Baffinland
Iron Mines Corporation

MARY RIVER PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT

VOLUME 4
HUMAN ENVIRONMENT

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

TABLE OF CONTENTS

PAGE

LIST OF TABLES

LIST OF FIGURES

APPENDICES

SECTION 1.0 - INTRODUCTION

1.1 SOCIO-ECONOMIC ZONE OF INFLUENCE AND STUDY AREA DETERMINATION

Several "Potentially Affected Communities" are expected to be ecosystematically or socio-economically influenced by the Project. They represent the communities "where Inuit land-use and occupancy (past, present and future) should be considered" as well as to "the extent to which traditional land-use and Inuit harvesting could potentially be affected by the Project" (NIRB, 2009).

In this context, Baffinland views the communities of Baffin Island in three tiers:

- Tier 1: Communities in the immediate vicinity of the Project, which have existing and historical socio-economic and/or ecosystemic ties to the Project area, and for which the Project has a direct effect on the traditional land-use of their residents: Pond Inlet, Arctic Bay, Igloolik, Hall Beach and Clyde River.
- Tier 2: Communities with a potential interest in the Project due to their location along the shipping lanes, and therefore have a biophysical tie to the Project: Cape Dorset and Kimmirut.
- Tier 3: The community of Iqaluit, which will be affected because of its commercial and institutional importance in Nunavut.

Public consultation initially focused on the Tier 1 communities and Iqaluit and more recently have focused on all Tier communities. Socio-economic studies have focused on Tier 1 communities and Iqaluit (the Tier 3 community) since these communities are expected to be most affected socio-economically. The ties of the individual communities to the Project are described in more detail below:

Tier 1 Communities - Hall Beach, Igloolik, Arctic Bay, Pond Inlet, Clyde River

Hall Beach 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 those of Igloolik despite their proximity, with a concentration of marine harvesting centred on the Hall Beach area. Some hunting occurs on Baffin Island intermixed with Igloolingmiut hunting, including in and around Rowley and Koch Islands and Steensby Inlet; thus, the Project shipping route through this area may have land-use and ecosystemic effects on the community.

Igloolik 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 use 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. They still hunt around Rowley and Koch Islands and even in Steensby Inlet; thus, the Project shipping route through this area may have land-use and ecosystemic effects on the community.

Arctic Bay is located on northern Baffin Island, some 280 km northwest of the Mary River site. Harvest and land-use patterns indicate that the effect on these current patterns is less than what it would have been historically. Arctic Bay residents may use the Milne Inlet, Eclipse Sound and Mary River areas for hunting on a sporadic or occasional basis, but other geographic areas are more important to this community's land-use.

Pond Inlet, approximately 160 km to the northeast of Mary River, is geographically the closest community to the Mary River mine site. Residents rely on hunting in the marine environment of Eclipse Sound and Milne

Inlet, as well as caribou hunting through the Mary River area; it has the closest land-use, historical and ecosystemic ties to the Mary River area.

Clyde River is located in northeastern Baffin Island some 415 km from the Project area. Historical land-use information and discussions with Elders from various communities suggest that the people of the 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; however, historical ties to the Mary River area have resulted in the inclusion of this community in the study area.

Tier 2 Communities - Cape Dorset and Kimmirut

The communities of Kimmirut and Cape Dorset are located on South Baffin Island (Tier 2). While Project ships pass near to the communities through Hudson Strait, recent harvest data for Cape Dorset and Kimmirut suggest that hunting activities are very concentrated along the coast but do not extend far into Hudson Strait because the ice is mainly first year ice in restricted motion; thus, harvesting activities are physically restricted to the near shore of the Strait because of dangerous ice conditions.

Tier 3 Community - Iqaluit

Iqaluit is geographically and ecosystemically well removed from the Project area, but is inherently tied to the Project in a socio-economic sense, because of the presence of government/regulatory agencies with whom the Project must interact and also the need to pass through Iqaluit to access other Nunavut communities from other parts of Canada. The size of the city and its developed commercial economy make Iqaluit a logical procurement centre and point-of-hire for the Project. It is conceivable that mine employees who were originally based in other Baffin communities may opt to move to Iqaluit for its amenities and relative lower cost of living.

In 2007, Baffinland established Baffinland Liaison Officer offices in the five Tier 1 communities in the North Baffin. Baffinland has continued to maintain these offices in two of the Tier 1 communities (Pond Inlet and Igloolik) to organize and facilitate its employment initiatives. In the fall of 2011, Baffinland hired a Senior Northern Affairs Manager in Iqaluit, and has recently filled and administration / liaison position. The intention is to hire three new Baffinland Liaison Officers in 2012 from Hall Beach, Arctic Bay, and Clyde River. The Tier 1 communities have had fly-in/fly-out service to the Mary River site to support the Bulk Sampling Program and the current exploration program.

Other communities in the Qikiqtani Region were also considered in terms of potential Project interactions, but baseline investigations did not identify any current or historic socio-economic or ecosystemic ties to the Project area. Additionally, each of these communities is at least 500 km from the Project area. Although Baffinland intends to focus on the five Tier 1 communities as its direct points-of-hire, qualified workers from other Inuit communities will also be welcomed as members of the Project workforce.

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

Regional Study Area and Local Study Area

The socio-economic study area encompasses the communities and regions of Nunavut that will be directly or indirectly affected by the Project (Figure 4-1.1). Three levels of interaction have been considered. First,

50000
300000
550000
800000
1050000
1300000
N
8500000
8250000
8000000
7750000
7500000
7250000
7000000

ᐃᒃᐱᐊᕐᓂᒃ
ARCTIC BAY
(285 Km)

ᑎᑎᒪᒍᓪᓗᒃ
POND INLET
(150 Km)

ᖃᐅᓚᐅᓪᓗᒃ
MILNE PORT

ᐅᓕᖕᓂᐅᔪᖅ
MINE SITE

ᑲᓗᖕᓂᐅᔪᖅ
CLYDE RIVER
(390 Km)

ᐃᒃᓚᐅᑲᓂᕐᓂᖅ ᐋᓕᒫᒃ
STEENSBY PORT

ᐃᒃᓚᓕᒃ
IGLOOLIK
(220 Km)

ᓴᓂᖅᓯᒃ
HALL BEACH
(290 Km)

ᑭᒡᓕᓚᐅᖅ
CAPE DORSET
(800 Km)

ᐃᖅᓚᐃᑦ
IQALUIT
(950 Km)

ᑭᓪᓕᕐᑦ
KIMMIRUT
(1025 Km)

BL_Vol4_GIS_001 Communities in the Vicinity of The Mary River Project Figure 4-1-1.mxd

LEGEND:

- ᓄᓇᓕᒃ COMMUNITY
- ᐅᓂᖕᓂᐅᔪᖅ MINE SITE
- ᐋᓕᐊᑎᒃ PORT SITE
- ᐅᒥᐊᓴᐃᑦ ᐊᖏᑎᓂᐊᖑᓪᓚᖅ - ᓯᓚᐅᕐᓇᑎᒍᑦ NOMINAL SHIPPING ROUTE - ICE BREAKERS
- ᐅᒥᐊᓴᐃᑦ ᐊᖏᑎᓂᐊᖑᓪᓚᖅ -ᐊᐅᓚᓐ NOMINAL SHIPPING ROUTE - OPEN WATER SHIPPING ONLY
- ᒪᓕᔪᓐ ᐊᖓᔪᖅ ᐅᓪᓗᑎᒃᓴᕐᓂᖅ MILNE INLET TOTE ROAD
- ᓄᓇᓕᐅᑎᑦᑕ ᐊᖏᑎᓂᐊᖑᓪᓚᖅ PROPOSED RAILWAY ALIGNMENT

NOTES:

1. ᐅᓂᖕᓂᐊᖑᓪᓚᐅᑦ ᓄᓇᕗᑦ 2009
1. BASE MAP: COPYRIGHT © 2009 ESRI. ALL RIGHTS RESERVED.

2. ᓄᓇᕗᑦ ᑎᑎᕐᒪᓂᖅ ᒪᓕᓕᒃ ᐱᓕ ᐊᓯᖏᓐ ᒪᓕᒐᕐ ᓴᓗ
2. COORDINATE GRID IS SHOWN IN UTM (NAD83) AND IS IN METRES.

BAFFINLAND IRON MINES CORPORATION

ᓄᓇᒋᑎᓂ ᐅᓂᖕᓂᐅᔪᖅᑐᑦ MARY RIVER PRJECT

ᓄᓇᕗᑦ ᓄᓇᒋᑐᒃᑎᒥᐅ ᖃᓄᐃᒪᖓᓂᒃᓴᑦ
COMMUNITIES IN THE VICINITY OF THE MARY RIVER PROJECT

Baffinland Iron Mines Corporation

REF NO. BL_Vol4_GIS_001

ᑎᑎᕋᐅᓕᕆᔨᒃᑲᓐᓂᖅ FIGURE 4-1.1

REV 0

the Project will have effects on the entire territory of Nunavut, the Regional Study Area (RSA), through its contributions to the revenues of government and Inuit organizations, as well as through the contracting opportunities it creates for business.

Other interactions between the Project and the socio-economic environment will take place on a more localized scale. In particular, employment at the Project will be the underlying interaction that leads to a wide range of socio-economic effects. This interaction will occur primarily at the level of the point-of-hire communities. These include the five Tier I North Baffin points-of-hire communities—Hall Beach, Igloolik, Arctic Bay, Pond Inlet and Clyde River—and the Tier 3 city of Iqaluit. Together, these communities comprise the Local Study Area (LSA) for the purpose of socio-economic impact assessment.

1.2 ISSUES SCOPING AND VSEC DETERMINATION

Socio-economic research was carried out in the communities to gather qualitative baseline data and to scope out the important issues and values perceived by residents of the LSA to be associated with the Project. The following approaches were used:

- Interviews with residents of the LSA workers and family members;
- Discussions with community representatives, key groups and individuals;
- Topic-specific and workshops in a number of communities;
- 'Kajjuqtikkut' - Arctic Bay working group meeting; and
- Meetings and interviews with government officials.

A more detailed description of the research activities carried out during the scoping phase can be found in Appendix 2B, "Summary of Community Based Research Undertaken for the Mary River Project in 2006 to 2010."

The issues, perspectives and concerns that arose from this community-based research were used in a content analysis process that allowed issues to emerge from the data. Some 2,550 comments, statements, or observations provided by more than 200 residents of the LSA were used as input into this scoping process. As the analysis proceeded, similar issues raised during different settings were "sorted" into the same issue or theme 'node.' These categories represented the things that people chose to talk about in response to the various research and consultation opportunities presented over the course of community-level research.

The themes raised during public consultation are presented in Table 2A-1.2 of Appendix 2A-1.

Analysis of the community research clearly identified the components of the socio-economic environment of value to residents of the study area. As these components correspond reasonably well with the NIRB set of valued socio-economic components, VSECs, a decision has been made to adopt the set of VSECs suggested by NIRB. A slight modification involved splitting "culture, resources and land-use" into three separate VSECs, to better support analysis of Project effects. The resulting VSEC list includes:

- 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

1.3 KEY INDICATORS

The community research was combined with NIRB scoping, a consideration of other relevant research, and with a consideration of the Project design details to determine the issues of particular importance that the socio-economic impact assessment should focus on. Expert experience and opinion played a role in this determination. Based on this process, a total of 15 Key Indicators were identified along with the Project effects considered to be of relevance to these indicators (see Table 4-1.1). These form the focus of the impact assessment.

Table 4-1.1 Key Indicators for Socio-economic Impact Assessment

VSEC	Key Indicator	Effects
Population demographics	Demographic stability	In-migration of workers from south for direct Project employment
		Out-migration from North Baffin
Education and training	Lifeskills	Improved lifeskills amongst young adults
	Education and Skills	Incentives related to school attendance and success
		Opportunities to gain skills
Livelihood and employment	Wage Employment	Creation of jobs in the LSA
		Employment of LSA residents
	Job progression and career advancement	New career paths
Economic development and self-reliance	Land	Increased pressure on the land
		Changes to land-based economy
	People	Increased opportunities for youth
		Education and training opportunities
		Increased wealth and well-being
	Community Economy	Increased wealth in community
		Rotational absence of residents
		Increased local business opportunities
	Territorial Economy	Expanded economic activity, flows, and opportunities
Human health and well-being	Well-being of children	Household income and food security
		Changes in parenting
		Overall effects on children
	Substance abuse	Transport of substances through Project site
		Affordability of substances
		Attitudes toward substances and addictions
	Community social stability	Absence from the community during work-rotation

Table 4-1.1 Key Indicators for Socio-economic Impact Assessment (Cont'd)

VSEC	Key Indicator	Effects
Community infrastructure and public services	Recruitment & retention of hamlet workers	Competition for skilled workers
		Labour force capacity
Contracting and business opportunities	Opportunities for business	Expanded market -business services to Project
		Expanded market-consumer goods and services
		Entrepreneurial capacity
Cultural Resources	Archaeological Sites	Disturbance or removal of archaeological sites
		Unauthorized removal of artifacts
		Potential loss of regionally significant archaeological sites through approved mitigation
Resources and Land Use	Inuit Harvesting of Wildlife	Caribou harvesting
		Marine mammal harvesting
		Fish harvesting
	Travel and Camps	Safe travel around Eclipse Sound and Pond Inlet
		Safe travel through Milne Port
		Emissions and noise disruption at camps
		Sensory disturbances and safety along Milne Inlet Tote Road
		Detour around Mine Site for safety and travel
		HTO Cabin closures at Mine Site and Steensby Port
		Difficulty and safety relating to railway crossing
		Detour around Steensby Port
Cultural well-being	(Subject of Note)	Pijitsirnjiq - serving and providing for…
		Pilnimmaksarniq - passing on of knowledge and skills
		Avatittinnik Kamattiarniq - environmental stewardship
Benefits, royalty, and taxation	Territorial own-source revenues	Payments of payroll and corporate taxes to territorial government
Governance and leadership	(Subject of Note)	IIBA Agreement with QIA
		Payments of taxes

1.4 SUBJECTS OF NOTE

In addition to the key indicators that are assessed, a number of additional issues were raised during the community research or during NIRB scoping that are addressed as “subjects of note.” These are areas that are not believed to interact with the Project in a way that will have any substantial effects on the VSECs, but are of adequate concern to merit consideration. A total of 41 subjects of note are considered (Table 4-1.2).

Table 4-1.2 Subjects of Note for Socio-economic Impact Assessment

VSEC	Subjects of Note
Population demographics	Migration for indirect jobs
	Increased mobility options
	Migration of Inuit into the North Baffin LSA
	Migration effects on Iqaluit
Education and training	Balancing school attendance with domestic responsibilities
	Strategic skills shortages in the Community
	Matching training to the lifestyle of the related jobs
Livelihood and employment	Traditional harvesting
	Employment of young adults
	Employment of women
	Employment of individuals from outside LSA points-of-hire
	"Boom", "bust" and closure effects
	Indirect job creation
Economic development and self-reliance	Traditional economic activities
	Impairment of "wilderness experience" of tourists
	Impact on commercial fisheries
	Temporary and final closure
Human health and well-being	Household income and money management
	Food Security
	Change in household composition
	Personal safety and security in community
	Human health
	Distribution of impacts and benefits within and between communities
Community infrastructure and public services	Synergy
	Project demand on infrastructure and services
	Local demand for improved infrastructure and services
	Investment in infrastructure and services
Contracting and Business Opportunities	Entrepreneurial capacity and support
	Local and regional business
	Labour force challenges
Resources and Land Use	Berry picking
	Mary River soapstone
	Traditional clothing
	Travel and camps in Cape Dorset and Kimmirut
	Lighting

Table 4-1.2 Subjects of Note for Socio-economic Impact Assessment (Cont'd)

VSEC	Subjects of Note
Resources and Land Use	Lancaster Sound National Marine Conservation Area
Cultural Well-being	[this VSEC is addressed as a subject of note]
Benefits, royalty, and taxation	Resource revenues to Inuit
	Support to Communities
	Government social expenditures and development partnerships
Government and leadership	[this VSEC is addressed as a subject of note]

1.5 VSEC ASSESSMENT OVERVIEW

Assessment of Project interactions with each VSEC is presented in Sections 2.0 through 13.0. For each VSEC, a brief summary of the relevant baseline context is presented, followed by an outline of the issues that arose from scoping activities. This scoping is the basis for identification of the key indicators and subjects of note.

The assessment of key indicators begins with a brief discussion of any methodological considerations specific to that indicator, followed by a presentation of the interactions, effects, and Project design and mitigation considerations. Residual effects are then considered to determine their potential to have significant effects on the key indicator. Each section finishes with an overall assessment of the impact of all Project interactions and residual effects on the VSEC.

A summary of impact statements is presented in Section 14.0. Section 15.0 provides a framework for socio-economic monitoring related to the Project. Section 16.0 provides an overall conclusion for the Volume. Section 17.0 identifies the lead authors for the various VSEC assessments, while Section 18.0 provides cited references. Definitions and abbreviations are presented in Section 19.0.

SECTION 2.0 - POPULATION DEMOGRAPHICS

This section addresses population mobility issues and associated living arrangements related to the Project. Dimensions of population health and household composition are addressed under the Human Health and Well-Being VSEC (Section 6.0).

2.1 BASELINE SUMMARY

The following section provides a brief summary of baseline data that is of relevance to the Population Demographics VSEC. Further detail is provided in the Socio-economic Baseline Report, Appendix 4A.

2.1.1 Baseline Conditions

Inuit and Non-Inuit Components of the Population

The population of the North Baffin region consists mostly of Inuit (94 %), with non-Inuit accounting for just 6 percent. In Iqaluit the balance between Inuit (60 %) and non-Inuit (40 %) is more even.

The age profiles for Inuit and non-Inuit are of particular interest in understanding the demographic make-up of the region. The distinction between Inuit and non-Inuit components of the population is most pronounced in North Baffin, where nearly all non-Inuit residents are of working age. In Iqaluit, non-Inuit make up a majority of residents aged 40 to 64 (58 %). Non-Inuit men make up 66 % of the male population of Iqaluit aged 40 to 64, and 53 % of the male population aged 25 to 39 years of age.

The picture suggests that non-Inuit residents move to North Baffin communities primarily to work and that relatively few are raising families or living out their retirement in these communities.

Sex Ratios

The ratio between males and females is an indicator that can provide useful insight into a population. Within the working-age population, for example, an imbalance could suggest that the local labour market is attracting more of one sex than the other.

Under baseline conditions the ratio of non-Inuit males to females is approximately even in the younger half of the working-age population. However in the older age categories (40 years and over) there are substantially more men (60 %), than women (40 %). The sex ratio among non-Inuit aged 40 to 64 years in North Baffin is roughly similar to that in Iqaluit (58 % male).

Amongst the Inuit population, more males than females are resident in North Baffin, across all age groups. The opposite picture is seen in Iqaluit, where females outnumber males.

Stability of Residency

The Inuit population of North Baffin communities was very stable over the five-year period leading up to the 2006 census. Only one in ten Inuit had re-located from another community during this period (see Appendix 4A, Table 6 and Figure 5). A similar picture of stability in the Inuit population can be seen during the period before 2001. Evidently the decentralization of territorial government jobs to Igloolik and Pond Inlet during this period did not lead to major relocation of Inuit workers from other communities, although some instances, no doubt, did occur.

This contrasts sharply with the non-Inuit population of North Baffin, where only one in three (35 %) of non-Inuit residents had been resident in the same community five years earlier. The level of instability of the non-Inuit population had been even slightly higher during the five years leading up to the previous census in

2001. At that time, only slightly more than one in four (27 %) non-Inuit residents had lived in the community five years before.

The residential stability of the Inuit population in Iqaluit is significantly less than that seen in the North Baffin. In the five years leading up to 2006, two in ten (20 %) Inuit moved to Iqaluit from another community, province or territory. This level of mobility declined from a rate of one in four (24 %) during the period before 2001.

Stability of the non-Inuit population is considerably higher in Iqaluit than it is in North Baffin, and appears to be trending in a direction of greater permanency. Before 2001, 41 % of this population had been resident in the capital for at least five years. By 2006, this stable population had increased to 50 %.

Net Migration into the Baffin Region

There are indications of an increasing net movement of Inuit from communities in the north to urban centres in the south. During the ten years between the 1996 and 2006 censuses, the Inuit population in regions outside the traditional Inuit lands, or "Inuit Nunaat," increased from 6,795 to 11,000 (62 %). In 2006, Inuit living outside the Inuit Nunaat accounted for 21.8 % of the 50,480 Inuit living in all regions of Canada. There are, however, few data on the specific flow of Inuit migrants from North Baffin and Iqaluit components of the RSA to the south. Nor have data been located to indicate flow back into Inuit Nunaat from southern locations.

As suggested by the analysis of the non-Inuit component of the LSA population, there has been tremendous movement between southern points of origin and Iqaluit and North Baffin, with nearly half the population changing over within five years. The majority of this group comes to pursue employment opportunities and, as indicated by the age profile, does not settle permanently in the region.

More detailed insight into migration can be drawn from tax-filer data. This analysis indicates that during the period from 1997 through 2002—leading up to division of Nunavut from the Northwest Territories, and for several years into the establishment of the territorial government—the net flow of people between the Baffin and other parts of Canada was mostly into the region. Since around 2002, this has reversed, with more people leaving the Baffin than moving into the region (see Appendix 4A, Table 7 and Figure 6). However, this net migration number is small, in the order of 150 individuals per year (less than 1 % of the total population).

Other regions of Nunavut as well as the Atlantic region of Canada have consistently seen more people leave for the Baffin region than they saw arrive from the Baffin. Since 1995-96, 548 more individuals moved to the Baffin region from Atlantic Canada than returned to that region. By contrast, the Baffin region provided a net contribution of 497 people to the population of Ontario during the same period, as well as 373 to the Northwest Territories (NWT) and 383 to western Canada.

Family Structure

Most Inuit across the LSA live with immediate family members. Amongst non-Inuit residents, a substantial number either live alone or with unrelated individuals. In the North Baffin, 94 % of Inuit live with immediate family members (i.e., in a "census family"). Only 3 % live either alone or with unrelated people, and the remaining 3 % live with relatives. Perhaps unexpectedly, this picture extends to Iqaluit as well. The picture for non-Inuit is rather different, with approximately three in four living with immediate family members, while most of the remainder either live alone — 14 % in Iqaluit and 21 % in North Baffin — or with unrelated people — 9 % for Iqaluit and 6 % for North Baffin.

The highest incidence of individuals living in situations where they are presumed to not have economic relationships with anyone else in their household is seen among non-Inuit over 25. Close to one-third of these individuals are living in non-economic family settings. While this sort of arrangement is fairly uncommon in the Inuit population, there is a small group of about one in ten Inuit in the 25-39 and 40+ age categories living in this type of setting in Iqaluit. In total, 140 non-Inuit males (110 females) and 55 Inuit males (40 females) age 25 to 39 years are living in non-economic families in Iqaluit.

This analysis does not lead to any specific conclusions related to social stability. It does, however, set a baseline for monitoring the structure of households. In particular, the data provide insight into the baseline level of "young single males" often associated with boom-and-bust resource developments.

Children in Single-Parent and Two-Parent Families

One in four children in Nunavut live with a single-parent, while the remaining three quarters live with two parents (Appendix 4A, Table 10). The incidence of children living in single-parent families in Iqaluit is similar to this territorial average at 26 %, while in North Baffin communities the rate ranges from 26 % in Hall Beach and Igloolik to 20 % in Arctic Bay, Pond Inlet and Clyde River. In comparison, approximately 22 % of Canadian children live in single-parent families, suggesting that the incidence in the LSA is in line with the national situation.

Language

The Inuktitut language is prevalent in North Baffin LSA communities (Appendix 4A, Table 11, Figure 8, and Figure 9). Nearly all Inuit residents of the North Baffin LSA learn this language as their mother tongue, and for nine in ten, Inuktitut is the language spoken most prevalently at home. A small portion of the population, ranging from 6 % in Hall Beach to 24 % in Igloolik, consists of unilingual Inuktitut speakers. Of importance, though, is the use of Inuktitut in the workplace environment. In North Baffin, nearly two in three Inuit work in settings where Inuktitut is the prevalent language. The lowest rate of use is in Hall Beach, (44 %), ranging to a high of 75 % in Clyde River and 72 % in Igloolik.

The linguistic picture in Iqaluit is dramatically different from that of North Baffin. In the capital, slightly more than one-fifth of the Inuit population did not learn Inuktitut as their mother tongue and fewer than half speak Inuktitut at home. Only 20 % of Inuit in Iqaluit speak Inuktitut in the workplace and only 3 % are unilingual Inuktitut speakers. It seems clear that while Inuktitut is healthy in North Baffin, it is under considerable threat in Iqaluit. Integration of Inuktitut language into Nunavut's public sector has been a goal of the Nunavut government. Results of language training of senior bureaucrats have been perceived, however, to have greatest value in demonstrating respect toward Inuit.

2.1.2 Expected Trends in the Absence of the Project

The following scenario sets out what is believed to be a reasonable expectation for future trends in key areas covered under the Population Demographics VSEC.

In the absence of the Project, the composition of the North Baffin population is expected to remain predominately Inuit. In Iqaluit the relative proportion of Inuit versus non-Inuit will depend on the success of the education system in providing students with the tools they need to successfully enter the labour market. Given the high proportion of Inuit in the student population, the potential for Iqaluit to increase the proportion of Inuit in the working aged population over time is high. However, if today's students do not become the skilled knowledge workers required by Iqaluit's major employers, the capital will continue to import labour from the south.

Net migration out of the LSA may also be expected to continue in the absence of the Project. It is unlikely that expansion of employment opportunities within the public sector will keep up with population increase. This may continue to drive migration toward regions of Canada where opportunities are available.

Future prospects for the Inuktitut language in the LSA appear to be good, for the near term at least. However, various pressures on the language exist, ranging from the increasing prevalence of English-based social media such as Bebo and Facebook to the use of English as the technical language in government.

2.2 ISSUES SCOPING

Several issues related to population demographics were identified during issues scoping activities. These relate to the potential for changes to occur in community and family composition as a result of Project-induced migration into and out of communities.

In-migration from the South

Some residents of the North Baffin LSA expressed concerns that the Project might lead to large numbers of outsiders moving into their communities. In-migration may have beneficial effects at the individual level, as migrants bring new skills and contribute to community life; however, regardless of the value of these individual contributions, if the level of in-migration is too high, adverse effects may be felt. These effects may be perceived by long-time residents as a feeling that they are no longer in control of how their community is evolving, and that the cultural and social norms they live by are being changed by outsiders.

Given the size of the North Baffin LSA communities, if even only a small proportion of the total Mary River workforce were to take up local residence, the concern was raised that this could have a significant effect on social cohesiveness, culture, housing and local infrastructure needs. This potential effect is considered in the assessment of the Project effects on demographic stability.

Future economic expansion generated by the Project may also lead to in-migration from the south to fill specialized jobs created in the public and private sectors. This will be highly dependent on decisions made by government and Inuit recipients of tax and royalty revenues flowing from the Project. It will be discussed as a subject of note.

Increase in "Non-family Person" Households due to In-Migration of Mine Workers

The potential that changes to household composition might occur as a result of workers moving into the region was raised. The conventional interpretation is that people living with family or relatives will have higher expectations to follow family social norms than those living alone or with unrelated peers. "Boom town" concerns frequently arise when large numbers of workers move into a community to live as "non-family persons" in socially unrestricted household configurations.

The concern as raised by community residents relates to in-migration of non-Inuit men. This issue is addressed as a subject of note that addresses the Project's effects on mobility more generally.

Out-migration from North Baffin

A second issue was concern that local residents might move away from North Baffin communities. The Project offers the opportunity to commute to work from several points-of-hire, so employees will be free to choose where they live. If many residents choose to relocate to Iqaluit or to a southern city, this may serve as a sort of "brain drain" out of the North Baffin LSA.

It was also noted that some Inuit have already relocated away from their home communities to take up employment in the territorial government. The following comment made by a resident of the North Baffin LSA suggests that some of these families may return once they have the option to live in the community and work at the Project:

> *"…A lot of people are unhappy with their [government] jobs, and when they see an opportunity where they can stay in their home community and commute [fly-in/fly-out] to work …it could affect an awful lot of positions."*

To some extent, therefore, out-migration from the North Baffin LSA may be balanced somewhat by a return of people who have moved to find employment in other parts of the territory. These potential effects are considered in the assessment of the Project effects on demographic stability.

Summary of Issues

Based on the issues identified during scoping activities the following key indicator is assessed:

- Demographic stability.

In addition four subjects of note are considered:

- Migration for indirect jobs;
- Increased mobility;
- Migration of Inuit into the North Baffin; and
- Migration effects on Iqaluit.

2.3 DEMOGRAPHIC STABILITY ("COMMUNITY FABRIC - DIMENSION I")

The stability of a community's demographic profile, particularly cultural composition, is assumed to be an important determinant of a community's "fabric." This indicator considers how the Project may affect the cultural dimension of LSA demographic profiles. The assessment question is:

- Will demographic changes brought about by the Project be large enough to affect the fabric of LSA communities?

2.3.1 Assessment Methodology

For the purpose of establishing the significance of Project interactions on demographic stability, the following effects are distinguished:

- In-migration on non-Inuit into the North Baffin LSA;
- In-migration of Inuit into the North Baffin LSA; and
- Out-migration of Inuit from the North Baffin LSA.

The focus of the assessment of Project effects on demographic stability is on the North Baffin LSA communities, which are considered to be the most sensitive to migration effects because of their small size and their predominantly Inuit composition. The effects of in-migration of non-Inuit and out-migration of Inuit are independent of each other, since the characteristics of one effect do not influence those of the other. Therefore they will be assessed as separate effects.

The following parameters are used to assess the magnitude of in-migration of non-Inuit workers:

Low	<5 % change in the non-Inuit baseline
Medium	5 % to <15 % of the non-Inuit baseline
High	15 %+ change in the non-Inuit baseline

The conceptual foundation for these levels is based on expert opinion related to the number of in-migrants that would be associated with perceived effects on the fabric of a predominantly Inuit community. At the proposed levels, in-migration of 5 % would be equivalent to four non-Inuit people settling into a community the size and composition of Pond Inlet or Igloolik. It is believed this level of migration would not lead to perceptions that the community demographic profile is changing. The "high" level of 15 % or more would represent in-migration of a dozen or more people settling into one of the larger North Baffin communities. This is felt to border on levels where perceptions of community change may reasonably begin to emerge.

Parameters for out-migration from the North Baffin LSA have been established based on the total, primarily Inuit, population:

Low	<1 % of population migrates away from community
Medium	1 % to <5 % of population migrates away
High	5 %+ of population migrates away

At these thresholds, a low magnitude out-migration effect would be equivalent to fewer than 15 individuals moving away from a community the size of Igloolik or Pond Inlet, or fewer than 8 people moving away from one of the smaller communities. While these people would be missed, it is not felt that residents would perceive a change in community fabric. Out-migration would be considered to be a "high" magnitude effect if 70 individuals from a larger community or 35 individuals from a smaller community moved away.

2.3.2 Potential Effects and Proposed Mitigation

The Project is expected to have the following effects that may interact with demographic stability:

- Migration of non-Inuit Project employees into the North Baffin LSA;
- Migration of non-Inuit into North Baffin for indirect jobs (discussed as a Subject of Note);
- Migration of Inuit into the North Baffin LSA (discussed as a Subject of Note); and
- Out-migration of Inuit from the North Baffin.

Migration of Non-Inuit Project Employees into the North Baffin LSA

The Project may directly lead to migration into Iqaluit and/or into the North Baffin LSA from the south. Some southern residents hired to work at the Project may opt to relocate to the LSA for personal reasons.

Some of this in-migration may involve a return to Nunavut by Nunavummiut who have moved south seeking education or employment. In other cases, southern residents might seek to pick up work in the LSA during their "off-rotation." Some instances may be expected where southern workers enter into relationships with local residents with the resulting couples choosing to reside in the LSA.

The Project is designed to avoid large flows of in-migration by providing transportation between the southern point-of-hire and the Project site. This measure, which is necessary in any case to supply adequate labour to the Project, is also expected to limit in-migration, as there will be no employment-related incentive for a southern-based employee to move to one of the direct-hire communities.

Out-Migration from the North Baffin

The fly-in/fly-out jobs created by the Project will give residents of the North Baffin and Iqaluit much greater choice of to work and residency than is currently available in these labour markets. At the level of individuals and families, simply having mobility options may be experienced as a positive effect, regardless of whether a decision to re-locate is made.

Migration of LSA residents away from their communities may lead to variable effects at the community level. If many residents choose to move out to either Iqaluit or to the south, this may lead to changes in community fabric. It may also, though, take pressure off the social sector—housing wait lists, for example, may be positively affected. For the purpose of this assessment, it is assumed that moderate magnitude/high frequency or high magnitude/intermittent frequency out-migration will be perceived as a negative effect, as conveyed during community research and issues scoping.

Decision-making related to migration can be complex and varied. Some individuals may value the ability to take on a job without having to leave their home community. Others may choose to relocate to Iqaluit or to the south, preferring a city lifestyle, or to gain higher level of services, access to higher education, or lower living costs. Pauktuutit (2007) has noted that some Inuit move south to:

> "…*pursue education and career opportunities. Still many other urban Inuit have fled their home communities to escape abuse, overcrowded housing, the legacy of residential schooling, and poor living conditions in the North. …Still others move to the south to access specialized healthcare and treatment options that are not available in their home community*."

The option to reside in high-service areas while working in remote locations is a characteristic of fly-in/fly-out work that has been documented elsewhere (Storey and Shrimpton, 1988; Northwest Alaska Native Association and Cominco, 1998). Conversely, as pointed out during community scoping activities, some who have moved away from North Baffin communities for work in other areas may choose to move back once they have an option to earn a good living there. This possibility is also noted by Storey and Shrimpton (1988).

The designation of North Baffin LSA communities as points-of-hire serves as mitigation to avoid out-migration for the purpose of gaining employment at the Project. Other measures that may influence out-migration relate to narrowing the gap in services between North Baffin and Iqaluit. This will be a function of government. The Project will lead to significantly increased government revenues (see Section 12.0, "Benefits, Royalty, and Taxation"), and some of this revenue might reasonably be expected to be used for this purpose.

2.3.3 Assessment of Residual Effects

The effects of Project induced changes to in-migration of non-Inuit and out-migration of Inuit on demographic stability are assessed separately.

Migration of Non-Inuit Project Employees into the North Baffin LSA

Ratings for the significance criteria for in-migration of non-Inuit are presented in Table 4-2.1. On an individual level, in-migration of southerners may have variable effects, but at the community level, high magnitude in-migration would be perceived as a negative experience.

The designation of a southern point-of-hire is considered an effective measure to mitigate any tendency to relocate to the LSA, except in limited cases of special personal circumstances. The level of in-migration of southern residents hired to work at the project is therefore expected to be of low magnitude and intermittent frequency in the North Baffin LSA. The duration of in-migration effects will be over the life of the Project. As most of these events are expected to be associated with the establishment of personal relationships, "reversibility" will be variable—in some instances the couple may remain in the community following Project termination; in other instances they may move once Project employment ceases.

Table 4-2.1 Population Demographics VSEC: Demographic Stability

Key Indicator: Demographic stability ("community fabric")		
Effect	**In-migration of Non-Inuit Project Workers into North Baffin**	**Out-migration of Inuit from North Baffin**
Design / Mitigation Measure(s)	Southern point-of-hire	North Baffin points-of-hire
Direction	Negative	Negative
Geographic Extent	Point-of-hire communities	Point-of-hire communities
Social Extent	Community	Community
Equity	Bystanders	Bystanders
Magnitude	Low	Moderate
Frequency	Intermittent	Intermittent
Duration	Long term	Long term
Reversibility	Reversible	Reversible
Significance of Adverse Residual Effects	Not significant	Not significant
Significance of Beneficial Residual Effects	No beneficial residual effects	No beneficial residual effects
Probability of effect occurring	High	High

Significance Determination

Some community concern has been expressed that if this effect were to occur at noticeable levels above the baseline, it would be perceived as a significant adverse effect. This concern is recognized; however, with a southern point-of-hire available, the residual effects of in-migration on population demographics are assessed to be not significant.

Out-Migration of Inuit Residents from the North Baffin

To assess the effect that improved mobility and residency options will have on out-migration, the following assumptions and observations are made:

- Workers who engage in the project on a part-time or irregular basis will be unlikely to relocate to other communities. For this group, access to work options while maintaining residency within their community is a significant benefit arising from the Project.
- For full-time workers, decisions about residency and migration will be influenced by the standard of living they enjoy in the smaller communities relative to what they could have in a larger centre.

- Perception of standard of living is subjective and influenced by many factors. Access to good housing and safe housing situations, perceptions of safety, access to recreation, child care, or quality schools may be all be important for some parts of the population or other. Cultural integrity—including the linguistic environment, access to extended families, ability to exercise traditional pursuits—along with strong social cohesion may also be important factors.

Ratings for the significance criteria for out-migration from the North Baffin LSA are presented in Table 4-2.1. A slow but long-term level of net out-migration from the North Baffin LSA beyond the baseline trend is anticipated over the course of the Project, as some individuals and families choose to relocate to larger centres such as Iqaluit or a southern destination. The rate of this out-migration may be moderated by the return of some individuals and families.

At a community level, out-migration from the North Baffin LSA may present both positive and negative effects on communities and on the extended families within these communities, depending on the patterns of this migration. However, if out-migration becomes substantial, community fabric may be affected and the overall effect will be perceived to be negative. Bystanders who are not directly involved with the Project would share in the negative outcomes.

The magnitude of out-migration from the North Baffin is expected to be of moderate magnitude, occurring at intermittent frequency throughout the life of the Project. While this will affect individuals and extended family members, it is not assessed to be high enough to affect community processes in a substantial manner.

The duration of these effects will vary. It is anticipated, however, that in many instances this will be long-term and potentially non-reversible as families establish roots in Iqaluit or in southern cities. While magnitude is anticipated to be only moderate, the probability that some out-migration will occur is considered to be high.

Significance Determination

The potential for out-migration to affect communities was recognized by some community members but was not raised as a critical concern. This assessment would seem to reflect the community expectation. Some out-migration should be anticipated; however, with the availability of local points-of-hire, the level is expected to be of moderate magnitude and intermittent frequency. Therefore the residual effects of out-migration from the North Baffin LSA on population demographics are assessed to be not significant.

2.3.4 Prediction Confidence and Risk Analysis

Migration of Non-Inuit Project Employees into the North Baffin LSA

Confidence in the prediction of non-significance is high, based on the understanding of local conditions, perceptions, and potential Project interactions with population demographics.

The largest risk would be termination of the southern point-of-hire. This is considered to be a highly unlikely scenario, since this point-of-hire will be needed to supply much of the Project's labour demand. A second risk would be implementation of northern cost-of-living adjustments adequate to incentivize southerners to move north. This risk is not considered to be substantial.

Out-Migration of Inuit Residents from the North Baffin

Confidence in the assessment is moderate. The complex factors that influence migration decisions, combined with relatively poor baseline data related to migration and the basis for migration decisions in the LSA, preclude a higher level of confidence in the determination.

Some of the factors that influence migration decisions may evolve over the course of the Project. The valuing of higher education, for example, may lead to higher motivation to move to Ottawa so children can attend specialized schools and post-secondary institutions.

Further, should service gaps between the smaller communities of the North Baffin LSA and Iqaluit expand beyond what currently exists under baseline conditions, the potential arises that frequency and magnitude of out-migration could increase to a point where community-level effects begin to be experienced.

2.3.5 Follow-up

Baffinland will participate in collaborative monitoring related to understanding regional migration patterns and their effects on communities, as outlined in Section 15.

2.4 SUBJECTS OF NOTE

Migration for Indirect Jobs

Some level of in-migration of individuals from the south to the RSA and to the LSA-including North Baffin may arise through the indirect and induced effects of the Project on the economy.

For example, some opportunities to do business with the Project may lead to hiring of employees into the LSA. Expansion of government programs in response to the increased revenues derived from the Project may also generate new job opportunities and some of these may be filled from outside the LSA. The Project will increase incomes within the direct-hire communities, which may increase demand for services. It is possible that southern-based persons could relocate to the direct-hire communities as increased business opportunities provide a growing economic base in the communities.

This migration will not be sensitive to Project design, policy or mitigation; rather, it will depend on the kinds of jobs created by the expenditure of tax revenues and royalty revenues paid by the Project to government and Inuit organizations, and on the nature of the developmental effects of Project-derived income earned by Nunavummiut working at the Project or by local businesses supplying the Project.

It is thought that this indirect effect may occur but it is expected to be limited to small numbers of individuals. It is difficult to quantify and is outside of the Company's ability to manage.

Increased Mobility Options

The Project will provide greater opportunities for residents of the LSA to move around within the region and between the LSA and the south. This will arise from the increase in wealth that employees will enjoy, providing an ability to pay for travel, and the potential to choose alternative fly-out destinations amongst the various available points-of-hire.

In addition, the Project will bring people together from different communities, leading to new opportunities for social interaction amongst Nunavummiut and between Nunavummiut and residents of other regions. This will be experienced as a positive effect by those directly involved. This opportunity for socialization was noted during research related to Nanisivik Mine (Brubacher & Associates, 2002):

> *"A lot of good came out of Nanisivik: Getting to know people. Realising that not only Inuit eat seal meat. A woman from Newfoundland once came by to ask if I had any seal - I had never realized other people ate seal. Then she told me that the flippers are really good - Inuit don't eat the flippers! Now I know people from Newfoundland [and] Ontario."*

Migration of Inuit into the North Baffin LSA

There is an acknowledged possibility that increasingly mobile Inuit may move into North Baffin LSA communities from other non-point of hire communities in order to work at the Project. If this were to occur in substantial numbers, it could become another source of in-migration for some communities. If it involved single workers moving together into housing units, in order to share the rent, it might lead to an increase in "non-family person" households. However, such movements into the small North Baffin LSA communities are expected to be infrequent, limited to individuals striking up "couple relationships" and perhaps including a few who have family ties to the particular community they choose to move to. It is expected that housing scarcity in the North Baffin will serve as a general constraint to this form of labour force mobility. Further, Baffinland's commitment to pay for transportation from non-point-of-hire communities (see HRMP, Volume 10, Appendix 10F-3), reduces the probability of this mobility becoming substantial.

It is thought non-the-less that this effect might occur. Some anecdotal evidence that Baker Lake has experienced in-migration following opening of the Meadowbank mine was suggested during a recent Kivalliq SEMC meeting, although no strong evidence was provided. Such an effect was not identified during monitoring studies carried out in Arctic Bay (Brubacher and Associates, 2002) or in the Kitikmeot (Brubacher Development Strategies, 2009). It is also not clear whether the effect, should it occur, would actually be positive or negative. Some in-migration of this type may, if it is actually occurring, be family members returning to their community of choice as livelihood opportunities emerge. This is an area where special monitoring studies related to migration and changing household structures might be called for should general monitoring surveillance identify early indications of an emerging issue of concern.

Migration Effects on Iqaluit

This section has been prepared to address potential demographic effects of the Project on the City of Iqaluit, in response to concerns raised during technical review of the DEIS.

In-migration of Mary River workers to Iqaluit from North Baffin

The Mary River Project may lead to several migration movements of relevance to Iqaluit. First, the Project will generate a number of direct jobs located in Iqaluit. While most of these are expected to be filled by individuals recruited locally, some of these may be filled by individuals recruited from outside the city.

Secondly, Iqaluit is the likely destination for individuals seeking employment at Mary River from other communities. As discussed in Section 2.3, some of these individuals may come from North Baffin communities. The assessment of this migration is, with "moderate confidence," that between 1 % and less than 5 % of the Inuit population would move away from these communities. This represents a total of between 50 and 252 individuals (including family members).

If three-quarters of these people chose to settle in Iqaluit (with the remaining one-quarter moving to a southern destination such as Ottawa), this would represent an in-migration of between 38 and 189 people moving into the city. If this movement took place over a five-year period, this would represent between 8 and 38 individuals per year moving to the capital. Iqaluit's estimated population as of 2009 was 6,832. The estimated in-migration from North Baffin communities therefore represents an increase of between 0.1 % and 0.5 % of the baseline population on an annual basis.

In-migration of Mary River workers to Iqaluit from non-point-of-hire communities

There is potential that some individuals from communities where transportation to the mine site is not provided by BIM will choose to relocate, rather than bearing the cost in time and/or money of travel from their home community to a transportation node.

The magnitude of this effect will depend on many factors, including the ability of the existing priority-hiring communities to supply the needed labour to the Project, the availability of un-employed skilled labour in non-point-of-hire communities, as well as the level of preference to migrate rather than maintaining residency and commuting to a transportation node. No attempt is made to estimate the magnitude of this possible effect, due to its multiple levels of uncertainty; however, it is reasonable to expect some such migration will occur.

In-migration of workers to respond to jobs created by Project-induced economic growth

The Mary River Project will also lead to substantial growth in Nunavut's economy, both through an expanded tax base as well as through substantial increases in revenues to Inuit organizations. This may reasonably be expected to lead to growth in the Iqaluit economy and in the number of jobs available there. As with previous economic expansion, it is reasonable to anticipate that some of these jobs will be filled by individuals recruited from outside the baseline population.

Impact of employment-related migration

All these effects will combine to lead to an increase in the population of employed residents of Iqaluit. This will have the normal consequences of economic growth-generated population increase—increased housing demand; expanded tax base; expanded service sector businesses; more vehicles; and so forth. This job-fuelled population growth is in contrast to increases propelled by natural (reproduction-led) growth or by in-migration to the urban centre from smaller communities by those seeking improved services or other desirable attributes.

This economic and demographic expansion will occur against a backdrop of substantial population and economic growth in the capital over the past decade. Iqaluit is a city that has been rapidly evolving in terms of size and economy. The Mary River project may be expected to support continued evolution in these areas.

Housing

The tight housing market that currently exists in Iqaluit, and across Nunavut for that matter, may lead to barriers to labour force mobility. Housing shortages in Iqaluit may, for example, hinder the ability of people to move to the capital in order to take on direct and indirect opportunities that are presented by the Project. The vacancy rate in non-social housing units has fallen to 0.4 % in 2010 from 0.6 % in 2009. New housing construction in Iqaluit has been strong, with some 160 new permits issued since 2006. Roughly 50 residential homes are sold each year at a median price of $369,000 in 2010 (CMHC 2011). However, the rental vacancy rate for individuals moving to Iqaluit is said to be essentially "nil." This is partly a consequence of a "landlord's market," in which demand is so strong that landlords are said to typically prefer to rent their units out to company or government clients, who then take on the responsibility to sublet units to the actual occupants. Some landlords are said to hold multiple units empty until they are able to rent them all at once to a company or government agency.[1]

[1] Personal communication with Terry Ma, CMHC Iqaluit, October 27, 2011.

In addition to serving as a barrier to labour mobility, this tight housing market also presents the prospect of increased overcrowding. Individuals who have family or friends in the capital who have an opportunity to move to Iqaluit in order to take on a job may seek to move in temporarily until they can find more suitable accommodation. These temporary situations may be expected to stretch out for extended periods given the tight housing market and landlord preferences to not rent to individuals. The Nunavut Housing Needs Survey carried out in 2009-2010 found that some 30 % of Iqaluit households housed one or more temporary residents who did not have a usual home elsewhere at some point during the 12 months prior to the survey. At the time of the survey, roughly 5 % of Iqalummiut did not have a usual home and were living temporarily in another person's dwelling (Nunavut Bureau of Statistics 2011).

CMHC Iqaluit notes there are too many variables to allow for confident predictions of the impact Mary River will have on housing demand in Iqaluit (or elsewhere in Nunavut for that matter). When they do begin to see a trend in housing, then they will try to raise awareness of the emerging issues among stakeholders in order to have a positive influence over housing stock.[2]

Baffinland is aware of Iqaluit's tight accommodations market. To address these challenges the following measures are planned:

- The Company will provide free air transportation for Inuit employees from the Baffin Region to and from Project sites. This may take the form of charter aircraft or commercial airfares where available, at the Company's sole discretion.
- Overnighting of employees from non-Point-of-Hire communities passing through Iqaluit or other locations will be avoided where possible; however this may be required during poor weather. When overnighting is required, BIM will work with local accommodation providers to adequately plan for accommodation in Iqaluit and other locations.
- When overnighting is required, BIM will work with local accommodation providers to adequately plan for accommodation in Iqaluit and other locations. This may be an opportunity for local business.

Effects of out-migration on Nunavut communities not in the LSA

The possibility that some residents from communities not in the North Baffin LSA may move away from their community to either Iqaluit or to a southern point-of-hire is recognised. Such movements would have similar effects as out-migration from North Baffin LSA communities, discussed earlier. It is not possible to anticipate in advance the likely magnitude of such effects for any particular community. It is considered more likely, however, that individuals are more likely to commute to a point-of-hire using regularly scheduled air service than to relocate solely for the purpose of employment. Scarce housing availability in Iqaluit may further limit mobility for the sake of job access.

Summary

The Mary River Project is expected to have some effects on the demographics of Iqaluit. The direct effect through Iqaluit-based Mary River job creation is expected to be small. Some in-migration from other communities is expected as individuals come to the city to benefit from its status as a transportation node to the Project, and to take on jobs that are induced by the Project.

The magnitude of these occurrences is difficult to predict. They will occur within a baseline where growth has been the norm for more than a decade. In the case of Project-generated growth, the economic benefits will provide the capacity to meet these growth demands. However, the extremely tight housing market —

[2] Personal communication with Terry Ma, CMHC Iqaluit, October 27, 2011.

especially rental housing available to individuals — is expected to generate barriers to labour mobility and may lead to increased crowding and associated social challenges.

2.5 IMPACT STATEMENT

The Project will have multiple residual effects on the Population Demographics VSEC for some of the communities in the North Baffin LSA and for the City of Iqaluit. These will affect individuals, families and communities and may include positive as well as negative directions. Baffinland recognizes the interest and concerns of some stakeholders related to these effects. The dynamic nature of human and community interactions make it difficult to predict the overall direction (positive or negative) and magnitude of such changes. Mitigation measures implemented by Baffinland aim to enhance positive residual effects.

Based on the best available understanding of the dynamics involved in these migration decisions, there is moderate confidence that negative residual effects will have no significant effect on Population Demographics.

Impact Statement for Key Indicator 1 - Demographic Stability

Residual effects arising from in-migration and out-migration are expected to arise due to the Project. At the anticipated levels, however, these effects are not expected to be sufficient to cause adverse effects on demographic stability of the affected communities. Therefore these residual effects are assessed to be not significant.

Potential for Cumulative Effects

The potential for negative residual effects related to migration to interact with other projects in cumulative ways is acknowledged. These residual effects have therefore been carried over for consideration in the cumulative effects assessment.

SECTION 3.0 - EDUCATION AND TRAINING

The Experience and Education VSEC considers the interactions between the Mary River Project and the life skills, education and training within the LSA. Potential effects on the performance of young children at school related to parental absence are addressed under the Human Health and Well-Being VSEC (Section 6.0). Mitigation efforts to improve the capacity of the labour force, including education and training initiatives to support job progression are referenced in the Livelihood and Employment VSEC (Section 4.0).

3.1 BASELINE SUMMARY

The following section provides a summary of baseline data that is of relevance to the Education and Training VSEC. Further detail and underlying data is provided in the Socio-economic Baseline Report, Appendix 4A.

3.1.1 Baseline Conditions

Early Childhood Education

Early childhood education (pre-school) opportunities are not widely available across the study area. Those that are might be available for only part of the day. Before-school and after-school programs, which are important for parents working during the day, are absent from nearly all LSA communities, except for Clyde River, where an after-school program was in place as of 2008.[3] The level of service in Iqaluit is better, with full-day and part-day preschool programs available as well as after-school programs.

Enrolment and Progression through School

From a population of 135 North Baffin students who started Grade 9 in 2003, just over half began Grade 12 in 2006. A similar progression rate can be seen for Iqaluit, while in South Baffin, three-quarters of the Grade 9 students make it to Grade 12.

However, the picture may be worse than these numbers suggest. Grade 10 is the point at which school drop-outs can re-enter to try again. In North Baffin, for example, an additional 75 students beyond the entry of the previous year's Grade 9 cohort enrolled into Grade 10. Starting from this class size of 210 students, by Grade 12 only 72 are enrolled, suggesting that 138 students dropped out along the way, with only one in three making it through to start Grade 12. Similar rates are seen in Iqaluit and in South Baffin. The bottom line is that dropout rates in the North Baffin LSA are very high.

During the years during which Baffinland engaged in advanced exploration and bulk sample activities, the Company provided laptop computers to high school graduates of the five North Baffin LSA communities as an incentive to succeed. This donation has continued, and a total of 198 computers were provided between 2007 and 2010.

Grade 12 Enrolment

The number of students starting Grade 12 in Nunavut increased from 336 to 399 (19 %) between 2003 and 2006. There is considerable regional variation in this trend.[4] However, most of this increase (60 students), has come from the Kivalliq. In the Baffin region, Iqaluit has shown a modest increasing trend, while enrolment in the North Baffin region declined over this period.

[3] Refer to Appendix 4A, Table 47.
[4] Refer to Appendix 4A, Table 49 and Figure 45.

Not all communities in the North Baffin region share the overall declining trend in Grade 12 enrolment. While enrolment in Clyde River, Arctic Bay, Igloolik, and Hall Beach has been trending down, Pond Inlet has seen a robust increase in its high school student population.

Grade 12 Graduation

The number of high school graduates has been increasing in Iqaluit and across North Baffin over the past 20 years. From 1992 to 1996, for example, 71 students in Iqaluit and 54 from North Baffin communities gained their Grade 12 diplomas. Between 2002 and 2006, 148 Iqaluit students and 182 North Baffin students completed Grade 12. In total, 390 North Baffin and 393 Iqaluit residents have graduated from high school since 1987.

The number of male students and female students graduating in Nunavut has generally been well balanced in Iqaluit and in North Baffin. In Iqaluit, 52 % of the graduates have been males and 48 % females, while the North Baffin ratio is 50:50. In contrast, South Baffin seems to produce more female than male graduates at a ratio of 58 to 42.

Post-secondary Qualifications and Training

While education levels are low across the study area, many residents of the RSA have enrolled for training and upgrading through the local college system and various specialized programs. Arctic College, which has Adult Learning Centres in every community, reports that between 1,200 and 1,350 Nunavummiut enrol in full-time programs at the college. This equates to roughly one-quarter of the population between 20 and 29 years of age, or one-fifth of the 20 to 34 group.

Because of the low rate of high school completion in North Baffin, a majority (62 %) of the population 25 to 64 years of age has earned no formal educational credentials. However, of those who have, only a small proportion (7 %), have settled with high school—most have gone on to other programs. As a result, nearly one-third of the North Baffin Inuit population between 25 and 64 have attained some post-secondary training qualification. In Iqaluit this proportion is similar.[5]

The focus of post-secondary training varies between Inuit males and females, but is fairly consistent across the RSA. Based on data collected during the 2006 census, Inuit men acquired post-secondary qualifications in areas that fall within the "Classification of Instructional Programs" categories of "architecture, engineering, and related technologies" and "personal, protective, and transportation services fields." In the context of Nunavut, the former category would be expected to include construction trades and mechanical/repair technology, while the latter category could encompass areas such as culinary services; corrections officer/services; peace officer/police; fire protection; heavy truck driver; commercial driver; heavy equipment operation; and commercial fishing.[6]

In pursuing post-secondary qualifications, Inuit women have focused more on the fields of business, management, and public administration, social and behavioural sciences and law, and education. Some men, particularly in Iqaluit, have pursued programs focused on business, management and public administration.[7]

[5] Refer to Appendix 4A, Table 52.
[6] Statistics Canada 2000: Classification of Instructional Programs. See Catalogue 12-590-XIE for a full list.
[7] Refer to Appendix 4A, Table 53 and Figure 47.

Literacy and Numeracy

Low baseline levels of literacy and numeracy present a major challenge to labour force development in the LSA and across Nunavut. In a report on adult learning in Nunavut, the largest group of adult learners in the territory are said to be at the lowest two levels of the four-level scale used in the International Adult Literacy and Skills Survey (Government of Nunavut and Nunavut Tungavik Incorporated, 2006). As a consequence:

"The largest group of adult learners in Nunavut needs programming that focuses on literacy, life skills, completion of high school or high school equivalency, adult basic education and personal empowerment."

Similar observations are made in the 2008 Nunavut Economic Outlook (Clinton and Vail, 2008):

> "*Low levels of adult literacy and numeracy create additional training challenges. The task of bringing individual math and literacy skills up to the needed level must be carried out as part of training programs. In the context of construction trades programs such as that being implemented under the Nunavut Housing Trust Delivery Strategy, this is typically done by incorporating pre-trades math and science into trades training programs. This challenge has been also noted previously, where low levels of literacy and numeracy across Nunavut's Inuit population are seen to raise challenges to training by adding an extra upgrading or access step to the training process*."

Infrastructure for Adult Education

The space available for education and training has been a challenge across Nunavut. However, progress has been made to expand the facilities. In a recent scan of the environment for adult education, the Nunavut Arctic College noted that "a large investment in infrastructure" was needed to respond to the demand for trades and resource technology training. This demand appears to have been partially met with the recent opening of the new trades training centre in Rankin Inlet in September 2010 (Nunavut Arctic College 2010).

A 2008 overview of the state of Arctic College community learning centres suggests that generally the adult learning infrastructure across the LSA is good (Nunavut Arctic College 2008). Hall Beach, Arctic Bay and Clyde River each have two classrooms, of which one (one of the two Hall Beach portables) was in poor condition. With the recent construction of a new learning centre in Pond Inlet, both Igloolik and Pond Inlet now each have four community learning centre classrooms that are in good condition.

The North Baffin LSA communities are said to generally have enough space to deliver programs, although this space does not always belong to the college. Generally speaking, Arctic College seats seem full much of the time, although space is often available in the summer time. Seats may also be vacant when the college is offering a course that has low enrolment.

A bigger challenge facing Nunavut Arctic College is said to be residential housing for students with families that travel to the larger communities of Iqaluit, Rankin Inlet, or Cambridge Bay to pursue their studies.[8]

3.1.2 Expected Trends in the Absence of the Project

Investment in early childhood education is dependent on government priorities. In the absence of the Project there are no obvious signals that would indicate a change to the status quo.

Progression through school to Grade 12 graduation has been trending down in the North Baffin and up in Iqaluit. Graduation rates are expected to be correlated over time with the value that people gain from their

[8] Personal Communication, NAC, Coordinator Policy & Planning, October 2011.

education. This value will relate to the relevance of education to the local economy. The presence of public sector jobs in North Baffin, particularly in Pond Inlet and Igloolik, combined with employment of local residents in some of these positions, may lead to a gradual increase in the "valuing" of education. However these positions have been present for nearly a decade and the graduation trend has been down, not up. There is no obvious major economic driver on the horizon in the absence of the Project that would lead to a substantial shift in the value of education.

Still, the potential for change to happen quickly has been suggested in comments emerging from the Kivalliq Region. A comment made during the Qanukkanniq consultations (North Sky Consulting Group, 2009) suggests that the transition toward post-secondary education pursuit can happen relatively quickly:

> *"We are doing quite well (post-secondary enrolment). The kids have decided to become part of a much bigger world. Five years ago nobody left here for school. Now we have an increasing rate of kids leaving to move on to post-secondary education (140 this year). Seems to be a revolution in the embracement of education; however, only 25 % of our kids have national average grades (Arviat)."*

Something along these lines may take place in Iqaluit before it occurs in North Baffin, as the breadth of the Iqaluit economy provides greater opportunity for education to generate tangible benefits to graduates.

The establishment of the trades school in Rankin Inlet may support a rise in the number of people entering apprenticeship programs; however, this may be constrained by the availability of journeyman trades people eligible to take on would-be apprentices. This may be a particular constraint for those who seek to pursue their apprenticeship program while living in their home community. The recent opportunities for apprentice positions generated by major investments by the Nunavut Housing Corporation in new social housing construction may be unlikely to be repeated in the near future.

3.2 ISSUES SCOPING

How the Education and Training VSEC is Valued

A well-educated and skilled population is essential to the achievement of Nunavut's development aspirations. The Nunavut Economic Development Strategy (NEDS) prepared by the Sivummut Economic Development Strategy Group (2003) notes that, "Economic and social development starts with people—our 'human capital.' Our society's level of literacy, education, skills and knowledge directly affects our ability to achieve our economic goals."

However, opportunities for gaining relevant training and experience are often limited within the small economies of the North Baffin communities. Again, the NEDS provides insight into this challenge:

> "*Young people need opportunities outside of school to engage in productive activities that promote life-skills, learning, develop self-esteem and confidence and engender leadership skills. Our youth want opportunities to gain work experience and to know the satisfaction of contributing to the well-being of their families and their communities. Young people also need opportunities to develop their abilities and interests and to acquire the skills needed to maintain a sustainable livelihood in the future. In many Nunavut communities, however, the programming and mentoring, volunteer opportunities, and entry-level jobs that can be used for this purpose are limited, so that many youth today do not have the chance to experiment and to learn about their options for productive economic roles. It is also important that our youth receive an early introduction to our economy and their potential roles in it. This introduction must take place in our schools*."

Access to opportunities to gain new skills, including relevant life skills and experience, is highly valued across the LSA. Hamlets and territorial agencies identify the need for more local trades people to replace the high cost of importing skilled workers from the south. Community development planners seek to identify the skill sets and training paths that will support achievement of sustainable development objectives. Successful completion of training programs is important in order to ensure a return on the time and money invested by trainees, business and government.

A major project like Mary River represents the prospect of introducing many opportunities for individuals—young and old, men and women—to develop abilities in areas of interest to them and to be able to apply these abilities in tangible and valued ways. New opportunities for gaining skills, experimenting with different kinds of work, and engaging in the wider economy will be highly valued by Nunavummiut.

The company also values effective education and training capacity in the region. For Baffinland, an experienced and educated population means that the prospects of accessing workforce from the local labour market will be greatly improved. The ability to hire locally has many benefits. The local population is familiar with the Arctic climate. Many individuals have close family ties in areas from Mary River all the way to Steensby Inlet. These ties may contribute to the development of a level of commitment and pride amongst the workforce that will benefit the Project. Hiring locally should help the Proponent to maintain good relationships with the affected communities, as well as helping the company to meet its corporate social responsibility goals and commitments related to generating tangible benefits for the local population.

The Value of Education in the LSA

For many individuals across the LSA—particularly in North Baffin— the link between education and work is relatively weak due to the very narrow range of job opportunities presented by the small local labour markets. The situation is somewhat less extreme in Iqaluit, where the larger economy produces a wider range of work options and an associated demand for skills ranging from entry level through high school diploma, general university degrees and specialized qualifications.

As a consequence, under baseline conditions in the North Baffin LSA, the tangible benefits of high school completion are low for many individuals. Jobs requiring a high school diploma are not available in the local economy. Local government jobs may be out of reach or already filled. Local retail businesses do not typically require high school diplomas for the categories of job typically available. An ability to work reliably is generally what managers seek.

Many higher skill-level positions available are for individuals with university degrees or specialized certification, particularly in Iqaluit, but also to a lesser degree in the communities of Pond Inlet and Igloolik, where government offices are located. However the path to achieving these positions entails high personal costs, including having to leave the community to pursue training in Iqaluit or in the south. Under the current social context many high school graduates have parental obligations, or duties for the care of other family members. The reward for success is also often tainted by the fact that resulting jobs may be available only in locations away from home and family. Risks of failure along the way are high, compounded by the cross-cultural challenges associated with learning in regions away from family and community support.

As a consequence, under realistic scenarios, the “opportunity cost” associated with having modest educational credentials is low for many residents of the North Baffin LSA. The result is that for individuals who do not experience formal school education as a “good” in itself there may be little sacrificed within a relevant planning horizon to dropping out of the school system.

Need For Improved Life skills

The notion of life skills was raised during community scoping. These are the skills that are required to make one's way in the world: self-discipline, self-reliance, healthy relationships, healthy choices, effective money management, and so forth. The issue of low levels of life skills was raised during community research, particularly in relation to youth.

> *"Employers need to understand that some people they hire won't have good life skills."*
>
> *"Life skills of youth today are more focused on Qalunaa Qaujimaajangit (southern knowledge), which is good, but the bad part is that they get confused with Inuit and Qalunaat Qaujimajangit."*

Good life skills are often associated with the ability to hold down a job and, as suggested during scoping research, getting a job is often seen as one path toward learning life skills.

> *"If the supervisors make sure the workers do the job right, it will help the workers to grow and to mature."*

The baseline situation, where life skills are felt to be a challenge for many youth, is complex. Some of the many factors that may be associated with life skills challenges include: on-going adjustments to cultural change; challenges to finding productive and meaningful livelihoods in either the wage economy or in the land-based economy; challenges related to physical or mental health, including addictions; unresolved issues arising from abuse; issues related to inadequate housing and living in low income situations.

For the purpose of the impact assessment, it will be assumed that a substantial proportion of the labour force will face life skills challenges. Anecdotal evidence gained from discussions with workers and supervisors during exploration and bulk sample activities supports the perspectives expressed during scoping activities.

Many residents of the LSA already face challenges to gaining productive livelihoods due to the high cost of traditional harvesting and limited opportunities in the local wage economy. A consequence of these life skills challenges is that even when opportunities arise, challenges may emerge as a barrier to success.

Access to Training and Apprenticeship Opportunities

Access to training opportunities can be a barrier to learning given the small population and associated need to limit the range of local programs. Individuals who seek to pursue education in areas where others are not interested in the same program are likely to need to travel to Iqaluit or to the south.

In the area of the trades, the apprenticeship system requires the apprentice to work under the guidance of a qualified journeyman who will certify the hours worked. The availability of these apprentice positions is limited by access to journeyman trades people at the local level who are willing to take on an apprentice. The recent investment in local social housing by the Nunavut Housing Corporation was specifically designed to include a trades capacity development component to build capacity in the construction trades. However, the availability of apprenticeship positions is considered to be a limiting factor to expansion of licensed trades people in the LSA. Baffinland's contribution to apprentice development opportunities is addressed later in this Section.

Concern That the Project May Encourage Youth to Drop Out of School

Some concerns are raised at the community level that access to entry-level jobs at the Project may provide an incentive for youth to quit school. This concern is typically based on a perspective that, while getting a job where some on-the-job training will be provided is good, getting the job without the broader foundation of high school degree may restrict career and learning options down the road.

Increased Care-Giving Responsibilities of Students

Community scoping activities identified inadequate access to child care as a challenge for some students seeking to complete high school, particularly where adequate child care space is not available at the local high school.

Students may also be called upon to look after children or other extended family members when the regular care-giver, often the student's parent, is unable to provide this care. This effect has also been suggested in research reported from northern Saskatchewan uranium mines (InterGroup Consultants, 2005):

> "*There was a general sense that things got easier for the parents as children got older. This could be linked to the fact that …many families begin to rely on older children to help fulfil household duties. One community member from Athabasca noted that this practice, in turn, has implications for the older child who essentially begins to assume a parental role at a fairly young age*."

3.3 LIFESKILLS

This indicator considers the effect the Project may have on the life skills of LSA residents, particularly youth. The assessment question is:

- "Will the Project lead to a noticeable change in the life skills of a substantial number of individuals?"

3.3.1 Assessment Methodology

A purely conceptual index is used that is based on the perceptions of community members and front-line workers. The assessment is based on expert opinion on effects that can be reasonably anticipated from a development such as the Project.

The following parameters for Project effects on life skills have been established as conceptual thresholds:

- Low, positive – life skills change may be perceived in some individuals, but this is isolated and does not change the overall dynamic of youth or of particular components of the young adult population;
- Moderate, positive – life skills change amongst young adults is noticeable by front-line workers such as Arctic College instructors, employers/supervisors, and other who work with youth; and
- High, positive – life skills change amongst young adults is noticeable by front-line workers, and are considered to be substantial.

3.3.2 Potential Effects and Proposed Mitigation

By providing employment in a demanding industrial work environment, the Project is expected to lead to improved life skills amongst many LSA residents, particularly youth. In the absence of any specific

mitigation, a portion of the workforce hired from the study area would be expected to gain some enhancement of their life skills, arising from conventional activities such as:

- General induction training;
- Job-specific training;
- Apprenticeship opportunities;
- Personal discipline and skills acquired through work experience; and
- No-drugs, no-alcohol policy.

There is an opportunity to further enhance the beneficial effects of Project employment on life skills through additional mitigation measures. These measures, addressed in the HRMP (Appendix 10F-3), include:

- Cross-cultural recognition and Inuktitut in the workplace;
- Work-readiness training;
- Employee and Family Assistance Program;
- Environmental and wildlife awareness; and
- On-going personal development orientation and training at site.

Baffinland's approach to hiring will generally recognize the developmental nature of the local labour force and provide a supportive environment for employees. Baffinland aims to create a workplace culture that respects, values, and promotes the steadily increasing involvement of Inuit in the Project. Baffinland will work to prepare the workplace to actively encourage Inuit to work at the mine, through culturally appropriate working conditions and cross-cultural training for both Inuit managers and workers and non-Inuit managers and workers.

Employee orientation training and the Employee and Family Assistance Program (EFAP) are expected to support lifeskills acquisition. The no-drugs, no-alcohol policy is an important measure to create a supportive environment for workers to build their life skills. In addition, Baffinland plans to contribute to a community support fund that will be administered by the QIA. The *Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat* (INPK) fund is described in the HRMP (Appendix 10F-3) and may include activities that will improve life skills. These measures will be monitored by the Joint Baffinland – QIA Executive and Management Committees, as described under the IIBA Governance discussion (Section 13.2, below). Their success should contribute to improvements in several key performance indicators, including "absenteeism," "turnover," and "reasons for termination."

3.3.3 Assessment of Residual Effects

The assessment of the Project's effects on life skills is focused on youth, to reflect the importance placed on this demographic group during community issues scoping.

Ratings for significance criteria for this effect are presented in Table 4-3.1. The residual effect of the Project on the acquisition of life skills is considered to be positive. This will be experienced primarily by young adults from point-of-hire communities who become engaged in the Project.

Table 4-3.1 Effects Assessment Summary: Life skills

Key Indicator: Life skills	
VSEC: Education and Training	
Effect	**Improved Life skills Amongst Young Adults**
Design / Mitigation Measure(s)	Job readiness training Supportive work environment Second chance" hiring policy No-drugs, no-alcohol policy
Direction	Positive
Geographic Extent	Point-of-hire communities
Social Extent	Young adults
Equity	Engaged individuals
Magnitude	Moderate
Frequency	Continuous
Duration	Long-term
Reversibility	Non-reversible
Significance of Adverse Residual Effects	No adverse residual effects
Significance of Beneficial Residual Effects	Significant
Probability of effect occurring	High

The magnitude of this effect will depend on how many youth with life skills challenges are able to engage with the Project long enough to benefit from Project effects on these skills. The magnitude is rated as "moderate" based on an expectation that a substantial number of young adults will participate in pre-employment programs and will work at the Project long enough to gain life skills. The effect is expected to be felt across the duration of the Project life, so the frequency is continuous, reflecting an expectation that these changes will take time to accomplish.

Once life skills are acquired they should last a lifetime. Therefore the effect is assessed to be non-reversible. Probability of occurrence is considered to be high.

Significance Determination

The beneficial effects of work at the Project for life skills of youth were noted frequently during community research. Community members clearly have a perception that the discipline of the workplace will have a significant benefit for many youth. Some requested that the Company provide the necessary support so that the youth may continue their employment despite early transitional challenges (such as absenteeism) so that they may learn to work effectively in a wage position for the long term.

This assessment conforms to the community expectation. The positive effect of supported access to industrial work on life skills of youth is assessed to be significant.

3.3.4 Prediction Confidence and Risk Analysis

Confidence in this assessment is moderate. The assessment is contingent on substantial numbers of youth with "life-skills challenges" gaining entry to job-readiness training and to the employment opportunities presented by the Project.

A risk also arises from the employer side. It may always be possible to use the selection process to hire only those who are able to demonstrate their readiness to work. It is reasonable to anticipate that on-going commitment to work will need to be nurtured by visible successes. A similar risk arises from the labour force side of the equation. If individuals do not see their peers benefiting, they may not seek to engage themselves. The outcome will depend on early, recognizable successes being achieved.

3.3.5 Follow-up

Outcomes of the various mitigation measures intended to support life skills and work readiness will be monitored through indicators such as absenteeism. This, combined with other sources of effectiveness monitoring will assist in on-going adaptation to these mitigation measures, as described in Section 15.5.

3.4 EDUCATION AND SKILLS

This indicator considers the effect the Project may have on the level of education and skills available in the local labour force. The assessment question is:

- "Will the Project substantially increase or decrease education and skill levels of residents of the LSA?"

3.4.1 Assessment Methodology

For the purpose of assessing the effect of the Project on education and skills, the following are assumed to be important factors that will affect levels of education and skills in the LSA:

- Value of education in the local job market;
- School attendance and graduation success; and
- Availability of training opportunities.

While "value of education" and "graduation success" are not entirely dependent on each other, they are sufficiently correlated to be considered together. To illustrate this, an increased variety of job opportunities for youth with high school diploma would be expected to increase the value of having an education and serve as an incentive to encourage others to also finish high school.

The availability of training opportunities is assessed separately. There is a connection between increasing value placed on education and on the demand for training opportunities. However, it is judged that a larger factor influencing these opportunities is the availability of funding and appropriate instruction facilities in local settings.

3.4.2 Potential Effects and Proposed Mitigation

Three potential effects arising from the Project are expected to influence the level of education and skills in the LSA population. These include:

- Changes to the value of education in the local job market;
- Changes to the incentives and disincentives related to dropping out of school; and
- Increased opportunities to gain skills brought about by Project-specific training initiatives.

Several important design and mitigation measures have been planned to further enhance the positive residual effects of the Project. These are described in the HRMP (Appendix 10F-3) and include the following:

- Creation of the INPK fund to support community initiatives;
- Hiring of two Inuit Employment and Training Coordinators, and two IIBA Coordinators with one of each of these positions on Baffinland's payroll and the second on QIA's payroll but funded by Baffinland;
- Collaboration with other agencies engaged in human capacity development;

- Maintenance of a human resources information system, and
- Retention of Inuit Elders at the work site.

Building Partnership Relationships to Support Human Resources Development

Baffinland has initiated training partnerships and has undertaken training activities during the years the company has been active in the LSA. The company is actively building these relationships in order to support on-going human capacity development in the LSA.

Progress-To-Date:

- Over the course of the Project definition phase, a total of $2.1 million of third-party training was delivered through approximately $1.7 million in funding provided by Baffinland. These training activities included emergency first aid/WHMIS to residents of the LSA; cultural awareness training delivered by QC to staff at Mary River; simulator heavy equipment (haul truck/dozer) training delivered to 20 candidates by NUNA Logistics; diamond drill program to 10 candidates from Igloolik delivered by Springdale Diamond Drilling; and heavy equipment operator training for 8 students from Pond Inlet.
- Baffinland participated in the establishment of the Qikiqtani Employment & Training Consortium (QETC) which was formed through an MOU between Baffinland Iron Mines Corporation, QIA, KA, and QC signed May 28th, 2008.
- Informal meetings with key stakeholders in education (GN officials, District Education Authorities, school teachers/principals, etc.), Doug Brubacher.
- Data-sharing relationship with Department of Education, 2006 through 2011.
- September 2008 MOU with Nunavut Arctic College and Department of Education and 2011 MOU regarding Baffinland support for an Environmental Technician training program in Pond Inlet.
- Collaboration in 2008 with Department of Education to identify labour force skills in North Baffin communities. Len Kutchaw, Doug Brubacher, and Baffinland CLOs.
- Informal information exchange meeting with officials from Education and NAC, October 19, 2011, Anne Pearce, Doug Brubacher.
- Informal information exchange meeting with Kakivak Association staff, October 18, 2011, Anne Pearce, Doug Brubacher.
- Conference call with NAC officials (Mike Shouldice, David Ittinuar, Cindy Cohen), November 10, 2011, and follow-up visits to NAC facilities in Clyde River and Pond Inlet, November 16 – 18, Anne Pearce, Doug Brubacher.
- Visit and information exchange with Jakob Gearheard, Director of Ilisaqsivik, and with Jonathon Palluk, Director of the Piqqusilirivvik Culture School in Clyde River, November 17, 2011, Anne Pearce, and Doug Brubacher.

In addition, the current Baffinland management team brings substantial expertise from other projects across Canada and around the world.

Effects on the Value of Education and Incentives to Stay in School

The Project is expected to influence the tangible value of education by introducing jobs to the local economy where those with higher levels of education and skill are rewarded. Many of these jobs, such as trades

positions, will require post-secondary education and training. Others, such as heavy equipment operator, will require functional literacy skills followed by specialized training. For safety reasons, all positions will have basic requirements related to literacy and other essential skills. Everyone working at the Project must be able to read warning signs and safety instructions.

Three characteristics of the Project's labour demand should be particularly important in influencing the value of education:

- Project positions will be available over a sufficiently long time-frame that it should be possible for youth to grow into them. Normal turnover associated with the industry should support on-going job vacancies across the spectrum of skill level requirements.
- There will be multiple career paths, whereby an individual can begin work and acquire the skills needed to advance through on-going training and promotion.
- The development and implementation of an Inuit Employment Strategy, actively supported by the two Inuit Employment and Training Coordinators, will assist in identifying skill requirements and appropriate training required for the Inuit workforce.

A consequence of the addition of these new work opportunities in an actively supported environment is that individuals may reasonably anticipate having positions to grow into as they expand their skills and their education.

This should increase the value of education to residents in the LSA, who will have the opportunity to pursue programs, certificates, and degrees that will lead to real jobs in the local economy. This increased value of having an education should serve as a positive incentive to finish high school.

However, this incentive to stay in school may be counteracted by the opportunity presented by the Project to earn comparatively good wages working in entry-level jobs. This may entice some to drop out of school to pursue work at the Project.

In the absence of mitigation, the outcome of these opposing incentives would be variable from individual to individual, influenced by many factors, only some of which relate to the Project itself. For example, characteristics of the school system, perception of the relevance of high school education to Inuit livelihoods, and family values related to schooling, will all influence the outcome. Recognizing this complexity the following points are noted:

- The Project's influence on increasing the relevance and value of education may serve as an incentive for some to complete school.
- The Project will, however, generate many jobs where a high school education is not immediately required, where opportunities to up-grade literacy and numeracy skills make it possible to succeed in equipment operator training or to pass trades entrance exams. The potential that some school-aged youth will choose a work-to-learn over a learn-in-class option is reasonably high.
- Some, perhaps many, Inuit youth may be more successful as on-the-job learners than they are in a classroom setting. Innovative partnerships between the Project and the school system to bring learning opportunities to these individuals may yield successful outcomes that might not otherwise be achievable.

- The active involvement of the Inuit Employment and Training Coordinators and on-site Elders, as well as the development of an Inuit Employment Strategy will provide support and direction to individuals who are facing decisions related to school versus work, reducing the frequency of poor decisions.

To enhance the positive effect of the Project on education, and to discourage students to drop out of school for work, the following design and mitigation measures are envisioned to support educational achievement:

- Minimum age (18 years) for employment;
- Individual career planning supported by dedicated human resources staff; and
- Visits to schools to talk to students.

Increased Opportunities to Gain Skills brought about by Project-Specific Training Initiatives

Baffinland has indicated it will work in partnership with Inuit organizations and government to implement training programs during the construction phase of the Project in order to prepare Inuit beneficiaries of the LSA for work at the at the Project.

As identified in the HRMP (Appendix 10F-3), Baffinland recognizes that training and education opportunities must begin well before the start of the construction and Operation Phases of the Project. Baffinland also recognizes that education and training will require cooperation of the Company, QIA, the GN, training institutions, and North Baffin communities. To this end, the HRMP (Appendix 10F-3) identifies a suite of initiatives designed to support capacity development of the LSA labour force.

- Baffinland will develop an overall human resources strategy that will include an Inuit Human Resources Strategy;
- Baffinland, the QIA, QC, and Kakivak Association signed an MOU in 2008 agreeing to develop and promote the delivery of mine-related training, training related to economic and community development, labour market research, curriculum development, career development, and other related activities for the benefit of Inuit in the LSA communities;
- Baffinland, the Nunavut Arctic College, and the Government of Nunavut (GN) Department of Education signed an MOU in 2008 to undertake activities designed to assist Inuit in communities associated with the Project to transition from high school through to employment;
- The Company will, in consultation with the QIA, establish training programs that include orientation, safety and skills training and will lead to certification. Potential training program categories include heavy equipment operator training, apprenticeship programs, technical and professional training through scholarships and work placements, business administration, and occupational health and hygiene. Baffinland will contribute to an education and training fund and will work with QIA to locate sources of funding from government sources;
- The Company will provide facilities on-site to support on-going training programs; and
- Baffinland's commitments regarding education and training of Inuit apply to the Company, its Contractors and all Subcontractors.

The training component of the Inuit Human Resources Strategy will include training programs for the construction and Operations Phase. To the extent possible exploration, construction, and other activities that take place before the start of commercial production will be used as opportunities to provide training and work experience before start of commercial operations in order to maximise the Inuit engagement in the

Project. A description of planned training is provided in Section 5.0 of the Project Description (Volume 3) and in Section 8.0 of the HRMP (Volume 10, Appendix 10F-3).

The following major training initiatives are planned:

- Adult education
- Work Ready / pre-employment
- Construction training program
- Operations training program

The training program will also include workplace induction, cultural awareness, apprenticeship positions, English Language and Inuktitut training, E-learning programs, management skills, and may also include educational initiatives such as career fairs, co-op education opportunities, and others.

Eligibility for Pre-Employment Training

Where possible, community members of the five North Baffin communities who are not employees of the Company its Contractors or Subcontractors will be allowed to enrol in training courses delivered in the communities.

3.4.3 Assessment of Residual Effects

The effect of the Project on two components considered to affect the level of education and skills of the LSA labour force are assessed: the effect on the incentives related to school attendance and graduation success, and the effect on the opportunities available to gain valued skills through training and educational upgrading.

Component Assessment: Incentives Related to School Attendance and Success

Assessment criteria ratings for determination of the significance of these effects are presented in Table 4-3.2. As discussed earlier, the Project is expected to influence the incentives for school attendance and success in positive as well as negative directions. The positive influence will be a structural change in the value of having an education in the LSA — a high school education will open doors to job opportunities and career pathways that are within reach of anyone able to thrive in a fly-in/fly-out work lifestyle. The negative influence will be the lure of access to entry-level jobs that may appear to provide good wages relative to other opportunities available in the local labour market.

The effect on the value of education is considered to be of greater importance than the potential that some individuals will drop out in order to work at the Project. With the planned design and mitigation measures in place, specifically entry-level essential educational skills and minimum age requirement, the direction of influence of the Project on incentives for school success is assessed to be positive.

This effect will be experienced in the point-of-hire communities and, as it is a structural effect at the level of the local labour market, it will affect the entire community; this is to say, the Project is expected to provide the spark needed to ignite a shift in the way that residents of the LSA communities value education. The magnitude of any negative effect on drop-out rates is considered to be low relative to the baseline, while the magnitude of the positive effect is expected to be high.

This positive effect on education will be continuous through the life of the Project. Further, since it represents a fundamental shift in the value placed on education, it is expected that the effect will continue after Project termination. The perceived value of education following the Project is expected to be higher

than it currently is under baseline conditions. This assessment is contingent on stated commitments by Baffinland to support employees hired from the LSA in succeeding in career advancement at the Project.

Table 4-3.2 Effects Assessment Summary: Education and Skills

Key Indicator: Education and Skills		
VSEC: Education and Training		
Effect	**Incentives Related to School Attendance and Success**	**Opportunities to Gain Skills**
Design / Mitigation Measure(s)	Minimum age of 18 for Project employment, career planning, priority hiring	Upgrading opportunities, summer experience, career counselling, training MOU
Direction	Variable, mostly positive	Positive
Geographic Extent	Point-of-hire communities	Point-of-hire communities
Social Extent	Community	Community
Equity	Bystanders	Bystanders
Magnitude	High	Moderate
Frequency	Continuous	Continuous then intermittent
Duration	Long term	Project life
Reversibility	Non-reversible	Spontaneous
Significance of Adverse Residual Effects	Not significant	No adverse residual effects
Significance of Beneficial Residual Effects	Significant	Significant
Probability of effect occurring	High	High

Determination of the Significance of the Project on this Component

With planned mitigation in place, the negative effects on education and skills that may arise from incentives to drop out of school to work at the Project are assessed to be not significant relative to the baseline. The positive effects on education and skills arising from the Project's influence on the overall value of education are assessed to be significant relative to the baseline.

Component Assessment: Opportunities to Gain Skills

Assessment criteria ratings for determination of the significance of these effects are presented in Table 4-3.2. The effect of the opportunities to gain education and skills will be experienced primarily in the point-of-hire communities, although some individuals from outside the LSA may also benefit from these opportunities. As planned, opportunities for residents not directly involved in the Project to participate in training may become available, as space permits. Therefore the social extent of this effect is considered to be the community level.

Some training opportunities are already available through programs offered through Nunavut Arctic College. Therefore the magnitude of additional training opportunities is expected to be moderate, relative to the baseline. During the early years of the Project, it is expected that training opportunities will be continuous, as major efforts are made to enhance the capacity of the LSA labour force. As this capacity improves over

the course of the Project, training is expected to become more focused and the frequency is expected to be intermittent. These opportunities will continue over the life of the Project, and the skills acquired will be durable over the long term. At Project completion, the increase in opportunities for training and skills acquisition may spontaneously revert to baseline conditions.

Determination of the Significance of the Project on this Component

With planned mitigation in place, the positive effect on education and skills that may arise from the increased opportunities for training and skills acquisition presented by the Project is assessed to be significant relative to the baseline.

Determination of the Overall Significance of the Project on Education and Skills

The overall effect of the Project on the level of education and skills of the local population is expected to be positive. This effect is expected to come about through fundamental changes to the tangible value of having an education, as well as through the introduction of new opportunities to gain training in a broad range of subject areas, all of which will relate to tangible job opportunities.

The extent of these positive effects will focus primarily on the point-of-hire communities and will be experienced by the entire community.

As the perception of the value of education changes at the family level, it is expected that effects on school attendance will begin to change. Therefore the magnitude of the overall effect on education and skills is expected to be high and these effects will be expressed continuously over the long term. Even when Project-related training opportunities end, the value of skills and training will continue and this may be expected to also affect future opportunities for training.

The Project will have a significant beneficial effect on education and skills across the LSA.

Generally, community comments indicate a perception that a significant beneficial effect will result. This is moderated somewhat by concerns that school dropout levels may rise in some cases. This latter effect is acknowledged; however, it is not considered to be of concern, given planned mitigation and the overall benefits that will arise from the increase in value of education. With the Project in place, the “opportunity cost” of dropping out of school will increase substantially over the baseline conditions, since individuals will have something to lose by not completing high school.

3.4.4 Prediction Confidence and Risk Analysis

Confidence in the assessment of a significant increase in education and skills is high.

A risk to the assessment arises from the uncertainty around the level of success local residents will have in engaging in fly-in/fly-out work over extended periods of time and in achieving the advancement toward high-level jobs that increased education and skills will allow. If advancement does not take place, then the increased value of education will not be realized. This could have the effect of making a drop-out-of-school-to-work strategy the more economically beneficial option.

3.4.5 Follow-up

As outlined in Section 13, Baffinland performance monitoring will include indicators related to Inuit employment by representative occupational groups. Changes in this indicator may provide insight into the contribution of the Project to developing labour force capacity. Collaborative monitoring related to

understanding success and incentives related to education and skills may be initiated by other stakeholders with Baffinland participation.

3.5 SUBJECTS OF NOTE

Three subjects of note are discussed:

- Balancing school attendance with domestic responsibilities;
- Strategic skills shortages in the community; and
- Matching training to the lifestyle of the related jobs.

Balancing School Attendance with Domestic Responsibilities

Under baseline conditions, domestic responsibilities are said to present a barrier to regular school attendance for some high-school aged youth. These responsibilities include parental responsibilities such as child care, as well as care for other family members. The effect of these responsibilities on school outcomes can be compounded by limited access to adequate service alternatives such as day-care options.

To the extent the Project recruits workers from the LSA who have shared in care-giving responsibilities, their absence during the work rotation may lead to increased responsibilities for those who remain at home. For some, this may serve as a barrier to school attendance. The frequency of these situations is expected to be low and therefore the issue is not further assessed.

Measures to support family services may be initiated through the INPK fund that will be managed by the QIA and that is intended to provide community support and capacity building, as described in the HRMP (Volume 10, Appendix 10F-3).

Strategic Skills Shortages in the Community

Communities in the LSA face challenges related to the absence of important skills in their local labour force. This can serve as a barrier to the achievement of community development objectives. Concerns are sometimes expressed that such a large project might tend to allocate training facilities, along with eligible trainees into a small number of skills areas. This could lead to a surplus of skills in some areas and an absence in other areas. Baffinland will cooperate with municipalities to identify areas of alignment between the labour force skill sets needed by communities and similar skills demanded by the Project. Individuals and students can be made aware of employment and training opportunities offered by the Company in these areas. Over time, this will lead to enhanced access to these strategic skills sets in the region.

The range of positions that Baffinland anticipates to generate should provide many opportunities for skills development that meets the interests and capacities of local residents, while also being of strategic importance to LSA labour force development. The following table, extracted from Volume 3 Section 5 provides insight into the diversity of job classifications that a large mining project such as the Mary River Project may typically generate. The table includes an estimation of the typical skill level eligibility requirements associated with these jobs. This table is intended to be indicative of the areas of work where individuals having different levels of education, skills and qualification can expect to engage with the Project. These areas will be refined during engineering, procurement and during operational preparedness.

Table 4-3.3 Diversity of Job Classifications at a "Typical" Operating Iron Mine Project

Area	Sub-Area	Job Classifications	Skill Level B+ (University, Journeyman Trades, Managers)	Skill Level C (Secondary school and/or occupation-specific training)	Skill Level D (Labourers, helpers, on-the-job training)
			(estimated percentage of positions)		
Site Services, Logistics	Medical Clinic & Emergency Response	Nurse, Paramedic, EMT, Firefighter	30 %	50 %	20 %
	Travel & Accommodations	Hotel Management, Logistics	30 %	50 %	20 %
	Catering & Housekeeping	Chef, Cook, Baker, Hotel/Restaurant Management	30 %	20 %	50 %
	Site Services Operators	Heavy Equipment Operator, Water Treatment Plant, Sewage Treatment Plant	20 %	40 %	40 %
	Security	Security Guard	20 %	30 %	50 %
	Procurement & Warehousing	Procurement, Warehousing, logistics, Buyers	20 %	40 %	40 %
	Power Plant Operation	Power Engineer	70 %	20 %	10 %
	Supervision & Management	Supervisors, Managers, Administrative Assistants	40 %	40 %	20 %
	Sewage & Water Treatment Operator	Water, Wastewater, Solid Waste Management - Water Testing	30 %	30 %	40 %
Mine	Geology	Mine planners, geologists	40 %	40 %	20 %
	Supervision & Management	Supervisors, Managers, Administrative Assistants, Dispatch Operators	40 %	40 %	20 %
	Laboratory	Chemist, Sample Prep Technician, Geological Technician	20 %	20 %	60 %
	Blasting	Explosives Plant, Blaster, Blaster Helper	20 %	30 %	50 %
	Engineering	Mining/Civil Engineer, Surveyor, CADD Operator, Document Control	40 %	40 %	20 %

Table 4-3.3 Diversity of Job Classifications at a "Typical" Operating Iron Mine Project (Cont'd)

Area	Sub-Area	Job Classifications	Skill Level B+ (University, Journeyman Trades, Managers)	Skill Level C (Secondary school and/or occupation-specific training)	Skill Level D (Labourers, helpers, on-the-job training)
			(estimated percentage of positions)		
Mine (Cont'd)	Heavy Equipment Operator	Drill, Excavator, Haul Truck, Dozer, Grader, Front End Loader, Shovel, Mine Helper	20 %	30 %	50 %
	Crushing, Screening	Crusher Plant Operator, Process Helper	20 %	30 %	50 %
	Stockpile Management	Dozer, Front End Loader	10 %	40 %	50 %
Rail & Port Operations	Track Maintenance	Trackmen, Welder, Maintenance of Way Operator	10 %	60 %	30 %
	Train Operations	Locomotive Operator, Dispatch Operators	30 %	60 %	10 %
	Supervision & Management	Supervisors, Managers, Administrative Assistants	40 %	40 %	20 %
	Port Operations	Shiploader Operator, Tertiary Crushing Plant Operator, Screening Plant Operator	20 %	30 %	50 %
	Stockpile Management	Dozer, Front End Loader, Port Helper	10 %	20 %	70 %
Maintenance	Fixed Plant Equipment	Electricians, Millwrights, Carpenters, Instrumentation, Welders, Apprentices	70 %	20 %	10 %
	Mobile Equipment	Heavy Duty Mechanics, Automotive Mechanics, Locomotive Mechanics, Welders, Apprentices	70 %	20 %	10 %
	Supervision & Management	Supervisors, Managers, Administrative Assistants, Maintenance Planners	40 %	40 %	20 %
	General Maintenance	Fuel/Lube Truck Operators, Maintenance Assistants	10 %	20 %	70 %
Support Services	Finance & Information Technology	Accountants, Accounting Technicians, IT Technicians	50 %	30 %	20 %

Table 4-3.3 Diversity of Job Classifications at a "Typical" Operating Iron Mine Project (Cont'd)

Area	Sub-Area	Job Classifications	Skill Level B+ (University, Journeyman Trades, Managers)	Skill Level C (Secondary school and/or occupation-specific training)	Skill Level D (Labourers, helpers, on-the-job training)
			(estimated percentage of positions)		
Support Services (Cont'd)	Human Resources & Training	Human Resources, Payroll, IIBA Coordinators, Elders, Trainers, Recruitment, HR Analysts.	40 %	30 %	30 %
	Environment, Health, Safety & Sustainability	Liaison Officers, Environmental Technicians, Safety Officers	20 %	40 %	40 %
	Exploration	Geologists, Geophysicists, Geological Technicians, Drillers	30 %	30 %	40 %

Source: Baffinland, 2011. These are examples of some of the positions that are typical for an open pit iron mine operation. Note that not all these positions are "in-house." Some may be contract positions.

Matching Training to the Lifestyle of the Related Jobs

A challenge for some individuals will be the fly-in/fly-out, residential camp nature of these jobs. Good jobs that would otherwise be available to reward those who achieve educational success may be out of reach if the fly-in/fly-out lifestyle is not a viable option.

Thus it will be important for individuals to match their educational focus to the lifestyles likely to be associated with the kinds of jobs available; otherwise the investment made in their education will have little value and their investment in "human capital" may not provide the intended reward. For students to spend several years pursuing an environmental services program, for example, only to discover they do not like the fly-in/fly-out lifestyle could mean a waste of these years of learning.

Summer student placements can provide youth 18 years of age or older with a taste of fly-in/fly-out camp life early in their career planning, before they invest too much time and resources. Company involvement in career fairs and other public information campaigns may improve knowledge of the range of job and career choices available through the Project. In addition, research into the "attributes and characteristics" of individual success in fly-in/fly-out employment may be of value in career counselling.

3.6 IMPACT STATEMENT

The assessment of the Project's residual effects on life skills and on education and skills, combined with a consideration of the subjects of note, leads to a conclusion that the Project will have a significant positive effect on education and training. This effect is expected to be confined to the LSA and should have sustained benefits beyond the termination of the Project. Given the mitigation measures that have been committed to, as described in the HRMP (Appendix 10F-3), confidence in this assessment is high.

Impact Statement for Key Indicator 1 – Life skills

Positive residual effects on life skills amongst young adults are anticipated to arise from the Project through access to industrial work supported by pre-employment preparation and on-the-job training.

Impact Statement for Key Indicator 2 - Education and Skills

The Project will have significant beneficial residual effects on education and skills across the LSA. Some potential that individuals may drop out of school or forego further education in order to work at the Project is recognized. However, the overall effect of the Project will be to increase the value of education and thereby the "opportunity cost" of dropping out of school.

Potential for Cumulative Effects

No negative effects are assessed to arise from the Project in relation to the Education and Training VSEC and therefore no cumulative effects are expected.

SECTION 4.0 - LIVELIHOOD AND EMPLOYMENT

The Livelihood and Employment VSEC addresses the creation of new job opportunities, as well as the recruitment of people into these new jobs. Issues of worker recruitment, turnover, retention and career advancement are also addressed.

Assessment of the effects of income earned from the Project, as well as the barriers and incentives to healthy financial management, will be addressed under the Human Health and Well-Being VSEC (Section 6.0). Consideration of the effects of competition for workers between the Project and existing employers is addressed under the Community Infrastructure and Public Services and under the Contracting and Business Opportunities VSECs (Sections 7.0 and 8.0, respectively).

4.1 BASELINE SUMMARY

The following section provides a summary of baseline data that is of relevance to the Livelihood and Employment VSEC. Further detail and underlying data are provided in the Socio-economic Baseline Report, Appendix 4A, and, in relation to indirect job creation, in Appendix 4B.

4.1.1 Baseline Conditions

Importance of the Land-based Economy to North Baffin Livelihoods

The land-based economy is a major component of the livelihoods of many residents of the LSA, particularly in North Baffin, where the land-based economy generates productive, but unpaid, work equivalent to 356 full-time jobs, or approximately one-third of the labour demand from the formal wage economy in the region. This amount of work roughly translates to 600,000 hours of labour.

The harvest effort is estimated to yield approximately 830,000 kilograms of food. The cost to purchase an equivalent amount of imported foods through local retailers is estimated at $12 million. This is the in-kind value to households of harvest activity in the land-based economy. Since retail foods are subsidized through the food mail (and now through the Nutrition North) program, the “economic value” of the land based harvest should take this into account. This leads to a total economic value of the land-based harvest of approximately $20 million.

Demand for Labour in the LSA Wage Economy

The amount of work generated by the wage economies of the study area amounts to the equivalent of 3,700 to 3,900 full-time, year-round jobs, of which 1,100 are located in North Baffin and 2,600 to 2,800 in Iqaluit.[9] This equates to approximately 2 million hours and 4.7 million hours of work respectively.

The number of jobs occupied by women has generally increased at a greater pace than those occupied by men. In North Baffin, the growth in demand for male labour has not kept pace with the growth of the Inuit male population. In Iqaluit, male-occupied job growth and Inuit male population growth rates appear to be increasing at similar rates. The jobs occupied by women are more narrowly concentrated in public sector industries. While these sectors might be fairly stable in terms of boom and bust cycles, they are less likely to experience dramatic growth, suggesting that women coming into the labour market may need to find work in sectors not traditionally filled by women.

[9] Refer to Section 4 of Appendix 4A for details related to the LSA labour market.

Approximately 18 % of occupations in North Baffin and 21 % in the Iqaluit labour markets require a university education. One-quarter to one-third of occupations in the study area 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.

Supply of Labour to the LSA Wage Economy

A total of 2,255 North Baffin residents worked to "fill" 1,100 North Baffin jobs, a rate of 2.0 workers per "job." In Iqaluit, 3,665 individuals worked to "fill" the 2,600 to 2,800 "jobs" in that labour market, a rate of 1.3 to 1.4 workers per "job." Looked at from another angle, wage-earners in North Baffin deliver some 1.7 to 2.0 million hours fewer than they would if they were all working full-time, full-year, and in Iqaluit they deliver 3.0 million hours fewer.

Demand among residents for wage employment in the study area is very high, even when it requires working in remote locations away from the community. For example, one in five working-age residents in North Baffin, and one in six in Iqaluit, applied for work with Qikiqtaaluk Logistics (QL) at some point between 2007 and 2009.

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 income. The picture of Inuit employment in Iqaluit suggests a blend of work patterns, with many individuals earning a small income and many earning full-time wages. 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. The highest rate of short-term employment among full time workers is seen among the younger North Baffin male workforce. Women who work full-time jobs in North Baffin are more likely to work year-round than are men.

Supply of Labour during Exploration and Bulk Sample Activities

A total of 1.3 million hours of fly-in/fly-out labour was delivered to exploration and bulk sample activities by 776 workers from across Canada over three years. Of this labour, 400,000 hours were provided by 265 North Baffin residents, and 212 residents, of Iqaluit. Women accounted for 11 % of the total number of people involved at the Project. During peak activity in 2008, 800,000 hours were worked at the Project, of which 200,000 hours were provided by residents of the LSA.

Approximately four in six workers hired from North Baffin worked for at least three rotations of two weeks in followed by two weeks home ("two in/ two-out"). A substantial number of those hired (one in five), did not complete one full 14-day rotation. Among workers hired from Iqaluit, one in eight did not complete one full rotation.

Exploration and bulk sample activities did not "tap out" the labour force of the study area. Both the North Baffin and Iqaluit labour forces were able to continue supplying new workers throughout the three years for which data were analyzed.

Sources of Income

In addition to the $12 million in-kind income generated for North Baffin households through harvest activities, residents of the LSA gain monetary income through employment and various social transfers. In 2007 the personal income reported by residents of the five North Baffin LSA communities and Iqaluit amounted to $83 million and $196 million respectively.

Personal income in North Baffin is comprised primarily of income earned from labour activities and government transfers. Among the resident Inuit population, earned income accounts for between 70 % (Clyde River) and 81 % (Pond Inlet) of total income. Most of the remaining income, ranging from 17 % (Pond Inlet) to 27 % (Clyde River) is derived from government transfers. Other income, such as investment income, accounts for less than 3 % of total income. In Iqaluit, the role of government transfers is much lower than in North Baffin LSA communities, accounting for only 8 % of the total income of the Inuit population of the city.

4.1.2 Expected Trends in the Absence of the Project

Participation in the Land-based Economy

Active participation in harvesting is expected to continue over the coming decades. However concerns are frequently raised by elders and hunters that transfer of knowledge related to travel on land and particularly on sea ice is not adequate. The new Piqqusilirivvik culture school in Clyde River, with satellite campuses in Igloolik and Baker Lake, may help to maintain this knowledge.

It is also widely recognized that, for the land-based economy to thrive into the next generation, people need adequate income to purchase snow machines and other essential equipment and supplies. Currently the level of subsidy for country food production does not support the costs of harvesting, nor is social assistance adequate to allow recipients to engage in this sector without additional support.

There are multiple factors that influence trends in harvesting participation. While it is expected that harvesting and land-based activities will continue to be practiced into the future, the baseline data are insufficient to support confident predictions of whether this activity will increase or decline over time. A discussion of the dimensions related to changes in harvesting is presented in Section 4.3 as a Subject of Note.

Participation in the Wage-economy

In North Baffin, job growth during the period of territorial division has not expanded with population growth. In particular, growth in jobs filled by men has lagged substantially behind the increase in the working-age male population.[10] Therefore, in the absence of the Project the baseline labour market conditions are, at best, expected to prevail, with few opportunities for youth, particularly young men, to move into local jobs.

This has implications for the ability of young adults to establish themselves as self-reliant, and for the economic value of education. If there are few accessible jobs, having an education will be a benefit for those willing to migrate away from their community but less so for those who desire to remain in the North Baffin. Slow job growth also implies on-going and increasing reliance on social entitlement programs — public housing and social assistance in particular. These are important programs, but they do not generate the level of wealth needed to support local business development and community economic self-reliance.

Outlook for Livelihoods

The combined population of the North Baffin LSA is not large. It is possible that substantial progress might arise from sectors of activity independent from the Project; for example, there may be some solution that would help participants in the land-based economy make a viable living from harvest activities. Recent changes to the food subsidy regime and on-going interest in opportunities for commercial harvests might eventually generate progress in this area. Opportunities in sectors such as arts and crafts, tourism and

[10] Refer to Appendix 4A, Section 4.3.1.1, including Table 14.

outfitting may evolve. These, however, have been established for some time and do not suggest that major changes will occur that would substantially increase their contribution to livelihoods.

In an optimistic scenario, it seems reasonable to anticipate that progress in generating livelihood options for the growing population of the LSA will be moderate to slow in the absence of the Project. A less optimistic outlook may see growing dependency on social welfare programs and an intensification of the challenges to physical and mental health that are typically associated with entrenched poverty. Challenges associated with transitioning from dependency to productive engagement may become more deep-rooted as dependency extends into multiple generations.

4.2 ISSUES SCOPING

How the Livelihood and Employment VSEC is Valued

As evident from the baseline data presented above, both the land-based economy and the wage-economy contribute to valued livelihoods of Nunavummiut. A substantial number of Inuit engage in intensive harvesting activities, while many combine harvesting with wage employment. Kinship sharing relationships serve to bridge these productive livelihood options—with intensive harvesters frequently sharing the country food they produce, and wage-economy earners using their spending power to help support land-based harvesters, often through in-kind contributions of equipment or supplies. It is a relatively recent occurrence that some households rely solely on the wage economy for their livelihood.

Recognition of the importance of traditional land-based livelihoods is expressed in the intense interest that residents of the LSA have in gaining understanding the effects of the Project on Inuit harvesting. This interest is expressed across communities and across generations. In particular, Inuit want to understand how all the various individual interactions from the Project may combine to affect their land-based livelihoods.

A desire for additional wage-economy jobs for local residents is expressed at the community level, particularly in the North Baffin, where the job market is very narrow. Elders see that most young people no longer live traditional livelihoods, but increasingly require jobs to earn money to buy food and to provide for their families. Those who *do* seek to maintain active involvement in traditional livelihoods require adequate income to support the costs involved. The effect of the Project on the traditional harvesting livelihood will be addressed below as a Subject of Note.

The variety of jobs available in the small economy of the LSA is limited. This is seen by some residents to limit opportunities for individuals to match their interests to a job. It is recognized that the introduction of different kinds of jobs will create opportunities that have not been available in the past.

For Baffinland, recruitment of Nunavummiut implies the development of a workforce that has a stake in the Project beyond that of simple employer–employee relationship. Inuit with roots in the North Baffin have long connections with the Mary River region as an important hunting, meeting and soapstone-gathering area. As owners of the sub-surface minerals, all Inuit share an economic interest in the Project through the profit-based royalty payments made to NTI. In addition, there will be economic and financial provisions in the IIBA. As owners and traditional stewards of the land, Inuit hold an environmental interest in the Project. These interests provide an organic connection to the Project that should serve to engage the Inuit workforce in ways not possible for outside workers.

The prospect of a local workforce flown to the site from local points-of-hire will also provide benefits in terms of reduced transportation effects. This has implications for lower Project-related fuel consumption, lower carbon emissions and reduced worker travel fatigue.

Company representatives have indicated their interest in recruiting workers as much as possible from within the LSA. This interest will be formally expressed within the IIBA.

Importance of Jobs

The promise of jobs is a significant benefit anticipated from the Project. This benefit is premised on an expectation that employment will engender good life skills and transferable work experience, especially among youth, and will support career advancement objectives.

These jobs and their derivative benefits are widely perceived by residents of impact communities to be the benefits for which tradeoffs—related to perceived land-use and wildlife interactions—are being accepted.

The value of work to Nunavummiut has shifted significantly in the past generation. A strong perception expressed across the region is that work and income have become far more important dimensions of Inuit livelihoods than they were in the past. Elders and youth reflected on how growing dependence on commercial goods—food and consumer items—means that money plays a more central role.

Access and Barriers to Employment

Access to jobs is clearly limited for many Nunavummiut. Barriers arise from a combination of a narrow economy where the public sector dominates the labour market and a mismatch between the skills available and those needed. Full-time permanent jobs that match local skills are quickly filled. The rest of the labour force is left underemployed in part-time, casual or dead-end jobs. Motivation for self-investment through education and training is eroded when prospects for a reasonably foreseeable employment pay-back are limited.

At the same time, many jobs are filled by individuals from outside the community and outside the territory. These jobs require a level of education or skills specialization not typically attained by the local population. Some Nunavummiut are pursuing paths of education and training that may open these jobs to them; for many others, though, the academic, social and cultural challenges entailed in this pursuit are beyond reach.

The result is an economy with a large underemployed labour component seeking whatever work is available, side-by-side with a significant itinerant labour component working in high-paying skilled jobs in the public sector. This situation is more evident in the North Baffin communities than in Iqaluit, where a larger private sector has helped to expand the available range of jobs—from entry level labour to semi-skilled, skilled and professional positions.

Given the underlying labour market context, the prospect of a major employer introducing new jobs in fields that fit well within existing—or reasonably attainable—skills sets and education profiles has understandably generated considerable interest in the LSA. Some Inuit residents will readily take up the employment opportunities presented by the Project; others will gradually adjust their style of life to adopt and embrace work at an industrial setting such as the Mary River Project. Others will find the job rotation, the extended periods away from the community, and the workplace dynamics to be unfavourable to their stage of life or lifestyle choices. The challenge for Baffinland is to provide a workplace that is as welcoming and flexible as it can be, recognizing that mine employment will not be the preference for some North Baffin residents.

Nunavummiut are familiar with mines that fail to meet employment expectations. The former Nanisivik mine, for example, is widely perceived in the region to have not met employment expectations in terms of either numbers or advancement. The result is a broadly-held understanding that the promise of mine employment will not be achieved simply because the project is large. Rather, Nunavummiut appreciate that concerted efforts need to be made if the highly valued jobs and income are to become the high quality, full-time jobs that are needed in the future Nunavut economy. This scepticism is recognized by Baffinland and is addressed in the assessment through careful consideration of the design and mitigation measures that are in place to achieve the sorts of durable benefits anticipated by communities. The significance of the effects the Project will have on wage employment is assessed as a key indicator.

Employment of Youth and Women

The importance of employment opportunities for youth—men and women—was raised repeatedly during community scoping sessions. This concern reflects the large proportion of the population that comprises youth and the challenges this group faces in finding meaningful work and livelihood options.

During the construction phase, demand for workers at Mary River will draw employees away from existing local employers, as assessed below under the Community Infrastructure and Public Services VSEC (Section 7.0). Mitigation of this effect over the medium and long term entails expansion of the net capacity of the labour force by developing worker capacity and by introducing additional workers. Employment of youth and women will be important to achieving this result.

The effects of the Project on employment of youth and women are closely related to the effects on wage employment. The specific implications for youth and women employment are addressed as a subject of note.

Job Promotion and Career Advancement

Career advancement requires a confluence of individual qualifications and objectives with opportunity. “Opportunity” encompasses many factors that combine to create viable career paths that start at an entry level and continue in steps up the career ladder that can realistically be taken with increased qualifications and experience.

The baseline situation in the North Baffin LSA is a paradox: Many individuals are seeking work while many jobs are filled by individuals recruited from outside the region. The situation arises not simply from a lack of qualified among local job-seekers, but also from the absence of career paths that can realistically be followed. While entry-level and high-level employment is available, the career steps in between are often missing. To progress to the next level may require movement into a technical position requiring university education. That’s a big jump to take. As a result, much of the available labour force becomes stuck at the lower levels of the local labour market.

The consequence is that the opportunity cost associated with choosing to not work is relatively low: essentially you lose the value of a part-time, entry-level wage in a position that leads nowhere. It’s not much of a sacrifice. Compounding this situation is the high personal cost and risks associated with acquiring levels of education needed to successfully negotiate the next rung of the career ladder.

Clearly, some LSA residents are successfully entering and advancing in their careers. Many, however, have been mired in seemingly dead-end entry level jobs or have given up on the labour market entirely. The effect of the Project on job progression and career advancement is assessed as a key indicator.

Boom and Bust Effects

Residents of the LSA have experienced mining in the past. The Nanisivik mine and, to a lesser degree, the Polaris mine employed workers from the region. These projects shut down during the mid-2000s after more than 20 years of operation. The effect on residents who gained jobs and then lost them was therefore noted as a concern during community scoping. Some concern was also raised that layoffs may occur in response to global market forces. These concerns are addressed as a Subject of Note.

4.3 INUIT HARVESTING LIVELIHOODS – COMBINED EFFECTS

Several agencies, including QIA and AANDC, expressed concerns with the determination in the DEIS that Project interactions will have no significant effect on Inuit harvesting. This section has been prepared to respond to this concern.

A wide range of potential Project interactions with individuals, households, communities, and marine and terrestrial wildlife addressed throughout the FEIS are summarized in Table 4-4.1, below. The combined effects of these interactions are considered in this section. This synthesis is intended to provide additional discussion about how multiple interactions and effects may combine to influence Inuit harvesting and harvest culture. It does not add new information about Project – harvesting interactions.

Table 4-4.1 Summary of Project Interactions with Inuit Harvesting

Socio-Economic Effects

- Inter-community Inuit migration – This may lead to more Inuit becoming interested in hunting in a particular region (and a consequent reduction in hunting in some other region). This is predicted to be a low magnitude effect.
- Improved life skills – Increased well-being associated with improved life skills could lead to a greater interest in rediscovering traditional Inuit values and activities, including perhaps a renewed interest in harvesting. This could lead to more hunting activities.
- Changes in parenting – The fly-in/fly-out work rotation could affect the time spent with family members, including the time spent getting out on the land. This change could lead to decreased or increased time engaging children in land-based activities depending on many factors. For example, an individual may find that the two week off period may offer a greater block of time for these activities.
- Increased household income – Those who gain income from the Project will have improved access to purchasing the gear, equipment, and supplies needed to support harvest activities of family and friends. They may or may not choose to apply their purchasing power to these ends however. If this does occur to a substantial degree, it is possible that hunting intensity may increase. Whether this leads to a change in harvesting patterns is not known—the baseline does not provide adequate insight into current harvest patterns in terms of the balance between "weekend hunters" and "intensive hunters."
- Absence from community during work rotation – Those engaged in Project employment will not be available to engage in hunting activities. This could serve to reduce hunting pressures locally, or it might lead to pent up demand for getting out on the land and result in greater harvest efforts overall.
- Expanded market – business services to Project – The potential for local business supplying country food to the Project through meat and fish plants could arise. This might lead to more opportunities for harvesters to gain some income by supplying the plants.
- Wildlife harvesting by Inuit – Harvesting by Inuit was assessed based on the parameter of harvest quantity per level of effort, meaning the number of harvests by species, or total quantity (i.e., weight) of country food obtained, in relation to an estimated level of effort (amount of time spend hunting). Taking into consideration the results of the assessments on marine wildlife and arctic char the residual effects on harvesting were predicted to be negligible.

The residual effects on caribou harvesting were predicted to be not significant because the measurable parameter was predicted to change by less than 1 % in magnitude.

- Travel and camps – Change in travel and camping locations as a result of project activities will occur particularly around Steensby Port, where a detour around the port site will be required. This can impact harvesting activities in the area, although the majority of harvesting in Northern Foxe Basin occurs west of Koch and Rowley Islands, away from Port Site activities. The addition of the railway also has the potential to impede harvesting if harvesters are in active pursuit of game and are unable to cross the railway. The need to find suitable and predetermined crossing points can result in prey getting away from the hunter.
- Cultural well-being – The need and desire to maintain cultural heritage and cultural pursuits such as harvesting in the communities has been identified by community members throughout the course of the assessment. Need for job opportunities (for youth to gain self-reliance) is also frequently expressed.

Effects on Caribou (Volume 6)

- Sensory effect on wildlife – Effects includes noise and dust emissions that are limited to the zone of influence and are addressed under loss of habitat.
- Caribou habitat – The Project will lead to small reductions in caribou habitat and habitat effectiveness. Assessment conclusion: We are moderately confident that Project related activities will have a “not significant” loss of habitat and a “not significant” reduction in the effectiveness of caribou habitat within the North Baffin caribou range.
- Movement – The overall residual effect of the project on caribou movement may be that caribou travelling on five of 52 (9.6 %) known trails experience a barrier to their movement on those trails. Few caribou currently exist within the RSA, so few caribou will be affected by the mine infrastructure and activity. Assessment conclusion: We are moderately confident that Project related activities will have a “not significant” effect on traditional caribou migration on north Baffin Island.
- Mortality – There are no expected residual effects of the project on caribou mortality. Mortality, if it occurs, will be limited to individuals within the PDA. There are no expected indirect effects on the north Baffin Island caribou population as a result of hunter access.

Effects of the Project on Marine Mammals

Walrus (Volume 8)

- Habitat change – The footprint of the Steensby Port dock structures is a negligible part of nearshore habitat in the Inlet. Less than 2 % of the total landfast ice edge leading into Steensby Inlet will be changed because of icebreaking. During a single transit to and from Steensby Port, an ore carrier will temporarily change <1 % of pack ice in Hudson Strait, Foxe Basin and near Steensby Inlet.
- Disturbance due to construction – The Steensby Inlet port site is not known as a key haul-out site for walrus, but some occur in the area during the period when construction is planned. Walruses in the vicinity of dredging operations and the associated construction activity (vessel traffic, dock construction including vibratory pile driving) may exhibit localized avoidance of the area, but the numbers of affected animals are expected to be low.
- Disturbance due to shipping – Walruses hauled out on ice may temporarily avoid an ore carrier transiting to and from Steensby Inlet by diving into the water, perhaps at distances ranging from 400–500 m up to several km. The area west of Rowley Island (the island is located >18 km west of the nominal shipping route) is thought to be calving area for walrus, and calving is thought to occur from March to July. Walruses in the calving area are not expected to respond to ore carriers transiting through eastern Foxe Basin either during the ice-covered or open-water period. Walruses hauled out at known terrestrial haulout sites in Foxe Basin and Hudson Strait are not expected to be affected by shipping because of the distance between the shipping route and the haul-out sites.
- Disturbance due to icebreaking – It is estimated that approximately <10 to 400 walruses may exhibit avoidance of an ore carrier passing through the southern LSA during a single vessel passage. It is likely that at least some

individual walruses will be affected multiple times by icebreaking during the course of a single ice-covered season.

- Disturbance due to aircraft overhead flights – It is likely that walruses along the Steensby Inlet flight path (used primarily during the Construction Phase), particularly those hauled out on the shoreline, may disperse, particularly as the Boeing 737 will have to maintain a lower altitude near the airstrip during landing and takeoff. It is uncertain if walruses that occur in Steensby Inlet will habituate to daily overflights of a commercial jet. Monitoring will be undertaken to address this uncertainty. Unlike other areas in and near the LSA, Steensby Inlet is not considered an area where walrus haul out in high numbers. Based on noise modelling results, walruses at known haul-outs in Foxe Basin are not expected to respond to overflights of Boeing 737s.
- Hearing impairment – Walruses in Steensby Inlet are not predicted to be exposed to in-air sound levels from aircraft overflights (Boeing 737) that exceed thresholds for hearing impairment in pinnipeds. Similarly, walruses are not expected to be exposed to underwater sound that would cause hearing impairment.
- Masking of environmental sounds – Any masking that might occur along the shipping route, as a vessel passed by, would occur for only a short time relative to the interval between transits. The amount of masking will be a function of how close to the ship's path the walrus is. Given that sounds important to walruses are predominantly at higher frequencies than shipping noise, it is unlikely that masking would significantly affect walrus.
- Mortality from collisions or walrus stampeding at haul out sites – It is unlikely that walruses will experience mortality from vessel collisions because walruses, including mothers and calves, exhibit at least localized avoidance of vessels. Also, ore carriers will reduce speeds to 7.5–11 km/h in areas of pack ice further reducing the risk of collision. During the Construction Phase, when daily flights of a Boeing 737 will occur at the Steensby airstrip, some walruses may occur along the flightpath. However, large herds of walruses, such as those in areas where stampeding events have been observed, are not expected in Steensby Inlet. As part of the proposed marine mammal monitoring program, the shoreline area around the Steensby Inlet construction site will be monitored to document walrus responses to aircraft overflights. With mitigation measures in place, no mortality is expected.
- Note: "It was predicted that with mitigation measures in place, contaminants from the Project will not significantly affect prey (or prey habitat) of marine mammals."

Ringed Seal

- Habitat change – Due to the constructions of ore dock structures and icebreaking, the change in habitat in landfast ice represents 5.6 % and 0.36 % of the suitable landfast ice habitat in Steensby Inlet and Foxe Basin, respectively. Less than 1 % of pack ice habitat in Hudson Strait, Foxe Basin and near Steensby Inlet will be changed during a single transit to and from Steensby Inlet.
- Disturbance due to construction – Temporary avoidance of areas of construction activities is expected. Blasting at the Steensby dock sites will produce the loudest sound emitted during the construction phase. Mitigation measures will be in place to minimize effects from construction activities.
- Disturbance due to shipping – It is predicted that ringed seals in the water will avoid ships during the open-water period by less than 100 m. Ringed seals hauled out on the ice may temporarily avoid an ore carrier at distances up to 500 m. The avoidance of ships is expected to be localized and short-term.
- Disturbance due to icebreaking – It is estimated that approximately 220 ringed seals may exhibit temporary avoidance of an ore carrier passing through the LSA during a single vessel passage. It is quite likely that the same ringed seals will be affected multiple times by icebreaking during the course of a single ice-covered season.
- Disturbance due to aircraft – Ringed seals are most abundant in Steensby Inlet during the ice-cover season vs. other times of the year. During the ice-covered season they occur inside of subnivian lairs. Airborne sounds of aircraft will be diminished inside seal lairs. During periods of open-water, seals will be more dispersed and individuals may be exposed to sound levels that cause minor disturbance responses.

- Hearing impairment – Ringed seals are not expected to be exposed to underwater sound levels high enough to elicit temporary decrease in hearing sensitivity. Ringed seals are not predicted to be exposed to in-air sound levels from aircraft overfilghts that exceed thresholds for hearing impairment in pinnipeds.
- Masking of environmental sounds – Sounds that are important to seals are predominantly at much higher frequencies than shipping noise, and given the intermittent nature of construction activity sounds, it is unlikely that masking would affect ringed seals.
- Mortality – It is possible that ringed seals could be struck by icebreaking ships as they move through the ice, particularly in Steensby Inlet. It is estimated that a maximum of 15 seal pups could suffer mortality from collisions with icebreaking ore carriers over a relatively short period each year during the Operation Phase. The risk of ringed seals experiencing mortality from blasting is very limited.

Bearded Seal

- Habitat change – Bearded seals predominantly occur in areas of pack ice but occasionally occur in landfast ice areas. Due to the constructions of dock structures and icebreaking the change in habitat in landfast ice represents 5.6 % and 0.36 % of landfast ice habitat in Steensby Inlet and Foxe Basin, respectively. Less than 1 % of pack ice habitat in Hudson Strait, Foxe Basin and near Steensby Inlet will be changed during a single transit by an ore carrier to and from Steensby Inlet.
- Disturbance due to construction – Temporary avoidance of areas of construction activities is expected. Blasting at the Steensby dock sites will produce the loudest sound emitted during the construction phase. Mitigation measures will be in place to minimize effects from construction activities.
- Disturbance due to shipping – It is predicted that bearded seals in the water will avoid ships during the open-water period by less than 100 m. