

# POPULAR SUMMARY

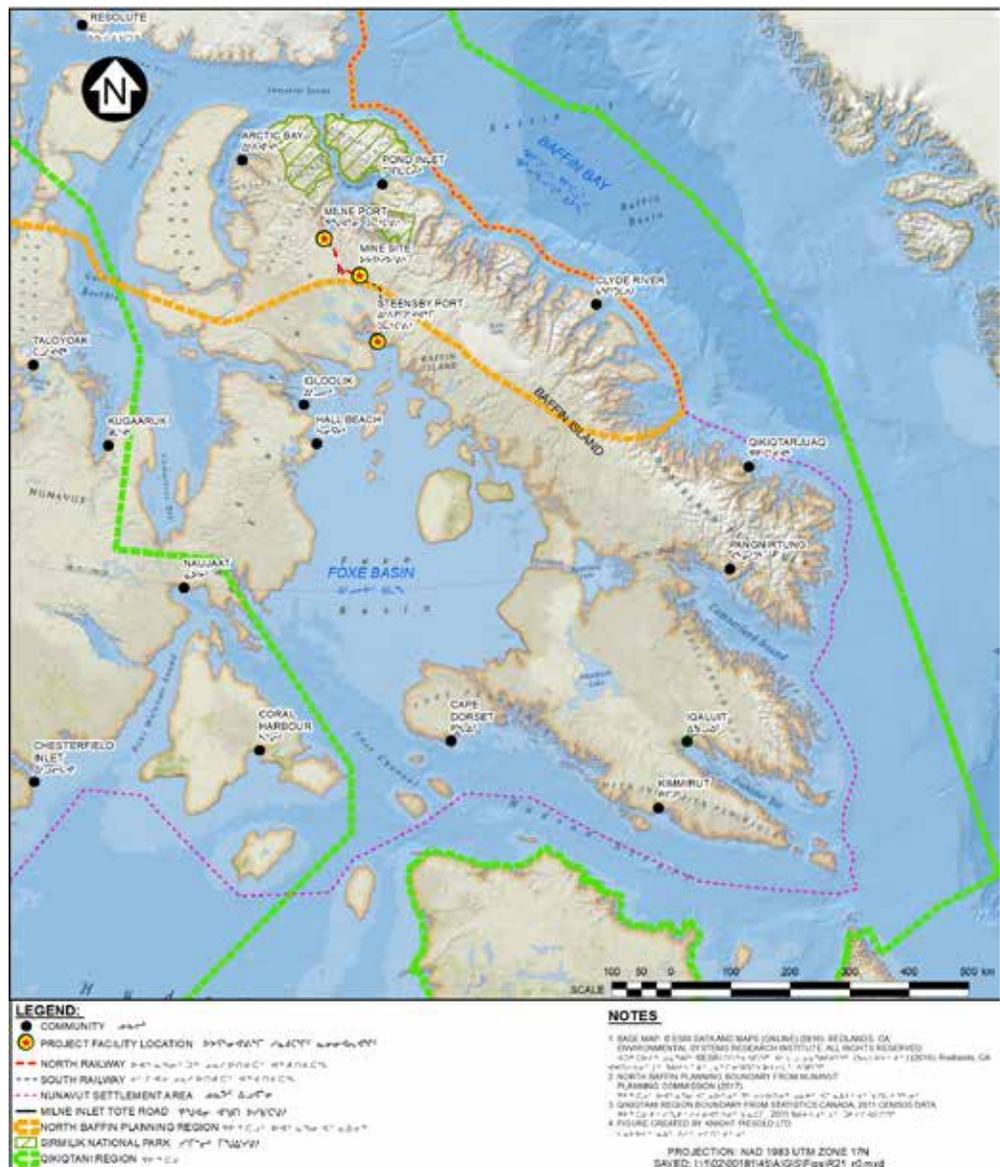
# 1 PROJECT SUMMARY

The Mary River Project is an operating iron ore mine located on northern Baffin Island, in the Qikiqtani Region of Nunavut, in the Canadian Arctic. Baffinland Iron Mines Corporation (Baffinland) is the owner and operator of the Project. Baffinland's initial Project consisted of mining iron ore from the reserve at Deposit No. 1 at a production rate of 18 Million tonnes per year (Mt/a) and constructing a railway to transport the ore to market via a port at Steensby Inlet. The Nunavut Impact Review Board (NIRB) issued Project Certificate No. 005 for this Project on December 28, 2012.

In 2013-2014, Baffinland prepared an addendum to the final environmental impact statement (FEIS) for the Project and the Project Certificate was subsequently amended to include the mining of an additional 4.2 Mtpa of ore, trucking this amount of ore by an existing road (the Tote Road) north to a port at Milne Inlet. The total approved iron ore production was increased to 22.2 Mtpa (4.2 Mtpa transported by road to Milne Port, and 18 Mtpa transported by rail to Steensby Port). This is now considered the Approved Project. The 18 Mtpa Steensby rail project has not yet been constructed, however 4.2 Mtpa of iron ore is currently being transported north by road to Milne Port.

The Addendum to the FEIS is part of the environmental assessment process established for a project under the Nunavut Land Claims Agreement. Under this environmental assessment process, the proponent of a project, such as the Mary River Project, describes the surrounding environment and the proposed development. Potential effects are then predicted and mitigation plans are developed. The severity or significance of residual effects (effects remaining after mitigation measures have been applied), are evaluated based on established criteria and expert opinion.

On February 3, 2017, Baffinland submitted the Phase 2 Proposal for conformity review to the NPC and an amendment to the North Baffin Regional Land Use Plan (Appendix P)



was granted for the Northern Transportation Corridor on March 18, 2018. This corridor includes a 10 km corridor that includes the Tote Road and North Rail, and the marine shipping route, “the Mary River Transportation Corridor”.

On April 23, Baffinland submitted a request to the NPC and NIRB to amend the North Baffin Regional Land Use Plan and Project Certificate No.005, respectively, to allow for a marginal increase in production and transportation of ore via the Tote Road through Milne Port from 4.2 Mtpa to 6.0 Mtpa (the Production Increase Proposal). This document is a request for an additional amendment (the Phase 2 Proposal). Phase 2 involves increasing the quantity of ore shipped through Milne Port to 12 Mtpa, via the construction of a new railway running largely parallel to the existing Tote Road (called the North Railway). The total mine production will eventually increase to 30 Mtpa, with 12 Mtpa being transported via the North Railway to Milne Port and 18 Mtpa transported via the South Railway to Steensby Port.

The Phase 2 Proposal builds on the extensive baseline studies and assessment carried out since 2011 for the larger Approved Project and is thus closely linked to the FEIS and previous addendums.

