantity generated. Also provide the location, rate, timing, frequency and duration of the deposit.							
	3	For each type of waste, provide the proposed methods and processes for collecting, storing, treating and discharging the waste. Indicate the capacity of these facilities.							
	4	For each waste facility, provide a description of the construction methods, type and composition of the materials to be used in the construction of the structure, equipment to be used, schedule, quality assurance/ quality control measures, and inspection and maintenance procedures.							
	5	For each waste facility provide the design plans stamped for construction. The designs shall include:							
	a	A description of the types of waste entering the facility (if applicable, provide a description of the source, type, and quantity of the waste);							
	b	The concentration of waste entering the facility;							
	c	The geochemical characterization of waste entering the facility, where applicable;							
	d	Details of the drainage basin;							
	e	Distance of the facility from watercourses and fish bearing waters;							
	f	All sources of seepage encountered near watercourse and fish bearing waters as well as the volumes (m3/day) and direction of any seepage;							
	g	Existing and proposed drainage modifications;							
	h	Details of retaining structures;							
	i	Level of treatment (primary, secondary or tertiary);							
	j	By products of treatment which may require further treatment, characterization, handling and disposal;							
	k	Capacity and retention time of the facility;							
	l	Identification of final discharge point (last point of control);							
	m	Method and type of discharge (seasonal, annual, continuous);							
	n	Estimated rates for discharge;							
	o	Restrictions on discharge;							
	p	Discharge effluent criteria proposed;							
	q	Receiving water quality objectives;							
	r	Capacity of the receiving environment;							
	s	Details regarding direction and path of wastewater flow from the area or infrastructure;							
	t	Mitigation measures;							
	u	Contingency measures;							
	v	Remediation objectives;							
	6	Final plans and drawings for construction must be stamped by a Professional Engineer licensed to practice in Nunavut. (See Section 7 of the NWB's *Guide 4: Completing and Submitting a Water Licence Application* for more information regarding design drawings).							
	7	Describe any measures proposed to minimize the production of wastes.							
	8	Provide detailed plans regarding the disposal of any lake bottom sediments							
	9	Provide a description of the general condition of any existing waste facilities and provide an explanation if it is unsatisfactory.							

7.0 Waste Disposal: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
Predicted Environmental Effects and Proposed mitigation measures	**10**	Provide detailed treatment plans for discharges from any tailings containment area, as well as treatment plans for discharges from attenuation ponds or reclaim ponds. Water treatment plans should include estimates of treatment efficiency for each parameter of concern and a description of pH adjustment methods.							
	11	Clearly outline proposed discharge criteria, how the criteria were developed, standards to be applied, and how these criteria will be used to prevent ecological effects in the receiving environment.							
	12	If waste is expected to infiltrate into the ground, provide a description of the sub-surface soil compositions and provide information on groundwater elevations for the project area. Also provide the proximity between the proposed waste disposal system and the groundwater elevation.							
	13	Provide a discussion of the consequences of long-term stratification in any pit lakes and associated contingency plans.							
	14	Provide the geochemical characteristics of any quarry or borrow material and the methods used to determine the characteristics.							
	15	Provide the geochemical characteristics of host rock, ore, waste rock and tailings and the methods used to determine the characteristics.							
	16	Provide designs for the fuel tank farm facilities including a description of the nearest water bodies. Provide an evaluation of impacts and mitigation measures in case of a fuel spill.							
	17	Provide detailed contingency plans for the treatment of turbid water during dewatering activities and/or increased suspended solids during operations (i.e rewatering).							
Operations and Maintenance	**18**	If the project includes sewage and/or solid waste disposal, provide an Operations and Maintenance Manual in accordance with the "Guidelines for the Preparation of an Operations and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories, 1996".							
Hazardous Materials	**19**	Provide a description of the type of petroleum products, chemicals and/or hazardous materials on site.							
	20	Provide details regarding the handling and storage of petroleum products, chemicals or other hazardous or potentially hazardous materials.							
Emergency Response and Spill Contingency	**21**	Provide an Emergency Response and Spill Contingency Plan (ERSCP) consistent with established Water Board guidelines.							
	22	Plan(s) shall address phases of the project including construction, operation, and care & maintenance.							
	23	Provide an explanation of how the applicant will ensure project contractors meet the applicant's due diligence standards with respect to oil and hazardous material spill prevention, preparedness, response, and restoration.							
Studies	**24**	Provide a list of studies, reports and plans relevant to the application that have been undertaken to date including design and management decisions. Studies, reports and plans may include:							
	a	Waste management;							
	b	Waste rock management;							
	c	Tailings management;							
	d	Metal leaching / acid rock drainage management;							
	e	Landfill management;							
	f	Landfarm management;							
	g	Quarry Management;							

7.0 Waste Disposal: Quality, Quantity, Predicted Environmental Impact and Proposed Mitigation Measures

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
	h	Incineration management;							
	i	Hazardous waste management;							
	j	Water management;							
	k	Geotechnical and geothermal assessment;							
	l	Permafrost protection;							
	m	Water quality modeling;							
	n	Snow drift assessments;							
	o	Leachate and groundwater collection systems;							
	p	Wastewater treatment;							
	q	Operation and maintenance plan;							
	r	Inspection plan;							
	s	General monitoring;							
	t	Tailings monitoring;							
	u	Mine site water quality monitoring;							
	v	Receiving water quality monitoring;							
	w	Aquatic effects monitoring;							
	x	Geotechnical and structural monitoring;							
	y	Quality assurance and quality control;							
	z	Spill contingency and emergency response plans;							
	aa	Interim and final abandonment and reclamation plans for the mine site;							
	bb	Remediation plans for waste disposal infrastructure;							
	cc	Human health and ecological risk assessment for establishment of remediation objectives for closure;							
	dd	The collection of weather data for purposes of mine design;							
	ee	Construction plan and construction schedule for waste disposal infrastructure;							
	ff	Implementation schedule for construction of works, submission of studies and mitigation plans for operations and closure;							
	gg	Options analysis.							

8.0 Monitoring

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
Monitoring	**1**	Provide a Monitoring Plan including a description of the methods, procedures, standards, and schedules proposed. Monitoring may be required for water use; effluent, surface and/or groundwater water quality, quantity, or flow; ground temperature; ground settlement; etc. The Monitoring Plan must consider the life of the project, temporary closure and permanent closure.							
	2	Indicate who is responsible for sampling including that person's position, contact information and level of training.							
	3	Indicate the name and contact information of the certified laboratory performing the analysis of samples.							
	4	Provide an Inspection Plan including a description of the methods, procedures, standards, and schedules proposed. Inspections may be required for engineered facilities related to the management of water and waste as well as spills. The Inspection Plan must consider the life of the project, temporary closure and permanent closure.							
	5	Provide a summary table of all monitoring commitments that details all Surveillance Network Program (SNP) locations. The table should include parameter(s), location, frequency, and mining phase, along with, cross-referencing to sub-documents where detailed information is provided. Where appropriate, a map detailing the location of monitoring sites is to be provided.							
	6	Provide a summary table of the expected quality and quantity of waters, over time in all sumps, SNP stations, and discharge points, along with i) if applicable, adaptive management criteria to benchmark if mitigation/contingency are to be implemented, ii) if applicable, water quality criteria, and iii) management action.							
	7	Provide a monitoring plan for incinerator emissions (including, but not limited to, stack testing and annual reporting).							

9.0 Project Specific Information Requirements (PSIR)

PSIR's will only be issued following a positive Environment Assessment Review determination by NIRB

to be determined

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
Applicant									
Applicant Representative									
Location of Undertaking									
NPC Determination									
NIRB Determination									
Description of Undertaking									
Nature of Interest in the Land									
Water Use: (including water works)									
Water Use: Quality and Quantity									
Waste Disposal:									
Waste Disposal: Quality and Quantity									
Other Authorizations									
Predicted Environmental Impacts and Proposed mitigation measures									
Options (Alternatives)									
Existing and Other User Water Rights									
Inuit Water Rights									
Security									

9.0 Project Specific Information Requirements (PSIR)

PSIR's will only be issued following a positive Environment Assessment Review determination by NIRB

Section Title	Section No.	Information Requirement	Indicate whether Information Requirement is applicable by inserting ' Y ' or ' NA '	If 'NA' provide justification	Insert Title, Author and Date of Document where information is provided	Insert electronic file name of document where information is provided	Insert Section of document where information is provided	NWB Concordance Assessment	NIRB Guideline Section No.
Financial Information									
Studies									
Proposed Time Schedule									
Proposed Term of Licence									

APPENDIX A: ADDITIONAL SOURCE DOCUMENTS TO ASSIST THE APPLICANT

This appendix provides a list of reference documents including legislation, guidelines and standards that may be of use to the applicant in preparing the supplemental information.

Federal Legislation

- *Canadian Environmental Protection Act, [1999, [1999, c.33]*
- *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations, [SOR/2008-197]*
- *Environmental Emergency Regulations, [SOR/2003-307]*
- *Fisheries Act, [R.S.C. c. F-14]*
- *Metal Mining Effluent Regulations, [SOR/ 2002-2222]*
- *Navigable Waters Protection Act, [R.S. 1985, c. N-22]*
- *Navigable Waters Bridges Regulations, [C.R.C., c. 1231]*
- *Navigable Waters Works Regulations, [C.R.C., c. 1232]*
- *Nunavut Land Claims Agreement*
- *Nunavut Waters and Nunavut Surface Rights Tribunal Act, [2002, c.10]*
- *Northwest Territories Waters Regulations, [SOR/93/303]*
- *Territorial Lands Act, [R.S. 1985, c. T-7]*
- *Territorial Land Use Regulations, [C.R.C., c. 1524]*
- *Territorial Quarrying Operations, [C.R.C., c. 1527]*
- *Transportation of Dangerous Goods Act, [1992, c.34]*
- *Transportation of Dangerous Goods Regulations, [SOR/2001-286]*

Territorial Legislation

- *Environmental Protection Act (Nunavut), [R.S.N.W.T. 1988, c. E-7]*
- *Used Oil and Waste Fuel Management Regulations, [N.W.T. Reg. 064-2003]*
- *Mine Health and Safety Act, [S.N.W.T 1994, c.25]*
- *Mine Health and Safety Regulations, [R-125-95]*
- *Mine Health and Safety Regulations, amendment, Nu. Reg. 016-2003*
- *Safety Act, [R.S.N.W.T. 1988, c. S-1]*
- *Work Site Hazardous Materials Information System Regulations, [R.R.N.W.T. 1990 c. S-2]*
- *Transportation of Dangerous Goods Act, [R.S.N.W.T. 1988, c. 81 (Supp.)]*
- *Transportation of Dangerous Goods Regulations, [1991, N.W.T. Reg. 095-91]*

Guidelines and Policies

- CCME – *Environmental Code of Practice for Aboveground and Underground Storage Tank Systems containing Petroleum and Allied Petroleum Products (2003);*
- CCME – Canadian Environmental Quality Guidelines *Guidelines (CEQG) and Canadian Water Quality Guidelines for the Protection of Aquatic Life;*
- CCME – *Canada-Wide Standards for Dioxins and Furans (2001);*
- CCME – *Canada-Wide Standards for Mercury Emissions (2000);*
- DFO – *Freshwater Intake End-of-Pipe Fish Screen Guideline (1995);*
- DFO – *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (1998);*
- DFO – *Policy for the Management of Fish Habitat (2001);*
- DFO – *Habitat Conservation and Protection Guidelines (1998);*

- DFO – *Operational Statements;*
- EC – *Guidelines for the Preparation of Hazardous Material Spill Contingency Plans (1990);*
- EC – *Metal Mining Guidance Document for Aquatic Effects Monitoring (2002);*
- EC – *Guidelines for the Assessment of Alternatives for Tailings Storage for Metal Mining Projects Proposing to use Natural, Fish-bearing Water Bodies as Tailings Impoundment Areas (Draft July 4, 2008);*
- GN – *Spill Contingency Planning and Spill Reporting in Nunavut. A Guide to the New Regulations.*
- GN – *Environmental Guideline for Contaminated Site Remediation (2002);*
- GN – Environmental Guideline for *General Management of Hazardous Waste in Nunavut (2002);*
- *GN - Environmental Guideline for Ozone Depleting Substances (2002);*
- *GN - Environmental Guideline for Waste Antifreeze (2002);*
- *GN - Environmental Guideline for Waste Asbestos (2002);*
- *GN - Environmental Guideline for Waste Batteries (2002);*
- *GN - Environmental Guideline for Waste Paint (2002);*
- *GN - Environmental Guideline for Waste Solvent (2002);*
- *GN - Guideline for the Management of Waste Lead and Lead Paint (2001);*
- *GN - Municipal Solid Wastes Suitable for Open Burning;*
- *GN - Disposal Guidelines for Fluorescent Lamp Tubes;*
- GN – *Occupational Health &Safety Guidelines (2006);*

- GNWT - *Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories, (1992)*

- GNWT – *A Field Guide to Ice Construction Safety (2007);*

- *Guidelines for the Preparation of an Operations and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories*, Duong and Kent, 1996

- INAC - *Mine Site Reclamation Policy for Nunavut (2002);*

- INAC – *Guidelines for Spill Contingency Planning (2007);*

- INAC - *Quality Assurance (QA), Quality Control (QC) Guidelines for Use by Class "B" Licnesees in Collecting Representative Water Samples in the Field and for Submission of a QA/QC Plan (1996);*

- INAC - *Mine Site Reclamation Guidelines for the Northwest Territories (2007);*

- INAC – *A Policy Respecting the Prohibition of Bulk Water Removal from Major River Basins in Nunavut (2003);*

- The Mining Association of Canada "*A Guide to the Management of Tailings Facilities*" (1998), (Referenced within the guidelines as GMTF);

- Mining Association of Canada, "*Developing an Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities*"

- The proponent where applicable should consider the application of the Canadian Dam Association "*Dam Safety Guidelines*" (January 1999) in the design, construction, operation, monitoring, decommission and closure of dam infrastructure. (Referenced within the guidelines as CDA);

- *Workplace Hazardous Materials Information System* (WHMIS);

The NWB maintains a folder on its FTP site containing electronic copies of reference documents. Federal legislation may be found on the Department of Justice Canada website at http://laws.justice.gc.ca/. Territorial Legislation may be found on the Canadian Legal Information Institute's website at http://www.canlii.org/. The applicant is encouraged to consult with government agencies on technical issues and to obtain the most up to date copy of reference documents.

It is the applicant's responsibility to ensure that all relevant standards and guidelines are considered in the water licence application and to incorporate proper footnotes and references.

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Nunavunmi Parnaiyiit
Nunavut Planning Commission
Commission d'Aménagement du Nunavut

October 12, 2011

Mr. Lucasssie Arragutainaq
Chairperson
Nunavut Impact Review Board
P.O. Box 1360
Cambridge Bay, NU., X0B 0C0

Re: North Baffin Regional Land Use Plan Transportation Corridor

Dear Mr. Arrangutainaq

In accordance with the North Baffin Regional Land Use Plan the Nunavut Planning Commission and Nunavut Impact Review Board coordinated a review of a portion of the proposed transportation corridor, associated with the Mary River project.

As part of our coordinated review there is a need to address whether the NPC will request the Minister to amend the North Baffin Regional Land Use Plan (NBRLUP) to include the portion of the new transportation corridor located within the North Baffin land use planning region.

The NPC is preparing a draft Nunavut Land Use Plan (NLUP) for public release. The NLUP, when approved, will replace the NBRLUP. Existing and proposed transportation corridors for the Nunavut Settlement Area are currently being addressed as part of the formulation of the draft NLUP. As such the NPC will not be seeking an amendment to the NBRLUP.

In short, proposing an amendment to the NBRLUP would be a duplication of our current land use planning activities.

Sincerely

Ron Roach, Chairperson
Nunavut Planning Commissions

CC. Baffinland Iron Mines Corporation

Nunavut Tunngavik Tiriqpiinga 638
Iqaluit
NU X0A 0H0 Canada

Nunavut Tunngavik Incorporated
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Office of the President

Qikiqtaaluk: Arctic Bay, Qikiqtarjuaq, Cape Dorset, Clyde River, Grise Fiord, Hall Beach, Igloolik, Iqaluit, Kimmirut, Pangnirtung, Pond Inlet, Resolute Bay, Sanikiluaq. Kivalliq: Arviat, Baker Lake, Chesterfield Inlet, Coral Harbour, Rankin Inlet, Repulse Bay, Whale Cove. Kitikmeot: Cambridge Bay, Kugluktuk, Gjoa Haven, Kugaaruk, Taloyoak

October 25, 2011

NUNAVUT IMPACT REVIEW BOARD
OCT 2 5 2011
RECEIVED

Mr. Ron Roach
Chairperson
P.O. Box 623
Nunavut Planning Commission
Rankin Inlet, NU X0C 0G0

Mr. Lucassie Arragutainaq
Chairperson
P.O. Box 1360
Nunavut Impact Review Board
Cambridge Bay, NU X0B 0C0

Dear Mr. Roach and Mr. Arragutainaq:

Re: North Baffin regional Land Use Plan Transportation Corridor

This is in response to Mr. Roach's October 12, 2011, letter regarding the North Baffin Regional Land Use Plan Transportation Corridor (the "Proposed Corridor").

Under section 3.5.11 of the North Baffin Regional Land Use Plan (the Plan), parties wishing to develop a transportation corridor such as the Proposed Corridor must submit a detailed application for an amendment to the Plan. Section 3.5.12 provides that the NPC and NIRB shall publicly review the Proposed Corridor, and if it is determined that the proposal meets the requirements of the Plan, NPC may request the ministers to amend the plan to allow the corridor.

Given that sections 3.5.11 and 12 are Conformity Requirements under the approved Plan, it is not an option for the NPC to bypass the amendment process based on the Nunavut land use planning process that is currently underway. NTI requests that the NPC reconsider its position on this issue as soon as possible, in order to avoid legal complications that may arise out of its October 12 decision, including those related to NIRB's review and ultimate issuance of a project certificate for the project.

NTI would appreciate an early and timely response.

Sincerely,

Cathy Towtongie
President, NTI

cc: file

Baffinland
Iron Mines Corporation

October 31, 2011

Mr. Ron Roach, Chairperson
Nunavut Planning Commission
P.O. Box 2101
Cambridge Bay, NU X0B 0C0

Re: North Baffin Regional Land Use Plan Transportation Corridor

Dear Mr. Roach

Baffinland Iron Mines Corporation ("**Baffinland**") would like to take the opportunity to comment on your letter dated October 12, 2011 to the Nunavut Impact Review Board ("**NIRB**") and to request that the Nunavut Planning Commission proceed with consideration of Baffinland's application for an amendment to the North Baffin Regional Land Use Plan ("**NBRLUP**").

The background and procedural chronology respecting the joint review process to date is summarized in the attached Schedule "A".

In accordance with the joint review process agreed to between NIRB and NPC as outlined in the joint letter of March 16, 2009, and in accordance with the provisions of the NIRB guidelines for the environmental impact statement, Baffinland included in its draft EIS at Appendix 1C-2 a cross reference to the information required under Appendices J and K of the NBRLUP. Section 1.4.1 of the EIS Guidelines provides that this Appendix and the information included in the DEIS serve as Baffinland's "formal application for an amendment to the NBRLUP".

As referenced in the background and procedural chronology, attached as Schedule "A" to this letter, it is anticipated that, in accordance with the joint review process established by NIRB and NPC on March 16, 2009, NIRB and NPC would consider the application for the transportation corridor amendment to the NBRLUP, at the Pre-Hearing Conference scheduled for Igloolik and Pond Inlet, on November 6 through November 10, 2011.

We were concerned to receive your letter of October 12, 2011, which appears to indicate that NPC would not be following the joint review process agreed to between NIRB and NPC on March 16, 2009.

We believe that we have complied with the requirements of the joint review process and we have been operating under the expectation that at the upcoming Pre-Hearing Conference, NPC and NIRB will determine whether the information requirements of Appendices J and K have been met. We would be pleased if NPC would confirm that it will continue to follow the joint review process established in March 2009 and proceed with the joint consideration of the amendment application at the Pre-Hearing Conference.

Attached as Schedule “B” to this letter is a map showing the proposed transportation corridor. Once an amendment is issued to provide for the transportation corridor under the NBRLUP, we expect that no further participation by NPC in the NIRB review process would likely be required.

We are copying this letter to NIRB in the hope that NPC will be in communication with NIRB to complete the joint review process established between the two agencies.

Yours very truly,

Erik Madsen
Vice-President Sustainable Development,
Health, Safety & Environment
T: (416) 814-3980
M: (416) 996-5523
Email: erik.madsen@baffinland.com
Baffinland

cc: Nunavut Impact Review Board

SCHEDULE "A"

On March 20, 2008, Baffinland filed the Mary River Project Development Plan with NIRB.

A 34 km of the section of the planned railway as proposed in the Mary River Project Development Proposal will be located in the North Baffin Planning Region.

On March 20, 2008, NIRB forwarded the Development Proposal to the NPC for a conformity determination under Article 11 of the Nunavut Land Claim Agreement ("**NLCA**").

By letter to NIRB and others dated August 30, 2008, the NPC determined that the project conformed to the NBRLUP and the NPC forwarded it to NIRB for screening.

The August 30, 2008 letter stated:

> "The NPC has completed its review of the above noted project proposal. The project conforms with the North Baffin Regional Land Use Plan (NBRLUP) and we are forwarding it to NIRB for screening. We draw your attention to the provisions of sections 3.5.11 and 3.5.12 of Appendix "C" of the NBRLUP, a copy of which is enclosed, and note that a joint process to address the prospective transportation corridor is contemplated by those provisions. NPC looks forward to working with NIRB in accordance with those provisions."

Sections 3.5.10, 3.5.11 and 3.5.12 of Appendix "C" of the NBRLUP read as follows:

> 3.5.10 While ensuring the respect of applicable Canadian international obligations in the region, the NPC shall implement the concept of a transportation and/or communications "corridor" as a land use policy having general application, and applying to land and water routes throughout the region, based on the processes outlined in Appendices J and K.
>
> 3.5.11 All parties wishing to develop a transportation and/or communications corridor shall submit to the NPC a detailed application for an amendment. This application must include an assessment of alternative routes, plus the cumulative effects of the preferred route. It shall provide reasonable options for other identifiable transportation and utility facilities.
>
> 3.5.12 The NPC, and either NIRB or a panel acting under section 12.4.7 of the NLCA, shall publicly review the proposed corridor to determine whether the proposal adequately meets the guidelines set out in Appendices J and K. Once it is determined that a proposal does meet the guidelines, the NPC may request the ministers to amend the plan to include the new transportation corridor.

By letter to Baffinland dated May 2, 2008, NIRB indicated that it would proceed with a screening of the project proposal.

In the letter of May 2, 2008, NIRB confirmed that it had received a positive conformity determination from the NPC, and indicated as follows:

> "As noted in the confirmation determination from the NPC, the NBRLUP, in conformity requirement 3.5.12 requires the NIRB and the NPC to jointly review the proposed transportation corridor associated with this project proposal in accordance with the guidelines set out in Appendices J and K of the NBRLUP. This public review exercise conducted jointly by the NIRB and NPC seems necessary to guide a potential amendment to the NBRLUP."

During the screening process, a number of parties including the QIA and INAC confirmed the need to proceed with a joint process (NIRB and the NPC) towards an amendment, in accordance with the NPC conformity decision. (See the letter from the QIA dated June 2, 2008 to NIRB, the NWB and the NPC, and the letter dated June 4, 2008 from INAC to NIRB and NPC.)

By letter of June 27, 2008 to the Minister of Indian Affairs and Northern Development, NIRB provided its screening decision and recommendations to the Minister. NIRB recommended that a Part 5 review be commenced under Article 12 of the NLCA. In that letter, NIRB referred to the NLCA conformity decision and the joint process considering an amendment application under the NBRLUP provisions 3.5.10 – 3.5.12 and Appendices J and K. NIRB sought the advice of the Minister on this process.

By letter dated February 11, 2009, the Minister acknowledged receipt of the NIRB screening decision report and referred the project proposal to NIRB for a review under Part 5 of Article 12 of the NLCA. The Minister's letter referenced the outstanding issues relating to the land use planning process, and stated as follows:

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

The letter to The Mary River Distribution List dated March 16, 2009 issued jointly by NIRB and the NPC referenced the Minister's letter of February 11, 2009 and confirmed as follows:

> "The NIRB and NPC are pleased to announce that their respective representatives have now had the opportunity to discuss and formalize arrangements to ensure an efficient Part 5 Review process which will satisfy both organizations requirements for this file. A detailed description of the process to be followed for the Part 5 Review of the Project is provided as Appendix A, and a diagram of the process is also provided as Appendix B to complement the written description."

The process diagram referred to as Appendix B to the March 16 letter indicated that:

- o the NIRB guidelines for the Part 5 Review would contain the information requirements established in the NBRLUP Appendices J and K;
- o NIRB would forward technical review comments specific to NBRLUP Appendices J and K to the NPC for information and at the Pre-Hearing Conference, NPC and NIRB will determine whether the information requirements of Appendices J and K have been met; and
- o once a final transportation corridor is determined, the NPC may request that the NBRLUP be amended to include the location.

The final NIRB guidelines for the preparation of the EIS for the project proposal included, in part 1.4.1, the arrangements made between NIRB and NPC for the joint review of the transportation corridor. Specifically, the guidelines specified:

> "In keeping with the Minister's direction and the provisions of the NBRLUP noted above, NIRB and the NPC have developed an arrangement to jointly review the transportation corridor (railway) proposed by the Project. The Proponent is required to include the project-specific information stipulated in Appendices J and K of the NBRLUP (see Appendix B), within its EIS. Given that much of the required information pertains directly to the impact assessment of the Project, the Proponent should cross reference where the required information can be found within the body of the EIS. It is recommended that an appendix be included in the EIS, with references to all the information required by Appendix B, <u>which will then serve as the Proponent's formal application for an amendment to the NBRLUP</u>. "

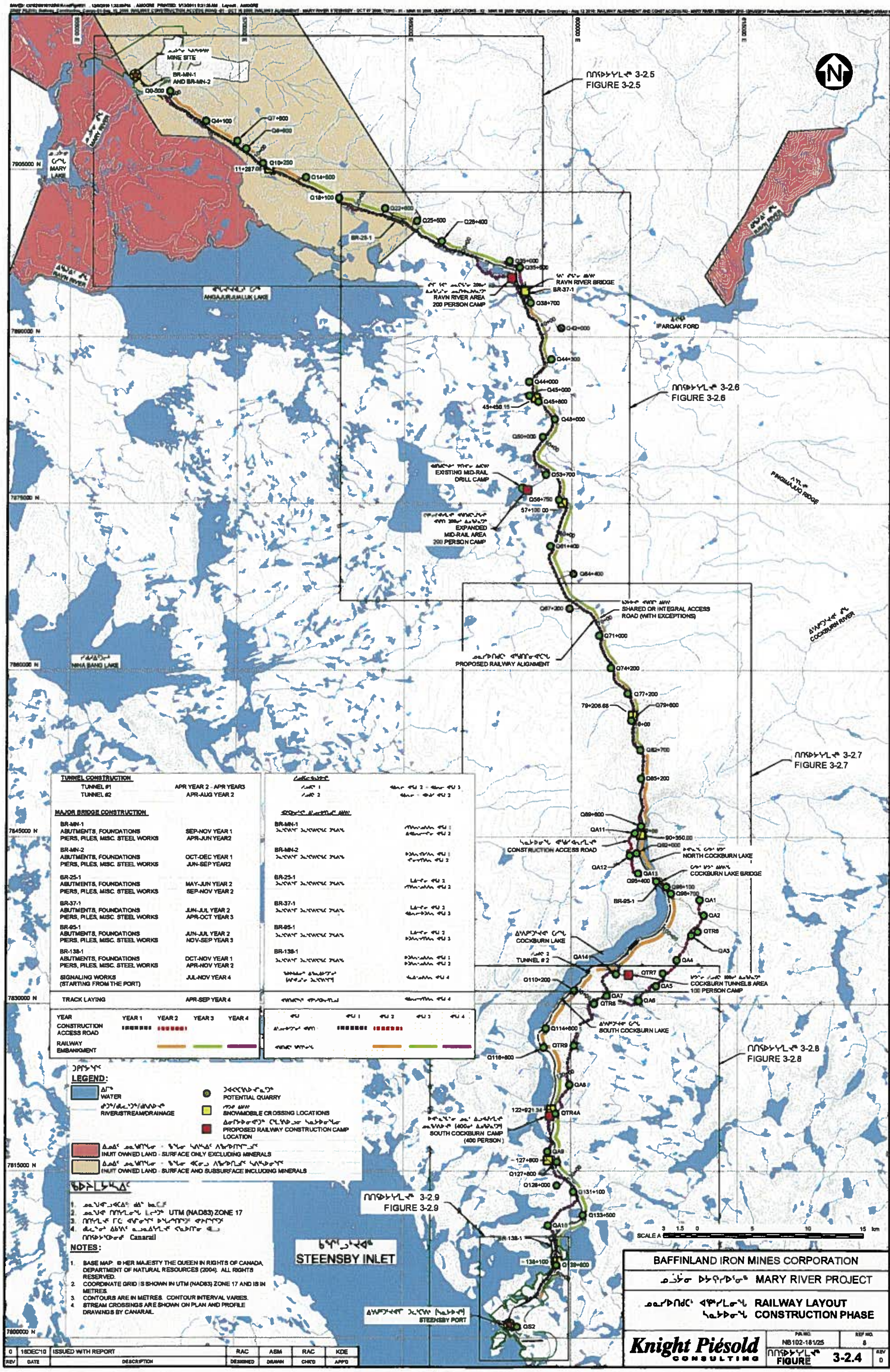
The Baffinland DEIS includes Appendix 1C-2 which references the information required by Appendices J and K of the NBRLUP, and serves as the proponent's formal application for an amendment to the NBRLUP.

In accordance with the coordinated Part 5 Review process, NIRB, in its letter of September 9, 2011, requested that the parties participating in the review submit Technical Reviews by October 5, 2011, and requested Technical Review comments on a number of issues including an indication of the issues relevant to the NIRB and NPC's joint review of the transportation corridor. We presume that, in accordance with the process schedule attached as Appendix B to the NIRB/NPC letter of March 16, 2009, the Technical Review comments relating to the transportation corridor were forwarded to the NPC by NIRB.

Also in accordance with the process schedule, at the Pre-Hearing Conference which is now scheduled for November 6 – 10 in Igloolik and Pond Inlet, NIRB and the NPC are to determine whether the information requirements of Appendices J and K have been met.

SCHEDULE “B”

MAP OF PROPOSED TRANSPORTATION CORRIDOR


MINE SITE
BR-MN-1
AND BR-MN-2
MARY LAKE
MARY RIVER
RAVN RIVER
ANGAJURJUALUK LAKE
FIGURE 3-2.5
FIGURE 3-2.6
FIGURE 3-2.7
FIGURE 3-2.8
FIGURE 3-2.9
BR-25-1
RAVN RIVER BRIDGE
BR-37-1
RAVN RIVER AREA
200 PERSON CAMP
IPAROAK FORD
EXISTING MID-RAIL
DRILL CAMP
EXPANDED
MID-RAIL AREA
200 PERSON CAMP
PINGMAJUQ RIDGE
SHARED OR INTEGRAL ACCESS
ROAD (WITH EXCEPTIONS)
PROPOSED RAILWAY ALIGNMENT
COCKBURN RIVER
NINA BANG LAKE
CONSTRUCTION ACCESS ROAD
NORTH COCKBURN LAKE
COCKBURN LAKE BRIDGE
BR-95-1
COCKBURN LAKE
TUNNEL # 2
COCKBURN TUNNELS AREA
100 PERSON CAMP
SOUTH COCKBURN LAKE
SOUTH COCKBURN CAMP
(400 PERSON)
BR-138-1
STEENSBY INLET
STEENSBY PORT
TUNNEL CONSTRUCTION
TUNNEL #1 APR YEAR 2 - APR YEAR3
TUNNEL #2 APR-AUG YEAR 2
MAJOR BRIDGE CONSTRUCTION
BR-MN-1
ABUTMENTS, FOUNDATIONS SEP-NOV YEAR 1
PIERS, PILES, MISC. STEEL WORKS APR-JUN YEAR2
BR-MN-2
ABUTMENTS, FOUNDATIONS OCT-DEC YEAR 1
PIERS, PILES, MISC. STEEL WORKS JUN-SEP YEAR2
BR-25-1
ABUTMENTS, FOUNDATIONS MAY-JUN YEAR 2
PIERS, PILES, MISC. STEEL WORKS SEP-NOV YEAR 2
BR-37-1
ABUTMENTS, FOUNDATIONS JUN-JUL YEAR 2
PIERS, PILES, MISC. STEEL WORKS APR-OCT YEAR 3
BR-95-1
ABUTMENTS, FOUNDATIONS JUN-JUL YEAR 2
PIERS, PILES, MISC. STEEL WORKS NOV-SEP YEAR 3
BR-138-1
ABUTMENTS, FOUNDATIONS OCT-NOV YEAR 1
PIERS, PILES, MISC. STEEL WORKS APR-NOV YEAR 2
SIGNALING WORKS
(STARTING FROM THE PORT) JUL-NOV YEAR 4
TRACK LAYING APR-SEP YEAR 4
YEAR YEAR 1 YEAR 2 YEAR 3 YEAR 4
CONSTRUCTION ACCESS ROAD
RAILWAY EMBANKMENT
LEGEND:
WATER
RIVER/STREAM/DRAINAGE
POTENTIAL QUARRY
SNOWMOBILE CROSSING LOCATIONS
PROPOSED RAILWAY CONSTRUCTION CAMP LOCATION
INUIT OWNED LAND - SURFACE ONLY EXCLUDING MINERALS
INUIT OWNED LAND - SURFACE AND SUBSURFACE INCLUDING MINERALS
2. UTM (NAD83) ZONE 17
Canarail
NOTES:
1. BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA, DEPARTMENT OF NATURAL RESOURCES (2004). ALL RIGHTS RESERVED.
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. CONTOURS ARE IN METRES. CONTOUR INTERVAL VARIES.
4. STREAM CROSSINGS ARE SHOWN ON PLAN AND PROFILE DRAWINGS BY CANARAIL.
SCALE A
3 1.5 0 5 10 15 km
BAFFINLAND IRON MINES CORPORATION
MARY RIVER PROJECT
RAILWAY LAYOUT
CONSTRUCTION PHASE
Knight Piésold
CONSULTING
NB102-181/25
8
FIGURE 3-2.4
0
0 18DEC'10 ISSUED WITH REPORT RAC ASM RAC KDE
REV DATE DESCRIPTION DESIGNED DRAWN CHK'D APP'D

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Nunavunmi Parnaiyiit
Nunavut Planning Commission
Commission d'Aménagement du Nunavut

November 5, 2011

Mr. Erik Madsen
Vice-President Sustainable Development
Health, Safety and Environment
Baffinland Iron Mines Corporation
120 Adelaide Street West, Suite 1016
Toronto, Ontario M5H 1T1

Delivered by Electronic Mail

Dear Mr. Madsen

Thank you for your October 31, 2011 letter regarding the Baffinland Iron Mine Corporation's application for an amendment to the North Baffin Regional Land Use Plan (NBRLUP).

The Commission remains committed to continuing with implementation of the NBRLUP Terms 3.5.10, 3.5.11 and 3.5.12 and the steps of Nunavut Impact Review Board (NIRB) Part 5 Review. This includes the Commission's participation in the joint public review of the information provided to address the information and planning guideline requirements of the NBRLUP Appendices J and K.

The Nunavut Planning Commission is the authority on implementation and interpretation of its approved land use plans.

The Commission has recently learned that there may be independent interpretations of the NBRLUP being brought to the NIRB Part 5 review that contradict the Commission's position. These independent opinions prepared in isolation of the Commission only serve to cause confusion and are unhelpful.

It needs to be made very clear. The completion of the action component of NBRLUP Term 3.5.12 which reads, *"NPC may request the ministers to amend the plan to include the new transportation corridor"* has no effect on the Commission's positive conformity determination of April 30, 2008, the current NLCA NIRB Part 5 review, or the issuance of any permit, license or authorization.

To assist with Baffinland Iron Mines Corporation understanding of the Terms of the NBRLUP please note that the NBRLUP contains conformity requirements, actions and recommendations. These are identified in NBRLUP Chapter 3. Also see footnote 7 on Page 29 for additional clarity. Terms 3.5.11 and 3.5.12 contain both conformity requirements and actions which, although related, must be implemented independently. For instance the "actions" set out in Term 3.5.12 of the NBRLUP provides an option for the Commission to consider a plan amendment to "*include the new transportation corridor.*" It is important to consider that:

- an amendment to show the new transportation corridor means to add a map showing the final location of the corridor.

- the NBRLUP requires alternative routes to be considered as part of the plan amendment request. Therefore, it is conceivable that the final location of the bed of the railway could be altered prior to the final approval of the NIRB Hearing Report.

- The final decision on the location of the new transportation corridor will be based upon the final approved routing of the rail way.

- The completion of the action component of Term 3.5.12 has no effect on the Commission's positive conformity determination of April 30, 2008, the current NLCA Part 5 review, or the issuance of any permit, license or authorization.

In summary the NBRLUP does not contemplate that a plan amendment be completed before the NLCA NIRB Part 5 project review is completed or before any permits, licenses or authorizations can be issued. The request to amend the NBRLUP requires that the final location of the railway be approved as the design of the transportation corridor is based upon the railways final location.

In my October 12 letter I indicated that the Commission "*will not be seeking an amendment to the NBRLUP.*" Implementation of NLCA 11.6.3 requires that the Commission provide a recommendation to the Minister of Aboriginal Affairs and Northern Development Canada and the Minister of Environment, Government of Nunavut. The recommendation must advise the Ministers on whether the request for plan amendment should be accepted or rejected in whole or in part. Although premature as our review is still underway there are a number of technical and administrative reasons why the Commission believes that the request for plan amendment may be rejected. None of these reasons reflect on Baffinland Iron Mines Corporation application for a request for plan amendment or the NIRB Part 5 Review currently underway. Again, because the NBRLUP Term 3.5.12 plan amendment provision is an action and **not** an outstanding conformity requirement the recommendation of the Commission to accept, or reject the plan amendment proposal in whole, or in part has no effect on the NIRB Part 5 review or the issuance of any permit, license or authorization.

Once the final decision on the completeness of the information requirements and the location of the bed of the rail way is made, the Commission will implement the requirements outlined in NLCA 11.6.3. The decision whether the NBRLUP should be amended to include a map showing the location of a portion of the new transportation corridor located within the North Baffin planning region rests with government.

To summarize, the Terms 3.5.11 and 3.5.12 contain "actions" which are considered separate from the conformity determination requirements. The project proposal conforms to the conformity requirements contained in the NBRLUP and the project is proceeding through the NLCA NIRB Part 5 review. Once the Part 5 review is completed the Commission will implement the NLCA 11.6.3 requirements for plan amendment. The action under Term 3.5.12 does not affect the Commissions conformity determination or the process currently being under taken by NIRB under NLCA Article 12 Part 5. Nor, does it infringe on the ability of regulators or land managers to issue permits, licences or authorizations.

There is one point in your letter that needs to be clarified. The Commission and NIRB will determine whether the information requirements of the NBRLUP Appendices J and K are met and make the decision public as part of the Pre-hearing Conference Report. The final alignment of the bed of the railway must be approved before the Commission will undertake the design of the transportation corridor. Once the information requirements are met and the final location of the railway bed is known the Commission will proceed with implementation of the plan amendment process established under the Nunavut Land Claims Agreement Section 11.6.3.
Also, please note that the NIRB is not involved in the NLCA 11.6.3 plan amendment process.

Should the Baffinland Iron Mine Corporation receive information that is contrary to the interpretation of the NBRLUP Terms outlined above the Commission asks that you please forward the name of the individual and the organization they represent to my attention.

In closing, we look forward to continuing to work with Baffinland Iron Mines Corporation during the review of the information requirements provided in accordance with the NBRLUP. If the Commission may be of further assistance with explaining the Terms of the NBRLUP please do not hesitate to contact the Commission's Executive Director, Sharon Ehaloak.

Respectfully,

Ron Roach

Ron Roach
Chairperson

CC: Lucassie Arragutainaq, Chairperson, NIRB

MARY RIVER PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT

VOLUME 9
CUMULATIVE EFFECTS AND OTHER ASSESSMENTS

DOCUMENT STRUCTURE

Volume 1
Main Document

Volume 2
Consultation, Regulatory, Methods
- Consultation
- Regulatory Framework
- Impact Assessment Methodology

Volume 3
Project Description
- Project Description
- Workforce and Human Resources
- Alternatives

Volume 4
Human Environment
- Population Demographics
- Education and Training
- Livelihood and Employment
- Economic Development and Self Reliance
- Human Health and Well Being
- Community Infrastructure and Public Service
- Contracting and Business Opportunities
- Cultural Resources
- Resources and Land Use
- Cultural Well-being
- Benefits, Taxes and Royalties
- Government and Leadership

Volume 5
Atmospheric Environment
- Climate
- Air Quality
- Noise and Vibration

Volume 6
Terrestrial Environment
- Landforms, Soil and Permafrost
- Vegetation
- Birds
- Terrestrial

Volume 7
Freshwater Environment
- Freshwater Quantity
- Freshwater Quality
- Freshwater Biota and Habitat

Volume 8
Marine Environment
- Sea Ice
- Seabed Sediments
- Marine Fish and Invertebrates
- Marine Mammals

Volume 9
Cumulative Effects and Other Assessments
- Cumulative Effects Assessments
- Effects of the Environment on the Project
- Accidents and Malfunctions
- Transboundary Effects Assessment
- Navigable Water Assessment

Volume 10
Environmental, Health and Safety
- Management System
- Individual Management Plans

PROJECT FACT SHEET

Location	• Located at Mary River, North Baffin Island. 1000 km north of Iqaluit, 160km south of Pond Inlet
Reserves	• Comprised of nine known iron ore deposits around Mary River. The current project is focused on Deposit No.1 with known reserves of 365 million tonnes estimated at >64 % iron
Construction Phase	• Construction of the project could commence as early as 2013 • Milne Port will support construction activities, receiving materials during the open water season and moving them to the Mine Site along the existing Tote Road • Construction materials will also be received at Steensby Port • 4 years to complete construction
Operational Phase Open Pit Mine Processing	• Operations will involve mining, ore crushing and screening, rail transport and marine shipping to European markets • Projected production of 18 million tonnes per year for 21 years • No secondary processing required; no tailings produced due to the high grade of ore
Rail Transport and Shipping	• A rail system will be built for year round transfer (~150 km) of ore to Steensby Inlet • A loading port constructed at Steensby Inlet will accommodate cape sized vessels • These specially designed ships will transport to the European market year round • Milne Port will be used to receive construction materials in the open water season and then very rarely to ship, during the open water season, oversized materials
Environment	• Baseline studies have been conducted by Baffinland since 2005 • Inuit Qaujimajatuqangit (traditional knowledge) information collected since 2006 • These baseline studies form the foundation for the environmental impact statement and provide information for the development of mitigation and management plans • Studies cover terrestrial environment, marine environment, freshwater environment, air quality, and resource utilization • Extensive ongoing consultation with communities and agencies • Monitoring during project activities will be important in validating predictions and mitigating potential affects
Social and Economic Benefits	• Mineral royalties will flow to NTI • Taxes will flow to governments of Nunavut and Canada • Baffinland finalizing negotiations with the Qikiqtani Inuit Association (QIA) for an Inuit Impact Benefits Agreement (IIBA) • During the four year construction period employment will peak at 2,700 people • Through the 21 years of operations about 950 people on the payroll each year
Closure and Post-Closure Phase	• Conceptual mine closure planning has been completed • Closure will ensure that the former operational footprint is both physically and chemically stable in the long term for protection of people and the natural environment • Post closure environmental monitoring will continue as long as needed to verify that reclamation has successfully met closure and reclamation objectives

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APPENDICES

SECTION 1.0 - CUMULATIVE EFFECTS ASSESSMENT

1.1 INTRODUCTION

The Nunavut Impact Review Board (NIRB) defines a cumulative effect as:

> "…the impact on the environment that results from the incremental effects of a development when added to other past, present and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (NIRB, 2009)

This cumulative effects assessment (CEA) identifies the residual effects of the Mary River Project and the potential to interact with the residual effects of other projects or activities that could result in a greater effect to a valued component (VC) of the biophysical or socio-economic environments. The CEA consists of three main steps:

- Determine whether the Project will have a residual effect on identified valued components (VECs and VSECs, together referred to as VCs);
- If a residual effect is likely, assess the potential for the Project's residual effect to interact with residual effects resulting from other projects or activities (past, current, or future); and
- Determine if the interaction of the residual Project effect, in combination with other project effects, is likely to meaningfully influence a VC.

The assessment of a single project determines if *that* project is incrementally responsible for adversely affecting a VC beyond an acceptable level. The CEA must make clear to what degree the project under review is *alone* contributing to that total effect. Interactions are considered only if their assessment would influence the decision regarding approval by the regulatory reviewers.

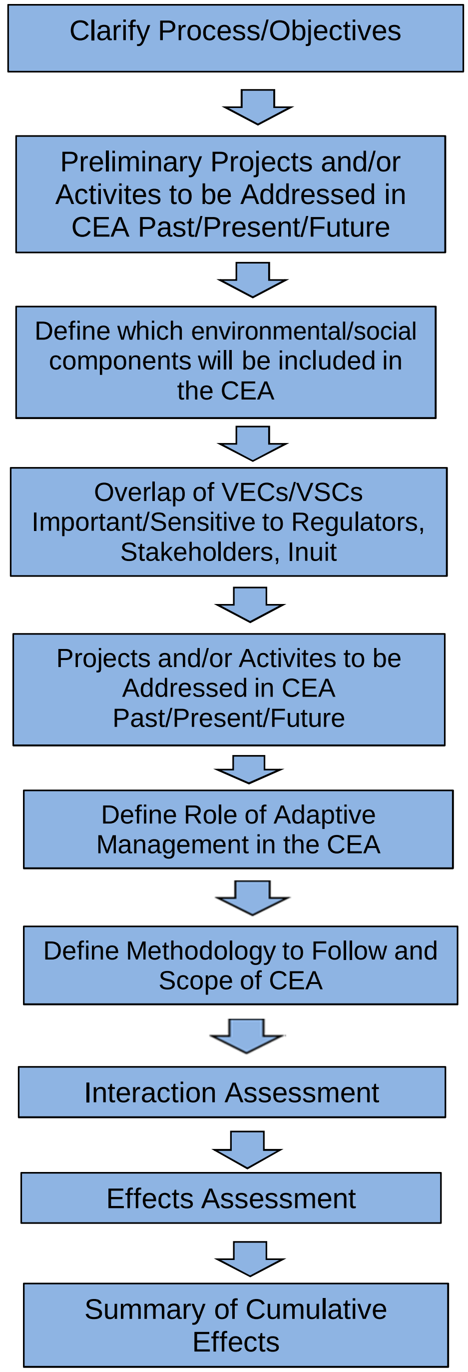
1.2 APPROACH

1.2.1 Methodology

The CEA process adopted for this analysis is illustrated in Figure 9-1.1, which in accordance with the methodology put forth by the Canadian Environmental Assessment Agency (CEAA) (Hegmann *et al*., 1999), includes the following.

- Scoping:
  - Identification of Project residual effects and receiving VCs;
  - Identification of other past, present and future projects and activities with the potential to interact with residual Project effects; and
  - Determine where residual Project effects interact with other past, present and future projects and activities, resulting in the potential for cumulative effects.
- Analysis of cumulative effects;
- Identification of mitigation;
- Determination of significance; and
- Identification of monitoring.

BL_Vol9_EXL_001 Cumulative Effects Assessment Framework Figure 9-1-1



NOTES:

1. ADAPTED FROM HEGMAN ET AL., 1999

BAFFINLAND IRON MINES CORPORATION	
MARY RIVER PROJECT	
CUMULATIVE EFFECTS ASSESSMENT FRAMEWORK	
REF No. **BL_Vol9_EXL_001**	
ᑎᑎᕋᐅᔭᖅᓯᒪᔪᖅ **FIGURE** **9-1.1**	REV A

A systematic screening method was used to identify and evaluate potential cumulative effects. The cumulative effects reported herein are based on residual effects identified in the discipline-specific impact statements (Volumes 4 through 8). On a VC specific basis, the zone of influence (ZOI) of residual Project effects was compared with the ZOI of other projects and activities. Cumulative effects were identified where an overlapping interaction in time and space was determined. Where cumulative effects were identified, they were ranked as described in Section 1.2.5.

For this assessment, cumulative effects were assessed when:

- A residual effect of the Project had a demonstrable effect (measured or reasonably expected) on a biophysical or human component; and
- It was reasonably foreseeable that the residual effect of the Project would interact with the effects of past, present, or future projects or activities.

For each residual Project effect, the CEA identified if there was:

- No anticipated interaction with other projects and activities that could result in cumulative effects;
- An anticipated interaction with other projects or activities, which could result in cumulative effects and available information allowed for consideration of measurable effects;
- An anticipated interaction with other projects or activities, which could result in cumulative effects and available information did not allow for consideration of measurable effects;
- An interaction with accidents and/or malfunctions of other projects and activities that could result in cumulative effects; these effects cannot be assessed, because they are dependent on other project/activity specific practises for prevention and response to accidents and malfunctions; and
- An interaction with accidents and/or malfunctions of other projects and activities, which could result in cumulative effects. Effects cannot be assessed due to the lack of information on the status or trends in the condition of the VC over time. Potential effects are dependent on the adoption and success of regionally based adaptive management practises.

1.2.2 Temporal Boundaries

Temporal boundaries define the period analyzed within which the Project or Project activities interact with environmental or socioeconomic components. The Project's own temporal boundaries are defined by Project phase as follows:

- Pre-development or Definition Phase (nine years - 2004 to 2012);
- Construction Phase (four years - 2013 to 2016);
- Operation Phase (21 years - 2017 to 2037); and
- Closure (three years - 2038 to 2040) and Post-Closure Phase (minimum five years – 2041 to 2045).

With respect to the above temporal boundaries, the following is noted:

- The Definition Phase is inclusive of all exploration and research programs, as well as the bulk sampling program carried out in 2007 and 2008; and
- The Closure and Post-Closure Phase, the period required for decommissioning and/or removing Project infrastructure.

The CEA considers the Project's residual effects in the context of the past, present and future actions of the Project and actions by others. The temporal boundary for the CEA was chosen based on the following criteria:

- The lifespan of the Mary River Project, including the pre-development, construction, decommissioning and monitoring phases (42 years); and
- To be inclusive of the lifespan of other projects and activities, where known or reasonably foreseeable.

Industrial development in the northern Baffin Island area started in the late 1970s with the development of the Nanisivik and Polaris mines, which opened in 1976 and 1980, respectively, and were preceded by several years of mineral exploration. Therefore, the temporal boundaries selected for the cumulative effects assessment is the 75-year period from 1970 to 2045.

1.2.3 Spatial Boundaries

A CEA scoping study area was adopted for initial consideration of other projects and activities that could potentially interact with the Project's residual effects (see Figure 9-1.2). The Nunavut settlement area boundary (4,025,445 km^2) was adopted, as it represents a sufficiently large scale to be inclusive of any other project or activity that could reasonably be foreseen to interact with the Project, and it represents NIRB's administrative boundary. Shipping to and from the Raglan Mine in the Nunavik region of Quebec was also included in the CEA scope. Current and future projects and activities in this area are listed in Section 1.3.3.

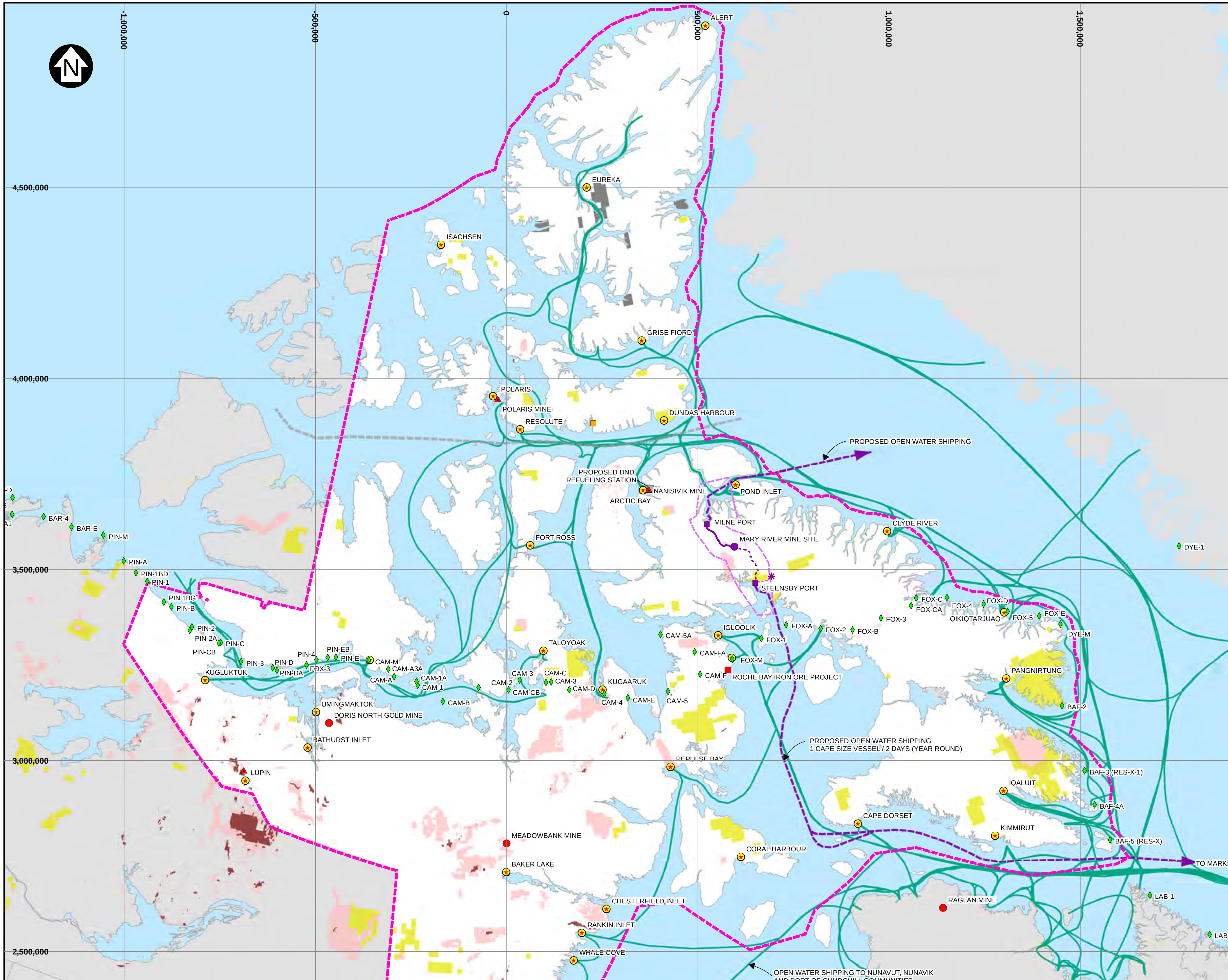
Study areas were determined on a VC-specific basis. The following describes the criteria and assumptions that were adopted for determining VC specific CEA study area boundaries.

Spatial boundaries were determined specifically for each VC on the basis of the following:

- To provide context to assess the magnitude of Project effects as well as interacting effects of other land uses;
- Overlaps with the expected ZOI likely affected by the Project;
- Conservative assumptions about the magnitude and probability of the effect;
- Adoption of an adaptive approach; and
- Large enough to allow meaningful assessment of VECs and VSECs that may be affected by the Project.

Where appropriate, they are different from (i.e., larger than) the boundaries for the corresponding residual Project effects;

- Set at a point at which potential cumulative effects become insignificant; and
- Determined based on ecological and/ or sociologically defensible rationale and/ or professional judgment.



LEGEND:

PROPOSED PROJECT COMPONENTS

GENERAL

- MARY RIVER MINE SITE
- PORT LOCATION
- SEPARATION LAKE HYDROELECTRIC PROJECT
- MILNE INLET TOTE ROAD
- RAIL ALIGNMENT FOR MARY RIVER PROJECT
- SEPARATION LAKE HYDROELECTRIC PROJECT TRANSMISSION LINE
- REGIONAL STUDY AREA USED FOR THE PROJECT IMPACT ASSESSMENT

MARINE TRANSPORATION ROUTES

- MARY RIVER PROJECT SHIPPING ROUTES

NON-PROJECT COMPONENTS

GENERAL

- COMMUNITY
- RCMP OUTPOST - HISTORIC
- PROPOSED DND REFUELING STATION
- NUNAVUT SETTLEMENT AREA BOUNDARY

MARINE TRANSPORATION ROUTES

- NORTHWEST PASSAGE
- EXISTING SHIPPING ROUTE

MINERAL EXPLORATION

- PROSPECTING PERMITS (ACTIVE)
- MINERAL CLAIM (ACTIVE)
- MINING LEASE (ACTIVE)
- MINING LEASE (PENDING)
- COAL CLAIMS (NIRB REJECTED PROJECT)

MINING

- ACTIVE MINE
- PROPOSED MINE
- DECOMMISSIONED MINE

DEW LINE FACILITIES

- DEW LINE FACILITY

NOTES:

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2. CO-ORDINATE GRID IS IN METRES. DATUM: NAD83 PROJECTION: CANADA LAMBERT CONFORMAL CONIC
3. MINING LEASE AND MINERAL CLAIM DATA PROVIDED BY THE DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT (INAC). AUGUST 2010.
4. EXISTING ARCTIC SHIPPING ROUTES OBTAINED FROM TRANSPORT CANADA, NOVEMBER, 2010. MARINE ACTIVITY DATA FOR CANADA WAS BASED ON NORDREG REPORTS AND CCG ROC CONTACTS. VESSELS NOT REPORTING TO THE VOLUNTARY NORDREG SYSTEM MAY NOT BE INCLUDED.
5. DEW LINE SITES OBTAINED FROM DEPARTMENT OF NATIONAL DEFENSE SEPTEMBER 30, 2010.
5. THIS FIGURE IS PRODUCED AT A NOMINAL SCALE OF 1:10,000,000 FOR 11x17 (TABLOID) PAPER. ACTUAL SCALE MAY DIFFER ACCORDING TO CHANGES IN PRINTER SETTINGS OR PRINTED PAPER SIZE.

SCALE 100 50 0 100 200 300 400 500 km

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

EXISTING AND FUTURE INDUSTRIAL PROJECTS AND ACTIVITIES IN NUNAVUT

Baffinland Iron Mines Corporation

REF NO.	REV
BL_Vol9_GIS_001	
FIGURE 9.1-2	0

Figure ID: BL_Vol9_GIS_001 Existing and Future Industrial Projects and Activities in Nunavut Figure 9-1-2.mxd

1.2.4 Consideration of Alternative Development Scenarios

Several alternative means of delivering the Mary River Project were considered by Baffinland in the alternatives analysis (Volume 3, Section 6) as follows:

- Production rate - of greater, less than or equal to the proposed production rate of 18 Mt/a, which would not meaningfully affect the conclusions of the cumulative effects assessment;
- Power supply - the potential to induce the development of the potential hydro-electric scheme at Separation Lake, to supply power to the Project - evaluated in Section 1.3.2.16;
- Port location - no other port location was deemed viable in the alternatives analysis, so the cumulative effects of alternate port locations was not evaluated;
- Ore transport method - ore could potentially be transported to Steensby Port by truck;
- Railway routing to Steensby Port – five overland routes from the Mine Site to Steensby Port were evaluated and, while the selected route was identified to have fewer effects to the environment, none of the alignments are substantially different such that an evaluation of the cumulative effects of these scenarios is useful or meaningful; and
- Alternatives to year-round shipping - including open-water shipping only and/or decreasing the production rate - has been assessed with the use of year-round shipping via the Railway and Steensby Port and with open water shipping at a lower production rate via Milne Port.

Additionally, alternative development scenarios could include the mining of other iron ore deposits owned by Baffinland. These scenarios are described in Section 1.3.2.5.

1.2.5 Ranking of Cumulative Effects

The significance of cumulative effects uses the same evaluation criteria applied elsewhere in the EIS, as described in Volume 2, Section 3. This includes an effect's magnitude, duration, frequency, extent and reversibility and consideration of the significance determination in the original assessment for each VC.

1.2.6 Cumulative Effects of Accidents and Malfunctions and other Projects

Project related accidents and malfunctions are considered in the Project residual effects analysis (Section 3). There is no systematic inventory of historical accidents and malfunctions from other projects that could interact with the Mary River Project, so consequently it is not possible to quantitatively assess the potential contribution of cumulative effects from other project accidents and malfunctions. Although no residual effects from accidents and malfunctions are anticipated, the CEA considers the possibility of cumulative effects from accidents and malfunctions from shipping activities (Section 1.4.4).

The CEA also considers cumulative effects of potential environmental effects generated from an array of existing and proposed projects in Nunavut. Sources of uncertainty include imperfect knowledge of the scope of planned or proposed projects, potential changes and modifications to existing and planned projects and their interactions with shared environmental and social receptors. Therefore, the complexity associated with other projects scope and scale, and the inherent uncertainties associated with predicting future events and activities are greater in cumulative effects assessments. For example, project effects associated with existing mining operations (Meadowbank, Doris North, and, Raglan) are quantifiable, whereas potential effects from project under development (Roche Bay, Meliadine, and, Kiggavik) are less certain. As these planned projects evolve, more information on potential interactions will be available and the uncertainties with the cumulative effects predictions may in some instances be reduced or increased. Adaptive management and the use of information generated by regional institutions can assist in reducing uncertainties.

1.2.7 Adaptive Management

Baffinland has committed to mitigation, environmental management, adoption of best management practices, and monitoring in order to:

- Avoid, eliminate, or reduce adverse potential environmental effects of the Project, including cumulative effects;
- Verify the effectiveness of mitigation;
- Confirm effects predictions, including cumulative effects; and
- Contribute to a better understanding of the effects of mine development in Arctic regions and of potential cumulative effects in the North Baffin Region.

The data obtained through monitoring will help the proponent to continually improve the environmental management and environmental effects prediction. However, while Baffinland can manage effects of the Project, management of cumulative effects requires a coordinated, multi-stakeholder approach that focuses on managing specific effects on specific resources. In the absence of adequate data and jurisdiction for determining and managing cumulative effects, the best response to cumulative effects is adaptive management using coordinated information-sharing and feedback loops to reduce risk and increase the success of management actions. Baffinland has agreed to contribute data, where reasonable or possible, to the Nunavut General Monitoring Program with the objective of contributing to the knowledge base of changes to the long-term state and health of Nunavut.

Currently in development, the Nunavut General Monitoring Program (NGMP) is a regionally based monitoring program being developed as a requirement of the Nunavut Land Claims Agreement. The objective of the NGMP is to identify changes in the long-term state and health of Nunavut, identifying changes in the environment. The NGMP is being developed jointly by Nunavut Tunngavik Incorporated (NTI), the Government of Nunavut (GN), AANDC, Aboriginal Affairs and Northern Development Canada (formerly Indian and Northern Affairs Canada - INAC) and the Nunavut Planning Commission (NPC). With the intention of contributing to the avoidance and/or mitigation of negative cumulative effects in Nunavut, Baffinland is committed to contribute to the NGMP by sharing data used in the preparation of the EIS.

1.3 SCOPE

1.3.1 Project Components

Project components included in the assessment of cumulative effects include:

- Milne Port;
- Milne Inlet Tote Road;
- Mine Site;
- Railway;
- Steensby Port;
- Marine Shipping Routes within the Nunavut Settlement Area; and
- Accidents and Malfunctions.

Details of all the Project components are included in Volume 3.

1.3.2 Other Projects and Activities of Consideration

Projects and activities located within the CEA scoping area are shown on Figure 9-1.2. Other projects were identified as either certain or reasonably foreseeable based on the following definitions:

- **Certain:** Either the project or activity exists already or there is a high probability that it will proceed. This includes past and ongoing projects and activities as evidenced by existing disturbance areas and facilities, current land use tenures and activities, and documented land use.
- **Reasonably foreseeable:** There is some uncertainty about whether the action or project may proceed. NIRB (2009) defines reasonably foreseeable projects as those that are currently under regulatory review, or that will be submitted for regulatory review in the near future, as determined by the existence of a proposed project description, of letter of intent, or any regulatory application filed with an authorizing agency.
- **Induced:** Projects and/or activities that are more likely to occur if the Project proceeds.

Obtaining sufficient data for meaningful analysis is a challenge in evaluating the interactions of current and future projects and activities. Since future projects and activities are sometimes only conceptual, without formalized development plans, potential effects of many of these projects could not be accurately determined.

Other projects and activities were identified from stakeholder input, land use plans, government plans and published development plans for Nunavut. Other projects and activities that were considered for the potential to interact with Project VCs identified in the residual effects assessment include:

- Baffinland's previous exploration and bulk sampling programs;
- Baffinland's proposed monitoring programs concurrent with the Project;
- Mining and mineral exploration activities;
- Operating mines;
- Decommissioned mines;
- Induced mining projects;
- Marine transport/ shipping;
- Naval refuelling station;
- DEW-line decommissioning;
- Air transport;
- Military exercises;
- Traditional and recreational hunting, fishing and foraging;
- Communities;
- Tourism and commercial recreation activities;
- Hydroelectric facilities; and
- Climate change.

The following provides a description of other projects and activities and an evaluation of their potential to overlap with the Project's residual effects. Where there was a high degree of confidence that the other project or activity would not interact with any residual effects of the Project, it was removed from further consideration.

1.3.2.1 Baffinland's Exploration and Bulk Sampling Programs

The following summarizes the scope of Baffinland's activities in the region since 2004:

- Exploration started in 2004 with the establishment of an exploration camp at Mary River and drilling of Deposit No. 1;
- Drilling extended to adjacent Deposits No. 2 and 3 in 2007;
- A bulk sampling program was undertaken in 2007 and 2008, involving the mining of 113,000 t of iron ore, upgrade of the Milne Inlet Tote Road to all-season capability, establishment of camp and ship-loading facilities at Milne Port and shipment of supplies and ore in and out of Milne Port;
- Geotechnical investigations at Project development sites and along the Railway (helicopter-supported drilling program) over 2007 and 2008;
- Comprehensive environmental baseline studies from 2005 through 2008, including terrestrial and marine aerial surveys for wildlife; and
- Regional exploration programs, operation of established camp facilities, road maintenance and environmental monitoring programs in 2009 and 2010.

These programs were screened by NIRB and carried out in compliance with regulations and land use permits, water licences and other approvals. These activities are considered in the assessment.

1.3.2.2 Baffinland's Monitoring Programs Concurrent with the Project

The following summarizes the scope of Baffinland's proposed monitoring programs during the life of the Project:

- Socio-economic monitoring, consisting mainly of collection of human resources data;
- Ongoing stakeholder engagement, including meetings, updates and notifications, etc.;
- Ongoing operation of meteorological stations at each of the three development areas;
- Air quality and noise monitoring during the first few years of Operations to validate impact predictions - will include the installation and operation of equipment to monitor air, dustfall and noise levels in the vicinity of Project sites;
- Establishment of soil and vegetation sample plots in the vicinity of Project development sites;
- Monitoring of cliff-nesting raptors in relation to railway construction during construction and operation;
- Ongoing baseline research on seabirds;
- Periodic baseline contributions to shorebird monitoring (e.g., PRISM plots);
- Ground-based observational surveys of caribou along the Railway to observe trail use and behaviour in relation to these linear features;
- Logging wildlife sightings;
- A potential wildlife harvest study, including caribou and marine mammals;
- Ongoing operation of stream gauging stations around the Mine Site;

- Ongoing water, sediment quality and fish habitat monitoring in fulfilment of water licence, environmental effects monitoring and *Fisheries Act* authorization requirements; and
- A variety of marine monitoring programs to be conducted early in the Project life, including acoustic measurements of ore carriers, aerial marine surveys in Hudson Strait, and ship-board Inuit wildlife observers.

The monitoring program has been designed to be as non-intrusive as possible. For example, a hunter-harvest study is proposed in lieu of caribou aerial surveys (although Baffinland may contribute to a Government of Nunavut-led caribou collaring or other monitoring program) and bird and marine mammal aerial surveys will be carried out early during the Project life and will be either discontinued or reduced in frequency as the Project advances. These activities are considered in the assessment.

1.3.2.3 Designated Areas

Designated areas include parks, reserves and wildlife sanctuaries. Figure 9-1.3 illustrates designated areas in the Nunavut Settlement Area. The two most relevant to the assessment, based on proximity and size, include Sirmilik National Park and the Bylot Island Migratory Bird Sanctuary.

Sirmilik National Park

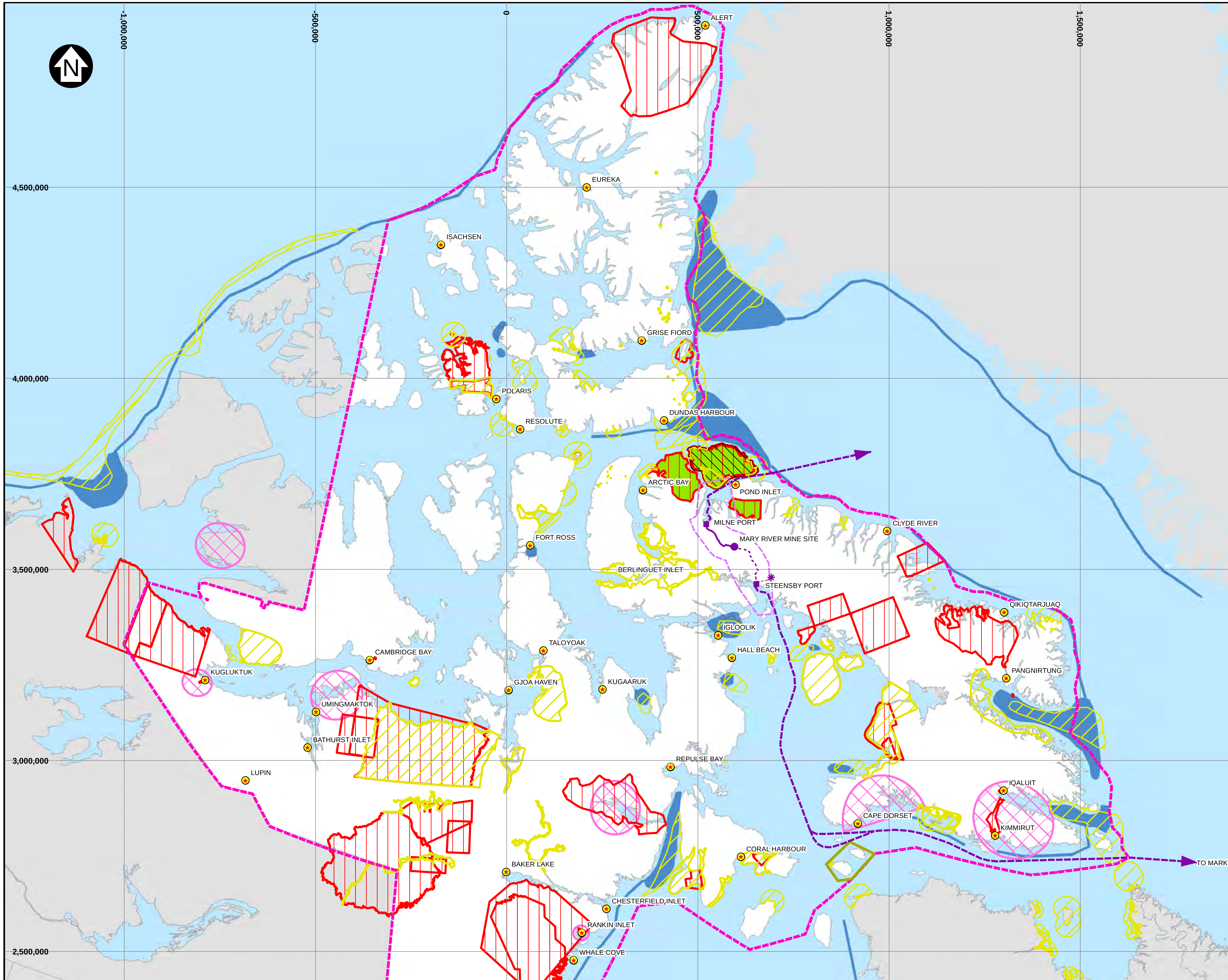
Established in 2001, the park is bordered by Lancaster Sound and Baffin Bay to the north and east, Admiralty and Elwin Inlets to the west, and Pond Inlet and Eclipse Sound to the south. The nearest community is Pond Inlet, located south of Bylot Island. The park is distinguished for its natural and cultural heritage, including sea bird colonies, whales, polar bears and archaeological sites. Activities include tourist visits to experience the ecology and remoteness of the area, mainly between May and September, and involve backcountry camping, ski touring, wildlife viewing and boating.

Bylot Island Migratory Bird Sanctuary

Federally designated in 1965, the Bylot Island Migratory Bird Sanctuary is classified as a Category IV Habitat Species Management Area by the International Union for the Conservation of Nature (IUCN).

Located within the boundaries of Sirmilik National Park, the 12,635 km^2 bird sanctuary provides habitat for large populations of Thick-billed murres, Black-legged Kittiwakes and Greater Snow Geese. Of the total area, 1,500 km^2 is a marine zone with intertidal and sub-tidal components. Associated with the sanctuary is a seasonally used goose research station.

These designated areas were not carried forth into the assessment because of limited activities associated with the areas. Tourism-related shipping is included and is described below.



LEGEND:

PROPOSED PROJECT COMPONENTS

GENERAL

- MARY RIVER MINE SITE
- PORT LOCATION
- SEPARATION LAKE HYDROELECTRIC PROJECT
- MILNE INLET TOTE ROAD
- RAIL ALIGNMENT FOR MARY RIVER PROJECT
- SEPARATION LAKE HYDROELECTRIC PROJECT TRANSMISSION LINE
- REGIONAL STUDY AREA USED FOR THE PROJECT IMPACT ASSESSMENT

MARINE TRANSPORATION ROUTES

- MARY RIVER PROJECT SHIPPING ROUTES

NON-PROJECT COMPONENTS

GENERAL

- COMMUNITY
- NUNAVUT SETTLEMENT AREA BOUNDARY
- SHORE LEAD
- POLYNYAS

SPECIAL MANAGEMENT AREA

- AREA OF EQUAL USE AND OCCUPANCY NUNAVUT AND NUNAVIK
- BYLOT ISLAND BIRD SANCTUARY
- SIRMILIK NATIONAL PARK
- IMPORTANT TERRESTRIAL AND MARINE BIRD HABITAT
- CRITICAL WILDLIFE AREA
- WILDLIFE AREA OF SPECIAL INTEREST (GYRFALCON & PEREGRINE FALCON)

NOTES:

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2. CO-ORDINATE GRID IS IN METRES. DATUM: NAD83 PROJECTION: CANADA LAMBERT CONFORMAL CONIC
3. CONSERVATION FEATURES PROVIDED BY THE GOVERNMENT OF NUNAVUT (2006) AND PARKS CANADA (2006).
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SCALE 100 50 0 100 200 300 400 500 km

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

SPECIAL MANAGEMENT AREAS

Baffinland Iron Mines Corporation

REF NO. BL_Vol9_GIS_002

FIGURE 9.1-3

REV 0

Figure ID: BL_Vol9_GIS_002 Special Management Areas Figure 9-1-3.mxd

1.3.2.4 Mining and Mineral Exploration Activities

There are several companies and individuals prospecting and holding active mineral claims within a 100 km radius of the proposed Mary River Project as illustrated in Figure 9-1.2. These companies include:

- Prospecting permits (active):
  - Mark Raguz.
- Mineral claims (active):
  - 569514 Alberta Ltd.
  - BHP Billiton Diamonds Inc.
  - Ray - Dor Resources Ltd.
  - De Beers Canada Inc.
  - Diamonds North Resources Ltd.

Prospecting and exploration activities are often intermittent and unpredictable. Claims may be visited one year and then not again for decades. The sites identified in proximity to the Mary River Project are not known to have camps established. Exploration in this region, by Baffinland as well as others has taken place and can be expected to continue into the future.

Included for Consideration in the CEA: Yes

Although limited information is available on previous and existing exploration activities, this activity has been included in the assessment in a qualitative way.

1.3.2.5 Operating Mines

Raglan Mine at Deception Bay (Xstrata Nickel)

The Raglan Mine is a large nickel/copper mine in the Nunavik region of northern Quebec, approximately 100 km south of Deception Bay. It has an airport 22 km from the mine site and a gravel road leading from the mine site to the seaport at Deception Bay. The mine began production in 1997 and has an anticipated mine life of 30+ years. It produces 1.3 million tonnes of ore annually from three underground mines and two open-pit operations. Xstrata is looking to increase production to 2.0 million tonnes per year by 2013. The site does not connect to any community, so workers are flown in from local communities or from the south (Ville de Rouyn-Noranda, Quebec) and housed on-site. Concentrate is shipped from Deception Bay to Quebec City and shipped by rail to Xstrata's smelting facility in Falconbridge, Ontario. Once smelted, the concentrate is sent back to Quebec City by rail and shipped to Norway to be refined.

Shipping of concentrate and supplies is carried out year-round. Seven or eight trips are made annually, with five or six trips in the ice-free season and two trips between January and March. Inbound trips bring supplies (including petroleum products) and outbound trips carry nickel concentrate.

Included for Consideration in the CEA: Yes

Shipping activities (including icebreaking) associated with the Raglan Mine overlap with the Project's plans to ship through Hudson Strait, and were therefore considered to have the potential for cumulative effects to marine wildlife. An increase in shipping frequency of 67 % above the current shipping traffic was applied to consider the planned increase in production mentioned above, increasing the number of trips to 13 annually, including three to four each winter between January and March.

Doris North Mine (Newmont Mining Corp.)

The Doris North Mine is located 75 km northeast of Umingmaktok and 5 km south of Roberts Bay in the Hope Bay gold belt. The project consists of an underground mine, fuel storage facility, camp, access road, airstrip, tailings management facility, barge landing facility, and a modular portable mill and processing plant.

The Doris North Mine Project was approved by NIRB and underground mining was anticipated to commence in the fall of 2010, but Newmont has elected to postpone mining to focus on an expanded exploration program. There are 230 workers on-site, with 400 anticipated for full operation.

Mine life is permitted for 2.5 years, though work is underway to expand the current mine and prolong its life to 2016 (project extension proposal anticipated to be submitted to NIRB in the near future). In addition, Newmont is exploring the development of the neighbouring Madrid and Boston properties (see "induced projects" in Section 1.3.2.7). Newmont has indicated that they plan to have the second phase operational by 2014, with mining operations extended to 2029.

Doris North is anticipated to contribute one tug and up to five barges each year for the two years the mine is proposed to be in operation. All shipping will take place during the open-water season and within the West Kitikmeot Region of Nunavut, with no overlap of shipping activities with the Mary River Project.

Affected communities, those near the Project and from which employment is targeted, are all located within the West Kitikmeot Region of Nunavut.

Included for Consideration in the CEA: No

The Doris North Mine is located over 1,000 km from the Project with no overlapping shipping routes and is not expected to interact with residual effects from the Mary River Project. The Doris North Mine was not included in the CEA.

Meadowbank Mine (Agnico-Eagle Mines Ltd.)

The Meadowbank Mine is located approximately 100 km north of Baker Lake in Nunavut's Kivalliq region. The open pit gold mine, opened in 2010, is expected to produce about 300,000 ounces of gold annually through 2019. The site is accessed via Baker Lake, which provides summer shipping through Hudson Strait. Supplies for construction and operations are shipped to Baker Lake from late July to early October. Most ship traffic consists of shallow-draft tug and barge operations and small vessels.

Kivalliq Region communities have been AEM's focus for employment, and the socio-economic zone of influence is confined mainly to the Kivalliq Region of Nunavut. Given the project's physical location, it is not expected to have land-based or socio-economic cumulative effects with the Mary River Project; its potential overlap with the Mary River Project is expected to be related to shipping through Hudson Strait.

Included for Consideration in the CEA: Yes

Shipping activities associated with the Meadowbank mine overlap with the Project's plans to ship through Hudson Strait and were therefore considered to have the potential for cumulative effects to marine wildlife.

For this assessment, it has been assumed that AEM uses up to two resupply vessels per year through Hudson Strait, until the projected end of operations in 2019.

1.3.2.6 Reasonably Foreseeable Future Mines

Roche Point Iron Ore Project (Roche Bay PLC/Advanced Explorations Inc.)

The Roche Point Iron Ore Project, located 60 km south of Hall Beach on the Melville Peninsula, is a disclosed project in advanced stages of exploration, yet to enter into the NIRB review process. The potential for a project was first identified in 1965. Between 1975 and 1985, 3,000 m of exploratory drilling was undertaken, a feasibility study was carried out and an airstrip was built. Economic uncertainty caused the project to lie dormant until 1997, when Roche Bay PLC assumed ownership. Exploratory drilling did not resume until 2007. The company and its joint venture operator Advanced Explorations Inc. (AEI) control four mineral leases, containing five mineralized zones with a 20 km strike length. A preliminary economic assessment (PEA) report, issued on June 10, 2009, contemplated an open-pit mine with a production rate of 5 Mt/a and a pelletizing plant that would process 1 Mt/a of iron nuggets annually for a 20-year period (Met-Chem Canada Inc., 2010). The capital cost was estimated at $1.11 billon. The PEA report does not outline definitive shipping plans, but acknowledges the need to ship 1 Mt of pellets each year and the likely necessity of year-round shipping, most likely to the Port of Churchill, Manitoba, to supply the American steel industry. Europe was identified as a possible second market.

A feasibility study was recommended in the PEA, although AEI has not yet announced commencement of such a study. A review of the public registry indicates that no application for mine development had been submitted to NIRB in 2010. However, NIRB (2009) indicated that the Roche Bay Project may be a reasonably foreseeable project for this CEA.

Given the project's physical location, the Point Riche project is not expected to have land-based cumulative effects with the Mary River Project; its potential overlap with the Mary River Project is expected to be related to shipping through southern Foxe Basin and Hudson Strait, and likely overlap of socio-economic influence as the project is located in the Baffin Region.

Included for Consideration in the CEA: Yes

As specified in NIRB's Guidelines, and as it is a reasonably foreseeable project, the Roche Point Iron Ore Project was considered in the CEA. It has been assumed that 1 Mt/a of iron nuggets are shipped year-round from the Roche Bay project site south of Hall Beach, through the south of Foxe Basin and across Hudson Bay to the Port of Churchill, using Panamax sized ships of approximately 50,000 DWT. This would necessitate approximately 20 voyages per year for shipment of ore (roughly one ship every 2 to 3 weeks), plus annual resupply during open water (assumed to be 4 ships per year). The Roche Bay shipping will pass through the southern portion of Foxe Basin and western Hudson Strait into Hudson Bay. Based on the absence of a Project Proposal filed with NIRB, it has been assumed in this assessment that the Roche Bay project will start construction in 2016 and will operate from 2019 through 2039.

Kiggavik Project (AREVA Resources Inc.)

The Kiggavik Project is a proposed uranium mining and milling project near Baker Lake. AREVA submitted its Project Proposal in November 2008 and the project is currently in a Part 5 environmental review. AREVA submitted its DEIS to NIRB in December 2011.

The Project Proposal states that all project-related shipping will originate from Churchill, Manitoba.

Included for Consideration in the CEA: No

While the Kiggavik Project qualifies as a reasonably foreseeable project, there is no overlap of activities that may result in cumulative effects.

Meliadine Project (Agnico-Eagle Mines Ltd.)

The Meliadine Project is a proposed gold mine near Rankin Inlet. Agnico-Eagle (owner-operator of the Meadowbank Gold Mine near Baker Lake) submitted its Project Proposal in April 2011, and in September 2011 NIRB announced that the Minister of Aboriginal Affairs and Northern Development Canada (AANDC) had designated the project for a Part 5 review by NIRB. The land-based portion of the Project is entirely within the Kivalliq Region and the socio-economic zone of influence is stated to be the communities adjacent to the Project. The established harbour at Itivia (Rankin Inlet) is expected to receive barge traffic of supplies from either Churchill, Manitoba, or Canada's eastern ports during the open-water season (AEM, 2011). The level of traffic associated with the project is not known but can be expected to be much higher during the 3-year construction phase and reduced during the operating phase.

Given Meliadine's physical location, it is not expected to have land-based or socio-economic cumulative effects with the Mary River Project; its potential overlap with the Mary River Project is expected to be related to shipping through Hudson Strait.

Included for Consideration in the CEA: Yes

The Meliadine Project may involve shipping from Canada's east coast, which may overlap with shipping associated with the Mary River Project through Hudson Strait. The frequency of shipping is unknown, so for the purpose of this assessment the dates and frequency of shipping has been assumed to be four ships each open water season from 2013 through 2015 (the assumed construction phase) and two ships per year through the estimated 10-year operation phase (2016 through 2025).

Bathurst Port and Road Project (Bathurst Inlet Port and Road Joint Venture)

The Bathurst Inlet Port and Road (BIPR) Project consists of a port on Bathurst Inlet in the Kitikmeot Region, a new 211 km all-weather road connecting to the existing Tibbitt to Contwoyto Winter Road (TCWR) at Contwoyto Lake. The project is proposed to resupply local communities in the region and to facilitate mineral exploration and development projects in the region.

While a Part 5 environmental review by NIRB had progressed with a DEIS submitted in December 2007, the proponent suspended the review in mid-2008 and on July 7, 2011, announced to NIRB that it would no longer be re-engaging the NIRB review of the project.

Included for Consideration in the CEA: No

The BIPR Project does not qualify as a reasonably foreseeable project, given that the proponent has announced its intent not to re-engage the environmental review process.

High Lake Project (MMG Canada Inc.)

The High Lake Project is a proposed polymetallic mine (copper, zinc, gold and silver), with an associated road and new port at Grey's Bay, west of Bathurst Inlet, in the Kitikmeot Region. The original proponent, Wolfden Resources, submitted its Project Proposal in late 2006; this was later accepted by NIRB as its DEIS. The project has changed ownership through a series of corporate mergers and take-overs. The most recent correspondence on NIRB's Public Registry is a letter dated May 18, 2011, from NIRB to the current owner, Minerals and Metals Group (MMG), requesting the company provide a comprehensive project update to NIRB by January 6, 2012, in order to re-engage the review of the Project.

Given this project's physical location, it is not expected to have land-based or socio-economic cumulative effects with the Mary River Project; its potential overlap is expected to be related to shipping through Lancaster Sound and Baffin Bay. Two shipping routes were described and considered in the Project Proposal, one of which would involve shipping through Lancaster Sound and Baffin Bay, though the proponent indicated that a preferred route had not been selected.

Included for Consideration in the CEA: No

While the High Lake Project qualifies as a reasonably foreseeable project according to NIRB's definition (existence of a filed Project Proposal), the proposal no longer appears to be current. Further, the scope of the High Lake Project is similar to that of the BIPR Project, and it is understood the MMG is now considering focusing its attention on its IZOK lake project before High Lake.

Hackett River Project (Sabina Silver and Gold Inc.)

The Hackett River Project is a proposed silver mine near Bathurst Inlet in the Kitikmeot Region of Nunavut. Sabina Silver and Gold Inc. (Sabina) submitted a Project Proposal in January 2008, and in September 2008 the AANDC Minister referred the project to a Part 5 review by NIRB. A DEIS for the project has not been submitted to date.

The Project Proposal described a project that would rely on the proposed BIPR Project for road and port infrastructure; the company stated that, should the BIPR Project not proceed, it would construct its own road and a port at Bathurst Inlet. Given that the BIPR Project is no longer advancing, presumably the Hackett River Project will require its own port and road facilities. The Project Proposal describes concentrate to be shipped out by 50,000 DWT ice-class bulk carriers, with a total of 10 trips between August and mid-October. The ice-class bulk carriers will transfer their cargoes to other vessels at a terminal in Greenland for delivery to the final destination, smelters in Europe or North America (Sabina, 2008).

Included for Consideration in the CEA: Yes

While the Hackett River Project qualifies as a reasonably foreseeable project according to NIRB's definition (existence of a filed Project Proposal) and the file with NIRB remains active even though a DEIS has not yet been submitted.

Given the project's physical location, it is not expected to have land-based or socio-economic cumulative effects with the Mary River Project; its potential overlap is expected to be related to shipping through Lancaster Sound and Baffin Bay, and it will presumably add to the shipping traffic associated with the BIPR Project. For the CEA, it has been assumed that ten ships a year over a 3-year construction and 14-year operation phase would pass through Lancaster Sound. The start-up date for the project has been assumed to be 2015; this is considered the earliest the project would start given a DEIS has not yet been filed with NIRB.

Nunavik Nickel Project (Jien Mining Canada Inc.)

The Nunavik Nickel Project is proposed at Deception Bay in Nunavik (northern Quebec) near the current operating Raglan Mine. The project completed an environmental assessment in 2008, but construction has not started.

Given the project's physical location, it is not expected to have land-based or socio-economic cumulative effects with the Mary River Project; its potential overlap is expected to be related to shipping through Hudson Strait, with potential overlapping effects to marine mammals and marine mammal harvesting.

Included for Consideration in the CEA: Yes

Baffinland was not able to locate a description of this project. It is anticipated that the Nunavik Nickel Project will require a similar intensity of shipping as the initial Raglan Mine, which included shipment of concentrate approximately three to four times per year and annual resupply during the open water season. The start-up date for the project has been assumed to be 2015, in the absence of any additional information.

1.3.2.7 Induced Developments

Mary River Project: Deposits No. 2 through 9

This EIS is focused on the development of Deposit No. 1, which has been the subject to a positive feasibility study. Potential exists in the future for the current Project to be extended by increasing mine life and/or production rate and developing additional deposits. Since the 1960s, Deposit No. 1 was one of four known high-grade iron ore deposits (Deposits No. 1 through 4). In the past two years, Baffinland's regional exploration program has identified an additional five deposits (Deposits No. 5 to 9); locations are shown on Figure 3-1.2 in Volume 3. Exploration of these additional deposits to date has consisted of preliminary drilling at Deposits No. 4 and 5 in 2010 and surface sampling of the remaining deposits. Their viability to support mining has not yet been proven.

Deposits No. 2 and 3 are located within the Mary River watershed upstream of Deposit No. 1. Due to the close proximity to the proposed mining infrastructure of Deposit No. 1, little additional infrastructure would be required. If Deposits No. 2 and 3 were mined concurrent with Deposit No. 1, additional material handling and stockpiling infrastructure would be required at the Mine Site. More trains would move the additional ore to Steensby Port or Milne Port, and more material handling infrastructure (i.e., stockpiles, rail unloading equipment, conveyors and ship loading equipment) would be required at one or both ports, as appropriate. Additional vessel traffic would be needed to ship the additional ore to market.

Drilling at Deposits No. 4 and 5 commenced in 2010. Ore from these deposits, if developed, could be transported to Milne Port over the Milne Inlet Tote Road, which is close by, or could be accessed by an approximately 25-km railway spur from the Mine Site. New mining infrastructure would be required, as would additional material handling and shipping at one or both ports, as described above.

Deposits No. 6 through 9 were discovered in 2010 and have been sampled at surface only. These deposits are located within tens of kilometres (up to 50 km) of either the Mine Site or the Railway.

Mine infrastructure developed for Deposit No. 1 can be expected to improve the prospects of developing a portion of these ore bodies, all of them, or potentially yet unidentified iron ore deposits. It should be emphasized that, despite the existing infrastructure, development of any or all of these deposits within the temporal boundaries of this assessment is not a foregone conclusion. Strictly speaking, they do not meet the definition of "reasonably foreseeable projects".

Included for Consideration in the CEA: Yes

Baffinland has assumed that development of additional deposits would practically involve an approximate doubling of production output over the temporal scale of the assessment, through the development of one or two additional deposits. It is considered highly unlikely that more than this would be developed before the end of life of the current Project, based on a capital outlay required within this timeframe, the number of additional ships that would be required to transport this ore, and ore throughput capacity limitations at the Steensby port. Finally, there is only so much capacity in the market for additional iron ore.

Establishment of shipping activities for the Mary River Project is not expected to induce the use of the same shipping corridors for other projects. It may assist with a better operational understanding of commercial icebreaking at this level, which could lead to more of this activity occurring in the future in this part of the Arctic and elsewhere.

Madrid and Boston Properties (Newmont Mining Corp.)

The Madrid and Boston properties, part of the Hope Bay gold belt, were acquired by Newmont Mining Corporation in early 2008. They represent a reasonably foreseeable extension of the Doris North property, which will be operational in 2011. These properties continue to undergo advanced exploration, but have yet to enter into the permitting process.

Included for Consideration in the CEA: No

The Doris North mine is not anticipated to interact with residual effects from the Mary River Project, and was therefore not included in the evaluation, so by extension these potential extensions of the Doris North Project have also not been included.

1.3.2.8 Decommissioned Mines

Polaris Mine (Cominco) 1980-2002

Located 96 km north of the community of Resolute, the Polaris zinc mine was an underground mine on Little Cornwallis Island, over 600 km from the Mary River Project. It was approved for development in 1979 and closed in July 2002. Clean-up of the site occurred over two years, with environmental monitoring commitments extending to 2011.

Included for Consideration in the CEA: Yes

As specified in NIRB's Guidelines, the decommissioned Polaris mine has been considered for potential historic overlaps in shipping through Lancaster Sound and Baffin Bay.

Nanisivik Mine (Breakwater Resources) 1976-2002

The Nanisivik Mine is a decommissioned zinc-lead mine near Arctic Bay; it closed because of low metal prices and declining resources. Mine reclamation started in April 2003 and is on-going. Remaining facilities include an airport 7 km southwest of the mine, still in operation as the main airport for Arctic Bay, and a port and dock 2.7 km north of the mine, currently used by the Canadian Coast Guard for training. The dock is being considered by the federal government for use as a naval refuelling station for Arctic offshore patrol ships, as described in Section 1.3.3.8.

Included for Consideration in the CEA: Yes

As specified in NIRB's Guidelines, the decommissioned Nanisivik mine has been considered for potential historic overlaps in shipping through Lancaster Sound and Baffin Bay, and with respect to potential historic effects to caribou.

Jericho Mine (Shear Minerals Ltd.) 2006-2008

The Jericho mine, 420 km northeast of Yellowknife, was Nunavut's first and only diamond mine. Operations were suspended in 2008 as a result of financial losses caused by operational difficulties, the high value of the Canadian dollar, high oil prices and the short operating season of the ice road. Shear Diamonds (Nunavut) Corp purchased the mine from the original owner (Tahera Diamond Corp.) in July 2010. A Type A water licence was issued by the Nunavut Water Board in December, 2011, for the re-commissioning, operation and ultimate reclamation of the project

Included for consideration in the CEA: No

Shear Minerals intends to initiate processing of the recovery reject pile in 2012; however, no interactions are be anticipated.

1.3.2.9 Shipping

General

Shipping within the CEA study area (the Nunavut Settlement Area) generally consists of the following:

- Annual resupply of fuel and dry cargo to communities and industrial outposts (mines and exploration projects) during the open-water shipping season;
- Transport of goods to and from the Port of Churchill, through Hudson Strait, during the open-water shipping season;
- Transport of ore concentrate from operating mines (historic, current and reasonably foreseeable), in open water and through ice;
- Government icebreaking exercises;
- Canadian military exercises; and
- Limited transit of commercial and recreational vessels through the Northwest Passage.

Primary shipping lanes within and peripheral to the study area are shown on Figure 9-1.2. Marine transport and shipping records for Eclipse Sound, Baffin Bay, Foxe Basin and Hudson Strait from 2002 to 2010, from the Canadian Coast Guard Marine Communications and Traffic Services Program (INNAV), were obtained from Xpert Solutions Technologiques (2010) and are presented in Table 9-1.1.

Shipping Lanes with the Potential to Interact with the Project

Hudson Strait

- Open-water shipping occurs through Hudson Strait to access Igloolik, Hall Beach, Cape Dorset, Kimmirut, the seven communities in the Kivalliq Region of Nunavut along the west coast of Hudson Strait, Nunavik communities in Northern Quebec, and the Port of Churchill. Most of this traffic occurs during the open-water season approximately July through November (Table 9-1.1). During the open-water season for the 9-year period of 2002 through 2010, an average of 187 ships reported being within Quebec waters of Hudson Strait. Another 108 ships reported being in Nunavut waters of Hudson Strait, although it is expected that there is overlap with these two numbers, where the same ships have passed through Nunavut and Quebec waters during the same voyage.

Table 9-1.1 Current Levels of Shipping in the Eastern Arctic (2002-2010)

AREA	SUB AREA	January			February			March		
		Min	Max	Average	Min	Max	Average	Min	Max	Average
Eclipse Sound	Tay Sound	2	2	2	na	na	na	1	1	1
Eclipse Sound	White Bay	2	2	2	na	na	na	1	1	1
Eclipse Sound	Eskimo Inlet	2	2	2	na	na	na	1	1	1
Eclipse Sound	Milne Inlet	2	2	2	na	na	na	1	1	1
Eclipse Sound	Tremblay Sound	2	2	2	na	na	na	1	1	1
Eclipse Sound	Koluktoo Bay	2	2	2	na	na	na	1	1	1
Eclipse Sound	Eclipse Sound	2	2	2	na	na	na	1	1	1
Foxe Basin	Steensby Inlet	2	2	2	na	na	na	1	1	1
Foxe Basin	NW Foxe Basin	2	2	2	na	na	na	1	1	1
Foxe Basin	NE Foxe Basin	2	2	2	na	na	na	1	1	1
Foxe Basin	E Foxe Basin	2	2	2	na	na	na	1	1	1
Foxe Basin	SE Foxe Basin	2	2	2	na	na	na	1	1	1
Foxe Basin	SW Foxe Basin	2	2	2	na	na	na	1	1	1
Frobisher Bay	Frobisher Bay	2	2	2	na	na	na	1	1	1
Hudson Strait	Hudson Strait QC	1	3	2	1	1	1	1	2	1
Hudson Strait	Ungava Bay	2	2	2	na	na	na	1	1	1
Hudson Strait	Hudson Strait NU	1	3	2	1	1	1	1	2	1
Hudson Bay	Hudson Bay	2	2	2	na	na	na	1	1	1
Baffin Bay	Baffin Bay	2	2	2	na	na	na	1	1	1
Lancaster Sound	Lancaster Sound	2	2	2	na	na	na	1	1	1
Eclipse Sound	Navy Board Inlet	2	2	2	na	na	na	1	1	1

Table 9-1.1 Current Levels of Shipping in the Eastern Arctic (2002-2010) (Cont'd)

AREA	SUB AREA	April			May			June		
		Min	Max	Average	Min	Max	Average	Min	Max	Average
Eclipse Sound	Tay Sound	1	2	2	3	3	3	2	2	2
Eclipse Sound	White Bay	1	2	2	3	3	3	2	2	2
Eclipse Sound	Eskimo Inlet	1	2	2	3	3	3	2	2	2
Eclipse Sound	Milne Inlet	1	2	2	3	3	3	2	2	2
Eclipse Sound	Tremblay Sound	1	2	2	3	3	3	2	2	2
Eclipse Sound	Koluktoo Bay	1	2	2	3	3	3	2	2	2
Eclipse Sound	Eclipse Sound	1	2	2	3	3	3	2	2	2
Foxe Basin	Steensby Inlet	1	2	2	3	3	3	2	2	2
Foxe Basin	NW Foxe Basin	1	2	2	3	3	3	2	2	2
Foxe Basin	NE Foxe Basin	1	2	2	3	3	3	2	2	2
Foxe Basin	E Foxe Basin	1	2	2	3	3	3	2	2	2
Foxe Basin	SE Foxe Basin	1	2	2	3	3	3	2	2	2
Foxe Basin	SW Foxe Basin	1	2	2	3	3	3	2	2	2
Frobisher Bay	Frobisher Bay	1	2	2	3	3	3	1	3	2
Hudson Strait	Hudson Strait QC	1	3	2	3	3	3	2	6	4
Hudson Strait	Ungava Bay	1	2	2	3	3	3	1	2	1
Hudson Strait	Hudson Strait NU	1	2	2	2	3	3	1	7	3
Hudson Bay	Hudson Bay	2	2	2	3	3	3	1	2	2
Baffin Bay	Baffin Bay	1	2	1	3	3	3	1	2	1
Lancaster Sound	Lancaster Sound	1	2	2	3	3	3	2	2	2
Eclipse Sound	Navy Board Inlet	1	2	2	3	3	3	2	2	2

Table 9-1.1 Current Levels of Shipping in the Eastern Arctic (2002-2010) (Cont'd)

AREA	SUB AREA	July			August			September		
		Min	Max	Average	Min	Max	Average	Min	Max	Average
Eclipse Sound	Tay Sound	1	3	2	1	5	3	1	9	3
Eclipse Sound	White Bay	1	3	2	1	5	3	1	9	3
Eclipse Sound	Eskimo Inlet	1	3	2	1	5	3	1	9	3
Eclipse Sound	Milne Inlet	1	3	2	1	11	4	1	11	5
Eclipse Sound	Tremblay Sound	1	3	2	1	11	4	1	9	5
Eclipse Sound	Koluktoo Bay	1	3	2	1	5	3	1	9	4
Eclipse Sound	Eclipse Sound	1	5	3	13	25	18	5	19	11
Foxe Basin	Steensby Inlet	1	3	2	1	5	3	1	9	3
Foxe Basin	NW Foxe Basin	1	4	2	4	11	7	4	20	10
Foxe Basin	NE Foxe Basin	1	3	2	1	6	3	2	14	6
Foxe Basin	E Foxe Basin	1	3	2	1	6	3	2	12	6
Foxe Basin	SE Foxe Basin	1	4	2	1	10	6	2	11	7
Foxe Basin	SW Foxe Basin	1	4	3	3	14	8	7	20	12
Frobisher Bay	Frobisher Bay	15	31	23	10	33	20	13	33	19
Hudson Strait	Hudson Strait QC	39	61	46	29	61	41	29	60	43
Hudson Strait	Ungava Bay	11	25	19	8	16	12	7	19	13
Hudson Strait	Hudson Strait NU	18	29	23	14	38	26	21	38	27
Hudson Bay	Hudson Bay	17	42	25	10	66	37	20	50	35
Baffin Bay	Baffin Bay	8	21	12	24	47	32	16	41	24
Lancaster Sound	Lancaster Sound	4	9	5	16	31	23	8	27	14
Eclipse Sound	Navy Board Inlet	1	4	2	3	8	5	2	10	5

Table 9-1.1 Current Levels of Shipping in the Eastern Arctic (2002-2010) (Cont'd)

AREA	SUB AREA	October			November			December		
		Min	Max	Average	Min	Max	Average	Min	Max	Average
Eclipse Sound	Tay Sound	1	3	2	1	4	2	na	na	na
Eclipse Sound	White Bay	1	3	2	1	4	2	na	na	na
Eclipse Sound	Eskimo Inlet	1	4	2	1	4	2	na	na	na
Eclipse Sound	Milne Inlet	1	7	3	1	4	2	na	na	na
Eclipse Sound	Tremblay Sound	1	7	2	1	4	2	na	na	na
Eclipse Sound	Koluktoo Bay	1	3	2	1	4	2	na	na	na
Eclipse Sound	Eclipse Sound	2	7	4	1	4	2	na	na	na
Foxe Basin	Steensby Inlet	1	3	2	1	4	2	na	na	na
Foxe Basin	NW Foxe Basin	2	10	6	1	4	3	na	na	na
Foxe Basin	NE Foxe Basin	1	5	3	1	4	2	na	na	na
Foxe Basin	E Foxe Basin	1	5	2	1	4	2	na	na	na
Foxe Basin	SE Foxe Basin	2	10	4	1	4	2	na	na	na
Foxe Basin	SW Foxe Basin	2	11	6	1	5	2	na	na	na
Frobisher Bay	Frobisher Bay	14	33	19	1	10	5	1	2	2
Hudson Strait	Hudson Strait QC	26	57	43	5	28	14	1	4	2
Hudson Strait	Ungava Bay	6	17	10	1	11	6	na	na	na
Hudson Strait	Hudson Strait NU	17	38	26	1	13	6	1	4	2
Hudson Bay	Hudson Bay	16	58	34	1	15	7	na	na	na
Baffin Bay	Baffin Bay	6	17	10	1	5	2	1	1	1
Lancaster Sound	Lancaster Sound	1	9	3	1	4	2	na	na	na
Eclipse Sound	Navy Board Inlet	1	4	2	1	4	2	na	na	na

NOTE(S):

1. SOURCE DATA FROM THE CANADIAN COAST GUARD MARINE COMMUNICATIONS AND TRAFFIC SERVICES PROGRAM (INNAV), SUMMARIZED BY XPERT SOLUTIONS TECHNOLOGIQUES INC., 2010

- Limited shipping (icebreaking) occurs during periods of ice-cover through Hudson Strait. According to Table 9-1.1, there are currently 1-2 transits in each winter month. The icebreaker *MV Arctic*, operated by Fednav, sails through Nunavut waters of Hudson Strait to call at the Raglan Mine at Deception Bay in Northern Quebec.

Foxe Basin

- Open-water shipping occurs through Foxe Basin mainly for sea-lift operations, but possibly commercial fishing as well, based on the vessels that have been tracked. An average of 28 vessels per year travel into the northwest and southwest of Foxe Basin and an average of ten vessels enter Steensby Inlet.
- Limited icebreaking appears to have occurred within various portions of Foxe Basin including Steensby Inlet each winter, with an average of a ship a month over the nine year period.

Baffin Bay

- A level of traffic similar to that in Hudson Strait also passes through Baffin Bay during the open-water shipping season. Traffic is expected to include community sea-lifts to Pangirtung, Qikiqtarjuaq, Clyde River, Pond Inlet, Arctic Bay and Resolute; commercial fishing; cruise ships; ships transiting the Northwest Passage; and government surveillance vessels.
- Limited icebreaking appears to have occurred within various portions of Baffin Bay each winter, with an average of one to two ships per ice-cover month over the nine year period.

Eclipse Sound (Including Milne Inlet)

- Open-water shipping occurs in Eclipse Sound mainly for sea-lift operations, but possibly commercial fishing as well, based on the vessels that have been tracked. An average of 36 vessels per year travel into Eclipse Sound and an average of 14 enter Milne Inlet. Baffinland's exploration and bulk sampling operations have contributed to these numbers. Traffic into Eclipse Sound is expected to include community sea-lifts, commercial fishing, cruise ships, ships transiting the Northwest Passage and government surveillance vessels.
- Limited icebreaking appears to have occurred within various portions of Eclipse Sound including Milne Inlet each winter, with an average of a ship a month over the 9-year period.

<u>Canadian Coast Guard Activities</u>

The Canadian Coast Guard (CCG) carries out icebreaking for commercial vessels to move efficiently and safely. The CCG also carries out northern resupply, transporting dry cargo and fuel during the annual resupply of northern settlements and government sites when commercial operators are unable. In addition, the CCG is involved in search and rescue, environmental response to ship-sourced spills and maritime security. The dock at the decommissioned Nanisivik mine is used by the CCG for training purposes.

In the Baffin region, CCG icebreaking service dates (day/month) are as follows:

Hudson Bay:	03/07-24/10
Foxe Basin:	20/08-15/09
Hudson Straight:	03/07-24/10
East Baffin:	14/08-18/09
Parry Channel East:	10/08-15/10
Pelly:	12/08-13/10

CCG activities are recorded within the shipping activity levels discussed above and totalled in Table 9-1.1.

Nanisivik Naval Facility

In 2008, DND initiated a feasibility study for the construction of a naval refuelling station using the decommissioned Nanivisik mine dock. The station is expected to be the base for Arctic offshore patrol ships as part of Canada's effort to exert sovereignty in the Arctic, operating from July through October and shut-down and unmanned the remainder of the year. DND submitted a full document for Part 4 screening by NIRB in the fall of 2011 and the screening process is not yet completed, pending DND responses to intervener responses. According to information available on the NIRB public registry, construction was expected to begin in 2011, with operations beginning in 2015, and the naval facility will serve frigates, destroyers, coastal defense vessels, heavy gulf icebreakers, medium icebreakers and commercial tankers (Stantec, 2011). No data on anticipated level of shipping traffic was provided by DND.

Included for Consideration in the CEA: Yes

As specified in NIRB's Guidelines, the naval facility is a reasonably foreseeable project and is included in the CEA. Baffinland has not located any publicly available information on the anticipated shipping operations that may be associated with the naval station, which limits the ability to incorporate the activity into the assessment.

1.3.2.10 DEW Line Decommissioning

The Distant Early Warning (DEW) Line was a system of 63 radar stations (42 of which were in Canada) positioned along a line across the north from Alaska to Baffin Island. Additional sites were located in Greenland and Iceland. The stations generated hazardous wastes that were poorly disposed of on-site (judged by today's standards) following deactivation. Decommissioning activities have been under way and have generally involved moving one or more supply barges in and out from each site and regular air traffic to local airstrips to move clean-up staff during summer months. DEW Line decommissioning of facilities on or around Baffin Island by AANDC and DND are anticipated to be completed by 2012 (Plato, pers. comm.). Sites Fox 1, Fox A, Fox D and Fox E are Class 3 sites, meaning they are low priority and are not currently slated for decommissioning.

Included for Consideration in the CEA: Yes

These recent activities have involved air and marine traffic and human presence in the region. Given that the DEW Line sites are operated remotely and most remediation activities are currently winding down, the sites are expected to have limited land-based and socio-economic effects, and that marine based resupply activities are included in the ship traffic estimates presented in Table 9-1.1.

1.3.2.11 Air Transport

Air transport is the lifeline of Nunavut communities and regular scheduled flights transport people, perishable items and other goods. Fixed-wing aircraft and helicopters are used for access and exploration of resource projects in Nunavut. Most active mines and exploration projects in northern Canada use fixed-wing aircraft to transport shift workers.

Included for Consideration in the CEA: Yes

Air transportation was considered in general terms where it could contribute to GHG emissions and/or sensory disturbance to terrestrial wildlife and/or marine mammals.

1.3.2.12 Military Exercises

Operation Nanook is an annual joint exercise of Canada's Maritime Command and the Canadian Coast Guard for the training for disaster preparedness, as well as for Arctic sovereignty patrols. The exercises last approximately three weeks and take place in or around August. In 2010, Operation Nanook was conducted in proximity to Pond Inlet and assembled three ships, divers and helicopters, as well as troops from Denmark and the United States. In 2011 a similar exercise was undertaken in the Resolute Bay area.

Included for Consideration in the CEA: Yes

Military exercises occurring near Pond Inlet have the potential to interact with the residual effects of Project shipping activities. Interactions are most likely along the Project's shipping routes in the vicinity of Pond Inlet. It is expected that ship-related traffic is included in Table 9-1.1.

1.3.2.13 Communities, and Traditional and Recreational Hunting, Fishing and Foraging

Communities have a terrestrial footprint and represent a human presence in the region. On-going traditional sustenance and recreational (sport) hunting, fishing and foraging activities occur in the terrestrial and marine environments, concentrated mainly concentric to the communities but also extending outward hundreds of kilometres, primarily targeting game species.

Included for Consideration in the CEA: Yes

The potential for interactions exists with Project effects on traditional and recreational hunting species and thus on traditional sustenance. The possibility of induced hunting/fishing pressure as a result of the Project was considered, and while the IIBA is expected to allow traditional harvesting by workers, it is expected that the harvesting actually undertaken during work hours will be limited due to the 12-hour work-days.

1.3.2.14 Tourism and Commercial Recreation Activities

Tourism and commercial recreation activities on northern Baffin Island are primarily:

- Adventure tourism: where participants engage with the natural and cultural uniqueness of the area (e.g., kayaking, hunting, hiking and nature watching). Tourism numbers are low and generally confined to the summer months; and
- Cruise ships: travelling through Pond Inlet and past Sirmilik National Park several times each summer. There is also an increasing trend in use of the Northwest Passage by private and commercial recreation vessels.

Included for Consideration in the CEA: Yes

The main overlap of tourism activities with the Project is expected to be related to shipping during the open water season. Cruise ship traffic is included in the shipping frequency statistics presented in Table 9-1.1.

1.3.2.15 Potential Separation Lake Hydroelectric Project

A hydroelectric project is being considered by Baffinland to meet the needs of the Mary River Project. A site at Separation Lake was identified, roughly 100 km east of the proposed Steensby Port (see Figure 9-1.2). The hydropower project, which would be induced only if the Mary River Project proceeds, is anticipated to create a reservoir, a power generation facility and a transmission line to the Mary River Project, connecting at the proposed Steensby Port. The feasibility of this project is being evaluated and the Project has yet to enter into the NIRB review process. Development of the Separation Lake hydroelectric project would be contingent on the approval and development of the Mary River Project, future consideration by management and approval from regulators.

Included for Consideration in the CEA: Yes

Strictly speaking, the Separation Lake Hydroelectric Project does not qualify as "reasonably foreseeable project", according to the definition. However, because Baffinland has acknowledged the intent to investigate the feasibility of the project as an alternate energy supply to supplement the Project, it has been included as a reasonably foreseeable induced future project in this assessment.

1.3.2.16 Seismic Study

The Eastern Canadian Arctic Seismic Experiment was blocked by a Nunavut court in 2010 as a result of concern for northern marine mammals and the people that depend on them. The project, jointly run by Natural Resources Canada and Germany's Alfred Wegener Institute, aimed to study the composition of the sub-sea continental crust of Baffin Bay.

Included for Consideration in the CEA: No

As a result of uncertainty over the future of marine seismic research activities in proximity to Project activities, seismic study is not considered a reasonably foreseeable future activity and therefore was not considered in the CEA.

1.3.2.17 Commercial Fishery

There are small-scale shrimp and offshore turbot fisheries near Pangirtung, as well as an unused Arctic char quota near Steensby Inlet. A feasibility assessment of the possibility of a fishery in Pond Inlet has been initiated, but the preliminary results suggest a commercial fishery is not likely at this time.

Included for Consideration in the CEA: No

There is no reasonably foreseeable interaction between the current and future fishery and the Project and consequently the commercial fishery was not included in the CEA.

1.3.2.18 Climate Change

Global climate change is expected to accelerate in the next century, notably in the Arctic, where average annual temperatures are anticipated to increase, precipitation is expected to increase, sea ice is expected to decline, reflecting less solar radiation, and the area of land covered by snow is expected to decline. Evidence of the recent warming of the Arctic is found in records of increasing temperatures, melting glaciers, sea ice and permafrost, as well as rising sea levels.

Key Project related considerations:

- Reduced sea ice may result in an increase in marine transport and access to resources; and
- Increased icebreaking will affect traditional winter travel, hunting and affect marine mammals.

Included for Consideration in the CEA: Yes

As specified in the Guidelines, effects of climate change were considered in the CEA.

1.3.3 Summary of Other Projects and Activities

Criteria used for this screening of other projects and activities were based on their potential for interaction with the Project. For instance, if the other project did not have any measured or potential effect on a Project

VC, it was excluded from further consideration. If a project or activity was too far away for any overlapping interaction to occur, it was not considered further in the CEA. On completion of screening, the projects and activities that were carried forward into the CEA are:

- Baffinland's previous exploration and bulk sampling programs;
- Baffinland's proposed monitoring programs concurrent with the Project;
- Past, current and future mineral exploration in the region, by Baffinland and others;
- Operating mines (Meadowbank mine in the Kivalliq Region and Raglan Mine in Nunavik) and reasonably foreseeable mines (Roche Bay Iron Ore Project);
- Decommissioned mines (former Nanisivik and Polaris mines);
- Induced development of other Mary River iron ore deposits;
- Marine transport/shipping;
- Nanisivik Naval Facility;
- Air transport;
- Military exercises;
- Traditional and recreational hunting, fishing and foraging;
- Communities;
- Tourism and commercial recreation activities;
- Baffinland's potential Separation Lake hydroelectric project; and
- Climate change.

Marine shipping is a key aspect of the cumulative effects assessment; a summary of the forecasted summer and winter shipping traffic for the northern (Milne Port) and southern (Steensby Port) shipping routes within the Nunavut Settlement Area are summarized below.

Summary of Forecasted Shipping Activities in Milne Inlet, Lancaster Sound, Baffin Bay

The baseline shipping levels in Eclipse Sound and Baffin Bay are presented in Table 9-1.1. It is assumed that in many instances the reportings may capture the arrival and return voyages of a ship entering the area. For the months of August and September, an average of 29 ship occurrences were recorded in Eclipse Sound and 56 in Baffin Bay. It is assumed that tourism-related ship traffic is included in this number and will remain relatively constant over time, in the absence of any information suggesting otherwise. Construction of the proposed Nanisivik Naval Facility is likely to increase marine shipping in the area, though the level of military shipping in relation to current military exercises undertaken in the past several years is unknown; it is assumed in this assessment that this traffic remains relatively constant.

Mary River Project will require open water shipping through Baffin Bay, Pond Inlet, and Eclipse Sound to Milne Inlet during the 4-year construction phase (2013 through 2016), with up to 23 vessels arriving in Years 1 and 2 of construction, and reducing to 6 vessels in the final two years of construction (the latter being within the range of variation of shipping from year to year). For the first two years, project-related shipping in Eclipse Sound will nearly double the baseline. During this period, it is possible that shipping related to the Hackett River Project may add up to 10 ships per year to this number, though these ships are unlikely to enter Eclipse Sound and are likely to pass through Lancaster Sound into Baffin Bay, and the schedule and certainty of this project remains unknown given it has been more than 3 years since the Project Proposal was filed and no DEIS has been submitted.

The credible scenario of doubling of production (and shipping) of the Mary River Project is unlikely to change shipping in the area meaningfully; it is possible that a second construction phase could occur at some time in the future associated with an expansion.

Neither the Mary River Project nor other reasonably foreseeable projects involve icebreaking in these waters over the temporal boundaries under assessment.

Summary of Forecasted Shipping Activities in Foxe Basin and Hudson Strait

The baseline shipping levels in Foxe Basin and Hudson Strait are presented in Table 9-1.1. The baseline during the ice covered period includes icebreaking to the Raglan Mine in Nunavik and other incidental ice-breaking, and shipping during the open water season represents shipping related to community resupply (in Foxe Basin, Hudson Strait and Hudson Bay), and commercial shipping to and from the Port of Churchill.

Mary River Project will require open water shipping through Hudson Strait and Foxe Basin during the 4-year construction phase (2013 through 2016), with up to 24 vessels arriving in Years 1 and 2 of construction, and reducing to seven to ten vessels in the final two years of construction. Approximately 100 voyages a year will occur over the 21 operational life of the mine. Shipping frequency is highest during the operational phase of the project.

In northern Foxe Basin there is a relative absence of shipping traffic such that the Mary River Project shipping traffic (under the base case and induced scenario of doubled production) will dominate.

In southern Foxe Basin there is the possibility of overlapping shipping with the Roche Bay Project, which may add 20+ ships per year (likely to be year-round shipping) to the Mary River Project`s 100+ transits (or 200+ transits under doubled production).

In Hudson Strait there will be a number of potential contributors to increased shipping over the baseline of an annual average of 114 ship occurrences within Nunavut waters of Hudson Strait, 202 ship occurrences in Quebec waters of Hudson Strait (presumably with some overlap in these numbers):

- The proposed Mary River Project (100+ round trip transits under the base case; 200+ round trip transits under the doubled production scenario; year-round)
- Proposed Roche Bay Iron Ore Project (20+ round trip transits; year-round)
- Raglan Mine (up to 13 round trip transits; year-round)
- Proposed Nunavik Nickel Mine (up to eight round trip transits; year-round)
- Proposed Meliadine Gold Project (assumed two round trip transits; during open water only)

Based on review of the above, the induced doubling of production of the Mary River Project would be the dominant increase in ship traffic through Hudson Strait, with the other projects adding another 40+ transits per year.

1.3.4 Screening of VEC and VSECs for Potential Cumulative Effects

The VECs and key indicators assessed in the EIS that resulted in residual effects after mitigation were screened for the applicability of cumulative effects, considering the outcome of the impact assessments (Volumes 4 through 8) and the potential projects/activities that could contribute to cumulative effects. The key VECs and VSECs identified as the focus on the cumulative effects assessment are presented in Tables 9-1.2 and 9-1.3.

The screening considers whether a VEC/VSEC/Key Indicator is likely to be subjected to effects from other past, present or reasonably foreseeable projects or activities, given the nature of the VEC/key indicator.

Tables 9-1.2 and 9-1.3 also indicate the spatial boundaries selected for each VEC and key indicator.

The VECs/VSECs/Key Indicators identified as potentially being affected cumulatively by the Project and other projects and activities were carried forth for assessment.

Table 9-1.2 Screening of VECs/VSECs and Key Indicators for Potential Cumulative Effects

VEC/VSEC	Key Indicator(s)	Spatial Boundary for CEA	Rationale for Inclusion in CEA
Climate change	Greenhouse gas emissions	Nunavut Settlement Area (NSA)	GHG emissions from a single project are typically negligible, but climate change is a cumulative effect arising from global GHG emissions
Air quality	Air quality	Air quality LSA	Expansions of the existing Project can contribute cumulatively to local air quality effects
Noise	Noise levels	Noise LSA	Expansions of the existing Project can contribute cumulatively to local noise effects
Vegetation	Abundance and diversity Plant health Culturally valued plants	Terrestrial RSA	Additional development within the terrestrial RSA has the potential to cumulatively affect vegetation
Migratory birds and habitat	Peregrine falcon Snow geese King and Common eider Lapland Longspur Red-throated loon	Terrestrial RSA	Additional development within the terrestrial RSA has the potential to cumulatively affect bird key indicators
Terrestrial mammals and habitat	Caribou	Range of the North Baffin caribou herd	Additional development within the range of the herd has the potential for cumulative effects
Freshwater quantity and quality	Water quantity Water quality	Freshwater LSAs	Additional development within the range of the herd has the potential for cumulative effects
Freshwater biota	Arctic char	Freshwater RSA	Additional development within the range of the herd has the potential for cumulative effects
Sea ice	Landfast ice	Marine LSA	Icebreaking may occur from other projects
Marine water and sediment quality	Marine water and sediment quality	Marine LSA	Increased production rates will increase ore throughput at port sites
Marine habitat and biota	Marine habitat Arctic char health Invasive species introduction	Marine LSA	Increased production rates will increase ore throughput at port sites
Marine mammals	Ringed seals Bearded seals Walrus Beluga whale Narwhal Bowhead whale Polar bear	Marine RSA	Shipping and harvesting throughout the marine RSA have the potential to cumulatively affect marine mammals

Table 9-1.3 Screening of VSECs and Key Indicators for Potential Cumulative Effects

Population Demographics	Demographic stability	North Baffin LSA	Additional projects drawing employment from the same communities could cumulatively affect demographic stability through in- or out-migration
Human health and well-being	Substance abuse Community and social stability	North Baffin LSA	The Mary River Project and additional projects could draw employment from the same communities, affecting the availability of abused substances
Community infrastructure and services	Competition for skilled workers	North Baffin LSA	The Mary River Project could compete for workers within the direct-hire communities, adversely affecting staffing to provide community services
Cultural Resources	Archaeology	RSA	Additional development within the RSA has the potential for cumulative effects
Land and resource use	Inuit Harvesting, Travel and Camps	Land use study area	Additional development within the land use study area has the potential to cumulatively affect land use

1.4 ASSESSMENT

The following section describes potential cumulative effects identified for each Valued Component and Key Indicator. A summary of identified cumulative effects is presented in Table 9-1.4.

1.4.1 Atmospheric Environment

1.4.1.1 Climate Change - Greenhouse Gas Emissions

Increased GHG emissions from all Project components in all Project phases are expected to interact with GHG emission from other potential projects and activities, specifically all existing and reasonably foreseeable mines, shipping and air transport, Mary River Deposits No. 2 through 9 and construction of the Separation Lake hydroelectric project. Overall, global climate change effects such as GHG levels related to Project activities are insignificant. However, the Project GHG contributions represent a substantial increase in Nunavut GHG emissions, a measurable portion of Canadian mining GHG contributions and a small but not infinitesimal portion of Canada's overall emissions.

The proponent is committed to developing an adaptive management strategy to work towards reducing the Project's relative contribution to GHG emissions in Nunavut. Project GHG data will be shared with the Nunavut General Monitoring Program to assist that program with managing GHG emissions in Nunavut.

1.4.1.2 Air Quality

Project activities will result in residual effects in the LSA for measured air quality criteria (CO, N, SO_2, NO_2, $PM_{2.5}$, PM_{10} and TSP) that are predicted to be not significant (Volume 5, Section 2). Within a common airshed or air quality LSA, the following other projects/activities may occur, causing cumulative effects to air quality:

- Concurrent development of either one or both of Deposits No. 2 and 3 while Deposit No. 1 is being mined. Emissions from combustion, waste incineration and fugitive dust emissions from both operations could cumulatively affect local air quality through increased concentrations of criteria air

Table 9-1.4 Cumulative Effects Summary

Potential Effects			Evaluation Criteria					Rated Significance of Residual Effects
Effect	**Direction**	**Mitigation Measure (s)**	**Magnitude**	**Duration**	**Frequency**	**Extent**	**Reversibility**	
GREENHOUSE GASES								
Greenhouse gas emissions	Negative	Reduce project emissions to the extent possible	Level 1 - minor in relation to global emissions	Level II - life of mine	Level III - Continuous	Level III - beyond the RSA	Level III - irreversible	Not Significant
AIR QUALITY								
Air quality emissions of criteria of concern (COC) at the Mine Site from concurrent development of Deposits No. 2 and/or 3	Negative	Implement air quality abatement measures, in Project design and/or as adaptive management	Level II, possibly Level III	Level II - life of mine	Level III - Continuous	Possibly Level II for some parameters, based on current project	Level I - reversible	Not Significant
Air quality emissions of criteria of concern (COC) along the Milne Inlet Tote Road or Railway, from concurrent development of Deposits No. 2 and/or 3, or development of other deposits in the region that utilize the tote road or railway	Negative	Implement air quality abatement measures, in Project design and/or as adaptive management	Level II, possibly Level III	Level II - life of mine	Level III - Continuous	Possibly Level II for some parameters, based on current project	Level I - reversible	Not Significant
Air quality emissions of criteria of concern (COC) at Milne Port or Steensby Port from larger tonnages of ore handled through the port sites, from concurrent development of Deposits No. 2 and/or 3, or development of other deposits in the region, and construction of the Separation Lake hydroelectric site staged from Steensby Port	Negative	Implement air quality abatement measures, in Project design and/or as adaptive management	Level II, possibly Level III	Level II - life of mine	Level III - Continuous	Level I, or possibly Level II	Level I - reversible	Not Significant

Table 9-1.4 Cumulative Effects Summary (Cont'd)

Potential Effects			Evaluation Criteria					Rated Significance of Residual Effects
Effect	**Direction**	**Mitigation Measure (s)**	**Magnitude**	**Duration**	**Frequency**	**Extent**	**Reversibility**	
NOISE								
Increased noise within the noise study areas of each of the Project sites, resulting from an increased mining production rate and construction of the Separation Lake hydroelectric project (applicable to Steensby Port)	Negative	Implement noise abatement measures, in Project design and/or as adaptive management	Level I for main Project, could increase to Level II with additional activities	Level II - life of mine	Level III - Continuous	Level I, or possibly Level II	Level I - reversible	Not Significant
VEGETATION								
Reduction in vegetation abundance and diversity within the terrestrial RSA	Negative	Minimize area of disturbance	Level I - Effect expected to be indistinguishable from natural variation	Level III - beyond life of the Project (permanent)	Level I - Infrequent	Level I - will occur within the PDA	Level II - partially irreversible (some natural regeneration will occur, post-closure)	Not Significant
Reduction in vegetation health due to deposition of dust and metals in soil	Negative	Dust suppression	Level I - Effect expected to be indistinguishable from natural variation	Level III - beyond life of the Project (permanent)	Level III - Continuous	Level I, or possibly Level II	Level III - irreversible	Not Significant
Reduction in culturally valued vegetation (represented by blueberries)	Negative	Minimize area of disturbance	Level I - Effect expected to be indistinguishable from natural variation	Level III - beyond life of the Project (permanent)	Level III - Continuous	Level I, or possibly Level II	Level III - irreversible	Not Significant

Table 9-1.4 Cumulative Effects Summary (Cont'd)

Potential Effects			Evaluation Criteria					Rated Significance of Residual Effects
Effect	**Direction**	**Mitigation Measure (s)**	**Magnitude**	**Duration**	**Frequency**	**Extent**	**Reversibility**	
TERRESTRIAL WILDLIFE AND HABITAT								
Reduction in caribou habitat	Negative	Minimize area of disturbance; manage dust emissions; minimize noise and other sources of sensory disturbance	Level I - Effect expected to be indistinguishable from natural variation	Level III - beyond life of the Project (permanent)	Level III - Continuous	Level III - confined to RSA	Level II - partially irreversible (some natural regeneration will occur, post-closure)	Not Significant
Reduction in caribou movement	Negative	Utilize existing transportation corridors for future development activities	Level I - Effect expected to be indistinguishable from natural variation	Level II - life of mine	Level III - Continuous	Level III - confined to RSA	Level I - reversible	Not Significant
Caribou mortality	Negative	Apply mitigation in current Project to minimize potential for additional mortality	Level I - Effect expected to be indistinguishable from natural variation	Level II - life of mine	Level I - Infrequent	Level II - confined to LSA	Level I - reversible	Not Significant
Migratory birds	Negative	Apply mitigation in current Project to minimize potential for additional mortality	Level I - Effect expected to be indistinguishable from natural variation	Level II - life of mine	Level I - Infrequent	Level II - confined to LSA	Level I - reversible	Not Significant
FRESHWATER QUANTITY AND QUALITY								
Doubling of water takes from water supply lakes at Milne Port, the Mine Site and Steensby Port	Negligible	No mitigation required - water taking is below thresholds	Level I - Effect expected to be indistinguishable from natural variation	Level II - life of mine	Level III - Continuous	Level II - confined to LSA	Level I - reversible	Not Significant

Table 9-1.4 Cumulative Effects Summary (Cont'd)

Potential Effects			Evaluation Criteria					Rated Significance of Residual Effects
Effect	**Direction**	**Mitigation Measure (s)**	**Magnitude**	**Duration**	**Frequency**	**Extent**	**Reversibility**	
Increased loading of runoff from mining areas into the Mary River	Negative	Water management (diversion to alternate receiving waters) or water treatment, if necessary	Level II - Effect expected to be moderate magnitude following mitigation, meeting compliance requirements of water licence, fisheries authorization and aquatic effects monitoring (MMER) requirements.	Level II - life of mine	Level II - Intermittent	Level II - confined to LSA	Level I - reversible	Not Significant
FRESHWATER FISH								
Effects to Arctic char health and habitat resulting from water quality effects	Negative	Mitigation to be identified within an authorization under the *Fisheries Act*. Compliance with water licence and aquatic effects monitoring under the MMER.	Level I - Effects expected to be low magnitude after mitigation	Level II - life of mine	Level II - Intermittent	Level II - confined to LSA	Level I - reversible	Not Significant
SEA ICE								
Disruption of fast ice (ringed seal habitat)	Negative	Confine ice breaking to narrow corridor to manage disturbance of fast ice to less than 10 % threshold	Level II - Effect expected to approach but not exceed established threshold.	Level II - life of mine	Level III - Continuous	Level II - confined to LSA	Level I - reversible	Not Significant

Table 9-1.4 Cumulative Effects Summary (Cont'd)

Potential Effects			Evaluation Criteria					Rated Significance of Residual Effects
Effect	Direction	Mitigation Measure (s)	Magnitude	Duration	Frequency	Extent	Reversibility	
Changes to marine water quality at port sites due to more frequent shipping and discharge of ballast water	Negative	Ballast water exchange as required by law	Level I - Effects expected to be low magnitude after mitigation	Level II - life of mine	Level II - Intermittent	Level II - confined to LSA	Level I - reversible	Not Significant
Effects to marine biota, including Arctic char, due to potential water and sediment quality changes.	Negligible	Apply mitigation for water and sediment quality	Level I - Effects expected to be low magnitude after mitigation	Level II - life of mine	Level II - Intermittent	Level II - confined to LSA	Level I - reversible	Not Significant
RINGED SEAL								
Increased disruption of fast ice in Steensby Inlet	Negative	Confine ice breaking to narrow corridor to manage disturbance of fast ice to less than 10 % threshold	Level II - Effect expected to approach but not exceed established threshold	Level II - life of mine	Level III - Continuous	Level II - confined to LSA	Level I - reversible	Not Significant
BEARDED SEAL								
Habitat change, disturbance, and masking.	Negative	Apply mitigation in current Project	Level I - low (habitat change); Level II - moderate (disturbance, masking)	Level II - life of mine	Level III - Continuous	Level II - confined to LSA	Level I - reversible	Not Significant
WALRUS								
Habitat change, disturbance, and masking.	Negative	Apply mitigation in current Project	Level I - low	Level II - life of the Project	Level III - Frequent	Level I - confined to LSA	Level I - reversible	Not Significant

Table 9-1.4 Cumulative Effects Summary (Cont'd)

Potential Effects			Evaluation Criteria					Rated Significance of Residual Effects
Effect	Direction	Mitigation Measure (s)	Magnitude	Duration	Frequency	Extent	Reversibility	
NARWHAL								
Habitat change, disturbance, and masking.	Negative	Apply mitigation in current Project	Level I - low (habitat change); Level II - moderate (disturbance, masking)	Level II - life of the Project	Level III - Frequent	Level I - confined to LSA; possibly Level II - beyond the LSA and within the RSA	Level I - reversible	Not Significant
BELUGA WHALE								
Habitat change, disturbance, and masking.	Negative	Apply mitigation in current Project	Level I - low (habitat change); Level II - moderate (disturbance, masking)	Level II - life of the Project	Level III - Frequent	Level I - confined to LSA; possibly Level II - beyond the LSA and within the RSA	Level I - reversible	Not Significant
BOWHEAD WHALE								
Habitat change, disturbance, and masking.	Negative	Apply mitigation in current Project	Level I - low (habitat change); Level II - moderate (disturbance, masking)	Level II - life of the Project	Level III - Frequent	Level I - confined to LSA; possibly Level II - beyond the LSA and within the RSA	Level I - reversible	Not Significant
POLAR BEAR								
Habitat change, disturbance, and possibly mortality.	Negative	Apply mitigation in current Project	Level I - low	Level II - life of the Project	Level III - Frequent	Level I - confined to LSA	Level I - reversible	Not Significant

NOTE(S):
1. CACs = CRITERIA AIR CONTAMINANTS [TSP, PM10, PM2.5, SO2, NO2, CO, Fe, Mn, As, Ca, Co and POI (potential acid input).

contaminants, or CACs; (TSP = total suspended particulate; particulate matter <10 µ diameter and <2.5 µ = PM10 and PM2.5; sulphur dioxide = SO_2; nitrogen dioxide = NO_2; carbon monoxide = CO, iron = Fe; manganese = Mn; arsenic = As; calcium = Ca; cobalt = Co; and potential acid input = POI). The magnitude of air quality effects would likely be similar to the proposed mining operation at Deposit No. 1 but could result in higher magnitude effects; will likely be confined to or slightly beyond the LSA (moderate level extent); of medium duration; and reversible. With additional mitigation/adaptive management measures, the effects of increased air quality are predicted to be not significant.

- Additional mining operations, at Deposits No. 2, 3, at the Mine Site or at other deposits identified during regional exploration, would likely result in increased CAC emissions along either the Milne Inlet Tote Road (if ore is hauled to Milne Port) or the Railway (if ore is hauled to Steensby Port). The emissions would be expected to be an increment of predicted emissions of the planned Project and are likely not significant.
- Additional mining operations, at Deposits No. 2, 3, at the Mine Site or at other deposits identified during regional exploration would likely result in increased CAC emissions at either the Milne Port or Steensby Port, depending upon where ore is transported. Similar to the assessment for the Mine Site above, the emissions would be expected to be an increment of predicted emissions of the planned Project and are likely not significant.

It is expected that if the magnitude of effects to air quality were to unexpectedly increase too high (Level III) magnitude, these effects could be mitigated by design or by adaptive management measures to bring such effects to a lower magnitude, resulting in cumulative effects that are not significant.

1.4.1.3 Noise

Like air quality, noise emissions will also increase incrementally over the Project under the same scenarios of increased mining activity and material handling through transportation infrastructure, or from construction of the Separation Lake hydroelectric project staged from Steensby Port. The resultant cumulative effects are predicted to be not significant.

1.4.2 Terrestrial Environment

With respect to the terrestrial environment, the following VCs and key indicators have been evaluated for cumulative effects:

- Vegetation;
- Migratory birds and habitat (four key indicator species); and
- Terrestrial wildlife and habitat (key indicator is caribou).

The EIS predicted no residual effects to landforms, soil and permafrost VEC (Volume 6, Section 2), so this VEC was not considered in the cumulative effects assessment.

1.4.2.1 Vegetation

The Project is expected to result in the following residual effects to vegetation measurable parameters:

- A loss of vegetation in the Project Development Area (PDA) and the potential for introduction of invasive plant species;
- A reduction in plant health (due mainly to deposition of dust) within the local study area (LSA); and
- A loss of culturally valued vegetation, such as blueberry, within the PDA.

These effects, in the context of the terrestrial RSA, were predicted to be not significant.

Other projects/activities that may also affect vegetation within the terrestrial RSA include:

- Past, present and future mineral exploration activities;
- Potential development of Baffinland's other iron ore deposits;
- Potential development of the Separation Lake hydroelectric project; and
- Climate change.

Baffinland's previous exploration and bulk sampling programs, while relevant as activities for the cumulative effects assessment, have already been considered in the main effects assessment, as they overlap effects of the Project.

Potential for Reduction in Vegetation Abundance and Diversity

The Project is expected to have an indistinguishable effect on vegetation abundance and diversity in the context of the terrestrial RSA, with an estimated 0.36 % reduction in abundance (Volume 6, Section 3.2.2). Assuming a doubling of the affected area due to the combined development of all of the above additional projects/activities, the cumulative effect of these projects on vegetation abundance and diversity would be an estimated 0.72 %, which remains a low magnitude effect that will be indistinguishable.

Generally, climate change is expected to result in changes to vegetation communities in the Arctic, with an overall increase in biomass and plant diversity, with a tendency for high Arctic polar deserts to become tundra and for tundra to more resemble boreal forest (Arctic Council and the International Arctic Science Committee, 2005).

The effects to individual species are more complicated and diverse and will occur on different timescales depending on soil conditions and other factors. Where suitable soil conditions exist, the Arctic Council and the International Arctic Science Committee (2005) predict that changes will be evident this century. Mosses and lichens, for example, are expected to generally decline as warming increases. It is likely that climate change effects to vegetation will be slower to occur than Project-related effects and visible changes may occur beyond the temporal boundaries selected for the assessment (i.e., the next 35 years, up to 2045). As the terrestrial RSA is located on an island and not the mainland Arctic, it represents a physical barrier to transport of seeds and it is likely that the predicted changes will occur slower than in other Arctic locations. Based on this, it is predicted that vegetation changes resulting from climate change will be relatively modest over the assessed time period and the cumulative effects on vegetation abundance and diversity due to the above projects/activities will remain indistinguishable and insignificant.

Potential for Reduced Vegetation Health

The Project is expected to result in a Level I magnitude effect to vegetation health that is predicted to be not significant (Volume 6, Section 3.2.4).

Dust and metals deposition at Project sites will increase with increased ground disturbance and scaled up material handling operations. Metals deposition to soils may also increase within the PDAs. Under the same assumption of a doubling of the extent of affected vegetation from 0.14 % of the RSA to 0.28 % of the RSA, the effects will remain not significant.

Culturally Valued Vegetation

Blueberries were assessed as an indicator plant species important to Inuit. Blueberry habitat within the terrestrial RSA was predicted based on the Ecological Land Classification (Volume 6, Appendix 6D; Volume 6, Figure 6-3.5). Assuming complete removal of blueberry within the PDAs, the Project is predicted to have a minor and indistinguishable effect on blueberry availability within the RSA (Volume 6, Section 3.2.2.3). Under the same assumption of a doubling of development footprint within the terrestrial RSA due to development of the additional deposits and ongoing exploration activities, the effect will remain indistinguishable, and therefore not significant.

1.4.2.2 Terrestrial Wildlife and Habitat - Caribou

The cumulative effects of the Project on terrestrial wildlife were considered for the key indicator wildlife species: caribou. Cumulative effects were considered at the scale of the north Baffin Island caribou herd (Volume 6, Section 5; Volume 6, Figure 6-5.1), that encompasses the known habitats and seasonal use patterns. The two reasonably foreseeable projects with the potential to interact with the Project's residual effects on caribou include the development of Deposits No. 2 to 9 and the Separation Lake hydroelectric project. The interaction between the Project and other projects will not result in significant cumulative effects on north Baffin Island caribou, primarily because the reasonably foreseeable projects in the range of the herd that could occur at the same time as the Project will result in only an additional 0.006 % loss of habitat. If any of Deposits No. 2 to 9 were to be developed, it is most likely that they will be developed sequentially instead of concurrently. In addition, there are assumed residual effects on caribou range from the Nanisivik mine, which could interact with the Project. However, because these can neither be detected nor reasonably determined, they are excluded from this analysis.

If Deposits No. 2 to 9 are mined, there will be a gradual increase in habitat loss as new road or rail spurs are developed, but the ZOI as a result of sensory disturbances will simply shift (disappear from abandoned sections, move to new sections). As most of the habitat loss is a result of the loss of effectiveness resulting from traffic, then development of spur lines/roads and decommissioning of existing spur lines/roads will balance the overall habitat loss within the development. Presuming an additional 100 km of linear access to the additional deposits, there may be an additional loss of 300 ha (3.0 km^2) of potential caribou habitat. This is equivalent to 0.002 % of the potential habitat in the 134,308 km^2 north Baffin Island caribou range.

A hydroelectric development at Separation Lake is another reasonably foreseeable project. It is predicted to include a 58 km transmission line (and probable matching access road) and an impoundment area that will increase the surface area of Separation Lake by 309 ha (existing surface area = 1,551 ha; predicted impoundment area = 1,860 ha). Assuming a 30 m-wide right-of-way for the road (174 ha footprint), this project could result in an additional loss of 483 ha (4.83 km^2) of potential caribou habitat. This is equivalent to an additional loss of 0.004 % of potential caribou habitat.

Habitat

The Project will have a "*not significant*" cumulative effect on habitat loss (or reduced habitat effectiveness) on north Baffin Island caribou. The residual habitat loss of the Project was assessed as an overall reduced effectiveness of ~2.0 % across the range of the herd. The additional loss of habitat from reasonably foreseeable projects amounts to 0.006 % of the north Baffin Island caribou range. This level of effect will be undetectable.

The decommissioned Nanisivik mine had no measurable habitat loss discernible at the scale of the north Baffin Island caribou range. Ongoing exploration activities will also have indiscernible effects on habitat loss. There are no other known or reasonably foreseeable activities in the north Baffin Island caribou range (Figure 9-1.2).

Movement

The Project could result in a cumulative effect on caribou movement but it is predicted to be not significant. Project features including the Milne Inlet Tote Road and the proposed Railway to Steensby Inlet and associated access road, may act cumulatively with the existing road corridor from Nanisivik to Arctic Bay to limit caribou movement. However, the significance of this interaction is considered to be negligible because the road corridor by Arctic Bay has a low traffic volume, and based on its position near the northern extent of the north Baffin Island caribou range, there is significantly less directional movement of caribou across that road. Future projects, including the Separation Lake hydroelectric project and the development of Deposits No. 2 to 9, will require linear features (roads and transmission lines) that could also act cumulatively with the linear disturbances from the Project to affect caribou movement. Project effects on caribou movement will be monitored and adaptive management will minimize the effects.

Mortality

The Project will not have a significant cumulative effect on caribou mortality. It will not significantly increase caribou mortality, either directly (e.g., road collisions) or indirectly (e.g., increased hunter access). There are no other projects in the north Baffin Island caribou range that will result in increased activity along caribou travel corridors. The Milne Inlet Tote Road has been in place since the late 1960s, and improvements to that road will not provide direct access from a community (and thus access to caribou habitat for hunting purposes remains at pre-existing levels). Future projects, including the Separation Lake hydroelectric project and the development of Deposits No. 2 to 9, will require linear features (roads and transmission lines) that could also act cumulatively with the linear disturbances from the Project to affect caribou mortality. It is expected that if these induced projects go ahead, they will adopt measures to minimize or eliminate the risk of caribou mortality.

1.4.2.3 Migratory Birds and Habitat - Peregrine Falcons, Snow Geese, Common and King Eiders, Red Throated Loons, Lapland Longspur

Migratory birds, particularly geese, use wetlands throughout the Project area, some of which will be impacted, most likely in locations near the railway and Steensby Port. The potential residual effects on migratory birds and their habitat were assessed by focusing on the following key indicator species: Peregrine Falcons, Snow Geese, Common and King Eiders, Lapland Longspur and Red-throated Loons. No seabird species were included in the residual effects analysis because they occurred in low numbers within the Project's footprint and LSA, and no large seabird colonies were recorded within the RSA.

Residual Project effects for migratory birds, identified for all five key indicator species, will result primarily from habitat loss and sensory disturbance of habitats used for staging, nesting, foraging and brood-rearing. Some mortality might be expected from accidents and collisions (air, vehicular and rail traffic), increased harvesting and/ or exposure to contaminants. While some individual-level displacement and disturbance is expected to occur in a relatively small zone of influence during all Project phases, no changes to key indicator populations are expected.

Other projects with the potential to interact with these Project effects are limited to those in its immediate vicinity, which include the potential future development of Deposits No. 2 to 9 and the Separation Lake hydroelectric project. If a decision is made to seek approval to proceed with development of Deposits No. 2 to 9 and the Separation Lake hydroelectric project, an environmental assessment will be conducted and a detailed assessment of the potential effects of these projects in conjunction with effects of the Project will be provided. The significance of potential cumulative effects will be reviewed by the appropriate regulatory agencies and significant cumulative effects on migratory birds will be avoided.

The effects assessment on migratory birds (Volume 6, Section 4) considered the Project's effects on bird species at risk to be minimal. The credible expansion scenario is not expected to change these conclusions.

1.4.3 Freshwater Aquatic Environment

With respect to Freshwater Aquatic Life and Habitat, the following Valued Components and Key Indicators were considered in the CEA:

- Freshwater quantity;
- Freshwater and sediment quality; and
- Freshwater fish and fish habitat (Arctic char).

1.4.3.1 Freshwater Aquatic Environment– Surface Water Quantity

Residual surface water quantity effects identified for the Project include water quantity reductions in certain lakes resulting from withdrawals, and from diversions of small watercourses, the main diversion being the collection of runoff around the waste rock stockpile at the Mine Site.

There are two potential projects/activities with the potential for cumulative effects on the Freshwater Quantity VC in combination with the residual effects on freshwater quantity of the Mary River Project:

- Development of Deposits No. 2 through 9; and
- Climate change.

Key water quantity related considerations:

- Development of Deposits No. 2 and 3 will require an increase in the use of water at the Mine Site. Development of Deposits No. 4 and 5, or 6 and 7, if mined as satellite operations based from the Mine Site, could also result in an increase (assumed to be a doubling) of water requirements. A doubling in production would result in a doubling of throughput at Steensby Port and possibly Milne Port and camp occupancies will increase accordingly.
- As discussed in Section 1.3.2.7, a doubling in the production rate, from any or all of the additional deposits, is considered the only credible expansion scenario.
- Development of Deposits No. 2 and 3 could also involve additional diversions of runoff around mining and stockpiling areas, although it is expected that these diversions would occur around these deposits, where runoff reports to the Mary River, rather than in the catchments that drain to tributaries of Camp and Sheardown lakes, as is the case with the current Project. Therefore, a cumulative effect on local watercourses due to water diversions around mining areas from development of Deposits No. 2 and 3 are not expected.
- Development of other deposits involving the establishment of camps and other mine site infrastructure at another location outside of the freshwater LSAs.

Based on the above considerations, cumulative effects to water quantity could occur with respect to water withdrawals for potable and other uses to supply larger accommodation facilities at each of the Mine Site, Milne Port and Steensby Port.

Under the assumption that development of additional resources in Deposits No. 2 and 3 would require a doubling of the Project's proposed water consumption, the resulting under-ice volume reductions in Camp Lake (Mine Site), 10-km lake (Steensby Port) and km-32 lake (Milne Port water supply) would all be less than 1 %, well below the recommended withdrawal threshold of 10 % identified by DFO, and does not represent a significant adverse cumulative effect.

Climate change and Water Quantity

Global temperatures are expected to increase in the next century, notably in the Arctic, where average annual temperatures are anticipated to increase, precipitation is expected to increase, sea ice is expected to decline reflecting less solar radiation and the area of land covered by snow is expected to decline (Arctic Council and the International Arctic Science Committee, 2005).

Key water quantity related considerations:

- Increased temperatures may result in a longer open-water season and an increased proportion of precipitation falling as rain;
- Increased precipitation may result in greater volumes of runoff; and
- Increased extreme precipitation may result in larger flood events.

Since potential effects of the Project (and cumulatively, from expansion scenarios) are water withdrawals, it is expected that climate change effect of increased runoff will not result in a cumulative effect. Increased flows have been accounted for by designing to higher return periods and this would also be carried out for expansion development scenarios.

1.4.3.2 Freshwater Aquatic Environment - Water and Sediment Quality

Residual surface water and sediment quality effects identified for the Project include changes to the measurable freshwater quality and sediment parameters, and occasional exceedances of CCME guidelines resulting from non point-source, point-source and airborne emissions.

Effects of the Project on water and sediment quality are confined to portions of the five freshwater LSAs (Volume 7, Figures 7-1.2 through 7-1.6) and are not expected to extend into the freshwater RSA (Volume 7, Figure 7-1.1).

Other projects/activities that may also affect freshwater within the terrestrial RSA include:

- Past, present and future mineral exploration activities (including Baffinland's exploration and bulk sampling programs);
- Potential development of Baffinland's other iron ore deposits;
- Potential development of the Separation Lake hydroelectric project; and
- Climate change.

To date, Baffinland has been the main exploration company operating in the region, and the bulk sampling program has been the largest industrial activity within the freshwater RSA. Local waters have been influenced by drilling operations (Mary River) and discharge of treated sewage effluent from the exploration camp to Sheardown Lake. These effects have been documented by compliance monitoring and water quality baseline studies, and were incorporated into the effects assessment in Volume 7, Section 3.

Deposits No. 2 through 9 are located within the freshwater RSA and have the potential to result in cumulative effects on surface water and sediment quality. Deposits No. 2 and 3 are located in close proximity of Deposit No. 1, and surface runoff from the deposits flows to the Mary River. Factors such as ore and waste rock geochemistry, the location of waste rock and temporary ore stockpiles and other factors will determine the potential water quality effects to the shared receiving water. Mining of these two adjacent deposits would involve an expansion of camp facilities, involving increased water use and higher volumes of treated sewage requiring discharge. There would presumably be additional discharges reporting to the Mary River from runoff of mining Deposits No. 2 and/or 3. The Mary River has additional assimilative capacity, based on calculations carried out in the assessment (Volume 7, Section 3) and parameters of potential concern are not approaching thresholds, so it is a reasonable assumption that the Mary River could assimilate additional discharges of mine runoff and that additional discharges are not likely to increase water quality parameters beyond thresholds. This can be confirmed only with a mine plan and sufficient geochemistry for these deposits, and additional analysis, but ultimately it is expected that significant cumulative effects can be avoided through Project design, as applied in the base case Project. Options include diversion of runoff to other receiving waters and/or additional water treatment.

Development of Deposits No. 2 and 3 are not expected to have cumulative effects to water quality outside of the Mine Site.

The other iron ore deposits recently identified as part of Baffinland's regional exploration program are further removed from the Mine Site, and development of these locations can be expected to involve temporary construction facilities, and either incremental population numbers at the Mine Site camp during operations, or new facilities at the respective deposits, which will have water quality effects within local waters and within the same freshwater RSA. Again, it is reasonable to expect that significant cumulative effects can be avoided through Project design. At a regional scale, even if these additional activities (and discharges) were to occur within the same catchment areas, it is expected the cumulative effects would be insignificant.

Water quality effects from other exploration activities are expected to be minor (low magnitude) and temporary.

Development of the Separation Lake Hydroelectric Project

The likely residual surface water and sediment quality effects (i.e., creation of the reservoir and hydraulic alterations of the system) of the Separation Lake hydroelectric facility would be outside of the Mary River Project RSA for the freshwater environment. Effects of the Project are not anticipated to extend outside of the RSA. No direct spatial overlap of residual hydrological effects is anticipated, and consequently no cumulative effects are anticipated.

There is potential for spatial and temporal interaction of the residual surface water and sediment quality effects resulting from the construction of the transmission line from the hydroelectric facility to Steensby Port with residual effects of the Project. Specifically, construction of the transmission line may result in localized water quality effects (e.g., increases in TSS) where construction activities occur in or near surface waters. Construction activities in or near fresh water would be subject to BMPs and standard mitigation measures to avoid or minimize effects on aquatic ecosystems, including use of sediment and erosion control. Effects that cannot be mitigated would likely be localized, infrequent, of small magnitude, short-term and fully reversible.

Climate Change

Climate change may have direct and indirect effects on freshwater and sediment quality in the Project LSAs and RSA through changes in air temperatures, precipitation and ultraviolet radiation. These effects may lead to the following changes in water and sediment quality:

- Increased productivity due to increases in water temperatures and/or lengthening of the open-water season;
- Lake bottom waters are likely to experience reduced oxygen levels as lake productivity increases;
- Earlier and more open water will result in more wind mixing, upwelling and greater nutrient availability;
- Earlier onset of stratification within lakes;
- Increased flows and reduced ice cover in river systems will result in increased erosion and sediment transport and increased nutrient transport and mixing;
- Permafrost thaw is likely to increase when mean annual air temperature rises and approaches 0°C resulting in a potential positive feedback loop;
- Potential increases in elemental (e.g., metal) availability and biomagnification; and
- Water quality parameters may become concentrated as shallow river systems dry out and ponds/wetlands experience reduced water volume due to increased percolation and evaporation.

There is a high level of uncertainty in predicting the effects of climate change on freshwater and sediment quality and determining the potential for cumulative effects. Monitoring and adaptive management are recommended to confirm effects predictions and ensure mitigation measures are adequate.

1.4.3.3 Freshwater Fish, Fish Habitat and Other Aquatic Organisms - Arctic Char

Residual freshwater fish, fish habitat and other aquatic organisms effects identified for the Project include effects to char health, habitat and mortality.

There are three potential projects/activities with the potential to interact with the residual freshwater fish, fish habitat and other aquatic organism effects of the Mary River Project:

- Development of the Mary River Project Deposits No. 2 to 9;
- Development of the Separation Lake hydroelectric project; and
- Effects of climate change on aquatic ecosystems.

Mary River Project Deposits No. 2 to 9

Development of these other deposits could potentially overlap spatially and/or temporally with the effects of the Mary River Project on freshwater biota and habitat. Major linkages may include effects on Arctic char health and condition (due to water and/or sediment quality changes), effects on char habitat and/or direct mortality.

Cumulative effects may occur in two ways:

- A spatial overlap of the current Project with an expansion scenario that doubles the production output with the development of the adjacent Deposits No. 2 and 3. Under this scenario, cumulative effects to Arctic char health and condition could result from cumulative effects to water and/or sediment quality. Development of these adjacent deposits is expected to result have minimal effects to habitat and no direct mortality.

- Development of other deposits removed from the Mine Site, which will likely result in new impacts to Arctic char health, habitat and mortality that contribute to a cumulative effect on char at a regional scale (i.e., within the freshwater RSA).

Either scenario will require environmental assessment. Any additional effects to fish and fish habitat will require an authorization under the *Fisheries Act*. With appropriate compensation measures implemented to the satisfaction of the Department of Fisheries and Oceans, it is expected that effects to fish and fish habitat are adequately mitigated. All effluents will be subject to an aquatic effects monitoring program under the Metal Mining Effluent Regulations of the *Canadian Environmental Protection Act*. Due to the nature of these regulatory requirements, it is expected that cumulative effects of the current Project and any doubling expansion scenario will be mitigated to acceptable levels. The cumulative effect on Arctic char is predicted to be not significant.

Development of Separation Lake Hydroelectric Project

The Separation Lake hydroelectric project is located outside of the freshwater RSA. Therefore, any effects to Arctic char resulting from this potential project will not contribute to cumulative effects to within the spatial boundaries of the cumulative effects assessment on Arctic char (the freshwater RSA).

A transmission line associated with the hydropower project will run through the freshwater RSA to Steensby Port at a minimum. Construction of the transmission line may result in localized water quality effects (i.e., increases in TSS) where construction activities occur in or near surface waters. Construction of transmission lines generally does not involve direct loss of fish habitat, as Project footprints are typically restricted to the terrestrial environment. There is limited potential for cumulative effects.

Climate Change

Climate change may have direct and indirect effects on freshwater biota in the Project LSAs and RSA through changes in air temperatures, precipitation and ultraviolet radiation. Climate change effects on aquatic biota will also be mediated through changes to hydrology and water quality, which are described in Sections 1.4.3.1 and 1.4.3.2, respectively.

The cumulative effects of the Project and climate change on Arctic char and freshwater biota in general are inherently difficult to predict and associated with high uncertainty. The Arctic Climate Impact Assessment predicts that increasing water temperatures are likely to result in an increase in food chain productivity that will likely result in an increase in growth rates of Arctic char (Arctic Council and the International Arctic Science Committee, 2005). It is possible that climate change could also result in adverse effects such as an increase in the accumulation of metals in fish tissue due to a higher respiration rate associated with warmer water (lower in dissolved oxygen). These two competing effects of climate change on are not expected to cumulatively affect Arctic char in a meaningful way, although there is a high degree of uncertainty in the predicted effects of climate change.

1.4.4 Marine Environment

1.4.4.1 Sea Ice

The Project will have residual effects to landfast ice and pack ice within the marine LSA.

Icebreaking will disrupt landfast ice in Steensby Inlet. The sea ice impact assessment (Volume 8, Section 2) identified residual effects to landfast ice, conservatively estimating a track width of 1.36 km wide to cause a disruption of 1.9 % along the shipping route in May when the spatial extent of landfast ice is at a maximum, and an estimated disruption of 4.0 % along the shipping route in July when break-up occurs.

Under proposed production levels, five repeat uses of the ship tracks in landfast ice are anticipated. Should iron ore production double, the maximum anticipated disruption of landfast ice would be expand proportionally, i.e., to approximately 3.0 km wide (4 % in May and 8 % in July) and should the production be halved, the landfast ice disruption would be approximately 0.75 km wide (1 % in May and 2 % in July).

Table 9-1.5 Approximate Width of Landfast Ice Disruption from Vessel Traffic with Various Transits Under Different Production Levels

Vessel Traffic	5 Repeat Transits	7 Repeat Transits	20 Repeat Transits
Proposed (136 transits)	1.36 km	0.97 km	0.34 km
Doubled (272 transits)	2.72 km	1.94 km	0.68 km
Halved (68 transits)	0.68 km	0.49 km	0.17 km

Based on the threshold limit of disruption of 10 % of ringed seal landfast ice habitat per year and 10 % disruption of bearded seal pupping habitat along the landfast ice edge per year, significant effects to these habitats are not anticipated to occur as a result of proposed or doubled shipping activities.

Pack ice was considered as a subject of note in the residual effect analysis in Volume 8. The subject of note identified a disruption of pack ice in Hudson Strait and Foxe Basin by Project shipping activities. The analysis identified a negligible effect on ice regime, on the assumption that ship tracks would closed within hours of the ship passing. This is based on the mobile characteristic of pack ice, subject to wind and tide currents and on the low frequency of Project shipping activities in the ice-cover season.

The current Project will involve icebreaking through pack ice in Foxe Basin and Hudson Strait of a frequency of one ship passage (either direction) about every other day. Under the credible scenario of doubling the production rate at the Mary River Project, this level of traffic could conceivably double. At present, only two icebreaking passages occur into the Raglan Mine each winter. Another reasonably foreseeable project is the Roche Bay Iron Ore Project, which could ship iron nuggets to the Port of Churchill (Section 1.3.2.6). No details on shipping are available other than an acknowledgement that year-round shipping may be required. Based on an assumption that 50,000 DWT Panamax sized icebreakers were utilized, approximately 20 voyages per year would be required to transport 1 Mt/a of iron nuggets, equating to a shipping frequency of one ship every two to three weeks. It is likely the Roche Bay's ships, sailing direct to the Port of Churchill, would sail some distance from the Mary River nominal shipping route. Given the distance from Roche Bay's assumed shipping route in the context of sea ice effects due to the Mary River Project's operations, the minor amount of current icebreaking that occurs (Table 9-1.1), mainly the *MV Arctic* sailing to Raglan Mine, the expansion scenario of the Mary River Project will be the main potential increase in icebreaking through Foxe Basin and Hudson Strait. As with the base case, cumulative effects of the expansion scenario are not anticipated, as effects of ship passage on sea ice are all considered as standalone events within a highly dynamic ice environment where the ship track usually becomes indiscernible within hours of ship passage. Additionally, the spatial distribution of ship tracks is miniscule in the context of the large geography of Foxe Basin and Hudson Strait.

Ice cover is expected to be reduced by climate change. It is not expected that icebreaking through the pack ice combined with climate change will result in a measurable cumulative effect.

1.4.4.2 Marine Water and Sediment Quality

Under the credible scenario of a doubling of production at Mary River by mining additional deposits, no changes to infrastructure at Steensby Port will be required. However, an approximate doubling of the number of ships that call on Steensby Port (and possibly Milne Port) can be expected. This will result in a doubling of the frequency of discharge of ballast water. The effects assessment for the current Project predicted that localized effects on temperature (i.e., slight increase) will occur in the immediate vicinity of the dock sites, that salinity and metal concentration thresholds will not be exceeded, and that a ballast water eddy of lower nutrient (silicate and nitrate) concentrations could occur in offshore areas. Therefore, it is predicted that the effects of ballast water discharge at the port sites will be of low magnitude (Volume 8, Section 3.5.2.3).

The Project will also result in the deposition of ore dust around the ore docks. The heaviest deposition will occur at the Steensby Port, since the stockpiles and ore dock are surrounded by water. The effects assessment predicted that, based on air quality modelling for the Project, changes to marine water and sediment quality would be within acceptable limits. A doubling of production would increase ore dust deposition in the marine environment. Should the expansion scenario proceed, revised air quality modelling would form part of another environmental assessment, and the effects of increased dust deposition to the marine environment would be required. Monitoring of dust deposition through an air quality monitoring program (Volume 5, Section 2) and an expected aquatic effects monitoring program (Volume 8,Section 3.3) during the Project will also provide real data regarding ore dusting and deposition rates in the terrestrial and marine environments. If initial modelling of the higher production rate suggested high magnitude effect that is significant, additional mitigation of dust emissions would be needed to reduce those effects to levels that are not significant.

1.4.4.3 Marine Habitat and Biota

Volume 8 identified residual effects to marine habitat (<1 % disruption of marine coastal habitat in Steensby and Milne Inlets), Arctic char health (as determined through changes to water quality) and invasive species introduction (as a result of ballast water introduction).

Doubling of production at Mary River may require a larger dock infrastructure at Steensby Port. However the description of marine coastal habitat remains less than 10 %. No cumulative effects to marine coastal habitat are expected. As described in Section 1.4.4.2, doubling the frequency at which ore carriers discharge ballast water at each of the ports, this will not adversely affect water quality; therefore, an increase in effects to Arctic char health are not expected.

The possibility of invasive species introduction as a result of ballast water management was identified in the marine biota assessment. Adherence to legal requirements regarding ballast water exchange (or alternatively, treatment) will be effective mitigation in addressing this potential concern, and an increase in shipping as a result of the Project will not change this conclusion.

1.4.4.4 Marine Mammals

Residual effects are predicted for the marine mammal VEC (all six indicator species). Project effects, with the exception of potential masking for bowhead whales, are not predicted to occur outside of the LSAs. The following lists the types of residual effects and the Project activity that may cause the effect for each indicator species.

- Ringed seals: habitat change (changes in ice from icebreaking), disturbance (shipping, aircraft overflights, construction) and mortality (icebreaking).
- Bearded seals: habitat change (changes in ice from icebreaking), disturbance (shipping, aircraft overflights, construction) and masking (shipping).
- Walruses: habitat change (changes in ice from icebreaking), disturbance (shipping, aircraft overflights, construction) and masking (shipping).
- Beluga whales: habitat change (changes in ice from icebreaking), disturbance (shipping, aircraft overflights, construction) and masking (shipping).
- Narwhals: habitat change (changes in ice from icebreaking), disturbance (shipping, aircraft overflights, construction) and masking (shipping).
- Bowhead whales: habitat change (changes in ice from icebreaking), disturbance (shipping, aircraft overflights, construction) and masking (shipping).
- Polar bears: habitat change (changes in ice from icebreaking), disturbance (shipping, aircraft overflights, construction, camp operations) and possibly mortality (if a polar bear is killed in defence of human life).

Routine Project Shipping

Cumulative effects to marine mammals are possible, particularly in the marine LSA, where other vessels (e.g., Canadian Coast Guard) engage in icebreaking that may interact with Project shipping activities along the southern shipping route. Based on information acquired from INNAV for 2002-2010 (see Table 9-1.1), there are relatively few vessel transits during the ice-cover period in Hudson Strait and Foxe Basin. From November to June, an average of two icebreaking vessels per month can be expected in these areas. The vessels that operate in and near the southern shipping route might cause some localized avoidance behaviour by pinnipeds, whales and polar bears and some masking in whales (as discussed in Volume 8, Sections 5.6 to 5.12). But the effects are predicted to be short-lived and will not affect the overall well-being of the animals. Icebreaking ore carriers in the Baffinland Project are expected to transit the southern shipping route every two days. Given the length of the southern shipping route, it is unlikely that Project ore carriers would occur close enough to other icebreaking vessels to create synergistic noise effects on marine mammals.

During the open-water period, Project shipping may interact with other vessel traffic along the northern and southern shipping routes, particularly in the LSA. Based on information acquired from INNAV for 2002-2010 (see Table 9-1.1), vessel traffic increases substantially in some areas during July to October, with most traffic in August and September. It should be noted that vessels in the INNAV database include barges, CCG, DFO, fishing, tugs, tankers, naval ships and pleasure craft that vary in size, engine type, operational speeds and noise output. In Hudson Strait, about 26 vessels per month transit through this area during July to October (see Table 9-1.1). Only 2-6 vessels per month continue on into the eastern side of Foxe Basin, where Baffinland's southern shipping route extends into Steensby Inlet. There is potential for cumulative disturbance effects between Project vessels (expected 15 per month based on a vessel every two days) transiting the southern shipping route, particularly Hudson Strait. However, relatively few pinnipeds, whales and polar bears are expected in Hudson Strait waters during the open-water period because marine mammals are located in summering areas (in the case of whales), widely dispersed (in the case of seals), or located at and near haul-out sites, typically tens of kilometres away from the shipping lane (in the case of walruses). Based on the INNAV data, there is a moderate increase in vessel activity along the northern shipping route during the open-water period (see Table 9-1.1). On average, 18 and 11 vessels per month transit through Eclipse Sound in August and September, respectively. Only 4-5 per month occur in Milne Inlet. As ship transits to Milne inlet are anticipated to be infrequent during operation (less than one per year), there is a low potential for cumulative disturbance effects on marine mammals to occur along the northern shipping route

A doubling of mine production would see a similar increase in ore shipping, with a consequent doubling in the quantities of ballast water released at the Steensby port site. A numerical model was developed for Steensby Inlet (Volume 8, Appendix 8B-1) and this model was used to assess the distribution and dispersion of ballast water from ore carriers during Project operations. The sensitivity analysis of the model results included a doubling of the volume of ballast water released. The study result indicated a very low concentration of ballast water throughout Steensby Inlet (less than 0.4 %) under the planned level of ore production. This value remained low everywhere, even when discharge rates are doubled. The concentration of ballast water at all places in the inlet varies nearly linearly with the discharge rate of ballast water. The effect of ballast water on temperature and salinity in Steensby Inlet is well below natural variation and hence predicted to be negligible (not discernible), even with a doubling of input.

A doubling in ore production will increase the number of vessel transits, and hence the number of times/locations where vessels will pass each other when in transit. The potential increase in received sound level was considered for the event of two cape-size ore carriers passing in close proximity to each other. Ore carriers are expected to maintain a minimum separation distance of 1 nautical mile (T. Keane, FedNav, pers. comm.) along the shipping route. For purposes of this assessment, it was conservatively assumed that the minimum separation distance between two ore carriers will be 1 km. The acoustic noise literature (e.g., Richardson *et al*. 1995; Hansen 2005; Bies and Hansen 2009) indicates that the combined source level of two identical and co-located incoherent noise sources is the value of the source level from one of the sources plus 3 dB. The more dissimilar the two noise sources, then the lower the adjustment factor will be; for e.g., when the source levels are 20 dB different, then the combined source level will be one source level plus 0.043214.

The maximum increase (3 dB) in the combined received levels will occur at locations near or far from both vessels where the separate received levels from both sources is identical. For two identical ships and in the case of marine mammals, this would occur when the marine mammal is perpendicular to the mid-point of the shortest path between the two vessels. If the two vessels are abeam of each other, then this location would be forward or astern of the two vessels. If one vessel is astern of the other then this location would be abeam of both vessels. Marine mammals that may occur between two vessels passing in close proximity would be exposed to increased sound levels for a relatively short period of time. As assessed for a single vessel passage, effects on marine mammals from exposure to noise from two ore carriers are predicted as not significant.

Future Development at Mary River

If iron ore Deposits No. 2 to 9 at the Mary River Project and the Separation Lake hydroelectric project proceed, aircraft overflights will likely increase. A modest increase in air traffic at Steensby Port (and the mine site) may occur. It is anticipated that the Project would be in the Operations Phase and that air traffic at Steensby Port would be very limited. In addition, all aircraft will maintain a minimum altitude of 450 m over marine waters when possible, and will be prohibited from flying low over marine mammals for photography or sight-seeing. Increased air traffic at Steensby Port would have minor disturbance effects on marine mammals over the short-term.

For purposes of this assessment, doubling of production at Mary River is assumed to result in an approximate doubling in shipping frequency, i.e., approximately one transit every day along the southern and northern shipping routes. This would likely increase the potential for synergistic cumulative effects through the likelihood of more than one ore carrier transiting a given area at the same time. Synergistic disturbance and masking effects are most likely to act on belugas, narwhals and bowhead whales in Hudson Strait during the ice-cover season. During the open-water period, cetaceans, particularly narwhals in Eclipse Sound and Milne Inlet, may also experience synergistic disturbance and masking effects. These cumulative effects, especially masking, could extend beyond the LSA. If a decision is made to seek approval to proceed with the development of additional Mary River ore deposits, an environmental assessment will likely be required, and no doubt it will include a detailed cumulative effects assessment. Special consideration would be given to marine mammal species listed on Schedule 1 of the *Species at Risk Act* (SARA). The certainty level in cumulative effects predictions at that time will be increased by the results of the marine mammal monitoring program proposed for shipping activities associated with the current Project; this monitoring program is expected to address the uncertainties in marine mammal response to ore carrier traffic in Hudson Strait.

1.4.5 Communities

With respect to Communities, the following Valued Components and Key Indicators were considered in the cumulative effects assessment:

- Population demographics (demographic stability);
- Human health and well-being (substance abuse, community and social stability); and
- Community infrastructure and public service (competition for skilled workers).

For the purpose of this assessment only negative residual effects were addressed, though it should be noted that most of the residual socio-economic effects of the Project will be positive. In considering the cumulative effects that may arise through interactions with other projects and other reasonably foreseeable projects, none of the positive residual effects are expected to become adverse, and therefore, these positive residual effects are not considered further.

The following VSECs were determine to have the potential for negative residual effects:

- Population demographics;
- Human health and well-being;
- Community infrastructure and public services; and
- Culture, resources and land use.

1.4.5.1 Population Demographics – Demographic Stability

Spatial Scope

The spatial scope is considered to include the LSA. This includes five communities of the North Baffin Region - Hall Beach, Igloolik, Arctic Bay, Pond Inlet and Clyde River - and the community of Iqaluit. In addition to these priority point-of-hire communities, cumulative effects on population demographics of other communities in the RSA are also considered.

Temporal Scope

The communities are continuing to adapt to the tremendous demographic changes that have been experienced since Inuit first started moving into government-serviced communities in the 1950s. Population growth has been rapid, leading to a situation where, for the first time, the older generation finds itself living in an environment where they do not recognize everyone in their community. The recent decentralization of government departments to Igloolik and Pond Inlet has further led to demographic changes as Inuit and non-Inuit from across the RSA and Canada have moved to take on these and other government service jobs. This process of adaptation to demographic change is expected to continue well into the future as the youth, demographic profile ages. Combined with limited economic opportunity, migration out of the community is expected to maintain a degree of demographic adjustment well into the future, beyond the life of the Project. For the purpose of cumulative effects assessment, a temporal limit of two generations is considered - roughly 40 years.

During this time frame, further mine developments in the LSA, including advancement of any of the Mary River Deposits No. 2 through 9 and the Roche Bay Iron Ore Project, are possible. In addition, the proposed Nanisivik Naval Facility may proceed, which may influence nearby Arctic Bay. The Roche Bay Iron Ore Project would likely prioritize employment from Igloolik and Hall Beach and possibly nearby Kivalliq Region communities of Coral Harbour and Repulse Bay.

1.4.5.2 Population Demographics Assessment

These potential projects are not yet adequately defined to support assessment of probability of their advancement or of the magnitude of their effects on population demographics. However, sufficient insight can be gained to support a qualitative assessment of the cumulative effects.

In-migration

No direct in-migration interactions are expected between mining operations such as the Meadowbank, Doris North and the Raglan projects and the LSA. Nor is advancement of the Mary River Deposits No. 2 through 9 expected to lead to additional in-migration, since such a project is expected to use similar labour components as the currently proposed Project. Should Roche Bay proceed, a modest level of in-migration may arise if local offices are established in Hall Beach or Igloolik. This is an uncertain effect, but is considered to be a possibility.

The advancement of the Nanisivik Naval Facility may lead to an unknown level of in-migration to Arctic Bay. The project is expected to primarily affect Arctic Bay. However, uncertainty related to this project prevents reliable assessment of the level of positions such a facility might introduce to that community. Arctic Bay is not considered to be a likely candidate for Project-related in-migration, so any such effect arising from the Naval Facility is unlikely to be cumulative to Project-related in-migration in that community.

The possibility for indirect in-migration interactions is recognized. Should one of the RSA projects undergo temporary or final closure during the temporal scope of the Project, it is reasonable to anticipate that the laid-off skilled work force may seek employment elsewhere across the RSA. It is assumed that they would first seek employment in areas where they would not be required to migrate away from their home communities. However, if employment were not available locally, some may migrate to a point-of-hire community where they can access other projects, including the Baffinland Project. This is expected to more probably involve moving to Iqaluit than to the North Baffin, since the capital is already home to Inuit from across the RSA and likely to include some extended family or friends.

The reverse effect may also be anticipated. Within the temporal scope, the Baffinland Project will close. By that time, a large number of local residents will have gained considerable skills of value to other projects across the RSA. If no further projects pick up these skilled workers, some may choose to migrate to point-of-hire communities in other regions. Out-migration from the LSA will be experienced as in-migration in these communities.

Potential cumulative in-migration effects are acknowledged as possibilities. They are highly contingent on future developments of the relative labour markets of each of the regions of Nunavut. Where such cumulative in-migration effects do occur, they are expected to be of low magnitude and focused primarily in the larger regional centres where thresholds for in-migration are higher than in the smaller North Baffin communities. In light of current expansion of mineral exploration and mining activities across all regions of Nunavut, such effects are not likely to be experienced in the near to medium term. It is expected that on-going development of Iqaluit as Nunavut's capital city will strengthen its ability to accommodate Nunavummiut from across the territory moving to seek opportunity. Cumulative effects may arise in the future under this scenario, however these are not expected to be experienced as adverse effects.

Out-migration

The decision process that leads families or individuals to migrate away from their home community is complex and multi-dimensional, related to factors such as opportunity, wealth, personal relationships, access to health care, education services and so forth. Mobility options are considered to be a positive effect at the level of individuals and families. The adverse dimension relates to the outcome that high levels of out-migration may have on the stability or "fabric" of a community.

The scale of the Project is large enough that North Baffin residents who gain skills of potential value at any of the other mine projects in the LSA or RSA will also be able to work at the Baffinland Project itself. The potential for cumulative effects on out-migration is expected to arise if there is a temporary or final closure of the Project. At that point, residents who have gained skills and experience at the Project may seek work elsewhere. It is expected that those who have chosen to remain resident in North Baffin communities — rather than choosing to relocate to either Iqaluit or Ottawa while working at the Project — will initially seek work that allows them to continue living in the North Baffin. The Roche Bay project, if it were operating, would be expected to provide points-of-hire in some of the LSA communities, but perhaps not all of them. The specific effects cannot be assessed since that project has not yet entered the NIRB review process and details are not available. For example, it is not known if Roche Bay would, if it were to become a mine project, provide transportation for residents of all LSA communities or only those closest to that project. If the latter is the case, the possibility that Project workers from non-Roche Bay points of hire might leave their LSA community to move to a Roche Bay hiring point would rise.

If neither the Roche Bay nor the Mary River Deposits No. 2 to 9 is developed within the temporal scope of this assessment, then final closure of the Project is expected to lead to out-migration as some residents who gained skills during the Project seek work at other mining projects across the territory or across Canada. This is most likely to occur at final closure of the Project, some twenty years into the future. There is no generally accepted threshold for the level of out-migration that would lead to significant adverse effects on community fabric in small Nunavut communities. For the purpose of this assessment, a "low" out-migration effect was set at <1 % of the population—equivalent to up to 15 individuals in a community the size of Igloolik or Pond Inlet. A "high" level of out-migration was considered to be 5 % or more, or some 70 individuals moving away. Whether or not these thresholds are reached at some future time will be contingent on many factors related to the direction of development in the region, economic opportunities in other regions, and individual choices and preferences related to lifestyle. Given the uncertainty related to outmigration effects and its implications for communities, the area of demographic change is included in the socio-economic monitoring framework (Volume 4, Section 15).

1.4.5.3 Human Health and Well-being

Spatial Scope

The spatial scope is considered to include the LSA. This includes five communities of the North Baffin Region - Hall Beach, Igloolik, Arctic Bay, Pond Inlet and Clyde River - and the community of Iqaluit.

Temporal Scope

A temporal scope for consideration of cumulative effects on human health and well-being is established in relation to ongoing adaptation to rapid socio-economic changes in the LSA over the past fifty to seventy-five years. Exposure to alcohol and drugs, for example, is a fairly recent phenomenon, as is access to substantial monetary wealth. These changes have raised new challenges for Inuit individuals, families and society generally as they seek to establish new norms that reflect values and vision. This adaptation process can reasonably be expected to continue well into the future. To establish a temporal scope for cumulative effects assessment, two generations (approximately 40 years) will be considered.

Substance Abuse

Project effects on substance abuse are assessed to be complex, with both positive and negative direction. The positive influence relates to changes in attitudes and support for overcoming addictions. However, as personal income increases due to employment at the Project, residents will be more able to afford substances. The interplay between "availability," "attitudes" and "wealth" will determine the outcome. Baffinland's mitigation measures are designed to tilt the balance toward positive residual effects – i.e., less substance abuse. These are described in the Human Resource Management Plan (Appendix 10F-3) and include the following measures:

- The use of alcohol and illegal drugs at the site will be prohibited. Baffinland has also committed to strict measures to prevent use of the Project as a means to transport illegal substances into the North Baffin.
- Planned orientation and training programs to include components that provide information about substances, substance abuse, productive approaches to stress management, healthy living, money management practices and other components that may influence lifestyle choices.
- An employee and family assistance program (EFAP) will be implemented to support some individuals in recognizing and dealing with their addictions.
- Community support programs funded through the Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat.

The potential for other mine projects to interact with the Project to affect the cumulative outcomes on substance abuse is considered limited. Concern would arise if another project provided points of hire in the North Baffin without effective measures to prevent substance imports and support healthy attitudes toward the responsible use of alcohol. This could lead to a situation where the balance between "availability," "attitude" and "wealth" is tipped toward adverse effects. This scenario is considered improbable. The potential for acceptance of drug and alcohol use on-site at any remote fly-in/fly-out mine site is considered low within the temporal scale being considered. The negative safety and liability implications are too high.

Whether this assumption of prohibitive policy toward substances would hold true for the Nanisivik Naval Facility is not known. If that project were linked by a road to Arctic Bay and if a permissive environment were allowed with respect to the importation of substances, some spill-over effects could be envisioned. These might be considered to be cumulative in the sense that Project income could combine with increased availability. Monitoring of substance abuse is identified in the Volume 4 socio-economic monitoring framework as a dimension of health and well-being; collaboration will be required among multiple stakeholders. In this scenario, the naval facility would, presumably, be expected to participate in monitoring discussions related to substance abuse.

Absence from the Community

Fly-in/fly-out projects require residents to be absent from their community for a period of time. At some threshold level that is not well-defined, community processes and "community fabric" may be disrupted. The rate at which change occurs from "residents staying in the community" to "residents leaving to work away" is expected to affect the level of disruption. In the LSA, Inuit have long experienced situations where prolonged absence from family groups was a necessary characteristic of a hunting lifestyle. More recently, intermittent absence is caused by hunting trips, medical travel and education pursuit.

The Project will substantially increase the intermittent absence of community members. The magnitude of this effect is contingent on the number of residents who find employment there. It is anticipated that at the start of the Project, the level of employment will be limited more by local labour force capacity than by demand for workers. As this capacity increases through improved life skills, education and technical skills, the potential level of engagement—and therefore absence from the community—will increase. This is expected to take place in a gradual manner, providing time for community adaptation.

The addition of other fly-in/fly-out projects that provide point-of-hire opportunities will contribute to the magnitude of absence from communities only when labour demand constraints outweigh the current labour supply limitations. This will not be the case during the short or medium term of the Project. Rather, participation in fly-in/fly-out work will be limited by the number of qualified people willing to engage in Project employment. A cumulative increase in the number of fly-in/fly-out workers may occur over the longer term as progress is made in improving "readiness to work," education, and technical skills of residents, and if development of Roche Bay and/or Mary River Deposits No. 2 to 9 proceed. Development of local community-based employment opportunities for these same skilled workers could also arise, and this would serve to provide alternatives to jobs that require workers to be absent from the community.

Given these considerations, cumulative effects associated with the addition of foreseeable fly-in/fly-out employment opportunities are not anticipated over the short to medium term of the Project. The potential that over the longer term, cumulative worker absence brought on by additional projects and increased labour force capacity to engage in these projects could reach a level where communities begin to be affected is acknowledged. Monitoring the implications of worker absence on community fabric is addressed in the socio-economic monitoring framework of Volume 4. The implications of cumulative levels of worker absence should also be included in regional cumulative effects monitoring.

1.4.5.4 <u>Community Infrastructure and Public Services</u>

Spatial Scope

The spatial scope is considered to include the LSA. This includes five communities of the North Baffin Region - Hall Beach, Igloolik, Arctic Bay, Pond Inlet and Clyde River - and the community of Iqaluit.

Temporal Scope

The establishment of local communities began during the 1950s. Since then, infrastructure and services have developed gradually, with a focus on essential services. More recent investments have led to social infrastructure and services in areas of education and health. These are ongoing and gradual with substantial gaps in services between North Baffin, Iqaluit and typical Canadian "standards." Given the small economies and remote nature of the LSA communities, particularly those of North Baffin, access to the labour required to carry out essential hamlet services has been procured in a largely buyer's market—local residents with skills have essentially had one employer from whom to seek work.

The initiation of the Project will change the terms of labour exchange in North Baffin communities by introducing competition for labour. This will lead to a period of adaptation as local employers learn the new rules of the labour market game. The temporal scope of the assessment of cumulative effects is therefore set as twenty years, a reasonable adaptation period.

Competition for Skilled Workers

Three factors will affect the new equilibrium in the local labour market for municipal employment:

- The level of demand for workers having the skills required by municipalities;
- The level of these skills available "for rent" in the local labour force; and
- The relative ability of municipal employers to compete for these skills.

Three classes of projects have the potential to increase demand for workers. The Roche Bay Project and the development of Mary River Deposits No. 2 to 9, if they proceed, may increase demand for workers who are willing to engage in the fly-in/fly-out lifestyle. As with the Project, this competition may lead to some local transitional effects that may persist until municipal employers adapt to the competitive environment. Generally, local employment is expected to have some competitive advantage over fly-in/fly-out work, so this adaptation is expected to be readily achievable. In the medium and long-term, it is expected that the positive labour force capacity development effects associated with the Project—and assumed to be included in future projects as well—will lead to improved conditions for procurement of skilled labour from the local communities.

A second potential effect on the terms for local labour procurement may arise from mine developments in the RSA—such as Meadowbank and Doris North. These projects have been assessed during their respective NIRB review processes and no adverse cumulative effects on the LSA were identified. Nor are any such effects anticipated from this renewed consideration of these projects.

Additional employers in the LSA communities may present direct competition for labour. The projects that may have such an effect include Roche Bay and the Nanisivik Naval Facility, if they establish local offices in LSA communities. This is foreseeable; however, while there is not adequate detail to quantitatively assess these effects, they are not expected to be substantial.

Consideration of these potential interactions on the cumulative effects on competition for skilled workers leads to a conclusion that no significant adverse cumulative effects will arise in the area of Community Infrastructure and Public Services VSEC.

1.4.6 Culture, Resources and Land Use

With respect to the Culture, Resources and Land Use VSEC, the following key indicators were considered in the cumulative effects assessment:

- Archaeological sites; and
- Land use (harvesting; travel and camps).

Archaeological Sites

As described in Volume 4, Section 9, archaeological sites can be affected by ground disturbance and human presence. Provided archaeological surveys are conducted and identified sites are systematically mitigated under permits authorized by the Government of Nunavut, Department of Culture, Language, Elders and Youth (CLEY), the adverse residual effect is considered negligible. The chance still remains that sites can be discovered and damaged by increased human presence, and that chance finds during Project activities may result in a partial or complete loss of the archaeological record in a site. Baffinland has established measures to reduce the potential for the latter two effects to occur.

The potential for cumulative effects exist through the following other projects and activities:

- The credible expansion scenario of Deposits No. 2 to 9 by Baffinland;
- Ongoing exploration by Baffinland and others;
- Separation Lake hydroelectric project; and
- Traditional land use and harvesting activities.

Additional exploration or development activities by Baffinland are expected to have a low potential for adverse effects to archaeological sites, given that there is an understanding of the importance of such cultural resources, protocols and training within the organization. Exploration by others has the potential to cumulatively affect the archaeological resources in the region, if archaeological surveys do not precede ground disturbance activities and if training and protocols are not in place. Inuit land use is expected to have a very minor potential effect to archaeological sites, given the small scale of such activities, although many archaeological sites continue to be used by Inuit today, and this in fact represents an important connection to their past. Overall, the potential cumulative effect on archaeology within the study area is predicted to be not significant.

Land Use

Residual effects of the Project on land use include effects on caribou harvesting that, while they are expected to be minor, relate to the potential for caribou mortality due to collisions with the Railway (Volume 4, Section 10). Additional effects to land use will occur, including disturbance to camping areas at Milne Port, general disturbance and safety concerns related to Project-related traffic and Inuit hunters along the Milne Inlet Tote Road, potential crossing issues along the Railway and a detour on the Steensby Inlet fast ice. Mitigation has been identified and the residual effects are predicted to be not significant.

Other Project or activities that could also affect land use include:

- Baffinland's proposed monitoring programs;
- Mineral exploration activities, by Baffinland and others;
- Expansion scenarios for Deposits No. 2 to 9;
- Development of the Separation Lake hydroelectric project; and
- Shipping activities by others, including potentially the Nanisivik Naval Facility and the Roche Bay Iron Ore Project.

Helicopter activities associated with baseline (and potentially, monitoring) programs as well as mineral exploration has been noted as a nuisance to local hunters. Baffinland has designed a monitoring program that minimizes the need for terrestrial aerial surveys, opting for a hunter-harvest study as a potential alternate monitoring tool. Establishment of Project infrastructure including the Milne Inlet Tote Road and eventually the Railway, as well as site access roads, will reduce dependence on helicopters, although they will be necessary for mineral exploration by Baffinland and others, as well as development scenarios for the other iron ore deposits or development of the hydropower project. Adherence to the government's minimum flight altitude of 600 m will help to mitigate disturbance effects.

The Project will also result in interactions with marine water and fast-ice use for travelling and hunting. Under the credible expansion scenario for the other deposits, increased shipping will occur. This will mainly affect the frequency of ore carrier-small boat interactions in the open water, which is expected to be a low magnitude effect. The effect of icebreaking through the fast ice in Steensby Inlet will not change.

Other projects that may have interactions with marine use (open water and fast ice) are removed from the Project's shipping routes and, if effects occur, they will likely be to the communities of Hall Beach and Arctic Bay. The effect would not be cumulative above and beyond the effects of the Mary River Project, as they will affect other users within the land use study area.

Overall, cumulative effects to land use are predicted to be not significant.

1.5 MONITORING CUMULATIVE EFFECTS

The potential for cumulative socio-economic effects arising from interactions between the Project and other foreseeable projects is acknowledge. None of these cumulative effects are assessed to lead to significant impacts. However, uncertainty related to thresholds, the choices people make, and the direction of future development suggests that monitoring needs to take place. The socio-economic monitoring framework described in Volume 4, Section 15, addresses the need for collaboration in many areas of monitoring. Initiatives such as the Q-SEMC are well-designed to undertake monitoring related to cumulative effects. As indicated in the socio-economic monitoring framework, Baffinland intends to participate in these collaborative initiatives.

1.6 SUMMARY AND CONCLUSIONS

The cumulative effects assessment identifies assumed residual Project effects or preliminary indications of residual effects, other projects and activities that may interact with the Project residual effects, potential cumulative effects of the Project, and proposes mitigation measures.

Although cumulative effects have been identified as a possibility for several VCs, particularly caribou and marine mammals, no significant cumulative effects are anticipated to result from the Project. With the exception of marine mammals, most potential cumulative effects identified were the result of potential interactions with projects that may be induced by the Mary River Project (development of Deposits No. 2 to 9 and the Separation Lake hydroelectric project). As noted, if a decision is made to move forward with these projects (contingent on the Mary River Project proceeding), an environmental assessment will be conducted, including a detailed assessment of the potential effects of these activities in conjunction with effects of the Mary River Project. In this capacity, the potential cumulative effects would be reviewed by the appropriate regulatory agencies and any potential significant cumulative effects would be identified and avoided.

1.7 AUTHORS

The cumulative effects assessment framework was prepared by Richard Cook of Knight Piésold. Discipline-specific cumulative effects assessments were prepared by Richard Cook (air quality, noise, vegetation, land use, water quality and quantity); Mike Setterington of EDI (birds and caribou); Megan Cooley of North/South Consultants (freshwater fish); Warren Bernhardt of North/South (marine environment); and Val Moulton of LGL Ltd. (marine mammals). Doug Brubacher of Brubacher Development Strategies Inc. prepared the cumulative effects assessment on communities, and Carole Burnham prepared the archaeological cumulative effects assessment.

SECTION 2.0 - EFFECTS OF THE ENVIRONMENT ON THE PROJECT

2.1 ENGINEERING HAZARD ASSESSMENT

The environment has the potential to affect the Project. Extreme weather (storms, extreme rainfall or snowfall, extreme low temperatures) and geo-hazards (seismicity, ground and slope instabilities) have the potential to affect infrastructure, and in turn represent concerns for human safety and the environment. Included in the context of extreme weather is the potential for global climate change to affect the Project.

Environmental hazards that could potentially affect the engineering structures in the Project are assessed in Tables 9-2.1 to 9-2.5, which identify the potential engineering hazards that could occur for each component, describe the hazard within the context of the specific Project component, describe and assess potential consequences of the hazard, assess the risk factor and describe potential mitigation measures.

At Milne Port, some low to moderate risks associated with ice-rich permafrost and thaw-sensitive soils could result in failures of structures, creep settlement, or movement of foundations of heavy structures. Permafrost protection measures will be used to mitigate these risks.

Along the Milne Inlet Tote Road there are a number of risks associated with the ice-rich permafrost and thaw-sensitive soils that could result in creep settlement in high embankment, thermokarst development along the route or in borrow areas, thaw settlements under the bridge culverts and some general road embankment instability. These risks will generally be mitigated through proper design and construction to protect and maintain the thermal conditions along the road. Maintenance will most likely be required at some locations due to thermal degradation of the underlying foundations. Another more significant risk is related to the hydrology and the fact that high runoff events can lead to flows beyond the capacity of the hydraulic structures established along the road alignment. This risk is further increased by the spring icing of culverts further reducing capacity, leading to potential overtopping and wash-outs and causing high sediment loadings to the downstream environment and increase erosion.

The risks at the Mine Site are related to ice-rich and thaw-sensitive soils associated with the waste rock stockpile and open pit overburden cut slopes. The high ice content anticipated below the waste rock stockpiles are expected to lead to significant creep settlement once the stockpiles are fully loaded. Additionally, the stockpiles could become unstable and have other settlement issues without proper permafrost protection measures and stockpile construction scheduling. A thermal barrier will be required at the base of the stockpiles as to protect the exposed overburden cut slopes above the open pit to preventing thaw and instabilities. For ice rich areas near other Mine Site infrastructure, the majority of the structure locations have been optimized to avoid problem areas or founded on competent bedrock. In areas where this optimization is not possible, adequate permafrost protection measures will be implemented.

Along the Railway risks associated with the ice-rich permafrost and thaw-sensitive soils could result in creep settlement in high embankment sections, thaw settlements under the bridge culverts, thermokarst development along the route or in borrow areas and some general embankment instability. Relatively deep competent bedrock, and the presence of large boulders and ice rich in the overburden at some of the railway bridge crossing locations represent additional challenges for the bridge foundations. These risks will generally be mitigated through proper design and construction.

Table 9-2.1 Engineering Hazard Assessment - Milne Port

Engineering Hazard	Hazard Description	Potential Consequences	Risk Factor	Consequence Factor	Mitigation Measures
Permafrost / Thaw Susceptible Soils	- Construction over ice rich or thaw sensitive permafrost ground causing technical issues with project infrastructure foundations - Saline permafrost - Problems potentially leading to environmental impacts	- Heavy structure experiencing creep settlement over ice-rich permafrost - Thaw weakening of surficial soils causing failure or movement of foundations - Melting of massive deposits below or adjacent to structure causing settlement or movement	MODERATE	MODERATE	- Geotechnical investigations to understand ground conditions - Relocation of structures to avoid problem areas - Excavations in overburden materials will be avoided as much as possible. - If possible found most significant structures on bedrock - Disturbance of the natural ground surface will be avoided - Over excavation of natural materials and backfill with an insulating cover of thaw stable granular fill materials of a minimum 1.5 m thickness to protect against thaw and instability in the underlying ice rich overburden soils - Embankments or granular fill pads used to protect underlying permafrost should be constructed with maximum side slopes of 2H:1V - Use cooling or refrigerated foundations where required and possible - Rock socketed and add freeze piles
Seismicity	- Significant earthquake event subjecting structures to dynamic loading - Moderate seismicity of region (higher in north, lower in south)	- Failure of infrastructure or foundations (dock)	LOW	HIGH	- Concerns mitigated through seismic hazard assessment and understanding loading potential - Adequate design of structures and dock piers - Adequate construction using suitable fill materials, construction practices and QA/QC procedures - Monitoring during operations for indicators of potential problems - Impact of seismicity on structures in permafrost is low - Many of same mitigation measures as for static stability
Flood / Hydrology	- Although not expected to have significant impact, runoff and water pooling could impact thermal regime. - Although carefully sized, significant runoff event exceeds capacity of access road culverts (i.e., icing of culverts or debris reduces capacity)	- Surface water induced thermal degradation leading to thaw settlement or weakening of soils/foundations - Overtopping of roads causing failure and potential downstream sediment issues	MODERATE	LOW	- Where surface water collection or diversion is required, the thermal impact of runoff must be considered. Ideally, ditches should be avoided wherever possible. Diversion berms are the preferred method of redirecting surface water flows if feasible. If ditches are required, they may have to be created by over-excavation and replacement with thaw stable processed rock fill material and perhaps be lined with geotextile. - Maintain grading and drainage of all areas near infrastructure - Extensive hydrology baseline studies - Over design of culvert capacity - Regular monitoring of culverts to identify icing or other debris blockages

Table 9-2.2 Engineering Hazard Assessment - Milne Inlet Tote Road

Engineering Hazard	Hazard Description	Potential Consequences	Risk Factor	Consequence Factor	Mitigation Measures
Permafrost / Thaw Susceptible Soils	- Massive ice or ice rich soils at depth below higher embankments or in areas of cut - Thaw sensitive soils near ground surface below low embankments - Thermal degration of borrow areas and development of thermokarst areas	- High embankments may experience creep settlement over time - Cut areas may cause thermal degradation and settlement - Thaw weakening of soil leading to instability of structures - Construction disturbance or new ponding of water could impact thermal regime causing settlement, thermokarst development and potentially impact stability of road - Poor aesthetics	HIGH	LOW	- Geotechnical investigations should be conducted, although issues associated with settlement of road not as significant as rail line - Adequate design of embankments (i.e., flatter slopes in problem areas, minimum fill thickness for thermal protection, over excavation and backfill in cuts, etc.) - Adequate design of bridge abutments (i.e., maximize use of bedrock, rock socketed and adfreeze piles, refrigerated pile groups, thermal protection above pile caps, etc.) - Minimize cuts - Maintain proper grading and drainage from borrow areas - Replace some of cover material removed during excavation in borrow areas - Runoff and sediment control measures - On-going inspections and maintenance
Seismicity	- Significant earthquake event subjecting structures to dynamic loading - Moderate seismicity of region (higher in north, lower in south)	- Failure of larger bridge structure along rail alignment - Sudden failure of road embankment - Landslide, overburden/bedrock cut slope instability impacting road - Same impacts for items above	LOW	MODERATE	- Adequate design (i.e., suitable slopes for seismic design parameters) - Adequate construction using suitable fill materials, construction practices and QA/QC procedures - Monitoring during operations for indicators of potential problems - Impact of seismicity on structures in permafrost is low - Many of same measures as for standard/static stability
Flood / Hydrology	- Significant runoff event exceeds capacity of culverts or other water crossings. - Icing of culverts reduces capacity for normal flows - Debris build-up causes reduced capacity for flows	- Overtopping of road leading to operational shutdown, repairs and environmental impacts due to high downstream sediment loading - Ponded water impacting thermal regime and overall stability of structures	HIGH	LOW to MODERATE	- Hydrology baseline studies - Over design culvert capacity - Regular monitoring of culverts to identify icing or other debris blockages

Table 9-2.2 Engineering Hazard Assessment - Milne Inlet Tote Road (Cont'd)

Engineering Hazard	Hazard Description	Potential Consequences	Risk Factor	Consequence Factor	Mitigation Measures
Road Embankment Stability	- Sudden failure of road embankment due to physical failure of embankment fill or underlying foundations	- Failure causing operational shutdown - Costs of repairs - Environmental impacts due to high downstream sediment loading	LOW	LOW	- Geotechnical investigations - Adequate design (i.e., suitable slopes) - Adequate construction using suitable fill materials, construction practices and QA/QC procedures - Monitoring during operations for indicators of potential problems
Landform Stability	- Large scale landslide or slope instability outside footprint of road - Medium or large scale landslide through embankment footprint	- Sudden failure of road embankment - Blockage of culverts - Impact to thermal regime effecting longer term integrity of embankment permafrost foundations - Temporary shutdown of road operations	LOW	MODERATE	- Avoiding areas of major concern - Monitoring of potential problem areas
Stability of Overburden Cuts	- Failure of large slope upstream of rail cut into overburden causing impacts to rail.	- Slope failure could block, interrupt or even destroy section of road - Blockage of culverts - Impact to thermal regime effecting longer term integrity of embankment permafrost foundations - Temporary shutdown of road operations	LOW	LOW	- Geotechnical investigations - Minimize cuts - Cut slopes will be designed to address stability issues. - Ice rich slope will be constructed with thermal and erosion protection barrier - Diversion ditches may be utilized where seasonal flows can impact the cut face
Bridges Stability	- Failure of larger bridge structure - Bridge abutment failure due to thawed areas or impacts of flows on thermal regime - Erosion of abutment or pier foundations by water flows causing failure	- Failure of bridge causing operational shutdown, - Costs of repairs - Injury or fatality - Environmental impacts	LOW	MODERATE	- Geotechnical investigations - Adequate design (i.e., maximize use of bedrock, piles, refrigerated piles, thermal protection above pile caps, etc.) - Scour protection around abutments and piers - Instrumentation and monitoring for notification in event of potential failure

Table 9-2.3 Engineering Hazard Assessment - Mine Site

Engineering Hazard	Hazard Description	Potential Consequences	Risk Factor	Consequence Factor	Mitigation Measures
Permafrost /Thaw Susceptible Soils	- Construction over ice rich or thaw sensitive permafrost ground causing technical issues with project infrastructure foundations - Problems potentially leading to environmental impacts	- Heavy structure experiencing creep settlement over ice-rich permafrost - Thaw weakening of surficial soils causing failure or movement of foundations - Melting of massive deposits below or adjacent to structure causing settlement or movement	MODERATE	HIGH	- Geotechnical investigations to understand ground conditions - Movement of structures to avoid problem areas - Found significant structures on bedrock to maximum extent possible - Excavations in overburden materials will be avoided as much as possible. In areas which require excavation to remove ice rich soils, over excavation of natural materials and backfill with thaw stable granular fill materials to provide strength to the soils and promote drainage during thaw season. - Disturbance of the natural ground surface will be avoided - Over excavation of natural materials and backfill with an insulating cover of thaw stable granular fill materials of a minimum 1.5 m thickness to protect against thaw and instability in the underlying ice rich overburden soils - Embankments or granular fill pads used to protect underlying permafrost should be constructed with maximum side slopes of 2H:1V - Use cooling or refrigerated foundations where required and possible - Rock socketed and adfreeze piles
Seismicity	- Significant earthquake event subjecting structures to dynamic loading - Moderate seismicity of region (higher in north, lower in south)	- Pit slope failure - Failure of waste stockpile slopes - Failure of infrastructure	LOW	MODERATE to HIGH	- Concerns mitigated through seismic hazard assessment and understanding loading potential - Adequate design (i.e., suitable slopes for seismic design parameters) - Adequate construction using suitable fill materials, construction practices and QA/QC procedures - Monitoring during operations for indicators of potential problems - Impact of seismicity on structures in permafrost is low - Many of same mitigation measures as for static stability

Table 9-2.3 Engineering Hazard Assessment - Mine Site (Cont'd)

Engineering Hazard	Hazard Description	Potential Consequences	Risk Factor	Consequence Factor	Mitigation Measures
Flood/ Hydrology	- Although not expected to have significant impact, runoff and water pooling could impact thermal regime. - Significant runoff event exceeds capacity of access road culverts - Icing of culverts reduces capacity for normal flows - Debris build-up causes reduced capacity for flows	- Surface water induced thermal degradation leading to thaw settlement or weakening of soils/foundations - Overtopping of roads causing failure and potential downstream sediment issues	MODERATE	LOW	- Where surface water collection or diversion is required, the thermal impact of runoff must be considered. Ideally, ditches should be avoided wherever possible. Diversion berms are the preferred method of redirecting surface water flows if feasible. If ditches are required, they may have to be created by over-excavation and replacement with thaw stable processed rock fill material and perhaps be lined with geotextile. - Maintain grading and drainage of all areas near infrastructure - Over design culvert capacity - Regular monitoring of culverts to identify icing or other debris blockages
Open Pit Stability	- Overall slope stability - Rock fall potential - Freeze/thaw cycles within the active zone will cause or accelerate the deterioration of the bench faces and increasing the chances of rock falls	- That rock falls or an overall slope stability issue will result in material impacting men or equipment working at lower elevations within the pit	MODERATE	MODERATE to HIGH	- Bench face angles selected to reduce instabilities. - Catch benches were incorporated into the design to reduce the impact of small scale instabilities - Inter-ramp and overall slope angles selected to achieve target Factor of Safety against multi-bench or overall slope failures. - Bench maintenance program will be developed that will include a monitoring program, scaling and the cleaning of accumulated debris from the catch benches.
Open Pit Overburden Slope Stability	- Failure of natural overburden slope above open pit.	- Slope failure could impact men or equipment working at lower elevations within the pit - Thermal degradation could lead to increase sediment reporting to open pit	MODERATE	MODERATE	- Geotechnical investigations - Cut slopes will be designed to address stability issues. - Ice rich slope will be constructed with thermal and erosion protection barrier - Diversion ditches may be utilized where seasonal flows can affect the slope

Table 9-2.3 Engineering Hazard Assessment - Mine Site (Cont'd)

Engineering Hazard	Hazard Description	Potential Consequences	Risk Factor	Consequence Factor	Mitigation Measures
Waste Rock Stockpile Stability	- Stability problems associated with stockpiles of waste rock and waste overburden material	- Covering of unfrozen ground with waste materials could lock in heat, thus changing the thermal conditions and possibly thawing ice rich foundation soils. - Weakening of thaw sensitive soils during summer dumping - Weakening of thaw sensitive soils due to surface water flows impacting thermal regime outer slope failure - With the presence of ice rich foundations soils, creep settlement is expected to occur within the underlying foundations, leading to the development of cracks within the stockpile and at the stockpile surface. - Acid rock drainage	HIGH	HIGH	- Geotechnical investigations and installation of thermistors to obtain background ground temperature readings for design of the stockpile. - Adequate design of stockpiles (i.e., slopes) - An initial layer of NAG waste will be placed over previously uncovered ground surface during the winter months or when the active layer is fully frozen to act as a thermal barrier and prevent thaw over the short term prior to placement of waste materials during warmer months. - Ground disturbance will be minimized prior to placement of the thermal barrier. Only surface ice and snow to be removed from the footprint during the winter prior to placement of waste rock. - Depending on the conditions at the perimeter of stockpile footprint, a stability buttress (extension of thermal barrier) may be required at the toe in some locations to prevent minor localized stability issues due to thaw. - Management of surface runoff will be an important component of the stockpile construction/operation. Minimizing erosion and/or the effect of flowing/standing water on thermal regime within the pile foundation soils and in close proximity to the toes will be critical. - Ongoing monitoring of slopes. Any cracks that develop will be monitored and repaired as required to minimize inflow of surface water and subsequent ice wedge formation within the stockpiles. - Encapsulate PAG waste materials in waste rock to maintain frozen state and prevent release of ARD. - Encapsulate ice-rich materials in waste rock to maintain frozen state and prevent release of sediment.

Table 9-2.4 Engineering Hazard Assessment - Railway

Engineering Hazard	Hazard Description	Potential Consequences	Risk Factor	Consequence Factor	Mitigation Measures
Permafrost / Thaw Susceptible Soils	- Massive ice or ice rich soils at depth below high embankments or in areas of cut - Thaw sensitive soils near ground surface below low embankments	- High embankments may experience creep settlement over time - Cut areas may cause thermal degradation and settlement - Thaw weakening of soil leading to instability of structures - Construction disturbance or new ponding of water could impact thermal regime causing settlement	HIGH	MODERATE	- Geotechnical investigations - alignment routed around problem areas to maximum extent possible - adequate design of embankments (i.e., ventilated/cooling embankments, flatter slopes in problem areas, minimum fill thickness for thermal protection, over excavation and backfill in cuts, etc.) - adequate design of bridge abutments (i.e., maximize use of bedrock, rock socketed and adfreeze piles, refrigerated pile groups, thermal protection above pile caps, etc.) - regular inspections and maintenance - minimize cuts
Seismicity	- Significant earthquake event subjecting structures to dynamic loading - Moderate seismicity of region (higher in north, lower in south)	- Failure of larger bridge structure along rail alignment - Sudden failure of rail embankment - Landslide, overburden/bedrock cut slope instability impacting embankment - Same impacts for items above	LOW	MODERATE to HIGH	- Rail alignment routed to avoid potential problem areas. Air photo interpretation used to identify potential issues prior to planning rail alignment. - Geotechnical investigations - Adequate design (i.e., suitable slopes for seismic design parameters) - Adequate construction using suitable fill materials, construction practices and QA/QC procedures - Monitoring during operations for indicators of potential problems - Impact of seismicity on structures in permafrost is low - Many of same mitigation measures as for static stability - Instrumentation may be utilized to detect a rock fall within the tunnel based on rock conditions - Instrumentation used to detect rock fall and/or slope failures impacting embankments - Rigorous bridge inspection requirements after seismic events

Table 9-2.4 Engineering Hazard Assessment – Railway (Cont'd)

Engineering Hazard	Hazard Description	Potential Consequences	Risk Factor	Consequence Factor	Mitigation Measures
Flood / Hydrology	- Significant runoff event exceeds capacity of culverts through rail alignment. - Icing of culverts reduces capacity for normal flows - Debris build-up causes reduced capacity for flows	- Overtopping of rail embankments leading to operational shutdown, costly repairs and environmental impacts due to high downstream sediment loading - Ponded water impacting thermal regime and overall stability of structures - Surface flow may accelerate the deterioration of the cut face	MODERATE to HIGH	MODERATE	- Hydrology baseline studies - Over design culvert capacity - regular monitoring of culverts to identify icing or other debris blockages - Use of diversion ditches - Regular Railway maintenance activities will include thawing ice blocked culverts and removing debris that may impede flow through culverts
Embankment Stability	- Sudden failure of rail embankment due to physical failure of embankment fill or underlying foundations	- Failure of rail embankment causing operational shutdown - Costs of repairs - Environmental impacts due to high downstream sediment loading	LOW	MODERATE	- Geotechnical investigations - Optimized alignment to avoid problem areas - Adequate design (i.e., suitable slopes) - Adequate construction using suitable fill materials, construction practices and QA/QC procedures - Monitoring during operations for indicators of potential problems - Inspection frequencies will be increased during the summer 'thaw" period in areas with a risk of foundation failure
Landform Stability	- Large scale landslide or slope instability outside footprint of embankment - Medium or large scale landslide through embankment footprint	- Sudden failure of rail embankment - Blockage of culverts - Impact to thermal regime effecting longer term integrity of embankment permafrost foundations - Shutdown of rail operations	LOW	HIGH	- Rail alignment routed to avoid potential problem areas. Air photo interpretation used to identify potential issues prior to planning rail alignment. Geotechnical drilling used where necessary to confirm favourable conditions. - Monitoring of potential problem areas - Regular safety inspections will include monitoring problem areas

Table 9-2.4 Engineering Hazard Assessment – Railway (Cont'd)

Engineering Hazard	Hazard Description	Potential Consequences	Risk Factor	Consequence Factor	Mitigation Measures
Stability of Overburden Cuts	- Failure of large slope upstream of rail cut into overburden causing impacts to rail.	- Slope failure could block, interrupt or even destroy section of rail line - Blockage of culverts - Impact to thermal regime effecting longer term integrity of embankment permafrost foundations - Shutdown of rail operations	LOW	MODERATE	- Geotechnical investigations - minimize cuts in ice rich permafrost - cut slopes will be designed to address stability issues. - ice rich slope will be constructed with thermal and erosion protection barrier - diversion ditches may be utilized where seasonal flows can impact the cut face - regular safety inspections will include monitoring problem areas
Stability of Major Rock Cuts	- Failure of large slope upstream of rail cut into bedrock causing impacts to rail.	- Slope failure could block, interrupt service, or destroy section of rail line - Potential environmental impacts in event of failure due to sediment loading rail accident.	LOW	MODERATE to HIGH	- Geomechanical site investigations - Cut slopes will be designed to reduce bench scale and overall cut stability issues. - diversion ditches may be utilized where seasonal flows can impact the cut face - slope monitoring, early warning systems, rockfall fence, ditches/berms, use of shotcrete. - For the higher cuts, catch benches will be incorporated in the design to reduce the likelihood of dislodged rock material impacting the rail line.
Rockfall Hazards	- Falling rocks from upper slopes adjacent to rail embankment - Freeze/thaw cycles within the active zone or surface flow will cause or accelerate the deterioration of the rock slope increasing the chances of a shallow failure - Main concerns are along Cockburn Lake	- Falling rocks causing damage or impacts to rail alignment/track or operational trains - There will be a rockfall that will block the rail line or interrupt service. - Injury or death to human life	HIGH	MODERATE to HIGH	- Preliminary rockfall hazard assessment has been completed. High risk areas will be addressed using appropriate mitigation strategies. - For the higher cuts, catch benches will be incorporated in the design to reduce the likelihood of dislodged rock material impacting the rail line. - Slope monitoring, early warning systems, rockfall fence, ditches/berms. - Rockbolts, blasting loose rock, netting, fencing and shotcrete in place for Railway Portals - Maintenance program will be undertaken with appropriate scaling of any "loose" rock on the slope or cut face.

Table 9-2.4 Engineering Hazard Assessment – Railway (Cont'd)

Engineering Hazard	Hazard Description	Potential Consequences	Risk Factor	Consequence Factor	Mitigation Measures
Bridges Stability	- Failure of larger bridge structure along rail alignment - Bridge abutment failure due to thawed areas or impacts of flows on thermal regime - Erosion of abutment or pier foundations by water flows causing failure	- Failure of bridge causing operational shutdown, - Costs of repairs - Injury or fatality - Environmental impacts	LOW	HIGH	- Geotechnical investigations - adequate design (i.e., maximize use of bedrock, piles, refrigerated piles, thermal protection above pile caps, etc.) - scour protection around abutments and piers - instrumentation and monitoring for notification in event of potential failure - bridge structures will be inspected annually, including assessment of piers and abutments, any suspect piers or abutments will be instrumented and checked regularly - scour protection will be inspected and if necessary restored after the spring freshet
Stability of Tunnels	- Failure of tunnel causing impacts to rail operation. - Ventilated air will create an active zone surrounding the periphery of the tunnel - Warming and cooling will change the depth of the active zone around the periphery of the tunnel	- Ground fall will occur that will block the rail line or interrupt service - Thawing of the excavation periphery will reduce the strength of the rock and eventually generate falls of ground. - Drilling into frozen ground will be a safety issue if the drill water freezes.	LOW	LOW to MODERATE	- Geotechanical investigations - Rock mass characteristics will be considered during the tunnel design and will include consideration of: any faults or large scale discontinuities. - Excavation and ground support recommendations will be appropriate for ground conditions expected. - Further site investigation work will be undertaken to better characterize the rock mass. - Regular inspections by trained personnel and underground instrumentation will be used to monitor the long-term performance of the excavation

Table 9-2.5 Engineering Hazard Assessment - Steensby Port

Engineering Hazard	Hazard Description	Potential Consequences	Risk Factor	Consequence Factor	Mitigation Measures
Permafrost / Thaw Susceptible Soils	- Construction over ice rich or thaw sensitive ground causing technical issues with project infrastructure foundations - Problems potentially leading to environmental impacts	- Heavy structure experiencing creep settlement over ice-rich permafrost - Thaw weakening of surficial soils causing failure or movement of foundations - Melting of massive deposits below or adjacent to structure causing settlement or movement	LOW	HIGH	- Geotechnical investigations to understand ground conditions - Movement of structures to avoid problem areas - Majority of structures on bedrock - Excavations in overburden materials will be avoided as much as possible. - Disturbance of the natural ground surface will be avoided - Overexcavation of natural materials and backfill with an insulating cover of thaw stable granular fill materials of a minimum 1.5 m thickness to protect against thaw and instability in the underlying ice rich overburden soils - Embankments or granular fill pads used to protect underlying permafrost should be constructed with maximum side slopes of 2H:1V
Seismicity	- Significant earthquake event subjecting structures to dynamic loading - Moderate seismicity of region (higher in north, lower in south)	- Failure of infrastructure or foundations (dock)	LOW	HIGH	- Concerns mitigated through seismic hazard assessment and understanding loading potential - Adequate design of structures and dock piers - Adequate construction using suitable fill materials, construction practices and QA/QC procedures - Impact of seismicity on structures in permafrost is low - Many of same mitigation measures as for static stability
Flood / Hydrology	- Although not expected to have significant impact, runoff and water pooling could impact thermal regime. - Significant runoff event exceeds capacity of access road culverts (i.e., icing of culverts or debris reduces capacity)	- Surface water induced thermal degradation leading to thaw settlement or weakening of soils/foundations - Overtopping of roads causing failure and potential downstream sediment issues	MODERATE	LOW	- Where surface water collection or diversion is required, the thermal impact of runoff must be considered. Ideally, ditches should be avoided wherever possible. Diversion berms are the preferred method of redirecting surface water flows if feasible. If ditches are required, they may have to be created by over-excavation and replacement with thaw stable processed rock fill material and perhaps be lined with geotextile. - Maintain grading and drainage of all areas near infrastructure - Hydrology baseline studies - Over design culvert capacity - Regular monitoring of culverts to identify icing or other debris blockages

Maintenance may be required at some locations due to thermal degradation of the underlying foundations. Areas of cut along the Railway will require over-excavation and backfill to ensure thermal stability of foundations. Cut slopes in ice-rich overburden will require a protective thermal barrier. Another risk is related to the hydrology and high runoff events that may lead to flows beyond the capacity of the hydraulic structures. This risk is further increased by the spring icing of culverts, further reducing capacity and leading to potential overtopping, localized changes to the thermal regime and potential wash-out of embankment sections. Regular inspections and maintenance programs implemented throughout operations will be critical for mitigating many of the risks associated with permafrost and hydrology related issues.

The Steensby Port area is mainly bedrock controlled; the majority of the on-shore infrastructure will be founded on the bedrock, or using short pile foundations that extend to the bedrock. The offshore structure locations will be optimized to avoid thick layers of soft clay sediments present in the area and will have foundations that extend to bedrock, or having the sediments removed. The risks associated with the offshore structure foundations will be mitigated through proper design and construction.

Snow Drifts and Snow Banks

Potential for significant snowdrifts exists in highly exposed and hilly areas such as the Milne Inlet Tote Road, access roads and the Railway. Significant volumes of snow may exceed what was naturally collected by the existing terrain on the downwind sides of hills, especially when they are cut to accommodate a transportation link. Detailed snowdrift assessment of designs is recommended where the terrain is higher than the transportation corridor within a lateral distance of 75 m. Inactive mitigation measures include snow fencing, terracing and exposed (raised) road surfaces. Active mitigation measures include the use of snow berms and shaping snow banks to minimize snowdrifts. Changes in snow accumulation will have an indirect effect on run-off, slope stability/erosion and permafrost impact, and may also require assessment of the change in local drift patterns that they will create (RWDI, 2010).

2.2 POTENTIAL EFFECTS OF CLIMATE CHANGE ON THE PROJECT

Changes to Permafrost

The Project is situated within the zone of continuous permafrost, which is likely more than 500 m thick across the terrestrial RSA. The thickness of the active layer varies from less than 0.3 m in areas blanketed with organic soils to over 2.0 m in coarse-grained soils. The surficial geology is variable, with materials consisting of organic soils, alluvium, colluvium, marine and glacio-marine deltaic sediments, glaciofluvial deposits, glaciolacustrine and lacustrine deposits, glacial deposits and highly fractured to competent bedrock outcrops. Soils can be ice-rich, with the amounts of ground ice varying significantly from site to site. A more detailed description of geotechnical investigations carried out of the Project is provided in Volume 6, Section 2.1.3. The potential impacts on sensitive landforms (the key indicator for the Landforms, Permafrost and Soils VEC) are provided in Volume 6, Section 2.3.

Based on accepted climate change models, it is generally believed that global warming will have little impact on the very cold and deep permafrost conditions over the currently planned life of the project. Geotechnical investigations and studies have been completed, to identify areas of concern related to permafrost and potential geo-hazards that could impact the infrastructure. Although it is projected that the Mary River Project will remain within the zone of continuous permafrost, it is predicted that the active layer thickness could increase by 50 % (Arctic Council and the International Arctic Science Committee, 2005). Other potential impacts include changes to drainage pattern resulting from subsidence and thermokarst formation, increased sediment loadings and mass wasting on sensitive slopes. In general, the location of infrastructure has been optimized to avoid potential problem areas to the maximum extent possible. Additionally, areas where problems cannot be avoided will be constructed with conservatively designed permafrost protection measures and thermal barriers. Thus, the project is not sensitive to changes in climate-related parameters.

Changes to Sea Ice Conditions

As global temperatures rise, sea ice can be expected to form later and clear earlier in the year. Current Arctic sea ice extent in March is approximately 14 million km^2 but will reduce by about 2 to 4 million km^2 by 2100 (International Arctic Science Committee, 2010). Current Arctic sea ice extent in September (when ice over is at its minimum) ranges from about 5 to 6 million km^2 (Arctic Council and International Arctic Science Committee, 2005).

Projected changes in sea-ice conditions for the 21st century are summarized in tables 9-2.6 (winter) and 9-2.7 (summer) based on output from the five Arctic Impact Climate Assessment (AICA)-designated global climate models (International Arctic Science Committee, 2010). The projections vary widely, especially for the summer. The CSM_1.4 (National Center for Atmospheric Research) model consistently projects the greatest sea-ice extent and the least amount of change, while the CGCM2 (Canadian Centre for Climate Modeling and Analysis) model consistently projects the least sea ice and the greatest amount of change. However, all five ACIA- designated models agree that sea-ice coverage will decrease in summer and winter.

Table 9-2.6 Sea-ice extent (10^6 km^2) in Winter (March) as projected by the five ACIA-designated models (International Arctic Science Committee, 2010)

Model	1981–2000	2011–2030	2041–2060	2071–2090
CGCM2	7.28	3.33	0.55	0.05
CSM_1.4	16.32	15.00	14.16	14.01
ECHAM4/OPYC3	16.19	15.62	14.97	14.38
GFDL-R30_c	16.17	15.60	14.86	14.52
HadCM3	16.32	15.53	14.87	13.74

CGCM2: Canadian Centre for Climate Modelling and Analysis; CSM_1.4: National Center for Atmospheric Research; ECHAM4/OPYC3: Max-Planck Institute for Center for Meteorology; GFDL-R30_c: Geophysical Fluid Dynamics Laboratory; HadCM3: Hadley Centre for Climate Prediction and Research.

Table 9-2.7 Sea-ice extent (10^6 km^2) in Summer (September) as projected by the five ACIA-designated models (International Arctic Science Committee, 2010)

Model	1981–2000	2011–2030	2041–2060	2071–2090
CGCM2	16.14	15.14	13.94	13.26
CSM_1.4	7.22	7.00	6.72	6.59
ECHAM4/OPYC3	7.02	6.03	4.06	2.68
GFDL-R30_c	7.28	5.91	4.33	2.91
HadCM3	7.41	6.22	5.12	3.22

CGCM2: Canadian Centre for Climate Modelling and Analysis; CSM_1.4: National Atmospheric Research; ECHAM4/OPYC3: Max-Planck Institute for Meteorology; GFDL-R30_c: Geophysical Fluid Dynamics Laboratory; HadCM3: Hadley Centre for Climate Prediction and Research.

Overall, the decrease in areal extent of sea ice projected by the five models for the northern hemisphere ranges between 12 and 46 % by the end of the 21st century, as shown in Table 9.2.8 (International Arctic Science Committee, 2010).

Four of the five ACIA-designated models project that the seasonal sea-ice zone is likely to increase in the future because sea-ice coverage will decrease more during summer than winter. This suggests that sea ice thickness is also likely to decrease because a single winter of sea-ice growth is an insufficient period to reach equilibrium thickness (International Arctic Science Committee, 2010).

Table 9-2.8 Changes in mean annual Northern Hemisphere sea-ice extent between 2000 and 2100 projected by the five ACIA-designated models (International Arctic Science Committee, 2010)

	Unadjusted Projections			Adjusted Projections		
	Ice Extent (10^6 km^2)		Change (%)	Ice Extent(106 km^2)		Change (%)
Model	**2000**	**2100**		**2000**	**2100**	
CGCM2	9.7	5.6	-42	12.3	6.6	-46
CSM_1.4	16.5	14.2	-14	12.3	10.8	-12
ECHAM4/OPYC3	11.9	8.9	-25	12.3	9.3	-24
GFDL-R30_c	11.9	8.5	-29	12.3	8.6	-30
HadCM3	12.8	9.4	-27	12.3	9.1	-26

In recent years, diminishing ice cover has occurred in the Canadian Arctic. While there have been some exceptions, ice is generally forming later and clearing earlier, and it is generally accepted that this trend will continue. Project decisions taken today will therefore need to account for the long-term effects of possible and or likely changes to the ice conditions along the shipping route and at the port site. While global temperatures may continue to rise, the current pattern of ice growth in the Arctic will remain relatively unchanged. Freezing degree days in the Arctic will be such that ice growth, while potentially diminished, will follow historical patterns. Simply put, winter ice will remain a challenge to navigation for all but the most capable vessels. Any changes in the ice regime will reduce the challenges of ice navigation; therefore the Project has been designed by making the conservative (cautionary) assumption that ice conditions will follow historical patterns.

Sea ice reduction could have a positive effect on navigation through the Northwest and Northeast Passages, and may increase commercial shipping, transportation of unprocessed mineral resources, and tourism (Arctic Council and International Arctic Science Committee, 2005). It is expected that the changes in sea ice cover due to climate change will not significantly affect the shipping operations in the Foxe Basin.

Tables 9-2.1 to 9-2.5 provide a general assessment of hazards that could affect the engineering structures in the Project. Table 9-2.6 provides other design measures that may be implemented to protect the Project structures from the impacts of construction, operations and potential changes to the climate. In general, conservative assumptions are used as the way to address potential effects of climate change.

Table 9-2.9 Design Measures for Project Structures used to Account for Climate Change

Project Structure	Design Measures
Milne Inlet Tote Road – Upgrades	No specific measures were taken into account for climate change beyond those for construction on permafrost
Milne Inlet Tote Road – Water Crossings	A 1:100 year storm event was used for design of all water crossings
Railway – Embankment	Embankment thickness and over-excavation depths in ice-rich materials increased based on a 50 % greater thickness of active layer
Railway – Water Crossings (Bridges)	Designed culverts and bridges to a higher return period of 1:200 (Dillon, 2008)
Railway – Auxiliary Facilities	Loading and unloading facilities and the workshop will be located on bedrock or piles to account for the increased thickness of the active layer. The unheated inspection shed will be sited on run of quarry rock fill. Telecommunication towers will be located on bedrock or piles into bedrock where possible; towers installed on thaw sensitive soils will be monitored for subsidence during thawing months; further, specific operating instructions will dictate how everyone is to act in the case of a tower failure; redundancy measures will be in place.
Port Facilities	Docks can account for the fluctuation in sea levels (higher or lower) due to climate change. Water depth at ports due to lower predicted water levels at Steensby Port will be sufficient for ships.
Open Pit Mine	Thermal Barrier on ice-rich overburden slopes should be of adequate thickness to account for increase to active layer thickness
Waste Rock Stockpile	Potentially-acid generating (PAG) rock will be buried sufficiently deep within the pile to account for increase in active layer thickness
Airstrips and Access Roads	Thermal barrier (non-frost/thaw sensitive fill) thickness increased to account for increases active layer depth
Building foundations	Ad freeze pile calculations to account for slightly warmer permafrost and deeper active layer. Thermal barriers and foundation pads thicker.

2.3 AUTHORS

Effects of the environment on the Project were prepared by Charlotte Dubec and Kevin Hawton, P.Eng. of Knight Piésold. Revision was made by Ramli Halim, P. Eng of Hatch and Larry LeDrew M. Sc., Sikumiut Environmental Management Ltd.

SECTION 3.0 - ACCIDENTS AND MALFUNCTIONS

Baffinland has an obligation to identify any foreseeable hazards that may arise from the Mary River Project and to assess the risk of harm arising from the identified hazards. The reasons for this arise from the following considerations:

- Concern for the health and safety of employees, contractors and visitors;
- Concerns for environmental protection;
- It makes good business sense and is cost effective; and
- So that Baffinland's duty of care for its employees and contractors can be undertaken, and so that health, safety and environmental legal requirements can be met.

Knowledge of hazards and the evaluation of associated risks are necessary for establishing health, safety and environmental objectives and targets, and for setting priorities to control the risks to employees and others. Hazard identification, risk assessment and control are an on-going process undertaken periodically throughout the Project life cycle, presented in Volume 10, Appendix 10A-2. This rigorous approach leads to the development and implementation of mitigation actions and procedures, and the development of adaptive management plans.

Despite this on-going effort, major accidents and malfunctions can occur through natural events, breakdown of mitigation measures, or human error. Although the likelihood or probability of such events is low, accidental events could have environmental, health or safety repercussions.

3.1 IDENTIFICATION OF RISKS AND METHODOLOGY

A list of potential malfunctions or accidents was developed from the following primary sources:

- Public concerns: expressed by local communities and other members of the public;
- Project personnel: all Project risks, including environment-related risks were developed and assessed as part of Project risk assessment exercises;
- Comparative projects: review of readily available Environmental Assessments issued recently for other large scale mineral projects; and
- Experience of personnel with other projects.

Only credible malfunctions and accidents with a reasonable probability of occurring have been assessed. For the purpose of this assessment, the severity of consequences is provided in Table 9-3.1 and the likelihood of occurrence is defined in Table 9-3.2. The level of risk is thus defined by consideration of the severity of the consequences and the likelihood of occurrence. The risk matrix used to define the risk associated with the potential accidents and malfunctions is presented in Table 9-3.3.

Despite the fact that all foreseeable precaution measures have been implemented, the consequences of their occurrences can entail the loss of human life or severe environmental damage. Table 9.3-4 presents a list of credible potential accident and malfunction scenarios for the Mary River Project. Risks were assessed based on operational controls implemented on the basis of best management practices as outlined in Baffinland's EHS Management System (refer to Volume 10 and Appendix 10A-2 for Hazard Identification and Risk Assessment Procedure) and the application of the management plans provided as appendices in Volume 10. The EPP for the Project provides a summary of the controls and procedures to be implemented.

Table 9-3.1 Consequence Severity

Consequence	Definition
Critical	*Major uncontrolled event or inefficiency with uncertain and perhaps prohibitively costly remediation*. Health and Safety: Fatality. Production: More than six month production loss or expenditure. Cost: >$500,000,000 damage or additional costs. Environmental Impact/Compliance: Very serious environmental impacts with impairment on landscape/ marinescape ecology. Long-term, widespread effects on significant environment. Corporate Image or Utility: Corporate image tarnished internationally. Community Affairs: Non compliance with existing community agreement. Extreme and widespread community concerns with international exposure/influence.
Major	Significant event or inefficiency that can be addressed but with great effort. Health and Safety: Lost-time injury(s) potentially resulting in permanent disability. Production: Three to six months production or expenditure. Cost: $100,000,000 to $500,000,000. Environmental Impact/Compliance: Serious environmental impacts with impairment on ecosystems. Relatively widespread long-term effects. Regulatory approval withdrawn for a few months. Corporate Image or Utility: Corporate image tarnished in North America. Community Affairs: High local community concerns with national exposure/influence
Moderate	Moderate event or inefficiency that might need physical attention and certainly engineering review. Health and Safety: Lost-time injury (no permanent disability). Production: One to three production loss or expenditure. Cost: $1,000,000 to $100,000,000 damage or additional costs. Environmental Impact/Compliance: Some impairment on ecosystem function. Displacement of species. Moderate short-term widespread effects. Regulatory orders with significant cost implications. Corporate Image or Utility: Corporate image tarnished in region. Community Affairs: Moderate local community concern with potential permanent damage to relations.
Minor	Minor incident or inefficiency that might require engineering review and is easily and predictably remediated. Health and Safety: Injury (no lost time). Production: Less than one month production loss or expenditure. Cost: $100,000 to $1,000,000 damage or additional costs. Environmental Impact/Compliance: Minor effects on biological or physical environment. Minor short-term damage to small areas. Corporate Image or Utility: Corporate image not affected, written complaint or concern dealt with internally. Community Affairs: Minimal local community concern with no lasting damage to relations.
Insignificant	Minor incident or inefficiency of little or no consequence. Health and Safety: No injury or lost time. Production: One to two weeks production loss or expenditure. Cost: <$100,000 damage or additional costs. Environmental Impact/Compliance: No lasting impacts. Low-level effects on biological or physical environment. Limited damage to minimal area of low significance. Corporate Image or Utility: Corporate image not affected or verbal complaint dealt with internally. Community Affairs: No community concern

Table 9-3.2 Likelihood of Accidents and Malfunctions

Likelihood	Description in Context of Full Operating Life of the Facility	Frequency
Almost Certain	Consequence expected to occur in most circumstances	High frequency of occurrence - occurs more than once per year
Likely	Consequence will probably occur in most circumstances	Event does occur, has a history, occurs once every 1 to 10 years
Possible	Consequence could occur at some time	Occurs once every 10 to 100 years
Unlikely	Consequence may occur at some time	Occurs once every 100 to 1,000 years
Rare	Consequence may occur at some time	Occurs once every 1,000 to 10,000 years

NOTE(S):
1. REFER TO VOLUME 10, APPENDIX 10A-2 STANDARD FOR HAZARD IDENTIFICATION AND RISK ASSESSMENT.

Table 9-3.3 Risk Matrix

	Likelihood				
Consequence	**Rare**	**Unlikely**	**Possible**	**Likely**	**Almost Certain**
Critical	Moderate	Moderate	High	Extreme	Extreme
Major	Low	Moderate	Moderate	High	Extreme
Moderate	Low	Moderate	Moderate	Moderate	High
Minor	Very Low	Low	Moderate	Moderate	Moderate
Insignificant	Very Low	Very Low	Low	Low	Moderate

Table 9-3.4 Major Accidents and Malfunctions Risk Summary

Project Sector	Issue of Concern	Consequence	Likelihood	Risk Rating
Mine Site	Open pit and waste rock stockpile – slope failure causing production delay or human injury	Major	Rare	Low
	Explosive accidents (accidental detonation of explosives) causing human injury or fatality	Major to Critical	Rare	Low - Moderate
	Hazardous material release resulting in contamination of environment	Minor	Unlikely	Low
	Truck accidents resulting in human injuries or fatalities	Major to Critical	Unlikely	Moderate

Table 9.3-4 Major Accidents and Malfunctions Risk Summary (Cont'd)

Project Sector	Issue of Concern	Consequence	Likelihood	Risk Rating
Mine Site	Open Pit flooding resulting in a production delay	Minor	Unlikely	Low
	Open Pit flooding resulting in a human injury	Major	Unlikely	Moderate
	Fire at the camp facilities and infrastructure resulting in human injuries or fatalities	Major to Critical	Unlikely	Moderate
	Failure of power supply resulting in human injuries or fatalities	Major to Critical	Rare	Low - Moderate
	Failure of WWTP resulting in environmental contamination	Minor	Unlikely	Low
	Contamination or interruption of water supply resulting in effects on human health	Moderate	Rare	Low
Tote Road	Road embankment failure/collapse of water crossing resulting in environmental degradation	Insignificant	Likely	Low
	Hazardous material release resulting in environmental contamination	Minor	Rare	Very Low
	Truck accident resulting in human injuries	Moderate	Likely	Moderate
	Collision with other users resulting in human injuries or fatalities	Major - Critical	Unlikely	Moderate
	Weather related strandings resulting in Human injuries	Major	Possible	Moderate
	Collision with wildlife Resulting in injury to Wildlife	Minor	Unlikely	Low
Railway	Road embankment failure/collapse of water crossing resulting in environmental degradation	Insignificant	Possible	Low
	Derailment resulting in human injuries or fatality	Major - Critical	Rare	Low - Moderate
	Tunnel collapse resulting in human injuries or fatality	Major - Critical	Rare	Low - Moderate
	Weather related strandings resulting in human injuries or fatality	Major - Critical	Rare	Low - Moderate
	Hazardous material release resulting in contamination of the environment	Minor	Rare	Very Low
	Collision with human resulting in human injury	Major	Rare	Low

Table 9.3-4 Major Accidents and Malfunctions Risk Summary (Cont'd)

Project Sector	Issue of Concern	Consequence	Likelihood	Risk Rating
Railway	Collision with wildlife Resulting in harm to wildlife	Minor	Unlikely	Low
Milne Port and Steensby Port	Diesel spill – ship to shore transfer resulting in contamination of the marine environment	Minor	Unlikely	Low
	Fire at the camp facilities and infrastructure resulting in human injuries or fatalities	Major - Critical	Unlikely	Moderate
	Failure of power supply resulting in human injuries or fatalities	Major - Critical	Rare	Moderate
	Failure of WWTP resulting in harm to human health or the environment	Minor	Unlikely	Low
	Contamination or interruption of water supply resulting in an effect on human health	Minor	Possible	Low
	Congestion at Port resulting in damage to vessels, possible spills, production delay	Minor	Unlikely	Low
	Hazardous material release resulting in environmental contamination	Minor	Unlikely	Low
	Ice accumulation at Port resulting in damage to port infrastructure and vessels, production delay	Insignificant	Likely	Low
	Introduction of invasive species (marine and terrestrial)	Minor	Likely	Low
Air traffic	Aircraft or helicopter crash resulting in human injuries or fatalities	Major - Critical	Rare	Low - Moderate
Shipping	Collision with marine mammals resulting in harm to marine mammals	Minor	Rare	Very Low
	Engine failure resulting in a delay in shipping	Insignificant	Possible	Moderate
	Ship grounding resulting in damage to ship or possible harm to aquatic life	Minor	Unlikely	Low
	Ice / ship interaction resulting in a delay or possible damage to vessel	Insignificant	Likely	Low
	Collision with other vessels resulting in damage to ship, possible harm to aquatic life	Moderate	Rare	Low

Table 9.3-4 Major Accidents and Malfunctions Risk Summary (Cont'd)

Project Sector	Issue of Concern	Consequence	Likelihood	Risk Rating
Shipping	Major diesel spill along the shipping route resulting in contamination of marine and coastal environment along shipping lane	Critical	Possible	High
NOTE(S): 1. ASSESSMENT IS BASED ON OPERATIONAL CONTROLS IMPLEMENTED ON THE BASIS OF BEST MANAGEMENT PRACTICES AS OUTLINED IN BAFFINLAND'S EHS MANAGEMENT SYSTEM (REFER TO VOLUME 10, AND APPENDIX 10A-2 FOR HAZARD IDENTIFICATION AND RISK ASSESSMENT PROCEDURE).				

The above hazard assessment framework was applied to the significance methodology described in Volume 2, Section 3, to evaluate the significance of residual effects of accidents and malfunctions, as follows (Table 9-3.5).

The major accidents and malfunctions identified are described in the subsequent sections, and an evaluation of significance is provided in Section 3.9.

Table 9-3.5 Ratings for Evaluating Significance of Residual Effects of Accidents and Malfunctions

Criteria	Classification	
Magnitude	Level I	An effect on the exposed indicator/VEC that results in a change that is not distinguishable from natural variation and is within regulated values Does not result in any human lost-time injury. Is equivalent to a Very Low to Low Risk Rating
	Level II	An effect that results in some exceedence of regulated values Results in a change that is measurable but allows recovery within one to two generations Results in human injury but no fatality Is equivalent to a Moderate Risk Rating
	Level III	An effect predicted to exceed regulated values and/or results in a reduced population size or other long-lasting effect on the subject of assessment Results in human fatality Is equivalent to a High to Extreme Risk Rating
Extent The physical extent of the effect, relative to study area boundaries	Level I	Confined to the LSA
	Level II	Beyond the LSA and within the RSA
	Level III	Beyond the RSA
Frequency How often the effect occurs	Level I	Rare - Occurs once every 1,000 to 10,000 years
	Level II	Unlikely - Occurs once every 100 to 1,000 years
	Level III	Possible – Occurs once every 10 to 100 years
	Level IV	Likely - Event may occur every 1 to 10 years
	Level V	High – occurs more than once per year

Table 9-3.5 Ratings for Evaluating Significance of Residual Effects of Accidents and Malfunctions (Cont'd)

Criteria	Classification	
Duration The length of time over which a Project effect will occur	Level I	Short term (effect lasts up to four years)
	Level II	Medium term (up to 25 years, for the life of the Project)
	Level III	Long term (beyond the life of the Project) or permanent
Reversibility The likelihood of the VEC to recover from the effect	Level I	Fully reversible
	Level II	Reversible with cost/effort
	Level III	Irreversible
Qualifiers		
Certainty Limitations in the overall understanding of the ecosystem and ability to predict future conditions	High	Baseline data are comprehensive; predictions are based on quantitative data; effect relationship is well understood
	Medium	Intermediate degree of confidence between high and low
	Low	Baseline data are limited; predictions are based on qualitative data; effect relationship is not well understood
Probability The likelihood that the predicted impact/residual effect will occur	Unlikely	Less than 20 % likelihood of occurrence
	Moderate	Between 20 and 60 % likelihood of occurrence
	Likely	Over 60 % likelihood of occurrence

3.2 MINE SITE

3.2.1 Open Pit Slope Failure or Waste Rock Stockpile Slope Failure

Open pits that are not properly designed and operated can be subject to erosion, pit wall failure and other slope stability incidents, causing hazards to workers or the environment. The floors of the pit might heave, but this is usually a localized event of low environmental significance. Two main sources of pit slope failure are overburden and bedrock instability. Overburden slope failure can lead to uncontrolled erosion, and bedrock instability can lead to pit wall collapse. The overburden slope angles will be conservatively designed to reduce the possibility of failure; thus, no significant environmental effects are anticipated. The bedrock slopes will also be conservatively designed, taking into account the geotechnical characteristics of the rock. Pit dewatering can also affect the stability of pit walls. This is not foreseen for the pit at Mary River, since the design and development will incorporate water diversions away from the pit perimeter wherever appropriate. Freeze-thaw processes acting on freshly exposed pit walls could potentially cause structural weaknesses that could lead to wall failure.

Stability analysis will be conducted during design and planning to determine overburden slope configurations that would achieve a desired safety factor for the ore and rock parameters. Bench heights, excavation and face angles, rock buttress, etc., will be based on the results of stability analysis. If erosion of the pit occurs during operation, measures such as rip-rapping or rock nailing will be taken. Rocks would be captured by the safety berms wherever necessary and practical. Geotechnical monitoring will be continuous during excavation with periodic monitoring during operation. Pit walls and overburden slopes will be visually inspected by the engineering staff and preventive measures implemented as appropriate. A geotechnical engineer or a professionally qualified engineer will visit the site periodically to assess the stability of the pit, identify any potential for safety hazards and take measures necessary to prevent or correction hazardous circumstances. If necessary, monitors will be installed to record ground-movements and temperatures and the results evaluated for redesign or modification of design.

There are no instances envisioned whereby instability of overburden or bedrock slopes could cause significant environmental consequences when proper design and monitoring are incorporated in the planning and operation of the pit. However, in case an accident or a malfunction of operation parameters should occur, proper safety procedures such as pit evacuation and implementation of emergency measures will be established to protect workers from injury and fatalities.

Failure could cause localized slope changes that would require subsequent reshaping to ensure long-term stability. In the unlikely instance that workers are injured by slope failure, emergency response procedures (to be developed in detail prior to commencement of operation) will be followed and technical and environmental preventative measures will be implemented immediately. With the control measures in place, the risk rating is considered low.

Waste rock is generated from stripping overburden and lower grade material from the mine to access the ore. The waste rock is trucked and placed in the stockpile. Several measures are undertaken to ensure stability of this pile:

- Final toe 100m from the final pit crest;
- 2:1 (H:V) overall slopes;
- 1.5:1 (H:V) individual lift slopes;
- 10m lifts, triple benching (30m benches);
- 15m berms between benches;
- 150m segments (5 benches); and
- Upper segment (above 680m elev.) toe moved back 120m away from crest of bottom segment (below 680m elev.).

Haulage ramps for the waste stockpile are similar in design to those in the pit, at 33m wide with 10 % grade. Final access ramps enter from the east and west sides of the pit, tying into the pit design.

Slope failure could cause localized changes that would require subsequent reshaping to ensure long-term stability. In the unlikely instance that workers are injured by slope failure, emergency response procedures, which will be followed and technical and environmental preventative measures will be implemented immediately. With the control measures in place, the risk rating is considered low.

3.2.2 Open Pit Flooding

During pit construction and operation, water will be collected in a sump structure at the lowest elevation and pumped to surface retention ponds prior to release. Throughout the lifetime of the mine, the pit will be entirely contained and surrounded in permafrost with the exception of an active layer of exposed overburden around the perimeter and a short distance into the exposed pit walls. Therefore the main source of sump water will be rain, snow melt and a small volume of runoff and seepage from the active layer. Because of the permafrost, there will be no sudden inflows of water due to release of groundwater from large fracture zones, voids or abandoned drill holes. Surface water inflows will be curtailed by a series of diversion ditches and swale structures around the perimeter. An extreme rainfall event during freshet, coupled with rapid flows from snow melt within and external to the pit, could potentially cause rapid accumulation of water that exceeds the sump capacity and begins to flood the pit. This scenario could be made worse by the potential failure of a water diversion berm around the pit perimeter. The consequence could include human injuries or production delays. The environmental consequence would include sudden filling and overflow of retention ponds.

Design and operational controls in place to minimize the consequences include:

- Emergency response procedures to be developed and reviewed prior to commencement of pit construction and operations to provide rapid response and evacuation as required to minimize the potential for human injuries;
- Ability to quickly mobilize and operate additional pumping systems and equipment in the event of rapid pit water inflows to the sump;
- Properly designed and constructed perimeter diversion ditches and swales in and around the pit; and
- Appropriately designed sump, pumping system and retention ponds with adequate holding capacity, especially during higher risk periods such as freshet.

The potential for human injury, environmental damage and production delays is unlikely and the risk rating is considered moderate because of the natural environment (i.e., permafrost conditions), engineered design features in and around the pit and the development of adequate emergency response procedures.

3.2.3 Explosives Accident

Explosives will be used during Construction and Operations Phases of the Project. Pre-packaged explosives will be used mainly during construction. During operations, ANFO and emulsions will be the main explosives used. A dedicated manufacturing and storage facility will be established on site to facilitate appropriate handling, use and management of explosives according to applicable regulations, including the *Explosives Use Act* and Regulations and the DFO Guidelines for the Use of Explosives in or near Canadian Fisheries Waters.

The components of ANFO and emulsion in isolation are not explosive, but they will explode if mixed in the correct proportions, confined appropriately and detonated with an external device. However, appropriate precautions will be taken to prevent accidental spill or release of the individual components and bulk explosives. An Explosives Management Plan will be adhered to by all workers (Volume 10, Appendix 10C-4). A blasting operations standard, a site-specific blasting plan for blasting near water and an Explosives Emergency Response plan will also be developed.

Handling of explosives will be done by licensed personnel only. Other workers will be restricted from access to explosives components, explosives or the facility. These precautions, in addition to adherence to applicable regulatory requirements, appropriate blasting design, monitoring, good housekeeping and management oversight, will reduce the possibilities of explosive incidents.

The potential exists, however, for accidents or malfunctions to occur. The associated concerns include:

- Hazard to human health - injury or fatality;
- Effect on environment - ammonia run-off, fuel spill, etc.;
- Wildlife and habitat disturbances; and
- Damage to property.

Although rare in occurrence, human error or unforeseen occurrences could also lead to accidents or malfunctions. In worst-case scenarios where injuries or damage to human, wildlife or property occur, established emergency procedures will be followed according to the explosive management plans mentioned above. With the control measures in place and handling restricted to licensed personnel, the risk rating is considered low to moderate.

3.2.4 Accidental Discharge of Hazardous Materials

Material Safety Data Sheet (MSDS) will be available on-site for all hazardous materials transported, handled and stored at all locations of the Project sites. Hazardous materials are stored in appropriate containers placed within a lined/impermeable secondary containment structure. Secondary containments are designed and dimensioned to contain spills and are equipped with sumps for recovery of liquids/runoff or contaminated materials. Detailed operating procedures have been developed for the handling, transportation, use and disposal of hazardous chemicals and wastes (refer to Environmental Protection Plan).

Fuel storage tanks are constructed within the confined of a secondary containment sized to retain 110 % of the content of the largest fuel tanks. Double wall ISO-containers are used for temporary storage. Temporary storage and refuelling stations are constructed on impermeable surfaces. The Waste Management Plan (SD-EMMP-004) describes the procedures in place for the handling of all waste materials while the Emergency Response and Spill Contingency Plan (Volume 3, Appendix 3B) details the response procedures to be followed in the event of a spill. The Steensby Port (SD-ERP-003) and the Milne Port OPEP details the procedures for fuel handling at the ports.

Despite the mitigation measures and management procedures Baffinland has implemented, a major, uncontrolled land-based spill of hazardous materials is unlikely but remains a possible event. If a spill occurs due to malfunction or accident, it will be contained within the secondary confinement and cleaned up rapidly. Given the adequate training that the employees will receive and the Emergency Response and Spill Contingency Plan, as well as the engineered controls, the environmental and safety risks of such an event are considered low.

This discussion applies to all areas of the Project where hazardous materials such as fuel and other chemicals are transported, stored and handled (Mine Site, ports and transportation).

3.2.5 Traffic Accident

Despite best efforts in operator training, truck and vehicle accidents are likely to occur during the construction phase, and to a lesser extent during the life of the Project. Accidents may be caused by human error, mechanical failure and/or extreme weather events. The consequences can range from minor to severe, depending on injuries or fatalities and the extent of environmental damage.

Baffinland will ensure that vehicle operators are appropriately trained and that regular maintenance is performed on all vehicles. The main camp will have a medical facility and medical staff to deal with injured personnel. In case of severe injuries, the worker will be stabilized at the clinic and evacuated off-site for medical treatment (refer to Health and Safety Management Plan, Volume 3, Appendix 3B).

Despite best efforts, traffic accidents, collisions with other vehicles or with wildlife are all likely events. With the control measures implemented, Baffinland considers the risk of these events resulting in serious human injury or environmental impairment as moderate.

3.2.6 Fire at the Camp Facilities and Infrastructure

A major fire in or near the camp accommodation complex has been considered. There could be many causes for such a fire including electrical or mechanical malfunction of equipment or infrastructure, the accidental ignition of various flammable/combustible materials that are stored and used throughout the camp, vehicular collisions with camp infrastructure and accidental detonation of explosives. Causes could include some combination of design flaws, systems malfunction, unintentional or irresponsible human behaviour, or improper following of established procedures due to training systems failure.

The design and operational controls in place to reduce the potential for accidental fire include:

- Design and construction of camp facilities and infrastructure in accordance with relevant building codes, fire regulations and other guidelines and regulations (refer to Volume 10, Section 3 Environmental Design Guidelines);
- Materials storage, management and handling processes and procedures, especially for fuel, hazardous materials and explosives;
- Regular inspections by trained and competent personnel of all camp facilities and infrastructure for fire code infractions;
- Proper training programs for functions that involve a potential for accidental fire;
- Adequate preventive maintenance programs for equipment, vehicles and camp infrastructure;
- Employee orientation and regular safety meetings that stress the need for fire safety and proper evacuation and response procedures;
- Establishing building facilities that can be heated using fuel oil rather than electrical power that would provide temporary shelter and heat in an emergency;
- Proper signage and fire suppression equipment available where required;
- Emergency response procedures to provide rapid response and evacuation capabilities; and
- Employees will be properly monitored for safe and responsible behaviour.

The potential for human injury and fatalities is considered to be unlikely; however, the risk rating is considered moderate because of engineered design features and the development and implementation of adequate emergency response procedures.

This discussion applies to Milne Port, the Mine Site, Steensby Port and temporary construction camps along the rail alignment where there is a risk of accidental fire.

3.2.7 Failure of the Camp Power Supply

The failure of the camp power supply could result in the failure of heating systems, potable water treatment plant, wastewater treatment plant and other key systems. The cause of the failure could be improper design of power generation plant and distribution system, insufficient maintenance, accidental fire, or damage due to human error. This could result in major inconvenience, discomfort and health and safety risks, especially during colder weather periods.

Design and operational controls will be implemented to minimize this potential occurrence. These include:

- Design and installation of the power supply and distribution system based on relevant electrical codes and regulations, including sufficient and functional backup systems that would heat key areas of the camp and generate power for necessary services;
- Regular testing of backup systems and inspections of all facilities and infrastructure for electrical and fire code infractions by trained and competent personnel;
- Proper training programs for functions related to power supply and generation;

- Adequate preventive maintenance programs; and
- Emergency response procedures to provide rapid response in the event of power failures and building facilities that can be heated using fuel oil rather than electrical power that would provide temporary shelter and heat in an emergency.

The potential for human injury and/or fatalities is considered **rare**; however, the risk rating is considered low to moderate because of the engineered design features/contingencies and the development and implementation of adequate emergency response procedures,

The above discussion applies to all camp sites including camps at Milne Port, Steensby Inlet and camps along the rail alignment where there is a risk of power failure.

3.2.8 Failure of the Wastewater Treatment Plant

The potential for a failure of the wastewater treatment facility (WWTF) was considered. Such a failure would result in effluent that does not meet discharge criteria and is potentially detrimental if released to the receiving environment. If the WWTF does not operate effectively, unsanitary and unhealthy conditions can result and can affect camp occupants. Causes for failure of the WWTF could include camp power failure, frozen discharge line, insufficient capacity in effluent storage ponds, insufficient capacity of system due to design failure, effluent upset conditions or operator error. Design and operational controls will be implemented to minimize risk associated with this potential scenario. These include:

- Adequate design of the WWTF based on predicted influent characteristics and variability;
- Sufficient volume capacity in effluent discharge ponds to ensure adequate capacity in the event of upset conditions;
- Proper training programs for work functions related to the WWTF;
- Daily monitoring program for early detection of operational problems and preventive maintenance program;
- Adequate electrical power backup systems in the event of power failure; and
- Prompt and adequate emergency spill response in the event of effluent or influent spill to the receiving environment.

The potential for human health problems or environmental impairment is considered to be unlikely; however, the risk rating is considered low in consideration of the engineered design features/contingencies and the development and implementation of adequate operational controls and emergency response procedures,

This discussion applies to all camp sites including camps at Milne Port, Steensby Inlet and along the rail alignment.

3.2.9 Contamination of the Water Supply

There is the potential for potable water supply to become contaminated at source or during the treatment and distribution process. Potable water contamination can result in adverse health outcomes for camp occupants. Potential for contamination at source (Camp Lake) could result from accidental release of deleterious substances to the lake due to fuel spill, contamination from accidental release of water from the east waste rock retention pond, or localized release of sediment to the lake during construction. Potable water contamination could also result from malfunction of the potable water treatment system or contamination within the distribution system.

Design and operational controls will be implemented to minimize risk associated with these potential scenarios that include:

- The potable water treatment, storage and distribution system will be adequately designed for the population of the Mine Site camp. Treatment processes will include filtration and UV disinfection. Operators will be adequately skilled and trained for the work they are performing. Preventative and routine maintenance and inspection programs will be implemented for the potable water treatment and distribution system.
- Camp Lake will be adequately protected from potential for contamination by ensuring that any upstream retention pond that holds runoff from the waste rock pile is large enough to hold the water until it is tested for appropriate drinking water criteria and released, even under high flow conditions. A treatment plant will be mobilized, if necessary, to treat water prior to release from the pond. Adequate protection measures including buffer zones and silt control measures will be implemented and enforced. An alternative potable water supply will be identified and used in the event of short-term water source contamination.
- A robust drinking-water sampling and monitoring program, modeled after similar programs in southern Canada, will be conducted to test raw and treated water from Camp Lake and from strategic points within the distribution system. The on-site environmental lab will have sufficient capacity to conduct limited testing for common bacteriological pathogens. This will provide rapid turn-around of results on a routine or emergency basis.
- A potable water emergency plan will be established. This could involve a combination of temporary use of alternative sources, boil-water orders and increased frequency of drinking water quality monitoring.
- Adequate electrical power backup systems.

The potential for human health problems due to contamination of potable water is considered to be rare; however, the risk rating is considered low in consideration of the engineered design features/contingencies and the development and implementation of adequate operational controls and emergency response procedures.

3.3 TOTE ROAD

3.3.1 Traffic Accidents and Release of Hazardous Materials

See discussion in Section 3.2.4.

3.3.2 Collision with Wildlife

Collision with wildlife is possible throughout the life of the Project. Baffinland's environmental induction program will focus on increasing the awareness of vehicle operators to the presence of wildlife, while the Terrestrial Environment Management Plan (Volume 10, Appendix 10D-11) outlines the actions implemented for their protection. Given the low number of animals anticipated to be killed by road traffic, the impact on the herds is considered low.

3.3.3 Road Embankment Failure and/or Collapse of a Water Crossing

A road embankment failure or the collapse of a bridge or culvert could result from an extreme precipitation event, extreme freshet events and/or the degradation of the ground due to the thawing of the soil/permafrost. Such events are difficult to predict and, depending on their timing, may result in stranding of vehicles and personnel, or human injuries. Despite the application of best engineering practice for the design of these structures and the routine inspection and maintenance of the roads, such events are likely to occur over the life of the Project. Given the effort place in design and maintenance, the risk rating is low.

3.3.4 Weather-related Strandings

Due to the inclement weather and rapidly changing difficult-to-predict conditions at the project site, there is the potential for personnel to be stranded in vehicles along roadways, along the rail alignment and when working on the land away from roadways. The result can be injury or fatalities due to exposure. There will be many controls in place to prevent or militate against this type of outcome including:

- Focus during employee induction and during safety meetings on the potential for weather-related hazards and potential incidents.
- The review of available weather information and predictions prior to working away from camp including satellite weather data available from Environment Canada website and real-time weather data available locally from the Mine Site, Milne Port and Steensby Inlet stations.
- Development and implementation of effective procedures for work away from camp, including proper clothing, survival packs, radio and telephone communications and use of vehicles in proper mechanical condition.

Based on the ambient and extreme weather conditions that occur at the Project site, the scenario of a weather stranding event is predicted to be possible. However, based on the robust operational and procedural controls and preventative measures, the overall risk rating is considered to be moderate.

3.4 RAILWAY OPERATION RELATED ACCIDENTS AND MALFUNCTION

The potential accidents on the Railway operation are related to:

- Road embankment failure and/or collapse of water crossing (discussed in Section 3.3.3);
- Derailment with associated release of hazardous materials (fuel);
- Collapse of the tunnel;
- Collision with wildlife;
- Injuries to traveling hunters (collision with human);
- Accidental release of hazardous material (discussed in Section 3.2.4); and
- Weather related strandings (discussed in Section 3.3.4).

The draft Railway Emergency Response Plan is presented in Volume 10, Appendix 10D-9 outlines the Baffinland's responses procedures for Railway emergencies.

Generally, rail is one of the safest means of transport; however, the potential exist that trains may derail. Minor derailments such as track jumping, or major derailments, which may be caused by misalignment of the Railway tracks, broken rail, malfunction of the switch mechanisms, failure of signals, spring thaws, failure of roadbed foundation, etc., may lead to injury or fatality. To prevent or minimize the possibility of derailments, the engineering design will take into account factors such as permafrost thickness and seasonal thawing of ice, rail alignment, efficient signalling, etc. Ballast material selection and thickness will be carefully engineered. Signal effectiveness will be constantly monitored and changes or adjustments made as quickly as possible. End-of-train detectors will detect whether cars have been uncoupled. Emergency response procedures will be implemented as soon as possible during accidental derailments.

The following discussion provides an overview of operational methods and techniques that will prevent or reduce any possibility of serious train accidents or malfunctions.

Safe use of the track will be controlled by a dispatcher, who will have oversight of all movements by giving specific and exclusive authority to vehicle and equipment operators to occupy a section of the track at a specific period. In "dark territory", where there are no fixed signals, fixed blocks will be established using wayside signs that will extend from one passing track to the next. Train crews will receive authority to occupy one or more blocks by radio in a standard-format transmission recorded by check marks on a pad form. This authority takes effect only after being repeated back to and verified by the dispatcher. Upon leaving the block, the crew will release it by a similar radio protocol. Work crews and road-rail (hi-rail) vehicles may occupy main tracks only if it will not prevent the use of other track segments. When trains have to pass, the Controller will order one onto a siding.

A Computer-Assisted Manual Block System (CAMBS) will give the Dispatcher information to help follow and implement specific sets of operating rules. The system will provide visual information on the status of the rail network and through its data base the dispatcher will be able to verify the current status of occupancy authorities on the track. The system is also able to check for any conflicts of the track occupancy and give warnings. This double safety feature, self-check and dispatcher oversight, will add particular safety to the operation and use of the Railway route.

Other safety systems will include track circuits for the detection of broken rails, installed at appropriate locations along the main line. A sleep mode activation system will be a standard feature of these circuits. The system will turn itself off during periods of inactivity and on once movement resumes. Activities will be transmitted to and displayed on the CAMBS terminal. The main line will be equipped with wayside detectors, strategically placed at mainline sidings, to monitor passing trains for defects such as hot wheels or bearings, or dragged objects and equipment. Information will be provided directly to the train, to a wayside signal system or to remote systems that are monitored by the dispatcher. A wheel impact detector (WILD site) will be used at the port terminal to detect defects such as flat spots. All information from the detectors and switches will be transmitted to the Control Centre and made accessible to the dispatcher, who will assess the information and provide required adjustments, warning or immediate maintenance request, etc., as the need may be.

Rock falls may be caused by the effects of wind, human or wildlife activity, etc. To prevent rock falls on the track, rock-fall detectors will be installed at appropriate locations along the route. The fall detector will warn the dispatcher, who will implement preventative action or initiate a control measures as soon as possible. The dispatcher will also monitor weather forecasts and adjust operations accordingly. In the event of a forecast of a severe storm, operations may be halted.

3.4.1 Train Derailment with Ore Cars or General Non-Hazardous Freight

Current project planning predicts that it will take six trains a day, 300 days a year, to move the ore to the port at Steensby Inlet. The inlet, 149 km to the southeast of the mine, offers a longer ice-free period, which will allow the mine to supply the port with ore for shipment 12-month a year. Trains carrying ore or other non-hazardous materials are not anticipated to derail, but if derailment occurs, it will delay scheduled shipment of ore. There will be no significant impact to the environment, since the ore contains no known toxic substances.

In the rare event of such derailments, radio communication will be established immediately with all scheduled and non-scheduled trains to prevent any further collisions. Signs will be posted at determined locations to warn workers, incidental hunters, vehicles, etc., of the accident. Other emergency actions will be coordinated by the closest emergency response team. Based on the operational controls and emergency plans that will be in place, the risk of such an event is considered to be low to moderate.

3.4.2 Train Derailment with Fuel or Other Hazardous Materials

Derailment of a train carrying fuel or other hazardous materials is an infrequent occurrence. However, in the unlikely event that it does occur, the Emergency Response Plan will be implemented immediately and appropriate clean-up measures taken. It is unlikely that open water will be abundant on the Railway route, since waters and the ground will be frozen most of the year. Impact of fuel releases from train derailment would therefore be localized and contained by ice and snow, which will be cleaned up as quickly as possible. Radio communication will be established as soon as the spill is discovered to warn other rail users and provide an opportunity for a quick and uncomplicated clean-up.

Good maintenance of railway rolling stock as well as regular track inspection and maintenance are essential to reduce the risk of train accidents and derailment. The Railway Maintenance Management Plan and the Railway Emergency Response Plan present the management procedures that will be implemented in order to minimize the risks of train derailment and accidents.

A train derailment is considered a rare event. In the unlikely event that fuel or other hazardous materials come in contact with open water, the spill contingency plan will be implemented as soon as possible to contain and prevent the spread of material in water. Clean-up procedures will then be implemented by either the Project's emergency response team or an external team, depending on the severity of the spill. The risk is considered very low.

3.4.3 Train Collisions

The risk of accidental train collision with other trains, vehicles, human or wildlife leading to injury or mortality is low. With proper engineering, maintenance, inspection of warning signs and signals and adherence to speed limits, train collisions are unlikely.

The following safety measures will be enforced to reduce possibilities of accidents or malfunctions leading to collisions:

- Railway signals and gates at level/grade crossings;
- Train whistle or horn warning to warn wildlife, pedestrians and other trains and vehicles of the presence of a train; and
- Trackside signals to maintain distance between trains to prevent a head-on collision with another train or collision with other vehicles or wildlife.

With the control measures in place, collisions are considered an unlikely event and the risk is considered very low to low.

3.4.4 Injury to Passing Hunters at Steensby Inlet

Seasonal hunting of terrestrial and marine wildlife is one of the main land-use activities of Inuit in the Baffin Region. Hunters usually travel by boat or on snowmobiles to the Steensby area to hunt for caribou, seals, whale and other wildlife. To prevent accidental injury to passing hunters, community education and awareness programs will be established and presented in local communities to warn hunters of activities in the area. If possible, alternative hunting routes and trails will be established in consultation with the QIA, HTO, etc. Where such alternative routes are not possible or practical, localized exclusion zones will be developed with appropriate warning signs.

It is possible, though unlikely, that injuries may be caused to passing hunter(s) by a Project activity. Where such an injury occurs, the on-site emergency response team will be mobilized to assess the injury and implement response action as soon as possible. On-site medical services or evacuation to an external medical facility will be provided as required. Family members of the victim(s) will be contacted as soon as possible by an appropriate Project official to inform them of the incident. Appropriate counselling will be provided when necessary. With these control measures in place, the risk is considered low.

3.4.5 Collapse of the Railway Tunnel

A collapse in one of the tunnels is considered rare, given the application of best engineering design practices and construction standards used during design and construction. However, there is always the possibility of an unforeseen geological occurrence that would weaken the tunnel integrity and result in a rock slide/collapse of a portion of the tunnel wall resulting in human injuries or fatalities. If this were to occur, the slide/collapse area would be secured, the debris cleared when safe to do so and the tunnel repaired with adequate safety standards to prevent a second occurrence. This is considered an unlikely event, however; risk is considered low to moderate.

3.5 MILNE PORT AND STEENSBY PORT

For Milne Port, sea-lift and shipping will take place only during the open-water season. The most credible and likely accidents related to Milne Port activities are:

- Fuel spill during ship-to-shore transfer;
- Spill from over wintering fuel barge/vessel;
- Accidental release of hazardous substances (discussed in Section 3.2.4);
- Fire at the accommodation complex (discussed in Section 3.2.6);
- Failure of the power supply (discussed in Section 3.2.7);
- Failure of the wastewater treatment plant (discussed in Section 3.2.8);
- Contamination of the water supply (discussed in Section 3.2.9);
- Congestion at the port leading to a collision;
- Ice accumulation at the port;
- Introduction of invasive marine species; and
- Introduction of invasive terrestrial species.

3.5.1 Ship-to-shore Fuel Transfer

Fuel will be unloaded from tanker to shore by flexible hoses. For the early construction period, a fuel vessel/barge will overwinter in Steensby Inlet and will provide up to 20 ML of fuel storage. The distance between the receiving edge of the freight dock and the fuel tanker is about 400 m.

During ship-to-land fuel transfer at Milne Port and Steensby Port, minor accidental releases may occur occasionally in water and/or on land. Other oily discharges may also occur from bilge tanks, engines, mechanical parts and other devices on board. The accumulation of these minor spills may become a cause for concern if they are not quickly contained. Spills on land and ice are more readily contained than those in open water, since water can spread the spill quicker and cause immediate impacts to water quality and aquatic life. Snow and ice, on the other hand, will act to help contain the spill while clean-up action is implemented. Clean-up equipment will available at all times at both ports. An emergency and clean-up response team will implement the spill contingency plan as soon as possible. The shipping contractor will establish appropriate loading and off-loading procedures using the *Arctic Waters Pollution Prevention Act*, Arctic Shipping Pollution Prevention Regulation and the Regulation for the Prevention of Pollution from

Ships and Dangerous Chemicals to prevent or quickly contain any spills or releases of fuel during ship-to-land transfers.

Both ports are will have Transport Canada-approved Oil Pollution Emergency Plans (OPEPs) as required under the Oil Handling Facilities Regulations of the *Canada Shipping Act*; this Act also requires that every vessel have a Transport Canada-approved Shipboard Oil Pollution Emergency Plan (SOPEP) to address accidental releases of fuel. The OPEP for Milne Port is attached in Volume 3, Appendix 3B and the Steensby Port OPEP is attached in Volume 3, Appendix 3B.

The operations and response structure at the Port facilities have been designed for rapid response to a spill. All equipment and resources are strategically placed near the beach front, directly at the port operation site. Responders, workboats and other support equipment are on standby during all operations and will be on scene within one hour of a spill. Equipment and resources are required to contain and control diesel, up to the minimum spill size of 3.5 m^3, as determined in accordance with Section 2 of the Oil Handling Facilities Standards.

In the event of a spill, on-water recovery will be initiated immediately upon containment of free-floating product. The skimming capacities at the Port facilities are capable of recovery of several times the estimated spill volume.

The ports bulk fuel storage facilities will be equipped with appropriate spill response equipment, which provides *resident capability* for the response to spills in accordance with the scenarios developed under this Oil Pollution Emergency Plan. Containment and recovery equipment inventories exceed the facility category planning standards and are especially appropriate for the potential spill volumes as outlined in the scenarios contained in the OPEP. Routine training exercise will be carried out to assess the effectiveness of the spill response procedures; and improvements will be made as required.

Although a fuel spill is likely to happen over the life of the Project, spills resulting from the ship-to-shore transfer operation will quickly be contained and the environmental effects resulting from such an incident will not be significant. The risk is considered low.

3.5.2 Fuel Spill from Over Wintering Fuel Barge/Vessel

For the 2012-2013 winter, a 20 ML ice class fuel barge or vessel will be used for fuel storage at Steensby Inlet to provide the diesel fuel required to support early construction. This is a common practice used for site capture for Project undertaken in remote Arctic locations devoid of infrastructure.

The operation of this barge/vessel is regulated under the Canada Shipping Act. The barge/vessel operator will have its own SOPEP (reviewed and approved by Transport Canada) and will be ready to respond to any credible emergency scenarios that may arise on the barge/vessel.

This vessel will be capable of Arctic navigation and it will be positioned during the open water season. Once it is immobilized in the ice, there will be little movement except for tidal upswell. Collisions with other vessels are therefore unlikely. The only scenario that could result in a large spill are related to on-board operations of the vessels; the SOPEP will take this into consideration and will have detailed response procedures. The most likely spill scenario is thus from the ship-to-shore transfer of fuel as described in Section 3.5.1.

3.5.3 Ice Accumulation at the Port

Tide movement at the dock face will act to prevent ice accumulation to a certain extent, although a bumper of ice can develop around portions of the dock face. An icebreaking tug can maneuver close to the dock face after each vessel departure and before the next ship docks to reduce build-up.

The loaders will be designed with extension capability so that they can load some distance laterally from dockside should the vessels have to dock against an ice bumper.

Bubbler systems commonly provide enough up-welling circulation to reduce ice build-up within a confined area. Such a system could be adapted for use at the dock face. Generally, even at shallow water depths, the water is above freezing (around -2^{o} Celsius for salt water, depending on salinity) and its circulation can keep ice build-up to a minimum. Ice accumulation at the Ports is likely although the risks are predicted to be low.

Experience Elsewhere - To date, ice build-up at the dock has not been a problem experienced at Raglan with winter shipping (although they ship only four times a year, three during ice cover).

3.5.4 Congestion at the Port

A situation could arise in which several ships are waiting for unloading cargo or loading ore. Although planning and logistics will ensure that such events are rare, the probability of occurrence is likely. The probable accident associated with congestion is a collision or grounding of ship, especially during extreme weather events.

While an unlikely event, an accidental fuel spill could hypothetically occur as a result of collision or accident or while transferring fuel between tanker and shore base. The OPEPs address issues associated with minor spills resulting from the ship-to-shore transfer of fuel. A collision could result in a larger spill. Such a scenario is discussed in Section 3.7 (Major Diesel Spill at Port or Along the Shipping Lane). Throughout the life of the Project, it is expected that diesel fuel will be delivered to Milne Port or Steensby Port by 50 ML tankers only during the open-water season. Shipping of fuel in pack ice or under landfast ice conditions is not planned. The risk is considered low.

3.5.5 Introduction of Invasive Marine Species

Increased shipping activities could introduce invasive marine species in the northern Baffin Island area with ballast water or by physical attachment to ship hulls. The ability of introduced species to establish viable populations is determined in part by the physical and chemical conditions of the exchange site (CSAS, 2009).

Climate and water temperatures are prevailing barriers to colonization by invasive species. However, with climate change and the increase frequency of shipping, there is an increased possibility of introducing a species (biota) that can readily adapt to the prevalent conditions in Steensby Inlet or Milne Inlet. Such an invasive species would have to originate from a similar climatic region (average annual water temperatures of 2ºC) and could be a serious threat to native aquatic ecosystems. Although the likelihood of occurrence and the significance of the associated effects are impossible to predict, Baffinland will adopt best management practices in terms of ballast water management.

Ballast is water taken on to stabilize sea-going vessels by adding weight and maintaining draft (the depth a vessel sits in the water). Empty vessels take on much more ballast than a fully laden ship. For icebreakers, ballasting is used to keep the ice draft of the vessels constant and to stabilize the ship, thereby optimizing stresses in different loading conditions.

To reduce or eliminate the risk of invasive aquatic species and pathogens being introduced into Canadian waters, all ships will exchange ballast water in accordance with the *Ballast Water Control and Management Regulations* (Transport Canada, 2006a), which prescribe exchange of ballast water at sea in deep waters away from coastal zones. Ballast water will be exchanged in the mid-north Atlantic Ocean, which is part of the same ocean regime as Steensby Port. Upon arrival at the port, the ships will exchange ballast water for ore. During winter, full ballast is required to assist in icebreaking and so the entire amount of ballast water will be discharged at the ore dock. During summer, the ships may discharge ballast water along the shipping route before arriving at the dock (in such cases only a partial load of ballast in the order of 70,000 m^3 will be discharged at the ore dock). Baffinland is also committed to using an IMO and North American (Canadian) Coast Guard approved Ballast Water Treatment System to treat ballast water.

Ballast Water Management Plans are specific to individual ships. The Shipping and Marine Mammals Management Plan (Volume 10, Appendix 10D-10) outlines the major elements and requirements of a plan acceptable to Baffinland. In light of the ballast water management in place, the introduction of invasive species is unlikely and the risk is considered low.

Given the precaution taken, the introduction of invasive marine species is an unlikely event and the risk is considered low.

3.5.6 Introduction of Terrestrial Invasive Species

The delivery of material, equipment and freight to Steensby and Milne also introduces the potential for introduction of invasive vegetation species (e.g., dandelions) and terrestrial species (e.g., rodents) to the Arctic environment. Although climatic conditions at Milne Port and Steensby Port are expected to be the major barrier to the survival of introduced species, Baffinland will undertake routine inspection of storage sites. If a foreign species is detected, Baffinland will consult with Canada Custom and the Government of Nunavut DoE and take appropriate actions to remove/limit the spread of the species to Northern Baffin Island. The action taken will be species dependent.

3.6 SHIPPING RELATED ACCIDENTS AND MALFUNCTIONS

The potential accidents and malfunctions associated with shipping are:

- Collision with marine mammals;
- Ship engine failure at sea;
- Ship grounding;
- Ice /ship interaction;
- Collision with other vessels; and
- Major diesel spill at sea.

3.6.1 Collision with Marine Mammals

Collision of ships with marine mammals is considered highly unlikely, as there are very few reported cases. The consequence of such a collision would most likely be the death of the animal, which, although unfortunate, does not threaten the survival of the species.

The probability of collisions is considered in Volume 8, Section 5; however there is no reliable database available that could be used to arrive at a probability estimate for this highly unlikely event.

As a mitigation measure, Baffinland intends to post observers on the ore carriers to report sighting of sea mammals and provide guidance to the ship captain on avoidance. The event is considered rare and the risk is considered low.

3.6.2 Ship Engine Failure at Sea

Of all recorded incidents in 2010, 54 % of them involved propeller/rudder/engine troubles. Propeller/ rudder/engine issues have been the leading cause of marine incidents over the past ten years in Canada as well (TSB 2010).

Ship engine failure may be caused by malfunctioning of the engine system or systems connected to the engine. The quickest and safest way to resolve the problem is to repair the engine. Inability to repair the engine quickly may lead to drifting, which may eventually cause grounding (discussed below). Before any voyage, the engine system will be inspected to ensure that it is in good working condition. Repair and maintenance tools and equipment will be provided on each ship. Spare parts and if possible spare engines will be kept on board for potential engine failures.

Baffinland will have up to four dedicated ice breaking tug boats anchored at Steensby Inlet. A Baffinland tug boat or an international marine safety organization will be contact for assistance in case of unresolved engine failure along the Hudson Strait or in the Foxe Basin.

Although a ship engine failure is a possible event, the risk associated with such a failure is considered low.

3.6.3 Cargo Ship or Ore Carriers Grounding without Fuel Spill

Ship grounding is a marine accident that involves the submerging of ship, causing disturbance to seafloor and potential marine habitat and damage to the entire submerged ship or the part that is submerged. The bottom structure of the ship is often damaged, allowing water ingress and further damage. Grounding leads to financial difficulties and may also cause loss of human and marine life.

Some of the main causes of ship grounding include:

- Engine failure;
- Deviation from established shipping lanes;
- Inadequate training of crew;
- Malfunction of mechanical parts and/or engine;
- Extreme weather conditions; and
- Improper functioning of port facility.

The possibility of ship grounding will thus be prevented or minimized by properly engineered design, adherence to established shipping lanes (detailed bathymetry), employment of well-trained crew and following ship-specific operating procedures. As much as possible, port facilities will have dedicated personnel to direct incoming ships around any potential grounding locations.

Ship ground is a rare occurrence, when ships are designed properly and the ship operating procedures are followed by well-trained shipping crew. If grounding occurs, the established emergency response for each ship will be followed.

Cargo vessels and fuel tanker have anti-collision devices with alarms and radar to ensure that collisions are avoided. Marine heavy oil (MHO) used for powering the ship is stored within a double tank containment inside the ship (normally toward the stern), away from the hull. MHO storages are unlikely to be damaged by collision or grounding.

Ore carriers used by the Project, the dedicated fleet of icebreaking ore carriers and the chartered vessels likely to operate during the open-water season, will carry their own supply of MHO in an integral tank. While a collision or grounding of an ore carrier is possible, the subsequent potential release of MHO is not considered to be a credible spill scenario, since fuel is not contained next to the hull and therefore a breach of the tank is highly unlikely. The risk associated with such an event is considered very low.

3.6.4 Fuel Tanker Grounding or Collision Causing Fuel Spill

Shipping accidents in Canada are on the decline, with 2010 being a 36-year low in Canada for shipping accidents (Transportation Safety Board, 2010). Of the accidents that occur, ~90 % are shipping accidents and the remaining 10 % are accidents aboard the ship (TSB, 2010). The top three types of shipping accidents are groundings, fire/explosions and strikes.

Over the past ten years, few accidents have occurred within the Canadian Arctic waters and this will likely remain the case when compared to the other regions within Canada (TSB, 2010). While the potential for increased traffic in the Arctic is predicted due to climate change and variability, a large increase is not expected for many years to come (Analyse and Strategi, 2011). Given that detail bathymetry is currently ongoing, the defined shipping route will be in designed to maximize safety for the crew, the vessel and the cargo. As well, as technology progresses, more accurate navigational aid and technologies will be developed and will be implemented as necessary. The risk of a lost vessel is low for this project as the ore carriers will be designed to specifically handle the stresses of this harsh environment.

Of the incidents of oil spills less than 7 tonnes that occurred 1974 - 2010, the leading cause (40 %) was loading/unloading of oil, with the next leading cause (25 %) attributed to other/unknown (ITOPF, 2010). Groundings and hull failures each comprised of 3 % of the causes for oil spills (ITOPF, 2010). Of the incidents of oils spills (>700 tonnes) loading/unloading was again the leading cause at 35 %, followed by collisions at 29 % and groundings at 12 % (IOTPF, 2010). Modeling of oil spills at Milne and Steensby Port is discussed in Section 3.8.

Fuel will be delivered only during the open-water season. Large spills of diesel fuel may occur when a diesel fuel tanker is grounded. Such incidents are rare, but when they do occur immediate action is taken to salvage the ship and prevent uncontrolled flow of diesel. Each ship will have a proprietary general emergency plan based on to the International Safety Management Code (ISM Code) for the Safe Operation of Ships and for Pollution Prevention. The ISM Code is a management systems model designed to encourage safety and pollution prevention. Compliance with its provisions is mandatory for passenger and other ships. Emergency plans will be implemented as soon as possible to contain, clean up and salvage spills. Baffinland will be self-sufficient in terms of emergency response capability. The Canadian Coast Guard (CGC) and other regulatory agencies will be informed as soon as possible. Tankers will maintain a daily reporting routine to CGC and Baffinland when travelling through the north to inform tankers of other vessels in the area, a practice that will prevent or reduce possibilities of collision.

All tankers will have anti-collision devices with alarms and radar to ensure that collisions are avoided. Furthermore, marine heavy oil (MHO) used for powering the ship is stored within a double-hulled containment inside the ship. Fuel tanker grounding or collision causing a fuel spill is predicted as being unlikely with a low risk. Such an event would require that the vessel actually split and sink due to a major onboard explosion.

3.6.5 Ice / Ship Interaction

Dedicated ore carriers (160,000 to 190,000 DWT) will be designed for icebreaking capabilities. Ice / ship interaction is not expected to be a problem. Furthermore, two of the four tug boats anchored at Steensby Inlet will have icebreaking capabilities and will be available for rescue assistance through the Foxe Basin and Hudson Strait. The precautions taken for winter navigation are described in Section 3.2.2.5 of the Shipping and Marine Mammals Management Plan (Volume 10, Appendix 10D-10).

3.6.6 Collision with Other Vessels

Protocols are well established for commercial shipping in the Arctic. Several small fishing and harvesting vessels from both the LSA and the RSA frequent the coastal areas in the vicinity of both Milne and Steensby Ports.

For commercial ships, protocols and surveillance systems are well established to maintain communication with other vessels and avoid collision. For smaller vessels, the size of the ore carrier and their observation system should be adequate warn smaller craft of their presence. In addition, the Company will notify local communities when ships are expected to be in the area. There is a rare likelihood of collision with other vessels with a predicted very low risk.

3.7 AIR TRAFFIC

Air traffic emergencies were considered as a potential scenario for impacting personnel, aircraft and site infrastructure. The potential for aircraft incidents can occur anytime and anywhere. However, only incidents directly affecting the airport were considered. Incidents beyond its boundaries are covered in the Emergency Response and Spill Contingency Plan (Volume 3, Appendix 3B).

Air traffic incidents could result in failures to aircraft, infrastructure and personnel, significantly impacting the operation. The cause of these incidents could be:

- Aircraft incidents and accidents;
- Natural disasters;
- Bomb incidents;
- Hazardous material incidents;
- Structural fires; and
- Failure of power for movement area lighting.

Design and operational controls will be implemented to minimize this potential occurrence:

- Design will be based on Transport Canada Standards and Recommended Practices for designated aircraft use at the Mary River Project;
- Installation of visual aids for aircraft navigation;
- Installation and use of electronic and procedural approach aids;
- Adherence to the International Air Transport Association (IATA) standard for the air transportation of dangerous goods;
- Implementation of Mary River Project airport specific standard operating procedures; and
- Implementation and exercise of Mary River & Steensby emergency plans limiting the potential impacts of an incident.

Although the likelihood is rare, given the potential consequences of an aircraft crash for human injury and/or fatality, the risk is considered low to moderate. The potential of such an occurrence is reduced in consideration of the engineered design features, administrative and operational controls, and the implementation of the Emergency Response and Spill Contingency Plan (Volume 3, Appendix 3B).

The above discussion applies to all project airports including the Mine Site, Steensby Port and Milne Port.

3.8 MAJOR DIESEL SPILL AT PORT OR ALONG THE SHIPPING LANE

Catastrophic damage could possibly occur to a tanker delivering fuel, or to the fuel storage compartment of a bulk carrier. During the review of the DEIS, agencies requested that Baffinland endeavor to complete a more quantitative risk assessment of an oil spill along the shipping lane, and from the outcome, develop and assess a "worst-case scenario" spill event.

3.8.1 Worst-Case Scenario

In order to develop a credible "worst-case scenario" for an oil spill, a semi-quantitative approach was taken to risk assessment. We first considered the pattern of anticipated shipping that involves appreciable quantities of fuel, either as cargo or to propel the vessels.

During the 4-year construction phase, 13 fuel tankers will be arriving at Steensby Port carrying a total of 280 ML of fuel as cargo. During operations it is anticipated that 7 fuel tankers will be arriving per year for 20 years for a total of 140 transits. During the five years of decommissioning it is assumed that fuel delivery will be half of the volume delivered per year during operations. During construction 11 fuel tankers will be arriving at Milne Port carrying a total of 110 ML of fuel. Fuel tankers are assumed to carry 50 ML of fuel. Therefore over the life of the Project there are a total of 184 transits for fuel tankers which amounts to approximately 7,390 ML of fuel transported through the RSA.

During operations, 102 transits by ore carriers will occur per year. These vessels will carry ore as cargo, however each will carry a considerable quantity of fuel for the ship's own engines. These ore carriers have a capacity of 6 ML of fuel, however as these vessel will be fueled in Rotterdam only, while they are in the RSA the amount of fuel in the ore carriers will average in the order of 3 ML. Over the 20 year operation phase, an estimated total of 6,120 ML of fuel will transit through the RSA in the ore carriers.

Various cargo vessels will supply the Project during Construction via both Milne and Steensby Ports, and during Operation and decommissioning via Steensby Port. They will only carry oil products as fuel for the vessel. The cargo vessels will be arriving from Canadian ports and are assumed to have a maximum capacity of 2 ML of fuel. A total of 175 transits by freight vessels will occur carrying approximately 350 ML of fuel transiting through the RSA.

The risk of an event is a combination of probability multiplied by consequences. The number of anticipated trips related to the Project can be used as an indicator of probability, i.e., the greater the number of trips, the higher the probability of a failure event. In a similar fashion, the total quantity of fuel transported per trip can serve as an indicator of potential consequences. There are, of course a myriad of other factors that will affect the risk of a marine oil spill, consequently this consideration is, at best "semi-quantitative".

As shown in the Table 9-3.6 below, the largest number of trips associated with the Project will be by ore carriers, hence these vessels have a very high "probability Indicator" reflecting the fact that they represent a large portion of Project vessel traffic. This is offset by the "Consequences" Indicator which reflects the amount of fuel on board. As might be expected, the tankers contain the greatest quantity of fuel per trip and consequently pose the highest "Relative Risk" of a spill. Thus, a spill from a tanker is indicated as producing the most credible "worst-case scenario".

Table 9-3.6 Relative Risk Value of a "Worst-case Spill Scenario" per Vessel Type

Vessel Type	Probability Indicator	Consequences Indicator	Relative Risk
	# trips (% total)	Volume of oil (MT) onboard	(PXC)/100
Tanker	184 (7.67)	50	3.83
Ore Carrier	2040 (85.03)	3	2.55
Cargo vessels	175 (7.29)	2	0.14
Totals	2399 (100)		

The total amount of fuel being carried by fuel tankers is greater than the total carried by ore carriers during the life of the Project (9,200 ML vs. 6,120 ML). The ore carriers will have their fuel compartments contained well within the vessel hull and removed by several layers from the ship's hull. The tankers will carry the oil in sub-divided cargo compartments along the body of the vessel (approximately 14). As such the fuel tankers will be carrying more fuel, which is contained in a larger area making it more susceptible to a spill occurring should the hull of the vessel be breached.

The most likely location of a credible worst-case spill scenario is along the southern shipping route. As mentioned, the northern shipping route will only receive 110 ML of fuel from 11 fuel tankers over the four year construction phase of the Project. No fuel tankers will be arriving at Milne Port during the operations phase. The southern shipping route will be well charted and equipped with both Nav Aids as well as aids to Navigation in order to reduce the risk of a spill.

As fuel tankers will only be arriving at Steensby Port during the open-water season, the credible worst-case spill scenario will occur during this period. A conservative estimate of 5 ML of fuel being spilled has been used in other models for the Project (Section 3.8.8). This represents 10 % of the total cargo of a fuel tanker. Based on a fuel tanker with 14 separated storage compartments, a spill of 5 ML represents a breach of two compartments with the release of 75 % of their contents.

3.8.2 Spill Modelling

Only three types of bulk fuels will be used by the Project. They are:

- Arctic diesel fuel for use by mobile equipment, power generators and locomotives;
- Jet A aviation fuel; and
- Marine diesel fuel for use by tugboats anchored at Steensby Inlet.

Gasoline used for powering miscellaneous small equipment (ATV, snowmobiles, small crafts) will be delivered in double wall ISO-containers. Thus the development of spill modeling was based on diesel fuel as the most commonly handled of the three types of bulk fuel to be transported to site.

Large diesel spill scenarios for both Milne Inlet and Steensby Inlet were modeled to predict the trajectory of a diesel spill and the coast line that could be impacted by such a spill. The purpose of this modeling was for estimating the marine and coastal areas potentially affected by such an event and the initial weathering fate of the diesel fuel.

3.8.3 Fate of Diesel Fuel – Natural Weathering Processes

- Diesel is lighter than water (specific gravity of 0.85 kg/L compared to 1.03 kg/L for seawater) and will initially form a thin layer on the surface. It will not pool, when spilled in a marine environment, as will crude oil, diesel fuel undergoes a series of physical and chemical changes, which together are termed oil weathering (NOAA, 2002).

- Evaporation: The most volatile compounds will quickly evaporate once exposed (API, 1999; ITOPF, 2002). Oil, with boiling points below 200°C, will typically evaporate in 24 hours, and the larger the surface area of the spill, the quicker the evaporation will occur. The conversion of liquid fuel to gaseous fuel typically occurs in first five days. Spills of refined products such as gasoline can evaporate on their own in hours while light crude products can lose anywhere from 20 % to 60 % of their volume in the first few day (API, 1999; ITOPF, 2002). Evaporation does increase viscosity and density of the remaining oil (ITOPF, 2002). In 18 hours, 37 % of an instantaneous release of approximately 16,000 L of diesel fuel evaporated under conditions of 10 knot winds and a water temperature similar to what could be expected during the open water shipping season. This process would be slowed in colder water and accelerated in higher winds.
- Emulsification: Wave action causes very small water droplets to mix with the fuel, which slows down other mixing processes. Emulsification typically occurs when winds exceed 7-10 knots. Emulsification are more likely to occur in oils that have a nickel/vanadium concentration greater than 15 ppm or an asphaltene content greater than 0.5 % (ITOPF, 2002). As the oil emulsifies, it takes on water until it reaches a stable state, which typically ranges from 70-80 % water (ITOPF, 2002). It is this product that is the red/brown product that is highly persistent and accumulates on shorelines and often referred to as mousse (API, 1999; ITOPF, 2002). The mousse is resilient to weathering effects. Once emulsification occurs, the result is typically a product that has a volume three times greater than the oil alone (ITOPF, 2002). If the mousse becomes extremely stable it is very difficult to break it back down to oil and water.
- Natural dispersion: Small droplets of fuel are mixed into the water, removing fuel from the surface (typically occurs during the first five days). Dispersion occurs as a result of the wind and waves causing turbulence. The rate of dispersion is largely dependent on the oil and the sea state (API, 1999; ITOPF, 2002). Dispersion is typically viewed as the sheen of oil present on surface water after a spill. Oil may disperse completely from the area in a few days given a moderate sea state (API, 1999; ITOPF, 2002). Dispersion is not uniform and once oil encounters an obstacle, such as shoreline, it will form a thicker sheen in that area (ITOPF, 2002). While greater dispersion may make cleanup efforts more difficult due to the size, a larger dispersion of oil increases various processes such as evaporation, dissolution, oxidation and biodegradation (API, 1999; ITOPF, 2002).
- Dissolution: a minor weathering process whereby water soluble components of the fuel are mixed into the water (typically occurs in the first five days). The rate at which dissolution occurs depends on water temperature, composition, spreading, turbulence, and degree of dispersion (API, 1999; ITOPF, 2002). Light hydrocarbon compounds are typically highly soluble and the most likely to be dissolved while heavier hydrocarbon compounds are typically insoluble (API, 1999; ITOPF, 2002). While the lighter compounds are more soluble they are also more volatile and as such more likely to evaporate at a rate of 10-10,000 times faster than dissolution (API, 1999; ITOPF, 2002). It is rare to see dissolved hydrocarbons in seawater exceed 1 ppm (ITOPF, 2002).
- Sedimentation: Heavier hydrocarbons (>1.025 g/mL) will sink in seawater and fuel may adhere to suspended particles in the water column (ITOPF, 2002). In turbulent waters with a high sediment load (4,000 mg/L), sedimentation can transfer oil through the water column in hours. Oil sedimentation along shorelines is not uniform and will vary depending on the sediment present and disturbance along the shoreline. In exposed, high energy shorelines, lots of sediment can join with the oil creating vast tar beaches (ITOPF, 2002). This oil mixture will sink once brought out into the ocean by storms, tides or currents. In sheltered shorelines where mud and marshes are common, oil sedimentation may remain

for an extended period of time (ITOPF, 2002). Sedimentation may also occur as a result of oil being ingested by zooplankton and eliminated as fecal matter (API, 1999; ITOPF, 2002). The fecal matter, along with fine sediment particles that have become contaminated, may become suspended in the water column after storms, turbulence and tidal rise and fall. This process is called clay-oil flocculation (ITOPF, 2002).

- Biodegradation: breakdown of fuel by microbes into other compounds and eventually into water and carbon dioxide. There are a wide range of these organisms and are more likely to be found in chronically polluted coastal areas (ITOPF 2002). Each organism only degrades a certain type of compound, and biodegradation can only occur along the oil/water interface (API 1999). Biodegradation slows down significantly once oil becomes a thicker layer and may potentially stop once sedimentation occurs as the organisms may be unable to receive sufficient nutrients and light (ITOPF 2002). This process occurs over weeks to years, depending on type of oil, temperature, nutrients present, oxygen and quantity of hydrocarbons spilled.

3.8.4 Mitigation Measures

Mitigation to address the potential for fuel spills includes ensuring shippers operate in compliance with the stringent regulations and guidelines established for the transport of fuel in Arctic waters north of 60º latitude. The following regulations and guidelines have been established under the *Canadian Shipping Act* and *Arctic Waters Pollution Prevention Act*:

- Guidelines for the Operation of Tankers and Barges in Canadian Arctic Waters (Interim): provide an increased standard of protection (above other Canadian waters) from oil spills. The guidelines address the construction of vessels, operation, crew training, required oil cleanup equipment and the need for an Emergency Response Plan approved by the Canadian Coast Guard (Transport Canada, 1997a).
- Arctic Waters Oil Transfer Guidelines: describe the approved procedures for transferring petroleum products in Arctic waters, including requirements for safety, fire fighting and emergency equipment, assessment of weather conditions, responsibilities, communication, emergency stop procedures and spill response equipment (Transport Canada, 1997b).
- Arctic Shipping Pollution Preventions Regulations: sets out shipping requirements through the Arctic, including vessel construction requirements.
- Arctic Waters Pollution Prevention Regulations: defines equipment standards, inspections transfer operations requirements and shipboard emergency plans.
- Oil Pollution Prevention Regulations: indicates liability associated with the deposit of waste in Arctic waters.
- Response Organizations and Oil Handling Regulations: oil tankers must engage a spill response organization if larger than 150 gross registered tonnage.

Vessels must also have on board an Oil Pollution Emergency Plan (SOPEP) and shipping companies are required to maintain an arrangement with a certified response organization, such as the Eastern Canada Response Corporation for eastern Canada. A typical Table of Content of a SOPEP is presented in Volume 10, Appendix 10D-10.1

3.8.5 Recovery Methods for Spills

At the DEIS PHC held in Igloolik (November 7, 2011), Environment Canada requested that Baffinland:

- Incorporate the knowledge gained from the National Energy Board "Spill Response Gap Study for the Canadian Beaufort Sea",
- Identify areas and times along each shipping route where accidents are more likely to occur, and
- Identify optimal times for bulk fuel shipments based on open water season and when/where conditions are most favorable for responding to an oil spill/environmental emergency.

The NEB report cited by Environment Canada (S.L. Ross Environmental Research Limited, 2011) covers the Beaufort Sea and the Davis Strait. The gap analysis looks at the time of the year when three types of response measures are effective for spill recovery on the basis of:

- Wind conditions;
- Wave conditions; and
- Visibility.

The response measures investigated are:

- In-situ burning;
- Containment and recovery; and
- Dispersant.

For the central Davis Strait, the report concludes that for the months of June, July, August and September, at least one method of response intervention is applicable 100 %, 100 %, 99 % and 95 % of the time respectively (on the basis of wind and wave data). The effectiveness of the recovery methods can drop to the low 80 % by November.

This confirms that the optimal months for fuel delivery are from June to September for the Davis Strait, which translate to the July to September period for the Foxe Basin as the ice free condition in that area start a bit later in the year.

In terms of "areas and times along each shipping route where accidents are more likely to occur", the very notion that accidents are predictable is a stretch of the imagination. Baffinland has launched an extensive program to establish the bathymetry along the shipping route. This information will be available by the time the ore carriers begin sailing through the Foxe Basin.

As stated above, the possibility of ship grounding will be prevented or minimized by properly engineered design, adherence to established shipping lanes (well-known bathymetry), employment of well-trained crew and following ship-specific operating procedures. As much as possible, port facilities will have dedicated personnel to direct incoming ships.

Ship ground is a rare occurrence, when ships are designed properly and the ship operating procedures are followed by well-trained shipping crew. If grounding occurs, established emergency response for each ship will be followed.

Cargo vessels and fuel tanker have anti-collision devices with alarms and radar to ensure that collisions are avoided. Marine heavy oil (MHO) used for powering the ship is stored within a double tank containment inside the ship (normally toward the stern), away from the hull. MHO storages are unlikely to be damaged by collision or grounding.

Ore carriers used by the Project, both the dedicated fleet of icebreaking ore carriers and chartered vessels that are likely to operate during the open-water season, will carry their own supply of MHO in an integral tank. While a collision or grounding of an ore carrier is possible, the subsequent potential release of MHO is not considered to be a credible spill scenario, since fuel is not contained next to the hull and therefore a breach of the tank is highly unlikely. The risk associated with such an event is considered very low.

3.8.6 Canadian Coast Guard (CCG) Response in the Arctic Region

A major commitment made by Baffinland is that the Company will be self-sufficient in terms of emergency response that deals with all events related to its operation. This will apply at the onset of the Operation. During construction, the EPCM contractor will maintain necessary equipment and trained personnel at the Steensby Port at all times to enable the Company to respond effectively to spills within close proximity to the port. Fuel shipments will be delivered during the open water period. All vessels transporting fuel to the site will be licensed to navigate in Canadian waters and therefore will have a Transport Canada approved SOPEP. As per the current situation/practice throughout the Arctic, until Baffinland's fleet is operational, Baffinland will rely on the assistance of the Canadian Coast Guard for search and rescue operations and assistance to respond to accidental events during ship transit to the port sites.

For information purposes, an update is presented on the CCG response capabilities in the Arctic Region.

The "*Central & Arctic Regional Response Plan (2008)"* and the "*Baffin Region, Nunavut Area Plan"* outline the Canadian Coast Guard's response capability for the Baffin region. This plan is a component of the *Canadian Coast Guard National Response Plan* (2008), which is the responsibility of the Director Environmental Response, Ottawa. It establishes the framework and the procedures by which Central & Arctic Region will prepare for, assess, respond to and document actions taken in response to pollution incidents.

Arctic Community Packs (ACPs) are placed in northern communities for rapid (local) initial response. Canadian Coast Guard provides initial response training to members of the communities so that they may effectively deploy equipment in the ACPs in the event of a spill. Access (keys) for the ACPs have been given to community officials in most cases.

The inventory for each Canadian Coast Guard Arctic Community Pack location is listed in the Table 9-3.7. The program received funding under the Health of the Oceans Initiative and placement of ACPs at additional sites took place in 2009. A full review of each community through possible spill scenarios was undertaken and the equipment profiles at the existing Arctic Community Pack sites were changed to reflect characteristics of each community. The inventory at all communities is now site-specific and coincides with response strategies designed by the ER planning group. The locations of the additional Arctic Community Packs are: Baker Lake, Broughton Island (Qikiqtarjuaq), Chesterfield Inlet, Churchill, Pangnirtung, Tuktoyaktuk, Yellowknife, Hall Beach, Kimmirut and Iqaluit, the last three being along the proposed shipping route

Based on the findings of the review, inventories were adjusted by community and additional ACPs were delivered accordingly. For the most part, the single sea container approach has now been enhanced to contain three modules per community: one for boom, one for shoreline clean-up and one beach flush kit.

The approach is to provide the community with sufficient materials and training to ensure self-help capability for 48 hours and to ensure a timely initial response to spills less than 5 m^3. Following this initial response, should it be necessary, a cascading of resources from other CCG inventories would be initiated. The main base of operations with Environmental Response dedicated personnel is located in Hay River, Northwest Territories. This base is home to a Rapid Air Transportable (RAT) cache of equipment known as the

"RAT150". The RAT150T used in conjunction with the "Delta" (Δ) 1,000T meets planning standards for a 1,000 tonne (T) response. The equipment for the RAT150 meets pumping rates/capacities of 1,000T thresholds and is complimentary to the equipment held in the Δ 1,000T depots.

The response package, warehoused in Hay River, is maintained in 100 % readiness during the shipping season. The equipment is broken down and containerized so that it will fit through the smallest cargo door of any of the selected aircraft. Equipment is TDG compliant, palletized as appropriate and labeled for ease of selection and loading.

In combination with the RAT150T, equipment found in the Δ1,000T depots will be at a 1,000T capacity. Hence, the delta or "Δ" is the difference between the RAT150T and a full 1,000T. The Δ1,000T depots will have containerized heavier equipment (not suitable for air transport to smaller communities) augmenting the RAT150T to a 1,000T capacity, ready to be loaded on deck barge, Canadian Coast Guard icebreaker or freighter. While response personnel cascade in to the spill site, pre-identified local, CCG base and available ER personnel will mobilize to the centers and load the equipment on suitable marine transport.

Three Δ1, 000T depots are strategically located in the northern communities of Tuktoyaktuk (Northwest Territories), Iqaluit (Nunavut) and in Churchill (Manitoba). For the purposes of response in Central & Arctic Region, Churchill is included in the Arctic Zone of operations despite it being south of 60° North Latitude because of the similarities in response characteristics it shares with northern locations.

3.8.6.1 CCG Expectations of Oil Handling Facilities (OHF) for Response

In most instances when a spill occurs, the initial report will trigger the mobilization of the facility response team. It is normal, in most cases, for oil handling facility personnel to be the initial responders.

Small Spills

For the purpose of the OHF Plan, a small spill is defined based on the maximum oil transfer rate of the oil handling facility (i.e., what level it is assigned under the *Canada Shipping Act, 2001),* which directly links to the minimum spill size to which it must be prepared to respond within one hour. Oil handling facilities are required to have the resources on site to contain a minimum-size spill within one hour and have the resources required to recover, or where the oil cannot be recovered the resources to control, a spill of a minimum spill size within six hours. Response organizations may be called upon to provide additional operational response capability at the discretion of the polluter.

Large Spills

For the purposes of the OHF plan, any spill above the facility's minimum spill size will be characterized as a large spill. Oil handling facility personnel are still expected to deploy their on-site equipment. Additional resources beyond the capability of the OHF will be requested from CCG, or in the case that CCG deems the OHF unable to adequately respond, they will dispatch resources accordingly.

Table 9-3.7 Canadian Coast Guard Arctic Community Pack Locations

Location	EQUIPMENT SUMMARY			
	Boom (24")	Skimmers	Boats	Storage
Arctic Bay (Ikpiarjuk)	3,650'	TDS-118	16' Aluminum	Open top Tank
Cambridge Bay (Ikaluktutiak)	1,350'	TDS-118	16' Aluminum	Open top Tank
Cape Dorset (Kinngait)	1500'	TDS-118	16' Aluminum	Open top Tank

Table 9-3.7 Canadian Coast Guard Arctic Community Pack Locations (Cont'd)

Location	EQUIPMENT SUMMARY			
	Boom (24")	**Skimmers**	**Boats**	**Storage**
Clyde River (Kangiqtugaapik)	4,500'	TDS-118	16' Aluminum	Open top Tank
Coppermine (Kugluktuk)	1,350'	TDS-118	16' Aluminum	Open top Tank
Coral Harbour (Salliq)	1,500'	TDS-118	16' Aluminum	Open top Tank
Gjoa Haven (Uqsuqtuuq)	1,350'	TDS-118	16' Aluminum	Open top Tank
Holman (Ulukhaktok)	1,500'	TDS-118	16' Aluminum	Open top Tank
Rankin Inlet (Kangiqsiniq)	2,200'	TDS-118	16' Aluminum	Open top Tank
Resolute (Qausuittuq)	1,350'	TDS-118	16' Aluminum	Open top Tank
Hay River FRU +	1,000'	-	37' Seatruck 42' Cutter	-

3.8.6.2 <u>Recent Enhancements to the CCG Response Capability in the Arctic Region</u>

In 2009, CCG – C&A ER received funding under the Health of the Oceans Initiative to proceed with this enhancement to their regional response capability. The equipment profiles at the existing Arctic Community Pack sites were changed to reflect characteristics of the community. The inventories at all communities are site-specific and coincide with response strategies designed by the ER planning group.

An overlay of the shipping route proposed for Steensby and Milne ports shows that community packs are now staged at almost all villages along the shipping route. In the Foxe Basin, community packs are situated at Hall Beach. Igloolik currently is not supported by a community pack. In Hudson Strait, community packs are staged at Cape Dorset and Kimmurit. The east coast of Baffin Island is supported by CCG with units placed at Pangnirtung, Qikiqtarjuaq and Clyde River. A major 1,000T capability is also located at Iqaluit.

The equipment profiles at the existing Arctic Community Pack sites were changed in 2009 to reflect characteristics and specific risks on an individual basis by community. The inventories at all communities are site-specific and coincide with response strategies designed by the ER planning group.

3.8.6.3 <u>Interaction of CCG with Industry and Potential Polluters</u>

The Canadian Coast Guard is the Lead Agency in responding to marine spills north of 60°. Baffinland initiated discussion with the CCG regarding their current policies and approach in dealing with industry in the region. It is Baffinland's understanding that the CCG's current levels of service in the Foxe Basin and Hudson Strait, as well as on the east coast of Baffin Island, is adequate for the current and probably the future needs of the region.

Activity in the context of the Mary River Project would undoubtedly represent an increase of shipping volumes, but CCG sees spill risk centered around the diesel fuel deliveries. From an environmental response standpoint, CCG would respond in an efficient manner with current resource levels.

3.8.7 Potential Effects of a "Worst-Case" Spill Scenario

Impacts to Biota - Lower Trophic Levels and Fish

The introduction of diesel fuel into the marine environment could have a harmful effect on plankton, benthos and fish. In open water, toxicology issues would likely focus on acute toxicity within the first few days after a spill. Acute toxicity appears to be related to the Water Soluble Fraction of the fuel (McCarthy *et al*., 1985; Yapa and Shen, 1994) and due to the concentration of aromatic constituents, rather than the aliphatic compounds (Doeffer, 1992). Lethal concentrations of WSF vary between species, life cycle stages (eggs and larval stages are most sensitive) and physical environment parameters (water temperature).

In the event of a surface spill during fuel transfer, plankton living in the surface waters at the spill site would be particularly vulnerable because they would be exposed to the highest concentrations of WSF constituents. Organisms or certain life history stages of organisms with no or limited locomotory abilities (fish eggs, larvae and benthic invertebrates) would also be vulnerable. In contrast, adult fish would be less vulnerable because they are generally able to avoid spills by swimming away.

Craddock (1977) provided a summary of acutely lethal concentration (standardized for a continuous 96-hour exposure) ranges for the water soluble fraction of diesel fuel for a variety of marine biota as follows: fin fish, 5-50 mg/L; larvae and eggs, 0.1-1 mg/L; pelagic crustacean 1-10 mg/L; benthic crustacean 1-10 mg/L; gastropods 10-100 mg/L; bivalves, 5-500 mg/L; other benthic invertebrates, 1-10 mg/L.

Chronic exposure for these species will rely heavily on the substrate along the shorelines. In areas of low disturbance, contaminated sediments can rest for an extended period of time, and should these contaminants end up underneath a mussel bed, this would create a direct route into the food chain (Peterson *et al*., 2003). The sediment filtering benthics are typically slow at metabolizing hydrocarbon compounds allowing for high concentrations of hydrocarbons to occur (Neff, 1988; Peterson *et al*., 2003). Benthic invertebrates have been shown to have a quick uptake of these compounds, some as fast as 5 to 30 mg/g dry weight during the initial uptake following a spill (Teal and Howarth, 1984). These benthics also make up the diet of many larger animals such as walrus and King and Common eider. Chronic exposure of hydrocarbons to benthic invertebrates has been shown to decrease biodiversity, reduce population numbers, slower growth rates and slower assimilation rates (Teal and Howarth, 1984).

From this information, any spill that resulted in WSF concentrations greater than about 0.1 mg/L would be of concern if it occurred at a time when larval fish or eggs were present. This would likely have no acute lethal effects to juvenile and adult fish because it is below the reported lethal range of concentrations (5-50 mg/L) for fin fish. Also, it is highly unlikely that fish would be exposed to that concentration for 96 hours, the duration of exposure at which acute lethal concentrations are determined. Most activity that could result in an accidental introduction of diesel into the marine environment during the bulk sampling program would occur during August, when most fish species are not spawning, however large numbers may be present during in-peak migration during this time (Appendix 9C). Arctic char spawn during fall, but this takes place in fresh water and, consequently, their eggs (the more sensitive stages) would not be exposed to a fuel spill into the marine environment.

There may be acute lethal effects to some plankton groups in the initial spill area because the expected initial WSF concentration may fall within the reported range of lethal values (1-10 mg/L). However, the WSF concentration is expected to be quickly diluted, resulting in exposure to acutely lethal concentrations for only a short period. Plankton in the initial spill area would quickly re-establish potentially within two weeks (US EPA, 1980; Silva *et al*., 1997). It is expected that such a short-term reduction in zooplankton abundance over a small area would not have substantial effects to other ecosystem components. Similarly, the introduction of low concentrations of weathered oil to the sediment over most of the affected area would have little effect to benthic biota.

In addition to toxicity issues, the introduction of diesel or Jet A fuel could negatively impact domestic fisheries by tainting fish targeted for human consumption. Arctic char exposed to crude oil in a laboratory setting quickly accumulated an oily off-flavour. This eventually cleared, but much more slowly than it was acquired (Lockhart *et al*., 2002). Results of those experiments suggest that exposure of fish of edible size to concentrations of oil around 3 mg/L for periods of a few hours would be of concern for tainting. However, the small area affected and short duration of exposure at the concentrations described in our example indicates that tainting would be a much localized problem. Sport and domestic fishing for Arctic char occurs in the Robertson River entering into Koluktoo Bay and throughout most coastal areas of Milne Inlet and Eclipse Sound. Fuel from an accidental spill of the size discussed here is expected to disperse over an area within the bulbous head of Milne Inlet and would not reach Koluktoo Bay or areas farther from the head of Milne Inlet. Although anadromous char can move large distances from their overwintering stream while feeding in coastal marine environments, they return to their natal streams during August and September to spawn and overwinter in fresh-water areas. Consequently, it is thought that the only char in the immediate vicinity during August and September and susceptible to tainting are those fish that would move into Phillips Creek. While fish are expected to use Phillips Creek during summer, no fish have been captured as part of the Project's baseline studies. The capture of tainted fish in the area could be avoided by closing the affected area to fishing.

3.8.7.1 Impact on Seabirds

Seabirds are likely to interact with a spill through a variety of ways. Seabirds are the marine organisms the most affected by a spill due to the fact that they spend an appreciable portion of time in the water (Lock *et al*., 1994; Chardine 1992). Birds are vulnerable to oil exposure through contamination of their plumage and through the ingestion of oil contaminated food. Oiled plumage can result in the loss of insulative capacity leading to hypothermia or loss of buoyancy, which in turn could result in drowning. Ingestion of oil can lead to changes in physiology, internal tissue damage or death. Seabirds that are more susceptible to oiling (i.e., alcids, common eiders and gulls) include those that spend a large portion of time on the water, are weak flyers that prefer to dive, have flightless feather-moulting stages, dive for food, and roost on the water at night (Lock *et al.,* 1994; Piatt *et al.,* 1985). All seabirds are considered to be highly sensitive to oiling.

While nest and chicks would not be directly affected from the spill, they would be indirectly affected through various means. The largest cause of indirect impacts to chicks and eggs are the parent seabird becoming fouled by the spill (Eppley and Rubega, 1990). This can result in direct mortality for the seabird or it has been shown to cause a disruption in the natural parent behaviour of seabirds (Eppley and Rubega, 1990). This breakdown is potentially caused by seabirds being delayed in returning to their nest thereby creating a large window where the chick is unprotected from both the elements and predators. Oiled adults can leave oil stains on incubating eggs and this can induce mortalities.

A dozen sites in Foxe Basin and Hudson Strait have been identified as Important Bird Areas (IBA) (Appendix 9C). These sites also include marine habitat such as coastline, open sea, and polynya-shore lead habitat. Of these 12 sites, the 30 km swath that represents the likely boundaries of a major spill encroaches upon two (North Spice Island and Foxe Basin Islands), and as such these seabird colonies at these two IBAs are at a high risk of being exposed to a spill. A spill event near Hantzsch Island and Digges Sound would also put seabirds at a high risk of exposure due to the fact that a large thick-billed murre colony is present and these seabirds undergo a flightless, marine migration. Seabirds from other IBAs are considered to be at low risk of exposure due to the distance of the proposed shipping route and 30 km swath from the shore colonies (Appendix 9C).

Major seabird and waterfowl colonies are located on Bylot Island, but neither large colonies nor large feeding flocks were seen during aerial surveys conducted in the Milne Inlet area during the middle and end of the breeding season in 2006 (Volume 6, Appendix 6E). Only a few Thick-billed Murres, as well as Glaucous Gulls, Herring Gulls and Iceland Gulls were seen using the area and two small colonies (less than 20 breeding pairs each) were also located on the cliffs along the shoreline. An accidental spill would have no effect on birds nesting and feeding in the vicinity of Bylot Island, but could have some effect on the small number of seabirds and other birds in the immediate vicinity of Milne Inlet.

3.8.7.2 Impact on Marine Mammals

Whales are generally not at great risk to fuel spills because they rely on a layer of blubber for insulation and oiling of the skin does not appear to have adverse thermoregulatory effects (Kooyman *et al*., 1976; Kooyman *et al.*, 1977; Geraci, 1990; St. Aubin, 1990). There is a possibility that baleen of bowhead whales could be contaminated, thereby reducing filtration efficiency, though these effects are expected to be minimal and reversible (Geraci, 1990). There is no irrefutable evidence that links fuel spills with cetacean mortalities.

Seals can be sensitive to exposure to oil at certain times during their life history, particularly during their annual moult or pupping periods (Dickens *et al*., 1990). A number of sublethal effects of oil exposure or the consumption of oil-contaminated prey has been documented for seals, including changes in behaviour and physiology, but there is little evidence to irrevocably link seal mortalities to oil exposure. Similarly, polar bears can be affected by the consumption of oil-contaminated prey, direct ingestion due to cleaning oil from their fur, of suffer from adverse effect thermal insulation (Dickens *et al*., 1990).

Quantities of hydrocarbons can attach to the fur, thereby reducing swimming speed and mobility in the water (St. Aubin, 1988). Young seals may be more vulnerable to this effect as it has been noted before that a fouled coat has stuck flippers on the side of their bodies causing them to be unable to swim. It is thought that adults would be strong enough to avoid this affect. A build-up of hydrocarbons may limit the movement of more delicate structures such as eyelids and vibrissae (St. Aubin, 1988).

The 30 km swath overlaps with known terrestrial walrus haulouts. If the spill reach the shore of these haulout sites, walrus will be at an increased risk of being exposed. As well walrus have the potential to be exposed to chronic exposure due to foraging of contaminated benthic invertebrates. The benthic invertebrates living in an exposed shoreline would come into contact with the spill via direct contact and ingestions of oil attached to sediments. Any buildup of hydrocarbons within the benthic invertebrates would be taken in by foraging walrus thus creating a pathway for increased hydrocarbon intake. As well, due to the fact that walrus lack a significant coat of fur there is an increase possibility that lesions will develop as a result of contact with oil (St. Aubin, 1988).

During August and September, when shipping is expected to occur, narwhal, bowhead, ringed seals and harp seals are common in the waters of Milne Inlet and Eclipse Sound. Narwhal routinely move to the head of Milne Inlet, but bowheads and harp seals tend to remain in waters north of Koluktoo Bay. Ringed seals are likely present near the head of Milne Inlet through the summer. If it is assumed that the trajectory of a 10,000 L spill is 10 km^2, the area affected would include about a third of the marine area between the head of Milne Inlet and Koluktoo Bay. Under such a scenario, it is doubtful that bowhead or harp seals would be exposed to the slick. Narwhal and ringed seals may be within the area, but exposure would be short-term because of anticipated rapid dilution of the fuel and because general disturbance associated with the clean-up operations would likely cause animals to leave the area.

3.8.8 Large Spill Modeling - Establishing the Size and Trajectory of the Spill

The starting point for modeling a spill scenario is to establish the type of product and a credible volume. Only two types of fuels will be delivered in bulk, Arctic diesel and Jet A fuel. The spill scenario therefore assumed a total cargo volume of 50 ML (50 million litres or 5,000 m^3) of Arctic diesel fuel coming through the sea lane and to port.

Ship-to-shore transfer operations are not causes of major spills. Since these operations are closely monitored, spills rarely exceed 5 m^3, which is the basis for the development of the Milne Port and Steensby Port OPEPs (Volume 3, Appendix 3B). Due to rapid deployment of spill containment equipment, such spills are too small to be used in predicting the trajectory of a larger spill that could result from a catastrophic event.

For modeling purposes, the total amount of 50 ML spilled is judged to be too large a spill and not a credible amount. Instead, three possible 'modes' of release or of estimating the amount were put forward:

- For a hypothetical fuel transfer loss at the port, assuming a 3 ML/h transfer rate (equates to about 16.7 h where the entire offloading might be typically expected to take about 24 h), there would be potential release of 50,000 L/min. Assuming a period of 10 minutes before the spill is stopped, this would represent a spill volume of 0.5ML. Clearly the assumed time before spill stoppage is a key factor.
- If one assumes fourteen tanker compartments and complete loss of one, this would release 3.6 ML. Again, the number of compartments damaged is a factor.
- Historical spill statistics can also be considered. Some research/review (e.g., McKenna and McClintock, 2005) indicates spill amount is best expressed as a proportion of fuel transported, with 5 % a most likely estimate, and 10 % a conservative one: 10 % yields 5 ML.

From this work-up, it was assumed that 5 ML was a worst-case amount worth carrying forward. It was felt that the Port sites (either Steensby or Milne) were reasonable locations to take for the spill, as they match the first scenario above and could be considered possible even for the second.

The analysis of open-water scenarios was accomplished by making use of a numerical computer model developed by AMEC to predict the behaviour of fuel on the sea surface and determine probabilistic spill trajectories. The model simulates the two-dimensional motion of a surface slick transported under the joint influence of wind-driven surface currents and residual currents. The processes of evaporation and vertical dispersion are simulated to estimate the volume loss of fuel from the surface slick. Individual trajectories evolve under the influence of a deterministic time-series of winds (hourly) and current vectors until such time as the trajectory terminates ashore or on an external boundary to the model grid, the trajectory has drifted for more than 30 days, or until the slick volume drops to less than 5 % of its initial volume.

The advection or transport of spilled fuel on the sea surface was modeled using a *30-year time-series of gridded winds* from the NCEP/NCAR reanalysis project selected for use. These data are near-surface modeled winds and were determined to be the best comparable winds to the nearby Milne or Steensby stations from 2006 to 2010. The NCAR/NCEP winds long time-series length provides good statistical reliability in the predicted spill probability distributions. Several wind speed and direction sensitivity runs were also conducted to allow for discrepancies between the measured site and 30-year wind distributions.

The results of this modeling are fuel spill distribution probability maps for Milne Port and Steensby Port, developed by superimposing all possible spill trajectories, for a given month, over the 30-year distribution of selected wind data. The results of this modeling are presented in Appendix 9A for Milne Inlet and 9B for Steensby Inlet.

3.8.9 Spill Modelling at Milne Port (Appendix 9A)

Milne Inlet is divided into six geographical regions and for each monthly spill scenario a companion set of shore impact statistics are calculated to report the percent of trajectories impacting the shoreline and the earliest times to impact in any of the regions.

It is predicted that 90-97 % of all trajectories will reach shore in the port site area within about 4 km at the head of Milne Inlet in as soon as 30 minutes and on average in four hours, with an associated small amount of fuel weathering. Between 3 and 10 % of the time trajectories might be expected to first contact shore another 6 km farther out in the reach of the inlet leading to Cape Kwaunang. First impacts for shores in Koluktoo Bay, the Bruce Head region on the Borden Peninsula, and the southern tip of Stephens Island are much less likely, occurring less than 1 % of the time. Due to the short times to shore for most of the trajectories, weathering of the fuel is correspondingly low. In the Milne Port Area an average about 4 to 5 % of fuel is weathered due to evaporation or dispersion into the water column before any fuel reaches shore. This amount increases to 10 to 16 % for trajectories reaching Cape Kwaunang and about 15 to 50 % for trajectories north of there.

The collection of spill probability plots and shore impact statistics define the probable distribution of any hypothetical, uncontained and unmanaged spill for the Project domain of operations in Milne Inlet for the open-water season.

An important observation is that the trajectory model predicts the times and paths taken to first reach a shoreline in the inlet. More detailed characterization of the weathering fate of the spill, slick size and amounts of fuel remaining on the surface and ashore, e.g., after initial shoreline contact, is better afforded with the OILMAP software. To this end, several scenarios for a range of wind conditions likely to be encountered in Milne Inlet are considered.

Appendix 9A presents the spill modeling report for Milne Port.

3.8.10 Spill Modelling at Steensby Port (Appendix 9B)

The results are fuel spill distribution probability maps of Steensby Inlet developed by superimposing all possible spill trajectories, for a given month, over the 30-year distribution of the selected wind data. Steensby Inlet is divided into 10 geographical regions and for each monthly spill scenario a comparison of shore impact statistics are calculated to report the percent of trajectories impacting the shoreline and the earliest times to impact in any of the regions.

The vast majority of trajectories, 86 %, reach shore in the port site area, as soon as 15 minutes and on average in two hours. Just over 9 % of trajectories end on the western side of Steensby Inlet, about 12 to 20 km away. Times to shore are as early as 7 hours, 29 hours on average and up to 150 hours (6 days), where 54 % of the fuel is estimated to be remaining.

Other regions farther in the inlet are reached, though generally less than 1 % of the time. The Rocky East region is reached as soon as six hours and 56 hours on average. The Coastal Plain West is reached as soon as seven hours and 29 hours on average. The Inlet Islands are reached as soon as 18 hours and 56 hours on average. Koch Island, with one trajectory, at the mouth of Steensby Inlet, is reached in just over two days. To the north, the Rocky Northeast region is reached as soon as 34 hours and 52 hours on average. The Lagoon Complex to the head of the inlet is reached within 52 hours and 66 hours on average.

The collection of spill probability plots and shore impact statistics presented in the modeling report (Appendix 9A) define the probable distribution of any hypothetical uncontained and unmanaged spill for the Project domain of operations in Steensby Inlet for the open-water season.

A qualitative assessment of shoreline fuel retention has also been prepared, based on a review of the modeling results and an understanding of the shoreline habitats. The initial modeling results suggest that the impact to shoreline resources would be comparatively short-term (days to weeks), largely because of the volatile nature of diesel fuel. Shorelines close to the port location have fine sediment matrix in the immediate subsurface, this will limit fuel penetration and overall retention. Stranded fuel would continue to evaporate on the beaches.

Key macrobiota on these shorelines include salt marshes and rockweed. Salt marshes are in the upper intertidal and supratidal zones and are vulnerable to fuel contact. The substrate is typically fine-grained sediment and organics, which have low permeability so that significant volumetric retention will not be expected; however, diesel sticks to organics, so some residual fuel may be incorporated into the organic substrate. It is likely that salt marshes close to the spill site would experience a combination of lethal effects and some sublethal effects. New plants shoots would be expected during the spring melt so it is unlikely that most effects would be limited to a single generation. The estimated duration of impact would be weeks to months with normal growth rates returning the following spring; some marsh areas very close to the spill site could have reduced growth rates for longer periods of time.

Rockweed occurs in the lower intertidal and shallow subtidal. Rockweed would only be exposed during spring tides, so it is not vulnerable at any time. There are likely to be a combination of lethal and sublethal affects for rockweed located within 5 km of the spill location. The life stages of rockweed in this region are unknown but the extensive occurrence along the shore probably represents first-year growth; it also occurs offshore, where it is vulnerable to contact with sheens. As such, it is likely that effects of a diesel spill on rockweed would be limited to a single generation and that rockweed growth at breakup during the following year would be normal. The effect of a spill on rockweed is likely to be moderate (weeks to months).

3.8.11 <u>Generic Spill Scenario along the Shipping Lane (Appendix 9C)</u>

Baffinland commissioned a study by Coastal & Ocean Resources Inc. (CORI) on the Coastal Sensitivity of Proposed Port and Shipping Routes for the Mary River Project (Appendix 9C). This study considers the potential for open water diesel spill associated with fuel shipment to the Project. The assessment examines potential environmental sensitivity associated with the Project shipping routes.

A rationale was developed for the key elements of a spill scenario. Thus a set of reasonable assumptions have been postulated as comprising the spill features. These include:

- A worst-case spill of 5 ML of diesel (assume ADIOS2 “diesel [Canada]” fuel type NOAA, 2010);
- The spill occurs along the shipping lane;
- The spill will be largely confined to a 15 km swath on each side of the shipping lane;
- Slick areas are in the order of 18 km^2 after one day and 70 km^2 after seven days;

- Shorelines within 15 km of the shipping lane may be contacted by the spill; if they are contacted, it is likely that worst-case contact would be less than 100km);
- In general, diesel slicks are thin (approximately 1-10 microns) so that should shoreline contact occur, loading levels are low;
- Shorelines outside of 15 km from the shipping lanes are unlikely to be contacted;
- A spill would be most toxic, shortly after the spill, before weathering has taken place; locations more distant from the center of the shipping lane would experience lower toxicity levels;
- Spill scenarios assume no mitigation; in some locations, particularly near the port sites, there is good potential for mitigation; and
- Diesel persistence is relatively short – generally a matter of days and at worst-case one to two weeks.

The southern shipping route enters eastern Hudson Strait, passes close to the community of Cape Dorset and turns northward in Foxe Basin, passing 15 km offshore from Prince Charles Island and into Steensby Inlet. There are approximately 900 km of shoreline within the 30 km swath along the shipping route, of which 500 km (56 %) is located in the Steensby Inlet area. Much of the proposed southern route passes well offshore from Foxe Basin shorelines.

For a worst-case spill scenario anticipated to occur along the shipping route, the exact location of this spill scenario is difficult to determine. Conceivably, areas where navigation hazards exist would make the vessel more vulnerable. Examples of such hazards include narrow passages, shallow waters, areas of high currents and areas prone to bad weather. These types of hazards are present along the western and eastern end of Hudson Strait as well as the northern portion of Foxe Basin as the vessels approach Steensby Inlet. Shoals are known to be present approaching Steensby Inlet and as such extra precaution will be required.

Significant bird colonies and bird usage occurs along the shorelines of Foxe Basin and Hudson Strait and the area includes 12 designated Important Bird Areas. These sites also include marine habitat such as coastline, open sea, and polynya-shore lead habitat. Although these areas are generally more than 15 km from the proposed shipping route, birds do forage offshore to considerable distance and may be vulnerable to open-water spills. North Spicer Island and Foxe Basin Islands are key bird areas and a worst-case spill scenario could reach these islands. As such the colonies of seabirds present on these islands would be considered a high risk. A spill near Hantzsch Island and Digges Sound would also be considered a high risk for seabirds and the flightless, marine migration that occurs near these locations (Appendix 9C). Seabirds from the other IBAs are considered to be at low risk due to the distance of the proposed shipping route from the shore colonies. Impacts on seabirds as a result of a spill event are discussed in Section 3.8.7.2.

Known populations of bearded seal, ringed seal and walrus occur along the southern shipping route. Bowhead and beluga whales are known to occur within the southern shipping route; however their presence is limited during the summer months. These marine mammal species may be present during a spill event depending on the location. Walruses are the most likely to come into contact with a spill should the spill occur near known walrus haulout sites (Volume 8 Section 5.7.2.2). As such walruses are considered to be a moderate risk (Appendix 9C). Overall little to no direct marine mammal mortality is anticipated due to a spill event. Likely effects include consumption of oil-contaminated prey, changes in behaviour and changes in physiology due to fouling. As such the other marine species are considered to be a low risk (Appendix 9C). Impacts on marine mammals are described in Section 3.8.7.3.

Estuarine habitats include salt marsh that is an important feeding habitat of geese and also co-occurs with many anadromous Arctic char streams. Estuaries in Steensby Inlet and northern Foxe Basin are within 15 km of the shipping route, so have the potential to be contacted in a worst-case, open-water spill. Due to the oleophillic nature of salt marshes, and due to the fact that they occur in low-energy environments, they are regarded as sensitive to spills. Due to the potential for the spill reaching estuaries, Arctic char are considered to be low to moderate risk (Appendix 9C).

Fuscus seaweed is prevalent along the Steensby Inlet shoreline. This species has experience mortality and damage as a result of other spills, and such similar affects are anticipated should a spill reach the shoreline. Since *Fucus* is in the lower intertidal it would come into direct contact with surface slicks only at low tide and this could cause mortality and damage, but only to shorelines contacted by fuel (e.g., less than a few tens of kilometers). Since *Fucus* is widely distributed along the shore (CORI 2008a) and within the subtidal (CORI 2008b) recovery potential is considered good. Dispersed fuel within the water column may cause damage but since the effect is likely to be short, recovery potential is considered good. Impacts on biota such as zooplankton and fish are described in Section 3.8.7.1.

3.9 RESIDUAL EFFECTS SUMMARY

This Section presents potential accidents and malfunctions, mitigation measures and the residual effects assessment for the major accident and malfunctions presented in Table 9-3.2. Potential accidents and malfunctions that were assigned a "very low" risk rating were not carried forward into the assessment of significance. This includes:

- Explosives accidents;
- Fires;
- Failure/interruption of Power supply or WWTP;
- Contamination or interruption of water supply;
- Weather related strandings on the Milne Inlet Tote Road, Railway or construction access road;
- Collisions with wildlife;
- Railway derailment (without hazardous material release);
- Railway tunnel collapse; and
- Aircraft crash.

The exception is that the issue of potential introduction of invasive species at the port sites, raised as an issue of particular concern by local communities, was carried forth into the assessment of significance though it was assigned a "very low" risk rating.

Table 9-3.8 summarizes the ratings assigned to the significance criteria of residual effects associated with each effect discussed below. The confidence level assigned to the predictions is summarized in Table 9-3.9.

Safety is of paramount importance, and human injury (occupational or to bystanders) is a serious occurrence. Human fatality is considered a significant event. Therefore, it is recognized that a collision (of a truck or train) with a person, while considered an unlikely event, is potentially significant if human fatality were to occur. This potential effect was therefore rated as Significant and adverse.

Table 9-3.8 Residual Effects Assessment Summary – Major Accidents and Malfunctions

Effect			Residual Effect Evaluation Criteria					Significance
Effect	**Direction & Nature of Effect**	**Affected Receptors**	**Magnitude / Complexity**	**Geographical Extent**	**Frequency**	**Duration**	**Reversibility**	**Rated Significance of Residual Effect**
Mine Site - Open pit and waste rock stockpile slope failure	**Negative** Environmental degradation, Human injury	Landforms, water and sediment quality, vegetation, Humans	**Level II,** potentially **Level III** if human fatality occurred	**Level I:** confined to the LSA	**Level I:** Infrequent	**Level I:** short term	**Level II:** reversible with cost/effort	Not Significant
Mine Site – Hazardous material release	**Negative**	Soils, vegetation; Terrestrial wildlife and habitat; Surface water and sediment quality; Freshwater biota	**Level II:** Effect results in some exceedence of regulated values	**Level I:** confined to the LSA	**Level I:** Infrequent	**Level I:** short term	**Level II:** reversible with cost/effort	Not Significant
Mine Site/Tote Road - Truck accident	**Negative** Human injury; equipment damage	Human health and well-being/ Humans	**Level I, Level II or Level III** depending on whether human injury or fatality may occur	**Level I:** confined to the LSA	**Level I:** Infrequent	**Level I:** short term	**Level II:** reversible with cost/effort	Significant, if human fatality occurred
Mine Site – Open pit flooding	**Negative** Environmental degradation, potential human injury, production delay	Surface water and sediment quality; Humans	**Level II:** Human injury is possible	**Level I:** confined to the LSA	**Level I:** Infrequent	**Level I:** short term	**Level II:** reversible with cost/effort	Not Significant

Table 9-3.8 Residual Effects Assessment Summary – Major Accidents and Malfunctions (Cont'd)

Effect			Residual Effect Evaluation Criteria					Significance
Effect	**Direction & Nature of Effect**	**Affected Receptors**	**Magnitude / Complexity**	**Geographical Extent**	**Frequency**	**Duration**	**Reversibility**	**Rated Significance of Residual Effect**
Tote Road – Road embankment failure/collapse of water crossing	**Negative** Environmental degradation	Landforms, soil and permafrost; water quantity; surface water and sediment quality; Freshwater biota	**Level II:** Effect results in some exceedence of regulated values	**Level I:** confined to the LSA	**Level I:** Infrequent	**Level I:** short term	**Level II:** reversible with cost/effort	Not Significant
Tote Road – Hazardous material release	**Negative** Environmental degradation	Soil; Vegetation; Terrestrial wildlife and habitat; Surface water and sediment quality; Freshwater biota	**Level II:** Effect results in some exceedence of regulated values	**Level I:** confined to the LSA	**Level I:** Infrequent	**Level I:** short term	**Level II:** reversible with cost/effort	Not Significant
Tote Road or Railway – Collision with human	**Negative** Human injury	Humans	**Level II to Level III**: may result in injury or fatality	**N/A**	**Level I:** Infrequent	**Level I:** short term	**Level III**: irreversible	Significant, if human fatality occurred
Railway – Embankment failure/collapse of water crossing	**Negative** Environmental degradation	Landforms, soil and permafrost; water quantity; surface water and sediment quality; Freshwater biota	**Level II:** Effect results in some exceedence of regulated values	**Level I:** confined to the LSA	**Level I:** Infrequent	**Level I:** short term	**Level II:** reversible with cost/effort	Not Significant

Table 9-3.8 Residual Effects Assessment Summary – Major Accidents and Malfunctions (Cont'd)

Effect			Residual Effect Evaluation Criteria					Significance
Effect	**Direction & Nature of Effect**	**Affected Receptors**	**Magnitude / Complexity**	**Geographical Extent**	**Frequency**	**Duration**	**Reversibility**	**Rated Significance of Residual Effect**
Railway – Hazardous material release	**Negative** Environmental degradation	Soil; Vegetation; Terrestrial wildlife and habitat; Surface water and sediment quality; Freshwater biota	**Level II:** Effect results in some exceedence of regulated values	**Level I:** confined to the LSA	**Level I:** Infrequent	**Level I:** short term	**Level II:** reversible with cost/effort	Not Significant
Port Site(s) – Diesel spill during ship to shore transfer	**Negative** Environmental degradation	Marine water and sediment quality; Marine habitat and biota; Marine mammals; seabirds	**Level III**: An effect predicted to exceed regulated values and/or result in a reduced population size or other long-lasting effect on the subject of assessment	**Level II**: Beyond the LSA and within the RSA	**Level I:** Infrequent	**Level I:** short term (immediate response will occur, to contain spill and avoid long-term persistent effects	**Level II**: reversible with cost/effort	Not Significant
Shipping – Diesel spill along shipping route	**Negative** Environmental degradation	Marine water and sediment quality; Marine habitat and biota; Marine mammals; seabirds	**Level II: marine water and sediment quality;** marine mammals **Level III**: seabirds (result in a reduced population size)	**Level III**: may extend beyond the RSA (depending upon ship location)	**Level I:** Infrequent	**Level I**: Short term effect based on timely response to spill event and volatility of diesel fuel	**Level II**: reversible with cost/effort	Significant

Table 9-3.9 Significance of Residual Effects from Accidents and Malfunctions

Key Issue	Significance of Predicted Residual Environmental Effect		Likelihood (1)	
	Significance Rating	Level of Confidence	Probability	Certainty
Mine Site: Open pit and waste rock stockpile slope failure	N	2	N/A	N/A
Mine Site: Hazardous material release	N	2	N/A	N/A
Mine Site: Truck accident	N	2	N/A	N/A
Mine Site: Open pit flooding	N	2	N/A	N/A
Tote Road: Road embankment failure/collapse of water crossing	N	2	N/A	N/A
Tote Road: Hazardous material release	N	2	N/A	N/A
Tote Road: Truck accident	N	2	N/A	N/A
Tote Road or Railway: Collision with human	S	2	1	2
Railway: Embankment failure/collapse of water crossing	N	2	N/A	N/A
Railway: Hazardous material release	N	2	N/A	N/A
Port Site(s): Diesel spill during ship to shore transfer	N	2	N/A	N/A
Shipping: Diesel spill along shipping route	S	2	1	2

KEY:
Significance Rating: S= Significant, N = Not Significant, P = Positive
Level of Confidence : 1= Low; 2= Medium; 3=High
(1) Likelihood - only applicable to significant effects
Probability: 1= Unlikely; 2= Moderate; 3=Likely
Certainty: : 1= Low; 2= Medium; 3=High

A significant effect identified is the potential for a large fuel spill to occur along the shipping route. While unlikely to occur and depending upon location and other factors such as weather, a diesel spill by a tanker in the open water could result in a moderate magnitude effect to most marine environmental components and a high magnitude effect to seabirds. A large spill, depending upon the location and sensitivity of the area, could have a large extent (Level II or possibly Level III) but effects are short lived due to the volatility of the diesel fuel (Level I duration). For light diesel fuel, the effects are reversible.

3.10 AUTHORS

The accidents and malfunctions assessment was prepared by Fernand Beaulac of FMB Management Services, with inputs from John McClintock of AMEC, John Harper, Ph.D. of Coastal and Ocean Resources Inc. and Trevor Ford of Sikumiut Environmental Management Ltd. Review and edits were carried out by Larry LeDrew of Sikumiut Environmental Management Ltd. and Richard Cook of Knight Piésold Ltd.

SECTION 4.0 - TRANSBOUNDARY EFFECTS ASSESSMENT

4.1 INTRODUCTION

Over the past decade and beyond, a variety of international, bilateral and national laws, guidelines and institutions have adopted requirements that a transboundary impact assessment be conducted prior to making decisions on projects or activities with transboundary implications (Bruch *et al*., 2007). In Nunavut, consideration of transboundary effects is required by NIRB and the Board provides general direction to proponents regarding transboundary impacts in its minimum EIS Requirements for a Part 5 Review, including Item 10 which states:

> *Where relevant, an EIS must include an assessment of all significant adverse ecosystemic or socio-economic trans-boundary effects.*

The above requirement is also reflected in Section 1.3.10 of the EIS Guidelines provided to Baffinland for the preparation of the EIS.

Transboundary effects are defined by NIRB in its Guide 2 – Guide to Terminology and Definitions (NIRB, 2007) as:

> *Environmental effects/impacts which occur across provincial, territorial, or international boundaries.*

4.2 BOUNDARIES

The transboundary effects assessment is intended to consider the extent of effects that may occur outside of the NSA. There are two jurisdictional boundaries that border the Qikiqtani region of Nunavut. To the south of Baffin Island and across Hudson Strait is the Nunavik Inuit Settlement Area, which forms part of northern Quebec. To the east of Baffin Island and across Davis Strait is Greenland.

4.3 RELEVANT INTERNATIONAL AGREEMENTS

Canada has international agreements in place and joint efforts under way in the following areas that are relevant to development of the Mary River Project:

- Arctic Environment Protection Strategy;
- Polar Bear Conservation;
- Exchange of Information Related to Energy Project;
- Co-operation on Oil Spill Preparedness and Response; and
- Marine Mammals Conservation and Management.

4.3.1 Arctic Environment Protection Strategy - 1991

This Strategy represents the culmination of the co-operative efforts of the eight Arctic countries: Canada, Denmark, Finland, Iceland, Norway, Sweden, Union of Soviet Socialist Republics (Russia) and United States of America.

The eight Arctic countries were assisted in the preparation of the Strategy by the following observers: Inuit Circumpolar Conference, Nordic Saami Council, USSR Association of Small Peoples of the North, Federal Republic of Germany, Poland, United Kingdom, United Nations Economic Commission for Europe, United Nations Environment Program and the International Arctic Science Committee.

The objectives of this strategy are to:

- Protect the Arctic, including humans;
- Provide for the protection, enhancement and restoration of environmental quality and the sustainable utilization of natural resources including their use by the local populations and indigenous people of the Arctic;
- Recognize to the extent possible, seek to accommodate the traditional and cultural needs, values and practices of the indigenous people as determined by themselves related to the protection of the Arctic;
- Review regularly the state of the Arctic environment; and
- Identify, reduce and, as a final goal, eliminate pollution in the Arctic.

The link to the Arctic Council is www.Arctic-council.org.

4.3.2 Polar Bear Conservation

A Memorandum of Understanding (MOU, 2009) between Canada, Nunavut and Greenland outlines activities aimed at polar bear conservation (http://pbsg.npolar.no/export/sites/pbsg/en/docs/GN-MOU-PB.pdf). The MOU notes the different responsibilities of Nunavut and Canada in the areas of leadership, research, management authority and the establishment of protected areas for wildlife species, in co-operation with territorial and provincial governments and wildlife management Boards in the territories. For example, across the north, there are national parks, national wildlife areas, migratory bird sanctuaries and provincial and territorial parks that protect some terrestrial habitat.

4.3.3 Exchange of Information Related to Energy Project - Canada-Greenland Collaboration

This June 2010 Memorandum of Understanding (MOU), based on a marine cooperative agreement between the two countries dating from 1983, call for the participants to exchange information on specific energy projects, developments in their energy markets, the energy policy context within which they operate and their respective regulatory requirements, regulatory oversight approaches, regulatory processes, guidelines and best practices.

4.3.4 Collaboration on Oil Spill Preparedness and Spill Response

Since 1983, Canada has had an agreement with the Kingdom of Denmark related to collaboration with regards to oil spill preparedness and spill response in the Arctic (http://www.treaty-accord.gc.ca/text-texte.asp?id=101893&bprint=true).

4.3.5 Canada-Greenland Joint Commission on the Conservation and Management of Narwhal and Beluga

This joint commission provides international oversight on the national management practices affecting these two species. Canada has also Observer Government status at meetings of the North American Marine Mammal Commission (NAMMCO) and the International Whaling Commission (IWC) and contributes to the work of scientific committees of these three marine mammal commissions.

4.4 DEFINITION AND APPROACH

A transboundary environmental effect can occur when animals move across jurisdictional boundaries or when project activities themselves, or their zone of influence, cross jurisdictional boundaries. The focus of Baffinland's transboundary effects assessment is on the latter, as effects on migratory VECs occurring within Nunavut are considered and fully assessed in the component-specific effects assessments (Volumes 4 through 8) as well as the cumulative effect assessment (Section 1).

In accordance with the definition and guidance provided by NIRB, the transboundary effects assessment for the Mary River Project addresses effects from its activities that occur across provincial, territorial and international boundaries. The Project, including the proposed Canadian shipping route, is located entirely within the Nunavut Settlement Area (NSA) and therefore little potential exists for it to result in effects beyond the NSA. Nevertheless, some residual environmental effects directly linked to the activities associated with the Project, could, as a consequence of a large zone of influence, result in transboundary effects as described below.

The NIRB Guidelines also require that due consideration be given to effects of the Project in combination with the effects of other projects located outside of NSA. This consideration represents a refinement of the Project cumulative effects assessment (Section 1).

As a general approach, the environmental effects assessment undertaken for each VEC and VSEC has included a detailed consideration of the full effect of each identified interaction, including any possible instances where the zone of influence associated with the interaction extends beyond the boundary of the NSA. Additionally, the cumulative effects assessment includes a consideration, where applicable, of other projects or categories of projects/activities that are located outside of the NSA and which might potentially act in combination with the effects of the Project.

4.5 ASSESSMENT

Tables 9-4.1 and 9-4.2 present overviews respectively of the VSECs and VECs that have been considered in this EIS. The tables identify potential environmental effects that might have a transboundary component (either direct or cumulative) and identifies where this has been considered within the EIS.

In general, the Project configuration is such that there are few potential transboundary issues. This is not surprising, given the geographic location of the Mary River Project and the limited range of any possible or detectable biophysical effects.

As shown in Tables 9-4.1 and 9-4.2, the existing environmental assessment has already incorporated transboundary considerations into the evaluation. Where assessment boundaries are less than the full range, e.g., of a migratory species, the calculated effect will be conservatively estimated. Where the effects predictions are population-based, the reference population is usually far smaller than the total population of the affected species; thus the predictions will over-state any transboundary effect. In cases where species of concern have been considered, the evaluation has included relevant factors affecting the subject population, including transboundary factors. In this manner, the consideration of all such VECs has encompassed transboundary effects assessment. Within the tables, the term “subsumed” has been used to refer to this treatment of a VEC within the EIS.

A limited number of interactions require supplemental consideration in order to satisfy the NIRB Guideline requirement for consideration of transboundary effects. Where such consideration is required, the discussion is presented in this chapter. Five VECs and six VSECs are identified for transboundary interactions. Two of the VSECs have the potential for direct effects (demographics and substance abuse-transport). The remaining issues are all cumulative in nature. In no case, however is there a potentially significant negative residual environmental effect. Within the cumulative effects assessment (Section 1), consideration has been given to significant negative interactions that occur between a VEC and other projects or activities, including those outside Nunavut.

The discussion presented under each VEC and VSEC assessment chapter has, for every identified issue, incorporated a consideration of transboundary effects. Additionally, supplemental text has been provided below with respect to three issues:

- Shipping;
- Climate change/air quality; and
- Demographic change.

4.5.1 Shipping

There are two shipping destinations on Baffin Island: Milne Inlet on the north coast and Steensby Inlet on the south coast. The Milne Inlet site will occasionally receive oversized equipment for the Project by way of sea-lift during the open-water season. Milne Inlet is accessed through Davis Strait, which connects the North Atlantic Ocean with Baffin Bay and is 320 km wide at its narrowest point. Given the width of Davis Strait and Baffin Bay, and that shipping along this route will occur infrequently during the open-water period, there are no anticipated transboundary effects from shipping activities within Nunavut.

The viability of the Project relies on the year-round supply of iron ore to customers, which requires that ore be shipped from Steensby Inlet year-round. A Project-dedicated fleet of icebreaking ore carriers will transport ore to market during ice-cover months and will be supplemented by chartered ships during the open-water season. All ships will operate in accordance with the *Canadian Shipping Act* and the *Arctic Waters Pollution Prevention Act*, thus mitigating transboundary concerns related to sewage, solid waste disposal and ballast water management. All ships will have prevention and response equipment for accidental spills and will have in place a Shipboard Oil Pollution Emergency Plan.

Ships entering and leaving Steensby Port will navigate through Hudson Strait and Foxe Basin. While Foxe Basin is entirely within Nunavut, jurisdiction over development activities in Hudson Strait is divided geographically between Nunavut and the Nunavik Inuit Settlement Area of northern Quebec. The planned shipping route is located entirely on the Nunavut side of Hudson Strait, which is 65 km wide at its narrowest point and up to up 230 km wide in other parts. The central channel of Hudson Strait ranges in depth from 300 to 400 m. The analysis undertaken to predict the zone of influence of the largest ship used for the Project was presented in the marine mammal impact assessment (Volume 8). Given the width of Hudson Strait compared with the zone of influence of Project ships, no transboundary impacts are anticipated from shipping activities within Nunavut.

Baffinland acknowledges that in rare circumstances, depending on ice conditions, icebreakers may have to navigate Hudson Strait using a more southerly route for safety purposes. Hudson Strait is a well established shipping route. There are established shipping lanes for community resupply accessing the communities of Hall Beach, Igloolik, Cape Dorset and Kimmirut. In addition, the *MV Arctic* has been providing winter ore transport through Hudson Strait to support mining operations at the Raglan Mine (Deception Bay in northern Quebec) for a number of years. During that time no adverse effects on marine mammals have been documented. This is consistent with Baffinland's finding that no transboundary impacts will occur from shipping activities in Nunavut through Hudson Strait.

During the DEIS review meetings held in Iqaluit, it was agreed by Baffinland that the effects assessment will include an overview consideration of effects extending into Davis Strait and northern Labrador Sea regarding marine mammals and birds based on the zone of influence of the vessels and the receiving environment. As well, Baffinland agreed to review the range of interactions with marine mammals including those that could affect marine mammals to the west of Hudson Strait and provide rationale for not extending boundaries of zone of influence. This consideration was to include a discussion on the interactions along the shipping route including migrating marine mammals within Hudson Strait. These commitments are addressed for marine mammals in Volume 8, Section 5.14 (Indirect Effects on Marine Mammals in areas beyond RSA) and Section 5.15 (Effects of Shipping on Marine Mammals in Davis Strait and the Northern Labrador Sea). A consideration of seabird interactions extending into Davis Strait and northern Labrador Sea is provided in Volume 6, Section 4.9 (Thick Billed Murres), Section 4.12.1 (General Mitigation), Section 4.12.3 (Important Habitat Areas) and Section 4.12.4 (Seabirds and Seabird Colonies). In general, the level of interaction is rated as low and hence potential effects are few and are limited to unplanned events.

4.5.2 Climate Change/Air Quality

The assessment of effects on air quality, presented in Volume 5, shows that residual effects will not extend beyond 1.5 km from the Project site. As a result, and given the location of the Project, no transboundary air quality effects are possible.

The Project will emit greenhouse gases into the atmosphere, as diesel generators are the only current viable and available source of energy. Greenhouse gas emissions contribute to global warming, an issue of concern that crosses all borders and affects all jurisdictions, particularly circumpolar countries. Baffinland acknowledges that greenhouse gas emissions are a broad scale transboundary issue for which there is no viable alternative in Nunavut. At the Project level, Baffinland will report annually on performance indicators, including energy use and emissions management. The report will help to show Nunavummiut and other Canadians the Company's current performance and how it can be improved. Baffinland will also explore ways of conserving energy as the Project moves through development and will adapt accordingly.

4.5.3 Demographic Change

The potential for adverse residual transboundary socio-economic effects has been considered. The residual adverse effects relevant to the LSA are considered for their potential to affect other regions outside the RSA. The only potential effect relates to in-migration leading to demographic changes.

The Project is expected to draw workers from across Canada. Workers hired from outside of Nunavut will be provided with transportation to and from Project sites from one or more southern points of origin. Demographic changes in communities in the south as a result of the Project will not be discernible, and therefore, no adverse effect will arise from this interaction.

4.6 CONCLUSION

Baffinland has given due consideration to the potential for transboundary effects associated with the Project. This consideration has included:

- Any residual effects of the Project which have the potential to occur outside of the NSA; and
- Any (cumulative) effects that result from interactions between the Project effects and effects of other projects located outside Nunavut.

Baffinland has examined each of the VECs and VSECs and assessed the potential for these transboundary effects. Specifically, Baffinland has considered effects associated with marine shipping on marine mammals and migratory birds.

There will be a minor, "*not significant*" negative residual environmental effect of the Project on greenhouse gas emissions. With respect to all the VECs and VSECs examined, Baffinland has determined that there will not be any negative residual transboundary environmental effects.

4.7 AUTHORS

The transboundary effects assessment was prepared by Tobin Seagel of Knight Piésold, with contributions from Anne O'Toole and Warren Bernhardt of North/South Consultants.

Table 9-4.1 Summary of Project Transboundary Effects Assessment - VSECs

VSEC	Potential Effect	Transboundary Relevance	Type of Effect	Assessment Approach
Communities				
Population Demographics	Migration of non-Inuit Project employees into the North Baffin LSA Migration of non-Inuit into North Baffin for indirect jobs Inter-community Inuit migration Out-Migration from the North Baffin	Yes	Direct	Subsumed + Section 9.4.5.3
Education and Training	Improved life skills amongst many LSA residents	No	n/a	n/a
	Incentives related to school attendance and success	No	n/a	n/a
	Opportunities to gain skills	No	n/a	n/a
Human health and well-being, including local food security	Changes in parenting	No	n/a	n/a
	Increase household income and food security	No	n/a	n/a
	Absence from community during work rotation	No	n/a	n/a
Substance Abuse	Transport of substances through Project sites	Yes	Direct	Subsumed
	Affordability of substances	No	n/a	
	Attitudes towards substances and addictions	No	n/a	
Community infrastructure and public service	Competition for skilled workers	Yes	Cumulative	Subsumed
	Labour force capacity	Yes	Cumulative	Subsumed
Governance and leadership	IIBA Agreement with QIA	No	n/a	n/a
Economics and Employment				
Livelihood and employment	Creation of Jobs in the LSA	Yes	Cumulative	Subsumed
	Employment of LSA Residents	Yes	Cumulative	Subsumed
	Job Progression and Career Advancement – New career paths	No	n/a	n/a
Economic development and self-reliance	Land	No	n/a	n/a
	People	No	n/a	n/a
	Community Economy	No	n/a	n/a
	Territorial Economy	Yes	Cumulative	Subsumed
Contracting and business opportunities	Expanded market —business services to Project	Yes	Cumulative	Subsumed
	Expanded market —consumer goods and services		Cumulative	Subsumed

Table 9-4.2 Summary of Project Transboundary Effects Assessment - VECs

VEC	Potential Effect	Transboundary Relevance	Type of Effect	Assessment Approach
Landforms, Soil and Permafrost	Local subsidence	No	n/a	n/a
Climate Change	Contribution to greenhouse gas emissions	Yes	Cumulative	Subsumed + Section 9.4.5.2
Air Quality	Degradation of ambient air quality - long range transport	Yes	Cumulative	Subsumed + Section 9.4.5.2
Noise and Vibration	Sensory effect on wildlife	No	n/a	n/a
Freshwater Aquatic Ecosystem Fish and Fish Habitat				
Philips Creek km 32 Lake	Reduction in downstream discharge volume	No	n/a	n/a
Milne Port Watersheds	Change in drainage patterns	No	n/a	n/a
Katiktok Lake	Volume reduction	No	n/a	n/a
Mine Site Watersheds	Change in drainage patterns	No	n/a	n/a
Streams and Rivers	Changes in Flows	No	n/a	n/a
Camp Lake	Changes in lake volume	No	n/a	n/a
Sheardown Lake	Changes in lake volume	No	n/a	n/a
Ravn Camp Lake Withdrawal	Changes in lake volume	No	n/a	n/a
Cockburn Lake Withdrawal	Changes in lake volume	No	n/a	n/a
3 km Lake	Changes in lake volume	No	n/a	n/a
10 km Lake	Changes in lake volume	No	n/a	n/a
Steensby watersheds	Changes in drainage patterns	No	n/a	n/a
Water Quality				
Surface water freshwater quality	Deterioration of surface runoff - negative effects on receiving water quality	No	n/a	n/a
Treated Effluent Quality	Un treated effluent discharge to freshwater lakes or river	No	n/a	n/a
	Contaminated Runoff, Elevated TSS	No	n/a	n/a
	Spills	No	n/a	n/a

Table 9-4.2 Summary of Project Transboundary Effects Assessment – VECs (Cont'd)

VEC	Potential Effect	Transboundary Relevance	Type of Effect	Assessment Approach
Fish & Fish Habitat				
Freshwater fish, fish habitat and other aquatic organisms	Loss of Habitat (all areas within LSA) Movement (all areas within LSA) Mortality (all areas within LSA) Health (all areas within LSA)	No	n/a	n/a
Vegetation		No	n/a	n/a
Caribou	Loss of Habitat Mortality Movement Health	No	n/a	n/a
1) Migratory birds 2) Peregrine falcons 3) Snow geese 4) Common eiders 5) King eiders 6) Red-throated loons 7) Thick billed murres	Direct Habitat Loss	Yes	Cumulative	Subsumed
	Indirect Habitat Loss		Cumulative	Subsumed
	Indirect Habitat Loss		Cumulative	Subsumed
	Indirect Habitat Loss		Cumulative	Subsumed
	Health & Mortality		Cumulative	Subsumed
Marine water and sediment quality	Discharge of runoff	No	n/a	n/a
	Discharge of treated effluent	No	n/a	n/a
	Ship-to-shore spills	No	n/a	n/a
Sea seabed sediments quality	Discharges from Ships	No	n/a	n/a
Invasive Species	Ballast water	Yes	Cumulative	Subsumed
Marine and coastal physical habitat		No	n/a	n/a
Marine fish and invertebrates		No	n/a	n/a
Marine mammals Polar bears, ringed seals, bearded seals, bowhead whales, walrus beluga whales, narwhals	Habitat Movement Mortality Health	Yes	Cumulative	Subsumed

NOTE(S):

1. SUBSUMED = THE TRANSBOUNDARY ASSESSMENT IS INCLUDED WITHIN THE SUBJECT – SPECIFIC EFFECTS ASSESSMENT.

SECTION 5.0 - NAVIGATION OF WATERWAYS

5.1 INTRODUCTION

5.1.1 Purpose

This section assesses the effects of the Project on marine and freshwater navigation as required by federal legislation administered by the Navigable Waters Protection Program (NWPP) of Transport Canada under the *Navigable Waters Protection Act* (NWPA). The scope of the assessment includes any Project infrastructure or activities that directly affect both marine and freshwater waterways within the Nunavut Settlement Area. These waterways include the:

- Proposed northern shipping route corridors through Baffin Bay, Pond Inlet, Eclipse Sound and Milne Inlet;
- Head of Milne Inlet where dock facilities are proposed;
- Stream and river crossings on the Milne Inlet Tote Road alignment (subject to existing approvals under the NWPA);
- Stream, river and lake crossings on the Railway alignment;
- Proposed southern shipping route corridors through Hudson Strait, Foxe Basin and Steensby Inlet; and
- Portion of Steensby Inlet where dock facilities and causeway are proposed.

NIRB (2009) identified the following requirements related to navigation in the Guidelines:

- Potential impacts to the navigability of watercourses from proposed crossings;
- Acknowledge the requirement to provide formal applications to the Navigable Waters Protection Program (NWPP) for works in navigable waters;
- Description of the proposed shipping routes for open-water and year-round operations, navigational aids and other marine traffic using these routes;
- Description of the proposed land-based or sea-based navigational aids at the port sites;
- Potential impacts on local harvesting activities in freezing water seasons by Project shipping, and interference with offshore fisheries/boating in open-water season at both Milne Inlet and Steensby Inlet, as well as on shipping routes;
- Measures to mitigate potential impacts to the safety of persons traveling by snowmobiles, sledges and boats along Project shipping routes; and
- Consider the following source documents including the Navigable Waters Protection Act, (1985), Navigable Waters Bridges Regulations (Transport Canada, 2006b), and Navigable Waters Works Regulations (Transport Canada, 2011).

5.1.2 Relevant Legislation

Construction, operation, maintenance and removal of temporary or permanent Project infrastructure below the high-water mark in the waterways listed above will comply with the NWPA.

The purpose of the NWPA is to protect the public right of navigation in Canadian navigable waters. Navigable waters include all bodies of water with the potential of being navigated by any type of floating vessel for transportation, recreation or commerce**.** The NWPA prohibits the construction of temporary or permanent works in Canadian navigable waters and interference to navigation unless approved by the Minister of Transport or if the works are determined to be minor. Prohibitions include any bridge, boom, dam, wharf, dock, pier, pipe or cable.

Shipping will operate in accordance with two primary legal instruments regulating ship traffic in the Canadian Arctic: the *Canada Shipping Act*, the *Arctic Waters Pollution Prevention Act* and their associated regulations.

5.1.3 NWPA Related Consultation

Transport Canada staff visited the Mary River Project site during the summer of 2008 and provided preliminary feedback concerning the requirements for NWPA approval based on the level of Project design information provided at the time. The Project infrastructure identified as requiring NWPA approval was limited to four crossings along the Milne Inlet Tote Road (CV128, CV217, BG017 and CV223 – shown on Figure 3-2.2 in Volume 3) and the two major crossings along the Railway at the Ravn River and Cockburn Lake (shown on Figure 3-2.4 in Volume 3).

5.2 MILNE PORT

5.2.1 Baseline Conditions

The Government of Nunavut, industrial outposts such as mines, and communities throughout Nunavut use sea-lifts to transport and re-supply goods. Sea-lifts are a vital link for all Nunavut communities and outposts, as they are the most economical means of transporting bulk goods including construction material, vehicles, heavy equipment, housewares and non-perishable items. Sea-lifts most commonly take place in the open-water season (4-5 months per year); though on occasion they take place in winter, when icebreaking activities are required.

Marine transport and shipping data was compiled from INNAV data summarizing marine traffic in Eclipse Sound, Baffin Bay and Milne Inlet from 2002 to 2010 (Table 9-1.1).

The Canadian Coast Guard (CCG) carries out icebreaking to allow commercial vessels to move efficiently and safely through ice-covered waters. The CCG also carries out northern resupply, transporting dry cargo and fuel during the annual resupply of northern settlements and government sites when commercial operators cannot. In addition, the CCG is involved in search and rescue, environmental response to ship-sourced spills and maritime security. The dock at the decommissioned Nanisivik mine is used by the CCG for training purposes.

There is an increasing trend in use of the Northwest Passage by private and commercial vessels. Seven vessels cleared customs in Inuvik in 2009, and eighteen as of September 20, 2010. The increasing trend is largely the result of climate change making the passage more open and accessible. Most of these vessels likely pass through Lancaster Sound into Baffin Bay and do not enter the waters of Eclipse Sound and Pond Inlet.

Based on the available data, marine traffic in the Pond Inlet - Eclipse Sound - Milne Inlet areas consists of community sea-lifts to Pond Inlet, Inuit hunters in small boats, and to lesser extent, Arctic cruises and other tourism activities (often supported by Inuit small craft). Aside from community sea-lift to Pond Inlet, little commercial shipping occurs within these waters.

Figure 4-10.4 (Volume 4) shows the travel route information collected during workshops conducted in Arctic Bay, Clyde River, Hall Beach, Igloolik and Pond Inlet during 2008. These routes are used throughout the year to access hunting and fishing areas, gather carving stone, for other traditional use activities and as highways between communities. Considerable travel by Inuit occurs by snowmobile when the area of Pond Inlet - Eclipse Sound - Milne Inlet is encased in landfast ice. Travel by small craft occurs during the brief open-water season (late July through early October). Inuit hunters access the Milne Inlet beach area for camping and to store boats during hunting trips inland by all-terrain vehicle (ATV). Most of the camping (and beaching of small craft) occurs to the eastern end of the head of Milne Inlet. Phillips Creek, which flows into the head of Milne Inlet, is not normally navigated by Inuit hunters, although they reportedly store boats inside the sand spit at the mouth as a safe harbour before venturing inland.

5.2.2 Proposed Works

A temporary floating dock will be constructed at Milne Port at the location shown on Figure 3-2.1 in Volume 3. The floating dock will be deployed as required to receive fuel and freight deliveries and will be stored on shore during the winter.

At the onset of the Project, much of the construction material and supplies, fuel and mining equipment will be received at Milne Port during the open-water season. Up to 23 resupply vessels will dock at the peak in Year 2 of construction. Vessel docking will be assisted by harbour tugs and lines personnel on the dock, as required.

5.2.3 Potential Effects and Mitigation

Collisions at Sea and Increased Navigation Risk

The marine shipping required for the Project has the potential to affect other ship activity, use by small watercraft and travel routes over ice along the proposed shipping corridors or in association with ship operations in and around Milne Port. The potential effects of marine shipping on navigation include:

- Risk of collision between cargo ships and other commercial marine traffic; and
- Increased navigation risk to small vessels by having to alter their normal course around the cargo ships, or tugs.

Mitigation of these potential effects is best achieved by adopting best industry practices and ensuring compliance with relevant legislation to reduce the risk of collisions. Mitigation to address the potential effects of icebreaking activities on sea ice conditions and travel routes is addressed in Volume 4, Section 10.

The temporary infrastructure required for the Milne Port will temporarily change the existing coastline with the floating dock that extends approximately 200 m from the shoreline when deployed. The port docks and associated land-based infrastructure will make a portion of the beach unavailable for beaching small craft in this area, although the two primary use areas (for camping to the east of the port and for safe harbour/storage of small craft to the west within the mouth of Phillips Creek) will remain available for use.

Interference with Coastline Navigation

The potential effects of port infrastructure and operations on coastline navigation include:

- Increased navigation risk to small vessels by having to alter their normal course around ports;
- Increased navigation risk to small vessels resulting from port induced alterations to current, wind and ice conditions;
- Risk of collision between small vessels and cargo ships and tugs; and
- Risk of collision between small vessels and port infrastructure.

Mitigation of these potential effects is best achieved by adopting best industry practices and undertaking appropriate consultation with user groups to communicate potential risks. Navigation aids are not expected to be required, but might be specified by Transport Canada.

5.3 MILNE INLET TOTE ROAD

5.3.1 Baseline Conditions

The 100 km Milne Inlet Tote Road was upgraded in 2007 and 2008 from a winter road to an all-season road adequate for transporting equipment and ore using 45-t trucks. The upgraded road follows the original 1960s alignment.

The Tote Road passes through the Phillips Creek Valley, an inland travel route for Inuit hunters and people travelling between communities. Most travel occurs in winter by snowmobile, but as described in Section 5.2, some hunters travel up the valley, including along the road, by ATV in summer. No navigation of Phillips Creek or the surrounding waterways is known to occur.

5.3.2 Proposed Works

The Milne Inlet Tote Road was upgraded in 2007 and 2008. No further work is proposed at stream crossings along the road, except for ongoing maintenance.

5.3.3 Potential Effects and Proposed Mitigation

The existing navigable crossings are subject to existing NWPA approvals. No new effects or additional mitigation is proposed.

5.4 RAILWAY

5.4.1 Baseline Conditions

No infrastructure exists where the Railway will be constructed. The waterways at two crossings have been deemed navigable by Transport Canada: the Ravn River crossing at kilometre post 35 (kp-35) and the Cockburn Lake crossing at kp-95 (measured from the Mine Site). The locations are shown on Figure 3-2.4, Volume 3.

Land use studies have suggested that inland travel associated with hunting, and mostly by snowmobile. At the Ravn River crossing, most travel routes are along the length of the river. There is an existing Inuit crossing of the Ravn River (5 km upstream of the proposed Ravn River Bridge), called Iparqak Ford on government topographic maps. This crossing is located near to Pingimajuq Ridge, a historic meeting place of Inuit from Pond Inlet, Clyde River and Igloolik, located several kilometres from the Railway alignment. Pingimajuq Ridge was a feature identified by the Pisiksik Working Group during the Mary River Inuit Knowledge Study. It is not expected that small craft would be used on the Ravn River, a very large river system that eventually drains into the western side of Steensby Inlet.

The Cockburn Lake crossing is on the Cockburn River system that flows into Steensby Inlet at Ikpikitturjuaq Bay, immediately north of Steensby Port. It is thought that Cockburn Lake may be accessible from the coast by smaller boats, although navigation of the Cockburn River system was not identified in the land use portion of the Mary River Inuit Knowledge Study.

The Railway involves a number of encroachments of small lakes and ponds, shown on the plan and profile drawings of the railway in Volume 3, Appendix 3E. The lakes are theoretically navigable since they will support a small craft, but they are generally isolated from each other and from waters that are used for navigation.

5.4.2 Proposed Works

Locations of the large road bridge over the Ravn River is shown on Figure 3-2.6 (Volume 3) and the large Railway bridge on Figure 3-2.7 (Volume 3). Bridge design drawings are provided in Volume 3, Appendix 3E. Both are large structures, with greater than 1.5 m clearance above the Q2 high water mark.

5.4.3 Potential Effects and Proposed Mitigation

Two bridges on the Railway alignment, at Ravn River and Cockburn River, are quite large and are not expected to impede navigation in the unlikely event that a person attempts to navigate these waterways.

Detailed bridge drawings will be formally submitted to Transport Canada for review. Drawings will include the watercourse name and number (if applicable), crossing width, height to the bridge measured from the high water mark, bankfull depth, longitude and latitude.

Temporary closures of watercourses would occur due to potential safety concerns associated with operation of heavy equipment and other construction activities. During these periods, navigability would be limited or prohibited.

5.5 STEENSBY PORT

5.5.1 Baseline Conditions

Steensby Port, though removed from the communities of Igloolik and Hall Beach, is used to a limited degree. Historically, Steensby Inlet was used by Inuit to access inland areas to hunt caribou during summer months.

Contemporary navigation is expected to be limited to local hunting in small craft (up to 6 m). An older cabin located along a sandy section of shoreline at the Port Site is in disrepair and will be compensated for by Baffinland through the Inuit Impact and Benefit Agreement (IIBA). Other land use includes accessing a lake from Ikpikitturjuaq Bay for char fishing.

5.5.2 Proposed Works

A dedicated fleet of icebreaking cape-size ore carriers will transport most of the ore from Steensby Port to market, supplemented by the use of chartered ships during the open-water season. A 150 m by 100 m freight dock, an L-shaped 700 m by 30 m ore loading dock, a 200 m bridge between Baffin Island and a small offshore islet and two temporary docks will be constructed at the Steensby Port (see Figure 3-2.9 in Volume 3). Their combined footprint will cover maximum area of 8 ha. The ore dock will receive an average of 12 ore carriers per month on a year-round basis and up to 17 vessels per month in open-water season, when non-icebreaking ships will be chartered to ship additional ore. The dock has been designed to accommodate cape-size ore loading carriers with a draft of 20 m. Vessel docking will by harbour tugs and lines personnel on the docks.

Design drawings for the ore dock, freight dock, bridge and construction docks are provided in Volume 3, Appendix 3F.

5.5.3 Potential Effects and Proposed Mitigation

Collisions at Sea and Increased Navigation Risk

The marine shipping required for the Project has the potential to affect other ship activity, use by small watercraft, and travel routes over ice along the proposed shipping corridors or in association with ship operations in and around Steensby Port. In addition to large ore carrier ships several other types of vessels are proposed including tugs and other smaller cargo vessels.

The potential effects of marine shipping on navigation include:

- Risk of collision between ore ships and other commercial traffic; and
- Increased navigation risk to small vessels by having to alter their normal course around ore ships, cargo ships or tugs.

Mitigation is best achieved by adopting best industry practices and ensuring compliance with relevant legislation. Mitigation to address the potential effects of icebreaking activities on sea ice conditions and travel routes is addressed in Volume 4, Section 10.

The dock infrastructure required for Steensby Port will change the existing coastline through construction of permanent docks that extend several hundred metres from the shoreline. The docks and land-based infrastructure will make a portion of the beach unavailable for beaching small craft in this area, although the primary use area of Ikpikitturjuaq Bay will remain unaffected. The area where the older cabin is located will no longer be available for use.

Interference with Coastline Navigation

The potential effects of port infrastructure and operations on coastline navigation include:

- Increased navigation risk to small vessels by altering their normal course around ports;
- Increased navigation risk to small vessels resulting from alterations to current, wind and ice conditions;
- Risk of collision between small vessels and ore ships, cargo ships and tugs; and
- Risk of collision between small vessels and port infrastructure.

Mitigation is best achieved by adopting best industry practices and undertaking appropriate consultation with user groups to communicate potential risks. Navigation aids are not expected to be required, but might be specified by Transport Canada.

5.6 POTENTIAL RESIDUAL EFFECTS AND SIGNIFICANCE

The Project requires marine shipping, two ports sites with dock infrastructure, and several large bridges. Coastal waterways are used by small watercraft during the open-water season. There is limited or no current historical use of the inland waterways by watercraft for navigational purposes. In consideration these factors and mitigation, no significant potential adverse residual effects are expected. Any interruption in navigability due to construction or maintenance of bridges or dock infrastructure will be temporary. Bridges constructed over navigable waters will be built with sufficient freeboard to ensure crossings do not impede navigability.

5.7 AUTHORS

The navigability assessment was prepared by Oscar Gustafson, R.P.Bio., and Richard Cook, B.Sc., of Knight Piésold.

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SECTION 7.0 - DEFINITIONS AND ABBREVIATIONS

7.1 GLOSSARY

Access road	A road providing a way into or out of a particular area or site.
Adverse effect	Effects from a new development that could impair or damage the environment. Mitigation is used to reduce or eliminate adverse effects.
Aggregate	Crushed rock from quarries as well as sand and gravel from borrow sources.
Airstrip	A runway without normal air base or airport facilities.
Archaeological site	1. A place that was used by people hundreds or thousands of years ago and where the remains of their existence can still be found. Scientists can study the place and look at the items left behind to learn who the people were and how they lived. 2. Archaeology is the study of past human cultures.
Baseline	1. A line serving as a basis; especially: one of known measure or position used (as in surveying or navigation) to calculate or locate something 2. A usually initial set of critical observations or data used for comparison or a control 3. A starting point.
Beluga whales	A toothed whale (Delphinapterus leucas) of Arctic and sub Arctic waters having a fusiform body that is about 10 to 15 feet (3.0 to 5.0 meters) long and white when mature.
Bowhead whales	A baleen whale (Balaena mysticetus) of Arctic and subArctic seas.
Crusher	A machine for crushing rock or other materials. Used to reduce materials such as ore, coal, stone and slag to particle sizes that are convenient for their intended uses.
Culvert	A drain set at a right angle to cross the long axis of a body, often a large pipe used to allow water to pass under a road.
Cumulative effects	"…the impact on the environment that results from the incremental effects of a development when added to other past, present and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (NIRB, 2009)
Deadweight Tons (DWT)	A long ton used in indicating a ship's gross capacity.
Decommissioning	Closing the mine forever. As the act of permanently closing and removing the production facilities at a mine site.
Deposit	Place where there are enough rich rocks to start a mine. A natural occurrence of a useful mineral, or an ore, in sufficient extent or degree of concentration to invite exploitation.

Deposit No. 1 - Nuluujaak Mountain	Nuluujaak Mountain is also known as Deposit No. 1.
Dock	1. A wharf or platform for the loading or unloading of materials from a ship. 2. A landing place or moorage for boats.
Effect	The outcome or effects from something that has happened. The effects can be good or bad, depending on who or what was involved.
Emissions	Human made waste sent into the air, water or land.
Environmental assessment (used interchangeably with 'environmental effects assessment', see below)	1. An assessment of the effects caused by a development activity such as mining. 2. Looking at a proposed development to make sure there are no bad changes to the land, water, air or living things.
Environmental effect	Any change to the environment, whether bad or helpful, that wholly or partially results from an organisation's activities, products or services.
Environmental impact statement	A document outlining the environmental effects of the project on the environment prepared by the proponent of a project and presented to decision makers and the public.
Environmental Management System (EMS)	An Environmental Management System (EMS) is a framework developed by an organization to help improve its environmental performance by taking environmental considerations into account when making decisions and managing risks.
Environmental monitoring	Testing of the animals, air, soil, water and other things in the environment that happens on a regular basis to see if the environment is being damaged by a specific activity such as oil exploration. Special scientific equipment is used.
Exploration	The whole range of activity from searching for and developing mineral deposits.
Explosives	Any rapidly combustive or expanding substance. The energy released during this rapid combustion or expansion can be used to break rock.
Feasibility	Checking whether something is capable of being done or carried out.
Fresh water	Water found in lakes, rivers and streams that has little salt in it.
Fuel storage	A place or space for storing fuel. Fuel storage often refers to diesel and gasoline storage, which may occur in bulk storage.
Geochemical	Related to the chemicals that make up rocks, minerals, soils, water and the air. "Geo" means Earth. Geochemistry is the study of chemical properties of and chemical changes in rocks and other parts of the Earth.
Harvest	The reduction of wildlife into possession, it includes hunting, trapping, fishing, netting, egging, picking, collecting, gathering, spearing, killing, capturing or taking by any means.

Icebreaker	A ship equipped (as with a reinforced bow) to make and maintain a channel through ice.
Inuit Impact and Benefit Agreement (IIBA)	Contractual agreements under negotiation between the Proponent and Inuit groups. The intent of these agreements is to make it possible to develop the Project in a way that respects Inuit rights and culture, provides socioeconomic benefits to nearby Inuit communities and addresses negative environmental, economic, and social impacts
Incinerator	A furnace or a container for incinerating waste materials.
Infrastructure	Physical improvements to support mining, such as buildings, gas pipes, water lines, sewage and water systems, telephone cables and reservoirs. It may also include roads, railways, airports, bridges and electrical cables.
Iron	A heavy ductile magnetic metallic mineral that is silver-white in pure form but rusts easily.
Marine	Having to do with the ocean and salt water. Marine animals are animals that live in the ocean.
Marine mammal	Mammals that normally spend most of their time in the ocean. Examples are whales, seals and walrus.
Mary River	Nuluujaak Mountain (Deposit #1)
Mary River Project	Name for Baffinland Iron Mines Corporation's iron ore development on Baffin Island.
Metal	1. A solid mineral element that is able to conduct heat and electricity and is pliable under heat or pressure. Common metals include bronze, copper and iron. 2. Most metals are hard and shiny and are mined from the earth. After the rocks containing the metal are crushed, the metal is removed and used to make many different things. There are many kinds of metal. Gold and silver are commonly used to make jewellery; iron and steel are used to build cars and ships; and metals like aluminum are used to make drink cans, aircraft and doors.
Milne Inlet camp and port	The Milne Inlet camp will operate only during the construction phase of the Mary River Project, with a total population of 100 people. It will be connected to the Mary River site by a tote road, on which materials and supplies will travel.
Milne Inlet Tote Road	A road connecting the Mary River site to Milne Inlet that will be used to move materials and supplies. It will be during both the construction and operations phases of the Mary River Project.
Mine	1. Excavation in the earth from which ores and minerals are extracted. 2. A place where they find rich rocks and dig them out of the earth.
Mine life	The length of time a mine is or could be in production.

Mineral	A substance that occurs naturally in the Earth; a substance obtained by mining.
Monitoring	1. To study and measure the level of a substance, or a condition or a situation over a period of time. Monitoring is often used to provide information on wildlife populations so that steps can be taken to reduce or limit the harmful effects of human activity on the animals. 2. Keeping track of changes that are happening to the land, water, air or living things.
No net loss	Replace habitat you take from the fish with new habitat. A term found in Canada's Fisheries Act; it requires fish habitat replacement on a project-by-project basis.1
Nuluujaak	Nuluujaak Mountain (Deposit No. 1)
Oil	1. Any of various thick, viscous, usually inflammable liquids insoluble in water but soluble in organic solvents, obtained from animal, plant or mineral sources. 2. Petroleum. 3. A petroleum derivative, such as a machine oil or lubricant. 4. A substance with an oily consistency. 5. Black liquid from the ground.
Open pit mine	A mine working or excavation open to the surface, used to recover mineral reserves near surface.
Permafrost	Ground that is always frozen.
Permitting process	A process in which an applicant requests and acquires a permit from a regulatory agency.
Potable water	Water suitable for drinking.
Production	1. Bring out of ore by physical effort. 2. Total output especially of a mining industry.
Progressive reclamation	A type of reclamation that is done during the construction and operation phases of a mine prior to final closure.
Project proposal	A written paper that explains why a project should go ahead, when it should start and finish, how it should be done, what will be done, how much it will cost and who will do the work. A proposal is a plan to do something, building a new school for example. The proposal is read by a group of people who will decide whether to allow the project.
Project schedule	A schedule wherein activities are assigned a duration and sequenced in a logical order.
Railway	A permanent road having a line of rails fixed to ties and laid on a roadbed and providing a track for cars or equipment drawn by locomotives or propelled by self-contained motors.
Reclamation	Restoration of disturbed and/or mined land to its original contour, use, or condition. Fixing the land after a development is done there.
Environmental Health and Safety (EHS) Management System	A set of rules, procedures and information flows used to achieve results to satisfy the needs of environmental protection, safety and health.

Sewage	Sewage is made of solid human waste and urine, chemicals and other things normally collected in honey buckets, toilets, or septic tanks. Sewage contains a great deal of organic material.
Ship track	Place in landfast ice where a ship has passed.
Shipping route	Any of the lines of travel followed by merchant sea vessels.
Socio-economic environment	What life is like for the community or person. Includes economic activity, social relations, well-being and culture.
Steel	An alloy of iron, which is mostly pure iron combined with some other elements, such as carbon.
Steensby port	Port site for the Mary River Project that will be connected by a rail line to the Mary River site.
Stockpile	An accumulation of rock gathered or piled in one area.
Surface water	Water on top of the ground.
Sustainable development	Development that helps us now but will not hurt future generations; Where development meets the needs of the present generations without compromising the ability of future generations to meet their own needs.
Terrestrial	Related to the land and not the water. Caribou are terrestrial animals because they live on land; as opposed to fish who live in the water and are aquatic.
Toxicity	1. Related to how toxic or poisonous a substance is to a living thing. 2. The ability for a material to cause adverse effects in a living organism.
Traditional or Inuit knowledge	Aboriginal (including Inuit) knowledge about the people, the land, water, living things and the culture.
Tug boats	A strongly built powerful boat used for towing and pushing barges and assisting larger ships in and out of a dock safely.
Tunnel	A covered passageway; a horizontal passageway through or under an obstruction.
Walrus	A large, gregarious marine mammal of Arctic waters that is related to the seals and has long ivory tusks, a tough wrinkled hide and stiff whiskers and that feeds mainly on bivalve mollusks.
Waste rock	Left over rock after work is done.
Waste water treatment facility	Something that is built, installed, or established to improve the quality of water that has been used (as in a manufacturing process or sewage).

7.2 ABBREVIATIONS

AANDC	Aboriginal Affairs and Northern Development Canada
ACIA	Arctic Climate Impact Assessment
ACP	Arctic Community Packs

ANFO	Ammonium Nitrate Fuel Oil
ATV	All Terrain Vehicle
BIM	Baffinland Iron Mines (Corporation)
BMP	Best Management Practice
CCG	Canadian Coast Guard
CCME	Canadian Council of Ministers for the Environment
CEA	Cumulative Effects Assessment
CEAA	Canadian Environmental Assessment Agency
DEW	Distant Early Warning
DFO	Department of Fisheries and Oceans
DND	Department of National Defense
DWT	Deadweight Tonnage
EHS	Environmental, Health and Safety
EIS	Environmental Impact Statement
EPP	Environmental Protection Plan
ER	Emergency Response
GHG	Greenhouse Gas
GN	Government of Nunavut
HRMP	Human Resources Management Plan
HTO	Hunters and Trappers' Organization
IATA	International Air Transport Association
IBA	Impacts Benefit Agreement
INNAV	Canadian Coast Guard Marine Communications, Traffic Services Program
IPCC	International Panel on Climate Change
LSA	Local Study Area
MHO	Marine Heavy Oil
MOU	Memorandum of Understanding
MSDS	Material Safety Data Sheet
NAMMCO	Northern Atlantic Marine Mammal Commission
NCAR	National Center for Atmospheric Research
NCEP	National Centers for Environmental Prediction
NGMP	Nunavut General Monitoring Program
NIRB	Nunavut Impact Review Board
NLCA	Nunavut Land Claims Agreement
NLUP	Nunavut Land Use Plan
NOAA	National Oceanic and Atmospheric Administration
NPC	Nunavut Planning Commission
NSA	Nunavut Settlement Area
NTI	Nunavut Tunngvik Incorporated
NWPA	Navigational Waters Protection Act
NWPP	Navigational Waters Protection Program
OHF	Oil Handling Facility
OPEP	Oil Pollution Emergency Plan
PAG	Potentially Acid Generating
PDA	Project Development Area

QIA	Qikiqtani Inuit Association
RCMP	Royal Canadian Mounted Police
RDA	Regional Development Area
RSA	Regional Study Area
SOPEP	Shipboard Oil Pollution Emergency Plan
TSS	Total Suspended Solid(s)
UV	Ultraviolet
VC	Valued Component
VEC	Valued Ecosystem Component
VSEC	Valued Socio-Economic Component
WSF	Water Soluble Fraction
WWTF	Wastewater Treatment Facility
ZOI	Zone of Influence

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Nunavut Planning Commission
Commission d'Aménagement du Nunavut

March 30, 2012

Ms. Amanda Hanson
Director, Technical Services
Nunavut Impact Review Board
P.O. Box 1360 Cambridge Bay, NU
X0C 0E0
BY EMAIL ahanson@nirb.ca

Dear Ms. Hanson

RE: NIRB File # 08MN053- NIRB/NPC Joint Review of the Baffinland Iron Mines Corp. Mary River Project – Appendix J Item 3 Decision

The Nunavut Planning Commission (NPC) completed its absence - presence review of the Baffinland Iron Mines Corp's (BIMC) Final Environmental Impact Statement (FEIS) for the Mary River Project on March 14, 2012 to verify whether the BIMC adequately included information to satisfy Appendix J, Item 3 of the North Baffin Regional Land Use Plan.

The NPC observes that the FEIS, under volume 4, 5, 6 and 9 specifies the informational requirements for the process be assessed;

- The environment, social and terrain engineering consequences, and the cumulative impacts of the project, and
- The environmental and social impact of the project on nearby settlements or on nearby existing and proposed transportation systems

(Appendix J)

The NPC observes that more information regarding "the suitability of the corridor for the inclusion of other possible communication and transportation initiatives (roads, transmission lines pipelines, etc.)" be provided.

The NPC appreciates the opportunity to be involved in the joint review process with the NIRB in ensuring that the informational requirement's of the NBRLUP appendix J & K are being met for the

Mary River project. If you have any questions regarding this request, please call me at 867 857 2242 or email aglukark@nunavut.ca

Sincerely,

Brian Aglukark,
Director, Implementation
Nunavut Planning Commission

NUNAVUMI AVATILIKIYIN KATIMAYIN

NIRB File No.: 08MN053

April 30, 2012

Brian Aglukark
Director, Implementation
Nunavut Planning Commission
Arviat, NU

Sent via Email: aglukark@nunavut.ca

Re: <u>NIRB's Views on Completeness of Baffinland's Application for a Transportation Corridor in Relation to the Mary River Project Proposal</u>

Dear Brian Aglukark:

As you are aware, since the spring of 2009, the Nunavut Impact Review Board (NIRB or Board) and the Nunavut Planning Commission (NPC or Commission) have been working together in a joint review of a proposed transportation corridor associated with Baffinland Iron Mines Corp.'s Mary River project proposal (the Project), as directed by the Minister of Aboriginal Affairs and Northern Development Canada (AANDC) and as required by provisions of the North Baffin Regional Land Use Plan (NBRLUP). The intention of the NPC-NIRB joint review process is to consider an application for a transportation corridor for the Project pursuant to the requirements of NBRLUP Section 3.5.12 in coordination with the process for the NIRB's review of the Project under Part 5 of Article 12 of the Nunavut Land Claims Agreement (NLCA).

The proposed railway for the Mary River project is 149 km long and would include a construction access road with secondary arteries leading to quarries and camps required for railway construction. Approximately 34 km of the proposed railway routing originating at the proposed mine site at Mary River are within the boundaries of the North Baffin Regional Land Use Plan[1], while the remainder of the routing carrying on to a termination point at Steensby Inlet is not subject to the provisions of the NBRLUP. This initial 34 km section of the proposed railway falling within the NBRLUP area is the subject of Baffinland's application for a transportation corridor as required by NBRLUP Section 3.5.11.

On December 9, 2011, the NPC and the NIRB released an update on the joint review of this transportation corridor as Appendix 2 of the NIRB's *Preliminary Hearing Conference Decision Concerning The Mary River Project (NIRB File No. 08MN053* (PHC Decision). The NPC and NIRB noted that, in their opinion, further information on the following points would be needed to satisfy the information requirements in Appendix J of the NBRLUP:

[1] FEIS Volume 2, Section 2.2.1, page 45

- A more comprehensive alternatives assessment of the railroad options, including selection of railway, port and shipping options;
- Details regarding the final railway route; and
- Information regarding the construction and operation of the railway and related impacts on caribou, fish and fish habitat, and Inuit harvesting and traditional pursuits.

The NIRB went on to note that, should Baffinland submit a FEIS that complies with the Board's PHC Decision, including Baffinland's commitments as set out in Appendix 1, the FEIS should satisfy the information requirements set out in Appendix J, items 1 and 2. However, the NIRB also identified that as additional information requirements remained outstanding at the time of the PHC Decision, the NIRB was not in a position to provide the NPC with the NIRB's views on whether the assessments necessary to fulfill the environmental assessment elements of Appendix K of the NBRLUP had been provided. At the time the NPC noted it was considering whether it might require further information to satisfy item 3 of Appendix J.

Based on the results of the NIRB's compliance review of the FEIS as issued by the Board on February 29, 2012, the NIRB's consideration of Information Requests (IRs) received from parties on March 30, 2012 and Baffinland's subsequent IR responses received on April 19, 2012, the Board believes that sufficient information has now been provided in support of Baffinland's application for a transportation corridor to meet with the specific requirements of Appendices J and K that can be reasonably addressed through the NIRB's Review.

Please note, as identified in the PHC Decision, Appendix 2, the NIRB's project-specific review process is not designed to directly address some of the planning guidelines set out in Appendix K Item 1 (e.g. corridor width) and certain aspects of Item 2 (e.g. considerations of the role of the railway as a corridor to provide for improved access to other resources having high potential for development). Therefore, it is outside the scope of the NIRB's expertise to express our views regarding this information in the context of the NPC/NIRB joint review, and the NIRB defers to the NPC to evaluate whether it will be able to meet its planning guideline obligations using the information contained within Baffinland's FEIS, or whether additional information is required. Please note that the NIRB has enclosed FEIS Appendix 1 B-2 which provides an indication of relevant FEIS sections where the information provided by Baffinland in support of its transportation corridor application can be accessed.

In correspondence to the NIRB dated March 30, 2012, the NPC advised that, following its presence/absence review of the FEIS it appeared that more information regarding "the suitability of the corridor for the inclusion of other possible communication and transportation initiatives (roads, transmission lines pipelines, etc.)" may need to be provided in order to satisfy NBRLUP Appendix J, Item 3.

NBRLUP Appendix J item 3 requires that applicants wishing to develop a transportation and/or communications corridor in the North Baffin region provide the NPC with an assessment of the suitability of the corridor for the inclusion of other possible communication and transportation initiatives (roads, transmission lines, pipelines, etc.). This assessment should include:

- the environmental, social and terrain engineering consequences, and the cumulative impacts of the project, and
- the environmental and social impact of the project on nearby settlements or on nearby existing and proposed transportation systems.

While FEIS volumes 4, 7 and 9 address the potential environmental and social impacts of the Project on nearby settlements, it is recognized that potential impacts of this portion of the railway (i.e. the proposed transportation corridor) on nearby existing and proposed transportation systems are unlikely. This section of the proposed railway is located in the interior of northern Baffin Island and would be connected to the proposed Mary River mine site only. The only existing nearby transportation infrastructure is the Milne Inlet Tote Road which was built to allow for access from the coast at Milne Inlet to the Mary River mine site and does not connect with any other existing or proposed transportation systems. Consequently, in the NIRB's view there is no potential for environmental or social impacts on nearby existing or proposed transportation systems as a result of the portion of the proposed transportation corridor falling within the NBRLUP area.

In accordance with the PHC Decision and the NIRB's participation throughout the joint review process, now that the NIRB has provided our views to the NPC on the status of compliance with the requirements of Appendix K that are addressed under the joint review, we have now reached the extent of our advice and expertise under the NPC/NIRB joint review process. Consequently the NIRB will, unless requested otherwise by the NPC or the Minister, proceed with the next steps in the Board's Review of the Project in accordance with its established process and timelines.

Sincerely,

Ryan Barry

Ryan Barry
Executive Director
Nunavut Impact Review Board

cc: Erik Madsen, Baffinland Iron Mines Corp.
Mary River Distribution List

Enclosed: FEIS Appendix 1 B-2, Concordance with EIS Guidelines (Appendix J and K)

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Nunavunmi Parnaiyiit
Nunavut Planning Commission
Commission d'Aménagement du Nunavut

May 17, 2012

Erik Madsen
Vice President, Sustainable Development
Baffinland Iron Mines Corporation
Suite 1016, 120 Adelaide Street West
Toronto, ON M5H 1T1

EMAIL erik.madsen@baffinland.com

Dear Mr. Madsen;

RE: [NIRB File # 08MN053] NPC Decision whether more Information is Required to Satisfy NBRLUP-Appendix J & K

The Nunavut Planning Commission (NPC) and the Nunavut Impact Review Board (NIRB) have been reviewing the Baffinland Iron Mines Cooperation's (BIMC) proposed Transportation Corridor associated with the Mary River project Draft since 2010. This Joint Review is to ensure that the requirements of the *North Baffin Regional Land use Plan (NBRLUP)* section 3.5.12 are implemented.

On December 9, 2011, the NPC and the NIRB released an update on the Joint Review on the proposed transportation corridor in Appendix 2 of the NIRB's *Preliminary Hearing Conference Decision Concerning the Mary River Project (PHC Decision)*. It was confirmed under this report that a number of points were needed to satisfy the informational requirements of *Appendix J* of the *NBRLUP*. The NIRB also confirmed in the *PHC Decision* that further information requirements were outstanding at the time of the *PHC Decision.* The NIRB also noted that it was not in a position to provide the NPC with views on whether the assessments necessary to fulfill the environmental assessment elements of Appendix K of the NBRLUP had been provided. The NPC confirmed that it would study the material but a decision had not yet been reached whether more information to satisfy item 3 of Appendix J would be required.

Now that NPC is in receipt of the Final Environmental Impact Statement (FEIS), and having considered the NIRB's views as provided in correspondence to NPC dated April 30, 2012, the NPC has concluded its absence/presence review of the FEIS for the relevant NBRLUP information requirements. It has been determined by the NPC that adequate information has been provided by BIMC and parties to meet the requirements of the NBRLUP's appendix J & K, and as such no further information is required. The NPC notes that this decision is consistent with the assessment by the NIRB on this point.

The NPC and the NIRB hope to reach an agreement and verification on a decision determining whether NBRLUP's Appendix J & K requirements have been met by May 30, 2012.

Should you have any questions or concerns regarding the process or timelines given, please do not hesitate to contact me via email at aglukark@nunavut.ca.

Respectfully;

Brian Aglukark, NPC
Arviat, Nunavut

CC. Mr. Ryan Barry, Executive Director, Nunavut Impact Review Board

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Nunavunmi Parnaiyiit
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May 30, 2012

Ms. Amanda Hanson
Director, Technical Services
Nunavut Impact Review Board
P.O. Box 1360,
Cambridge Bay, NU., X0B 0C0

Delivered Via Electronic Mail

Dear Ms. Hanson

Re: NIRB/NPC Joint Review - Baffinland Mary River Project NIRB File 08MN053, AANDC N2008T0014, QIA LUA 2008 008, NWB 2AM MRY, DFO 2008 MR

The Nunavut Planning Commission (NPC) issued a conformity determination on April 30, 2008 for the above noted project proposal that includes provisions in section 3.5.11 and 3.5.12 of Appendix "C" of the North Baffin Regional Land Use Plan (NBRLUP), a copy of which is enclosed, that a joint process to address the prospective transportation corridor is contemplated.

On February 11, 2009, the Minister of Aboriginal Affairs and Northern Development directed the Nunavut Impact Review Board (NIRB) and the NPC to work together to ensure that the outstanding requirements of the NBRLUP sec. 3.5.11 & 3.5.12 are satisfied. On March 2009 the NIRB and the NPC formalized an arrangement to ensure that those provisions are implemented that includes a Review process that is efficient and that satisfies both organizations' mandated responsibilities. In part, the process included the following;

- Mary River Project Development Proposal (March 2008)
- Mary River Project Draft Environmental Impact Statement (December 2010)
- Mary River Project Final Environmental Impact Statement (February 2012)
- Responses to the informational requests related to the Mary River project,

After an absence, presence review of the Baffinland Iron Mines Corporation (BIMC) documents related to the Mary River project, the NPC observes that the provisions of

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section 3.5.11 and 3.5.12 related to BIMC Mary River Project concerning the Joint Review has been satisfied.

The NBRLUP section 3.5.12 specifies that the NPC decide whether an amendment to the NBRLUP, to insert a map illustrating the location of the prospective transportation corridor, be requested to the Minister. This decision will be made once the project certificate has been issued showing the final location of the transportation corridor.

Sincerely,

Brian Aglukark,
Director, Implementation
Nunavut Planning Commission

CC. Mr. Bernie MacIsaac, Director of Lands, Qikiqtani Inuit Association
Ms. Tracey McCaie, A/Manager, Land Administration, AANDC
Ms. Phyllis Beaulieu, Manager of Licensing, Nunavut Water Board
Mr. Derrick Moggy, Habitat Team Leader, DFO
Mr. Erik Madsen, Vice President, Sustainable Development, BIMC

Encl.

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