## 1.1 THE PROPONENT

Baffinland is owned by Nunavut Iron Ore Incorporated and Arcelor Mittal. While Nunavut Iron Ore has a majority stake in the company, the two companies have joint operational rights. Baffinland’s head office is located in Oakville, Ontario, Canada. In addition to its head office, Baffinland maintains a year-round presence at Milne Inlet, Mary River, and community liaison offices in Iqaluit, Igloolik, Pond Inlet, Hall Beach, Clyde River, and Arctic Bay. ArcelorMittal is one of Canada’s leading suppliers of iron ore to steel markets around the world. Recognized for the excellence of its products, the skills of its employees and its leadership in the industry, ArcelorMittal is one of the world’s largest steel companies, operating in more than 60 countries. The Company’s engineering and environmental teams have a wealth of Arctic development experience. Baffinland is also developing key partnerships with companies who have specific northern experience, for example, in shipping and ice-breaking.

## 1.2 THE PHASE 2 PROPOSAL

With the introduction of the Phase 2 Proposal, the Mary River Project will allow Baffinland to transport by rail and ship up to 12 Mtpa of ore from Milne Port, and to retain the current authorizations for the construction and operation of the Steensby Port and South (Mine to Steensby) Railway as proposed in 2012. The total mine production will eventually increase to 30 Mtpa, with 12 Mtpa being transported via the North Railway to Milne Port and 18 Mtpa transported via the South Railway to Steensby Port.

The additional or new facilities and activities required at each of the Project Sites for the implementation of Phase 2 are located at Mine Site, the Northern Transportation Corridor, and at the Milne Port.

For the Mine Site, the Project Development Area (PDA) defined in 2012 remains unchanged. However, some infrastructure within the PDA will be re-arranged in order to accommodate the construction of the North Railway line, support the increase in mine production and the construction of the northern section of the Steensby Railway. The Tote Road alignment will remain unchanged, some upgrades and minor realignments will be required to facilitate railway crossing.

The North Railway line will be 110 km in length, from the loading station at the Mine Site to the unloading station at Milne Port. For most of the length, the railway embankment will be constructed adjacent to the Tote Road. However, due to the steep topography, a 20 km section of the railway will deviate from the Tote Road alignment.

In order to accommodate the shipment of 12 Mtpa and the North Railway operation, the Milne Port PDA must be expanded. This will also involve upgrading or adding additional infrastructure at Milne Port, including a second ore dock. Shipping at Milne Port will continue to occur during the open water season, and may extend into periods when the landfast ice is not being used to support travel and harvesting by Inuit, up to November 15 of each year. Shipping transits will increase as will the size of a portion of the fleet of vessels that previously called on Milne Port.

Baffinland is investigating power alternatives through the proposed development of wind turbines; sites are being investigated near Milne Port, along the Tote Road, and close to the mine site. Locations will be chosen based on environmental and operational constraints, for the development of 2 sites – and the installation of a single turbine at each.

The South Railway operation will be constructed as soon as economically viable. Eventually total mine production will reach 30 million tonnes per year to accommodate the 12 million tonnes per year for the North Railway operation and the approved 18 million tonnes per year South Railway operation.

### 1.3 NEED FOR THE PROJECT

The world needs iron ore to continue to build and develop the materials our society uses every day. Global iron ore demand is expected to increase as countries such as China, India, and other emerging areas continue to grow and develop while the economies of western countries continue to grow. Baffinland proposes to develop the Project to supply high quality iron ore to world markets and provide acceptable profits for its investors. Expansion of the Project as contemplated by the Phase 2 Proposal is a necessity for Baffinland to continue to operate and provide benefits to Inuit, the public, local and regional Inuit organizations and hamlets, the Government of Nunavut, Federal agencies, and other interested parties.

For the people of Nunavut, the Project will continue to contribute to the development of infrastructure, skills, jobs, business opportunities, and will provide increased revenues to the Government of Nunavut and the Inuit birthright corporation (Nunavut Tunngavik Inc.). The Project is expected to bring benefits to local communities by providing an economic base and diverse range of employment options in a manner that is amenable to the continued practice of the traditional lifestyles of Inuit.

The renegotiation of the Inuit Impact and Benefits Agreement (IIBA) between Baffinland and the Qikiqtani Inuit Association (QIA) will describe how benefits from the Project flow to nearby Inuit communities and the Qikiqtaaluk Region of Nunavut. The development of the Project is consistent with the Nunavut Planning Commission's broad planning principles, policies, and goals as well as the Government of Nunavut's strategy for mining development, Parnautit. Overall, the Project should help to attract additional investment to a region with historically and comparatively low levels of developments.

The Project will also contribute to strengthening Canada's sovereignty in the North, protecting the country's environmental heritage, promoting economic and social development in the region, and improving Northern governance.

### 1.4 PROJECT DEVELOPMENT APPROACH

Baffinland will carry out the Phase 2 Proposal in an environmentally and socially responsible manner. The needs and values of Inuit will be respected throughout development and operation of the Project. Baffinland will comply with Nunavut and federal regulatory requirements. Where economically and technically feasible Baffinland will apply technically proven and cost-effective environmental protection measures. Baffinland's decision-making is guided by sound management principles where the sequence of "Policy – Planning – Implementation and Operation – Checking and Corrective Actions – Management Review" are systematically followed. At each of these stages community involvement is an important part of the process. An approach that emphasizes learning as you verify the effects of actions allows Baffinland to continuously improve and adapt quickly to changing conditions. Baffinland is committed to precaution to avoid and/or reduce potentially adverse effects of its operations to ensure the safety of its employees, the well-being of the residents of Nunavut, and the protection of the natural environment.

Baffinland has adopted progressive employment and business principles that will guide the Company through the life of the Project. Safety for employees is a cornerstone of all decisions. Baffinland provides a work environment that attracts, develops, and retains qualified personnel and maximizes Inuit participation. The company hires employees from the five communities closest to the Project (Igloolik, Pond Inlet, Clyde River, Arctic Bay, and Hall Beach). Baffinland works closely with the Qikiqtani Inuit Association (QIA) and others to deliver necessary training to employees and support community



**Mine Site:**

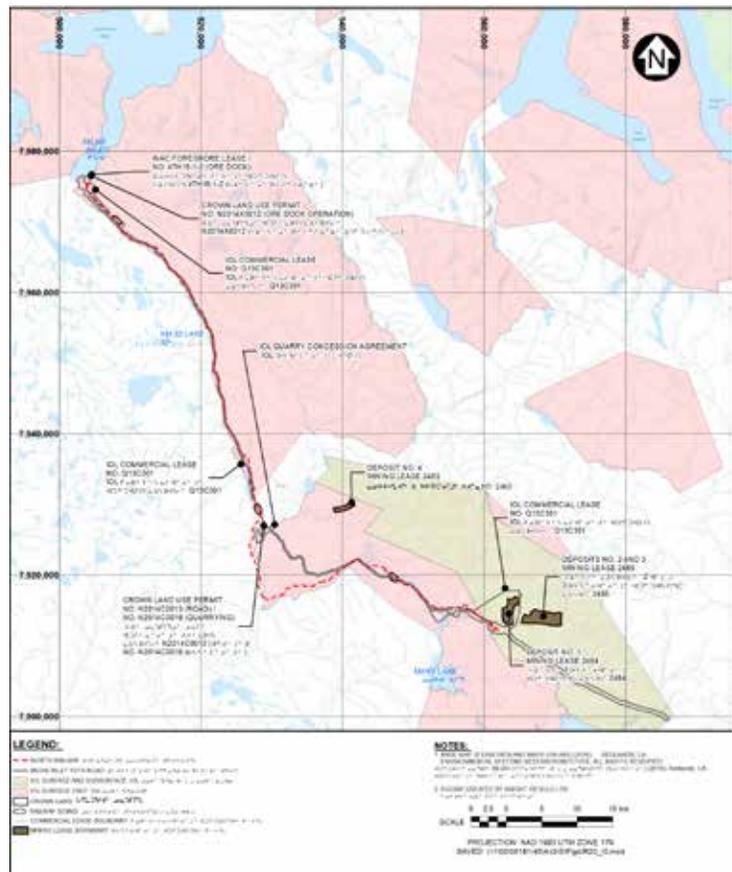
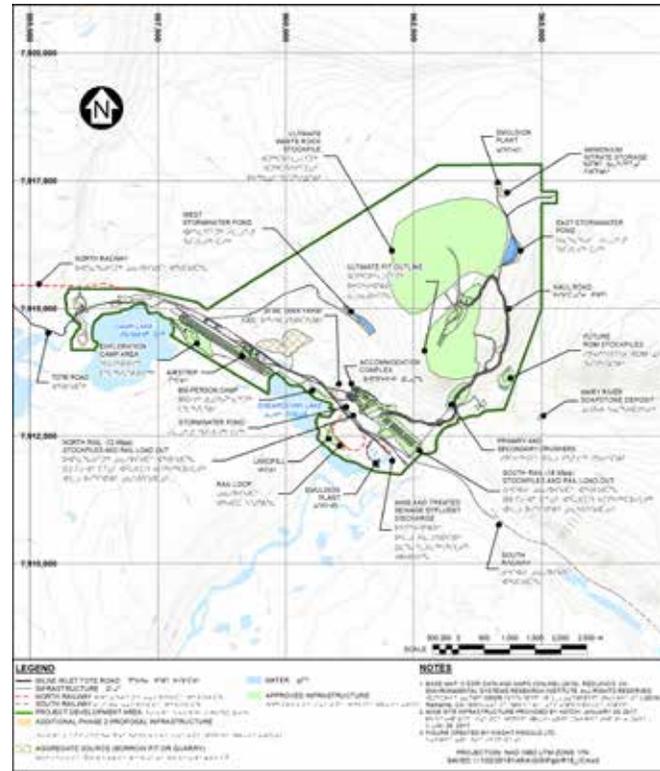
- Increasing the mining rate to 12 million tonnes per year for transportation to Milne Port via the North Rail;
- Additional rail loading facilities for the North Railway;
- An expanded fuel tank farm;
- Installation of a wind turbine; and
- Expanded mine maintenance facilities and support administration buildings/facilities (warehouses, shops, etc.)

**Mary River Transportation Corridor (Tote Road and North Railway):**

- Construction of the railway embankment and railway;
- Construction of water crossings (4 bridges and 417 culverts);
- Construction and use of multiple laydown areas (up to 14), shelters and small equipment shops at each laydown;
- Use of the laydown area at km 58 as for starting transfer from are haulage to rail and for commissioning the constructed portion of the rail line
- Construction and operation of four temporary camp pads and two mobile camps;
- Construction of several level crossings for the Tote Road; and
- Development and closure of up to 40 quarries along the railway corridor.

**Shipping:**

- Shipping during , between early July to mid-November. ; and
- Increased shipping frequency during open water period.



## 1.7 ORE PRODUCTS

The Mary River iron ore is of a very high-grade, and there is no need to have additional processing beyond crushing and sizing. Crushing and screening of the ore produce two iron ore “products”:

- a lump ore product in which the pieces of ore are between 6.3 mm and 31.5 mm in size (about golf ball size), and
- a fine ore product, in which the pieces of ore are less than 6.3 mm in size (about pea size).

## 1.8 CLOSURE AND POST-CLOSURE

Throughout all phases of the Project, Baffinland will plan and conduct operations in a manner designed to return the Project sites to a safe and environmentally stable condition. Baffinland will undertake ongoing reclamation activities throughout the mine life. Temporary facilities required for the construction camps will be decommissioned and removed at the end of their useful life. Borrow areas, quarries, temporary roads and other disturbed sites will be stabilized to limit erosion of ground surfaces and rehabilitated once they are no longer required. Environmental and safety monitoring will continue as long as necessary.

## 1.9 POTENTIAL FOR FUTURE DEVELOPMENT

The Phase 2 Proposal is designed to increase the production and transportation of iron ore to 12 Mtpa through Milne Inlet via the North Rail. The 18 Mtpa through Steensby Inlet via the South Rail is already approved. Annual production rates and the life of mine will vary with factors such as market conditions, ore grades and unanticipated events. All Project sites are thus capable of accommodating additional stockpiles, material handling equipment and personnel.

As well, regional exploration has enabled Baffinland to identify additional iron ore deposits that appear, based on surface sampling, to be of similar high-grade iron ore as Deposit No. 1. Deposits No. 2 and No. 3 are located adjacent to Deposit No. 1 and have been investigated (drilled) more extensively than the other deposits. Given their close proximity to the current mine site, it is expected that these deposits will be developed either prior to or following exhaustion of ore in Deposit No. 1, utilizing much of the same Project infrastructure. Having the mine and associated shipping, road, and railway infrastructure in place will facilitate such future development in the region.

# 2 COMMUNITY INVOLVEMENT

There has been ongoing and extensive consultation with many communities and organizations that have an interest in the Project. Engagement has included the public, local and regional Inuit organizations, territorial and federal government departments and agencies, and other interested groups. There has been a particular focus on the predominantly Inuit communities near the Project sites.

Inuit of the Baffin Region enjoy a rich oral tradition and this has influenced how Baffinland has engaged local communities. The company has focused on establishing a presence in the region through local Community Liaison Officers, holding numerous face-to-face meetings with community members and arranging site tours when possible. With the dominant language through the north Baffin region being Inuktitut, and a number of regional dialects existing within the area, translation using local interpreters has been an important element in supporting effective communication. In all instances, detailed records are prepared for the various meetings and other in-person discussions.

There have been specific efforts at assembling, recording and integrating traditional knowledge into project design decisions. Inuit knowledge of the area is extensive and extremely valuable especially when integrated into scientific studies and understanding.

In addition, community acceptance and preferences were important factors considered in the evaluation of project alternatives such as the use of Milne Inlet, the location of Steensby Port, the shipping route in Foxe Basin and the work rotation schedule.

For the past two years, the engagement program has included considerable consultation related to the Phase 2 Proposal, including the identification and discussion of topics of interest and concern regarding the proposal and potential effects. The Phase 2 Proposal has been guided by the views and perspectives raised during ongoing regulatory, community, and stakeholder engagement initiatives.

Baffinland will continue to pursue a vigorous approach to engagement with Inuit, the public, local and regional Inuit organizations and hamlets, the Government of Nunavut, Federal agencies, and other interested parties, through meetings, workshops, surveys and dissemination of information via newsletters and internet. In this way, the communities, QIA, regulators and the public are informed in a timely and culturally sensitive manner of the Project's progress and the potential environmental and social impacts of ongoing operations. Baffinland has specifically committed to return to the five (5) North Baffin communities to provide further and more detailed information in relation to the Phase 2 Proposal, and associated regulatory processes. Baffinland will continue its engagement activities and comply with the terms and conditions of the Project Certificate and the IIBA.

## 3 PROJECT SETTING

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### 3.1 PHYSICAL SETTING

The landforms and the iron ore deposits in the Mary River Project area are associated with widespread past and current glaciation on Baffin Island. Surface geology consists of locally abundant sediment deposits from glaciers and rivers. The North Baffin region containing the Mary River area lies within the Committee Belt, a granite-greenstone terrain mixed with sedimentary and volcanic rock. Occasional outcrops of granitic and sedimentary rock formations occur. The mountains to the east are more than 540 million years old, and the lowland plateaus to the west are about 250 to 540 million years old.

The region experiences near 24-hour darkness with less than two hours of twilight from November to January. During the winter months the treeless topography and fine powdery snow produce blowing snow conditions, resulting in restricted visibility. There is continuous daylight from May to August and frost-free conditions occur from late June to late August. The months of July and August usually experience the greatest precipitation. From September to November, temperature and the number of daylight hours decrease, and by mid-October the mean daily temperature is generally well below 0°C. The highest snowfall typically occurs during this period.

Air quality is very good and noise levels are low in the Project area as is typical of a remote environment. Freshwater quality measurements in the Mary River area indicate naturally elevated concentrations of dissolved oxygen, aluminium, and iron. As well, significant dissolved solids lead to increased turbidity of the water. Some average values for pH, as well as cadmium and mercury in the fresh water environment are currently greater than levels recommended by the guidelines of Canadian Council of Ministers of the Environment.

### 3.2 BIOLOGICAL SETTING

The Project is situated in the Northern Arctic Ecozone. The climate is semi-arid and permafrost coverage is continuous extending to a depth of 500 metres, with an active layer of up to 2 metres. The extremely cold temperatures of the region, combined with the permafrost, result in a short period of runoff that typically occurs from June to September. All rivers and creeks, with the exception of the very largest systems, freeze completely during the winter months. Due to the combination of low temperatures and the low capacity of the soil to hold moisture, vegetation is minimal and surface water is abundant. The region is dotted with thousands of small lakes and streams.

Plant life is relatively sparse in much of the Project area and is generally consistent with the plants that usually occur in arctic regions. No plant species considered to be “rare” in Canada were found to occur in the survey locations.

Terrestrial mammals in the region include barren-ground caribou of the North Baffin herd, wolf, arctic and red fox, ermine, arctic hare, and lemmings. Marine mammals are found in abundance in the region, including polar bears, narwhals, beluga whales, bowhead whales, several species of seals, and walrus. Killer whales and northern bottlenose whales have been found in small numbers.

North Baffin caribou are currently present at low densities and their numbers seem to vary in accordance with a 60- to 70-year cycle. The last period of caribou abundance in the area was 1980 to 2000, and the previous period of low abundance was in the 1940s. Caribou are expected to remain at low numbers for the next couple of decades. However, there is evidence that caribou do occur throughout the entire region. While some populations of caribou migrate between preferred habitats in summer and winter, North Baffin caribou appear to be non-migratory and are likely to be found relatively equally in many locations throughout the Project area.

Migratory bird species observed in the Mary River area include snow geese, ducks, eiders, loons, and mergansers. Raptors found include rough-legged hawks, peregrine falcons, gyrfalcons, and snowy owls. Relatively low densities of songbirds and shorebirds were recorded throughout the region. There are also numerous sea birds in the area of the shipping route including thick billed murre and many types of gulls.

There are two fish species in the freshwater environment: arctic char and a minnow species named nine-spine stickleback. The inland waters near the Project mainly contain landlocked arctic char, though sea-run char are present in a lake next to Steensby Port and up the Cockburn River system next to a portion of the railway. Fish in the marine waters include arctic char, sculpin, and Atlantic lumpfish at Steensby Inlet, and Arctic char, sculpin and Greenland cod at Milne Inlet.

### 3.3 SOCIO-ECONOMIC SETTING

The Baffin Region of Nunavut has a rich and visible archaeological heritage dating back many thousands of years. There are many archeological sites with varying degrees of importance that have been found in the project area, particularly around Milne Port and Steensby Port but also along some sections of the rail line.

The five communities of the north Baffin region in the immediate vicinity of the Mary River Project, listed alphabetically, include Arctic Bay (280 km), Clyde River (415 km), Hall Beach (192 km), Igloolik (155 km), and Pond Inlet (160 km). Each of these communities has long term social, economic and environmental ties to the Project area. For many of these North Baffin households, harvest of country food provides an important contribution to their overall well-being, both physical and cultural. In all five communities, caribou, ringed seal, and arctic char are of major importance. In addition, walrus is a significant species in Hall Beach and Igloolik, while narwhal is a key component of the harvest among households in Arctic Bay, Pond Inlet, and to a lesser degree, Clyde River.

The land-based economy is a major part of the livelihoods of many residents of the North Baffin. Harvesting from the land and sea produces food worth between \$12 million and \$20 million per year in this region. The amount of work to harvest this food is estimated to be 350 full-time jobs. In addition, residents of the region earn money through sales of arts and crafts, through employment, and from various government social programs such as Income Support.

The Inuit of the North Baffin region have experienced tremendous social and cultural change over the course of a few decades. In particular, initiatives such as residential schools, have affected family integrity and by implication, social cohesion. Elders are becoming increasingly engaged in community life and in promoting the learning of traditional culture for the younger generation. At the same time, a shift toward western middle-class expectations appears to be taking place among Inuit youth. These communities have experienced dramatic population growth over the last 20 years. Over 70 % of the population is under the age of 25. Underemployment and lack of opportunities are contributing to social stress.

Demand amongst residents for wage employment is very high, however, job opportunities in the North Baffin are limited. Inuit employment in North Baffin is characterized by many individuals earning small levels of income, well under what full-time work would pay, and a small number earning full-time, year-round incomes. Most residents working in full-time jobs in Iqaluit do so year-round. In North Baffin, many more full-time workers are engaged in these jobs for only short periods. Women who work full-time jobs in North Baffin are more likely to work year-round than are men.

Still, there are good-paying, full-time, year-round employment opportunities available. These are often with the territorial or municipal government and require levels of education and kinds of experience that many residents do not have. Community Elders recognize that the communities need to position themselves to enter the wage economy.

The number of jobs occupied by women has generally increased at a greater pace than those occupied by men. However, women in the region are working mostly in the public sector. The past public sector growth is not likely to continue and this suggests that as young women start to look for employment, they may need to find work in sectors not traditionally filled by women.

Approximately one-in-five jobs in North Baffin and Iqaluit require a university education. One-quarter to one-third of jobs in the region require college or apprenticeship levels of training and skills. A similar number require high school education and/or occupation-specific training. The remainder can be accessed by unskilled workers with on-the-job training. The opportunities for employment are much more limited for those who do not have good education or training.

The Government of Nunavut relies on federal transfer payments for at least 90% of its revenue. Government employment is a mainstay of the wage economy with many of Nunavut's small businesses and retail outlets established to support government needs, or those of public servants. Government jobs in administration, education, and health areas account for about half of all employment earnings in the territory. Construction employment has also been growing to support the development of government infrastructure.

The North Baffin has seen some resource development in the past including the operation of the Polaris and Nanisivik mines. Panarctic Oil was also responsible for extensive petroleum exploration in the 1970's and even developed commercial production at the Bent Horn project. More recently mineral and petroleum exploration in the area have wavered and disappeared, respectively. The Mary River project is the only operating mine in the eastern Arctic and only a few other companies are running small exploration projects in any given year.

## 4 PROJECT INTERACTIONS AND EFFECTS ON VECS AND VSECS

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Public consultation has enabled Baffinland to identify the key interests and concerns of the communities and stakeholders of the Project. These areas of focus are identified in the EIS as the "valued ecosystem components (VECs)" and "valued socio-economic components (VSECs)" of the Project.

### 4.1 Valued Ecosystem Components

The VECs include both the natural environment and the wildlife that depends on the health of that environment. The VECs can be grouped in theme areas related to key components of the environment. Significant indicator species were identified and provided a focus for the assessments.

**Atmospheric Environment** – Climate change; Air quality; Noise and vibration.

**Land Environment** – Landforms, soil and permafrost; Vegetation; Terrestrial wildlife and habitat; Birds.

**Freshwater Environment** – Surface water and sediment quality; Water quantity; Freshwater fish, fish habitats and other aquatic organisms.

**Marine Environment** – Sea ice; Marine water and sediment quality; Marine habitat and biota; Marine mammals.

## 4.2 Valued Socio-economic Components

The VSECs are related to the well-being of the people, their communities and the overall social and economic health of the area.

**People:** Population demographics; Education and training; Human health and well-being.

**Community:** Community infrastructure and public service; Cultural Resources; Resources and land use; Governance and leadership; Livelihood and employment; Cultural well-being.

**Economy:** Economic development and self-reliance; Contracting and business opportunities; Benefits, taxes and royalties.

## 4.3 VECs and VSECs Interaction with the Project

Through the review process the interactions of the Phase 2 Proposal with the various VECs and VSECs were identified and where appropriate, key indicator species were identified and analyzed. Extensive studies combined with traditional knowledge were used to establish the pre-Project conditions. Using scientific understanding, experience from past developments and traditional knowledge, predictions are made on the effects of various interactions. Where negative Phase 2 Proposal interactions could not be avoided, plans were developed to minimize or offset these effects. Mitigation measures are systematically addressed in the residual effect table.

Taking into account the adjustments and mitigation measures included in the Phase 2 Proposal to limit negative effects, residual effects of the Project were then assessed for their significance on the biophysical and socio-economic environments. This Phase 2 Proposal presents the outcomes of these assessments. A summary by theme area follows.

### 4.3.1 Project Effects on VECs

The Phase 2 Proposal design sought to minimize the interactions of the Project with the natural environment and to implement measures to minimize the potential negative effects of interactions. With these measures in place, the effects of the Phase 2 Proposal on the natural environment overall was assessed as not significant. The following sections summarize key project interactions and mitigation measures that will be implemented.

#### ***Atmospheric Environment - Climate change; Air quality; Noise and vibration***

Climate change is predicted to have little effect on the very cold and deep permafrost conditions in the area over the planned life of the Approved Project. The Phase 2 Proposal facilities will also be designed to account for any changes in site conditions induced by climate change. The Phase 2 Proposal activities will produce Greenhouse gases. Releases of Greenhouse gases from the Project are anticipated to be small in comparison to Nunavut and Canadian totals and the Phase 2 Proposal will reduce current emissions by use of rail over road ore transport. Greenhouse gas releases will not have a measurable effect on global climate change.

Ore handling, as well as driving on access roads, and emissions from power plants, trucks, and camp incinerators will affect air quality through the generation of particulates and other gaseous emissions. The use of low-sulphur arctic diesel fuels and ensuring modern emission controls on equipment will reduce these emissions. As well, air pollution controls such as dust suppressants will prevent significant effects on air quality. Once the railroad is constructed and operating, it will replace trucking as the method of transporting the ore from the mine to the port, and dust emissions from ore

transportation will be reduced. With the Phase 2 Proposal, secondary crushing will be moved from the Mine Site to Milne Port, where it will be enclosed, reducing dust emissions.

Phase 2 Proposal activities will increase noise levels but these will be limited to areas close to the activities. As well, the use of mufflers and regular maintenance of engines and equipment will prevent significant noise levels.

***Land Environment: Landforms, soil and permafrost; Vegetation; Terrestrial wildlife and habitat; Birds***

Sensitive landforms in the Project area include frozen soils that contain ice lenses or areas that could shift under pressure. Sensitive landforms will be avoided or appropriate engineering designs will be used to protect the sensitive areas. During site preparation adequate drainage to prevent water pooling during thaw periods will be used.

The design of all Phase 2 Proposal facilities minimizes the amount of land that the Project needs to disturb. Thus the amount of vegetation that is affected is minimal compared to the amount of vegetation cover in the North Baffin. Numerical modelling was done to predict the amount of dust that could settle on the vegetation in the area and these studies concluded that the dust suppression actions would prevent impacts on plants.

Caribou are the main indicator species used to assess potential effects on terrestrial animals. The main project interaction with caribou would be when caribou cross the road or rail lines. Although it is possible that individual caribou could be involved in collisions with trains or trucks, these numbers are expected to be limited and will not be significant compared with total numbers in the region. Several measures are in place to avoid collisions with caribou. Strict speed limits will be in place for trucks and trains, thus decreasing the probability of collision. Trucks will be required to stop if wildlife is observed on or next to the road. No sightings have been made at the Project sites.

There are many birds through the region and a small amount of habitat loss for migratory birds is expected to result from Phase 2 Proposal activities. These are not expected to lead to effects on populations of key species such as peregrine falcons, snow geese, eiders, and loons. Prior to initiating Phase 2 Proposal activities, nests and nesting areas will be identified and mitigation will be implemented to avoid direct effects to birds and bird habitat.

**Freshwater Environment – Surface water and sediment quality; Water quantity; Freshwater fish, fish habitats and other aquatic organisms**

A number of proven mitigation measures have been included in the Phase 2 Proposal to reduce potential effects on water quality, freshwater fish, fish habitat, and other aquatic organisms. Specific Management Plans detail the many ways that water will be protected.

Water use will be reduced to the minimum necessary and all used water will be tested and if required treated before it is released back to the environment. Sewage treatment facilities will ensure that all discharged water satisfies established standards. Run-off water from fuel storage and maintenance facility areas will be contained and wastewater from truck and rail maintenance facilities and explosives equipment-washing facilities will meet established standards before being discharged to the natural environment. An Emergency and Spill Response Plan will be in place and will ensure that there is prompt and appropriate clean-up of any spills should they occur.

In response to the non-compliant discharges from the Waste Rock Facility (WRF) in 2017, Baffinland has taken multiple corrective actions to prevent additional non-compliant discharges from the WRF and retained Golder Associates (Golder) to determine the appropriate corrective actions required to address the seepage observed at the WRF in 2017 and investigate the potential for ARD and develop mitigation measures, as required. Actions planned for 2018 include installing a water treatment system to manage captured runoff at the WRF pond, upgrading the WRF pond to address seepage and expand capacity and updating the Interim Waste Rock Management Plan. The revised plan will outline the management of waste

rock and surface water at the WRF for the next five years and will incorporate geochemistry data collected during field programs in 2018, updated water quality modelling results and lessons learned from the 2017 events.

The Tote Road and North Railway, crosses a large number of watercourses and a portion of these contain fish habitat. New bridges will be constructed, and many culverts will be replaced and will be designed to limit barriers to fish movement. A habitat compensation plan is included as part of the assessment.

### **Marine Environment – Sea ice; Marine water and sediment quality; Marine habitat and biota; Marine mammals**

At Milne Port, near-shore, including port activities, will be carefully managed to protect the marine environment. All sewage and wastewater from maintenance facilities and explosive residues will be treated before discharge and runoff from port site areas will be contained and monitored for water quality before discharge. Ship to shore fuel transfers will take place following the *Canada Shipping Act* regulations.

Pile driving during construction at the Milne Port has the potential to create an acoustic disturbance, which could affect the marine environment. Mitigation will be used to dampen sound transmission and marine mammal monitoring to avoid pile driving when marine mammals are present. Auditory disturbances are not expected to affect marine biota and mammals at the population level.

Shipping from Milne Port will be mainly during the open water season, but will extend into the shoulder seasons when the landfast ice is not in use for travel and harvesting by Inuit. Ore carriers will carry ballast water during their inbound trips to Milne Port. This water is required in order to keep the vessels stable and at an even draft. Ballast water will be managed in accordance with the Canada Shipping Act and its regulations which require mid-ocean exchange of ballast water. The water is pumped overboard as the vessels approach Milne Port. Ballast water will only be slightly different (in temperature and salinity) from the water in the Inlet. Modeling has shown that discharge will not alter the quality of water in Milne Inlet. There is a concern that ballast water could result in the unintended introduction of invasive species. Adherence to strict protocols developed by regulatory agencies will mitigate this concern.

The key marine mammal species include narwhals, beluga whales, and bowhead whales. Effects of Phase 2 Proposal activities were assessed for these species as well as ringed seals, bearded seals and walrus.

There is potential for acoustic disturbance from ship noise along the Northern shipping route as well as vessel strikes on marine mammals which can cause serious injury or mortality through physical harm. With respect to the Northern shipping route, ringed seals, narwhal, beluga whales and bowhead whales may all be expected to encounter ship traffic in low to high frequencies. There have been no vessel strikes to date with marine mammals. Polar bears and walrus are infrequent along the Northern shipping route in the open water season and are, therefore, not expected to experience acoustic disturbances from ship noise or vessel strikes. Given the relatively low likelihood and short duration of encounters between marine mammals and vessel traffic, acoustic disturbances are not expected to affect marine mammals at the population level. To mitigate potential vessel strikes, the Phase 2 Proposal includes mandatory nautical instructions including reduced speed limits when transiting within Milne Port or along the Northern shipping corridor, and the maintenance of a constant course and speed when in transit. Given the planned mitigation, and low likelihood for marine mammal vessel strikes, vessel strikes are not expected to affect marine mammals at the population level.

*Ringed seals* are present year-round along the northern shipping route, including the Milne Port site. Shipping and most construction activities at the Milne Port site will occur during the open-water period, which avoids pupping, nursing, mating, and moulting. Ringed seals are generally tolerant of industrial activity and shipping. The effects of Phase 2 Proposal activities on ringed seals are considered minor and are expected to occur in a localized area.

*Bearded seals* are expected to occur in small numbers along the northern shipping route during the open-water periods given that they predominately occur in areas of pack ice. Shipping during the Phase 2 Proposal does not overlap with bearded seal pupping and nursing. If bearded seals do occur along the northern shipping route or near the Milne Port, they may exhibit localized avoidance of shipping and construction activities. Given the small numbers of bearded seals expected to occur in Eclipse Sound and Milne Inlet, and the planned mitigation measures, predicted impacts are not significant.

*Walruses* may occur in small numbers along the northern shipping route during the open-water period. If walruses do occur along the northern shipping route or near the Milne Port, they may exhibit localized avoidance of shipping and construction activities. Given the small numbers of walruses expected to occur in Eclipse Sound and Milne Inlet, and the planned mitigation measures, predicted impacts are not significant.

*Narwhals* are present along the northern shipping route primarily during the open-water period when about 20,000 animals summer in the Eclipse Sound and Milne Inlet area. Narwhals are thought to calve and perhaps feed in this summering area. While there is little information on how narwhals respond to vessel traffic—there are relevant observations in the Milne Inlet area that indicated that narwhals exhibited variable responses to vessels (including the passage of an ore carrier, fuel tanker and sea lifts). Observations, including through the Bruce Head shore-based monitoring program, which involves local Inuit as observers, suggest that some narwhals may have left certain areas after a ship's passage but that others did not. It is predicted that narwhals will exhibit localized avoidance of ore carriers along the northern shipping route and vessel traffic in the Milne Port area. Potential effects are expected to be reduced by decreasing ship speed and hence, minimizing sound levels. Narwhals are predicted to habituate to repeat passages of ore carriers along the northern shipping route. Ongoing monitoring will be conducted to detect unexpected effects on narwhals and to identify any additional mitigation measures.

*Beluga whales* occur in relatively small numbers in Eclipse Sound and Milne Inlet during the open-water period. Beluga responses to vessels during periods of open water are variable, ranging from tolerance to avoidance, and likely depend on the type of vessel and its speed and course, and the whales' activity and previous exposure to industrial activity. It is likely that belugas will exhibit localized avoidance of ore carriers along the northern shipping route. Effects are expected to be reduced by decreasing ship speed. It is predicted that belugas will habituate to repeat passages of ore carriers along the northern shipping route. To address the uncertainty with this prediction ongoing monitoring will be conducted to detect unexpected effects on belugas and to identify any additional mitigation measures.

*Bowhead whales* regularly occur along the northern shipping route, and it is thought that this summering area is used for feeding. Behavioural responses to shipping activity by bowhead whales are variable and appear to depend on the whale's activity and the type of vessel. Based on previous studies, bowheads will likely avoid at least the immediate area around ore carriers and that effects can be minimized by reducing ship speed and by vessels maintaining a constant course and speed. It is predicted that bowheads will exhibit localized avoidance of ore carriers along the northern shipping route. It is predicted that bowheads will habituate to repeat passages of ore carriers along the northern shipping route. To address the uncertainty with this prediction ongoing monitoring will be conducted to detect unexpected effects on belugas and to identify any additional mitigation measures.

*Polar bears* occur along the northern shipping route throughout the year in relatively small numbers. Phase 2 Proposal activities will primarily occur during the open-water period and as such will not overlap with polar bear denning and mating. Bylot Island and coastal Baffin Island are used as summer retreats by polar bears. Polar bears are expected to avoid ships and the port site; however, they may also approach these areas. Project personnel will be educated about bear safety and the strict management of waste will reduce the chances of human-bear interactions. Polar bear monitors will be hired to ensure worker safety.

### 4.3.2 Project Effects on VSECs

#### Introduction

The Phase 2 Proposal will provide many potential social and economic benefits to the residents of North Baffin. These will arise from employment and training opportunities as well as from opportunities for businesses and from payments made to government and Inuit organizations. Careful planning is needed in order to improve the ability of people to attain these opportunities. Individuals and families will also require support as they cope with the challenges associated with the fly-in/fly-out style of life and with the wealth and financial responsibilities that come with this lifestyle. The assessment of valued socio-economic components is an important way to identify issues and develop appropriate mitigation measures. Overall the Phase 2 Proposal represents important and significant socio-economic benefits to Nunavut.

#### **People: Population demographics; Education and training; Human health and well-being**

The potential for the Phase 2 Proposal to cause non-Inuit migration into communities, as well as the potential for Inuit to move out of the communities as a result of the Phase 2 Proposal was assessed. Neither of these possibilities is identified as significantly affecting the composition and numbers of the North Baffin populations or the community social fabric.

Baffinland's education and training commitments will help upgrade the skills of North Baffin residents. Baffinland is committed to supporting training programs that will enable residents of nearby communities to develop the skills needed to qualify and perform jobs at every level of the Phase 2 Proposal operation. Baffinland has been actively pursuing education and training partnership initiatives. Baffinland and the QIA recently developed the Q-STEP training program, a four-year initiative that will be undertaken by QIA in close partnership with Baffinland to provide Inuit with skills and qualifications to meet the employment needs of the Mary River Project as well as other employment opportunities in the region.

The Approved Project was predicted to deliver positive effects related to education and training through access to industrial work supported by pre-employment preparation and on-the-job training for young adults, incentives related to school attendance and success, and opportunities to gain skills. Monitoring supports that these predictions are being realized by individuals employed by the Project and their families (TSD-27). While the development of an adequately trained and skilled Inuit workforce will take time to achieve, Baffinland expects that training programs will eventually contribute to the development of a stronger local workforce and economy. Monitoring supports that these predictions are being realized by individuals employed by the Project and their families.

The rotation schedule is two weeks in two weeks outs. The challenges associated with fly-in/fly-out operation are recognized. Steps will continue to be taken to help workers and families to succeed in this type of work environment. Orientation and training will continue to be provided to help workers and families adapt to the work rotations and improve money management practices.

Concerns are sometimes raised about the potential effects of the Phase 2 Proposal or the Approved Project on the transport of illegal substances through Project sites and on the affordability of such substances. To counter the possibility of increased substance abuse the company has a strict no drug–no alcohol policy. Addiction counselling will also be available.

#### **Community: Community infrastructure and public service; Cultural Resources; Resources and land use; Governance and leadership; Livelihood and employment; Cultural Well-being**

The Project is expected to create competition for skilled workers. Hamlets have expressed concern that they may face difficulty in hiring the people they need to deliver local services. However, employment experience and ongoing training will significantly improve labour force capacity helping to equip local residents with the qualifications and experience. As a result, increased competition for workers will be balanced by increased capacity.

The Phase 2 Proposal will be making use of the public airstrips at Iqaluit and at the five nearest communities for transporting workers to and from worksites. The Phase 2 Proposal's transportation plans will be designed to avoid placing demands on the airport's facilities beyond its capacity. Some increased demand for infrastructure is also expected to arise indirectly due to the Phase 2 Proposal. For example, increased wealth might lead to more vehicles and a need for road improvements.

Education and training as well as on-the-job work experience and counseling will develop leadership skills that will significantly improve local governance. The participation of community residents and leaders in agreement negotiations with Baffinland and in initiatives to identify key indicators for regional monitoring programs has already contributed to local community leadership development.

Measures will continue to be taken to respect and preserve the culture of Inuit employees while they are working. Policies that encourage respect of other cultures and diversity are in place. Baffinland supports the use of Inuktitut onsite, for signage and in work units. Traditional country foods will be provided in the Project cafeterias. Policies encouraging safety, employment equity, and, preventing harassment will be strictly enforced.

Archaeological sites have been identified in Phase 2 Proposal areas that contain features and artifacts representing substantial degrees of area use throughout the human past to the present. A number of important archaeological sites will be avoided by relocating Phase 2 Proposal infrastructure, and others will require protection through excavation, mapping, and artifact retrieval by a licensed archaeologist.

The Phase 2 Proposal will interact with existing land uses by Inuit. Measures to support these activities include check-in procedures at Phase 2 Proposal sites and a focus on public safety for the Milne Inlet Tote Road.

#### **Economy: Economic development and self-reliance; Contracting and business opportunities; Benefits, taxes and royalties**

Direct and indirect economic growth generated by the Phase 2 Proposal will create new opportunities for employment and business. The Phase 2 Proposal will enhance labour force capacity and may increase Inuit business capacity. Businesses may gain opportunities to expand through the supply of business services to the Phase 2 Proposal as well as indirectly through an expanded market for consumer goods and services. Baffinland will help Inuit firms, and in particular smaller Inuit firms located in communities in the Baffin Region to develop capacity to bid on and carry out contracts for the Phase 2 Proposal.

The Phase 2 Proposal will provide substantial cash payments to Inuit organizations and to government. These will arise through the Inuit Impact and Benefits Agreement with QIA as well as through royalty payments for the iron ore made to NTI. Payments to the Government of Nunavut will arise from fuel taxes, property taxes, and taxes on the profits earned by Baffinland. Some of these payments will start as early as the construction phase, while other payments will not kick in until later in the operations phase.

Through its contribution to human skills, to household wealth and to economic growth, the Phase 2 Proposal will support achievement of overall economic development goals, including progress toward improved self-reliance of individuals, communities, and the territory.

## **5 ENVIRONMENTAL, HEALTH AND SAFETY MANAGEMENT**

Baffinland is committed to protection of the health and safety of employees and the environment, and to ongoing community involvement and participation in the Phase 2 Proposal. The Phase 2 Proposal will meet or exceed the requirements of all applicable Nunavut and Canadian laws, regulatory requirements, agreements, permits, and licences.

Baffinland's Environment, Health, and Safety (EHS) Management System is the framework for adaptive management based on international best practices. The EHS embraces the Precautionary Principle and Sustainable Development. Within this framework, individual plans have been developed to address all aspects of the company's activities and contain the detailed mitigation measures and monitoring to be implemented throughout the life of the Project in order to eliminate, limit or minimize adverse effects. All Baffinland employees and contractors are required to comply with these management plans. The reporting and documentation requirements for these management plans, auditing, and process of management review and revisions are all specified in the EHS Management System.

The accountability for safety and environmental protection is shared among all employees and contractors and Baffinland is committed to providing the necessary training and awareness programs for effective implementation of its policies and management plans. These training programs will be documented, procedure manuals will be maintained, and retraining schedules will be established. Baffinland's Human Resource Management Plan outlines these commitments.

One of the key management plans is focused on Emergency Preparedness and Response. In the unlikely event that a major diesel fuel spill would occur along the shipping lane, such a spill would have a significant environmental effect. However, refuelling of fuel depots is a well mastered routine activity in Arctic communities. Furthermore, Baffinland will receive fuel only during the open water season. In order to respond to potential spill events along the shipping route, Baffinland has developed a Spill at Sea Response Plan and will draw on the expertise of OSRL to assist in spill management and clean up. OSRL is a leading world wide organization specializing in off shore spill response.

## 6 CUMULATIVE AND TRANSBOUNDARY EFFECTS

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Consideration was given to potential cumulative effects from reasonably foreseeable projects. For the Approved Project, the main potential cumulative effects are thought to arise if development of the Mary River Project would lead to further iron ore production up to twice the currently proposed production rate. Other projects in the area will have only minor cumulative effects. A doubled production rate of one or more other deposits would increase effects to a number of valued ecosystem and socio-economic components, but not to the extent that any of the cumulative effects are expected to be significant. In relation to the Approved Project, the Phase 2 Proposal presents no significant cumulative effects.

Transboundary effects to marine mammals would occur as a result of shipping, however, because the effects to marine mammals within the study area are not significant, the transboundary effects are similarly not significant. Socio-economic effects will occur in other jurisdictions of Canada as a result of employment of the Phase 2 Proposal by people living outside of Nunavut. However, these effects are not deemed significant.

## 7 CONCERNS OF THE COMMUNITIES

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Through the past years a number of community concerns have been raised and addressed. Some of the key issues are related to the essential balance between development and maintaining traditional lifestyles.

### SOCIAL-CULTURAL CHANGE

The socioeconomic benefits offered by the Phase 2 Proposal will inevitably trigger social changes for the Inuit of the neighbourhood communities and Nunavut as a whole. The increased purchasing power of employees as well as the redistribution of wealth generated by Phase 2 Proposal activities has the potential to accelerate the changes currently being experienced by the Inuit society and families. Although such changes are inevitable and will continue to occur, with or without the Phase 2 Proposal or the larger Approved Project, the rate and direction of such changes remain legitimate concerns for many Inuit.

Concerns were expressed on the overall effect of the Phase 2 Proposal or the Approved Project on harvesting and land-use activities that could arise from the combined interactions of the Phase 2 Proposal or the Approved Project on a wide range of factors. These interacting effects have been carefully considered and the potential for beneficial outcomes on harvesting activities appears to be more likely than overall negative outcomes. Baffinland will continue to work with communities to undertake collaborative monitoring and address issues as they arise.

## 8 CONCLUSIONS OF THE EIS

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The Phase 2 Proposal includes a thorough environmental impact assessment of Project development plans. The Phase 2 Proposal is based on extensive studies of the biophysical and socio-economic environments and builds on the knowledge acquired during the Approved Project FEIS and ERP review. Many consultations have been undertaken to identify and address the concerns and interests of Inuit, the public, local and regional Inuit organizations and hamlets, the Government of Nunavut, Federal agencies, and other interested parties and to benefit from the knowledge of the Elders in the region. The Phase 2 Proposal has addressed the topics identified by NIRB in the guidelines provided for the Project.

The Phase 2 Proposal will be designed to meet all relevant regulatory requirements and to avoid, limit, and, minimize negative effects where possible and to enhance socio-economic benefits. No outstanding issues have been identified which are not currently being addressed through adaptive management, and monitoring. Baffinland is confident that it has proposed a Phase 2 Proposal that will provide positive economic returns to investors and benefits to the people, the Government of Nunavut, and Inuit organizations. A comprehensive management and monitoring system has been developed to ensure that the commitments in the Phase 2 Proposal as well as the FEIS of the Approved Project will be respected. Baffinland is committed to ongoing consultations with stakeholders and will address public concerns throughout the life of the Phase 2 Proposal and the larger Approved Project.

### **NO SIGNIFICANT NEGATIVE IMPACTS ON THE BIOPHYSICAL ENVIRONMENT**

The Phase 2 Proposal will be designed to meet relevant regulatory requirements and to avoid, limit, and, reduce negative effects where possible and to enhance socio-economic benefits. The environmental assessment concludes that in consideration of the environmental interactions and planned mitigation, the residual effects of the Project on the valued ecosystem component (VECs) of the biophysical environment will be not significant.

A comprehensive management and monitoring system has been developed to safeguard the commitments of the Project. Existing management practices will continue to be applied with the Phase 2 Proposal, and management plans will be updated if and as applicable to include the Phase 2 Proposal.

### **POSITIVE SOCIO-ECONOMIC IMPACTS**

Assessments of potential effects on the socio-economic environment have concluded that there will be positive effects on local employment and skills development and that revenue will accrue to the Government of Nunavut. The IIBA will ensure that benefits from the Project flow to nearby Inuit communities and the Qikiqtaaluk Region of Nunavut. A major Phase 2 Proposal benefit will be a growing territorial economy that will increase economic stability in Nunavut. Increasing the number of ongoing mining projects in Nunavut will help stabilize the territorial economy.

The road, railway, and port infrastructure built by the Phase 2 Proposal will provide opportunities to access further mineral deposits in the North Baffin region and could improve access for Inuit harvesting and tourism. The two ports will provide opportunities for additional commercial uses and the bathymetry information collected and assembled as a result of the Project and Phase 2 Proposal will provide important information for shipping lanes through Foxe Basin and to Milne Port.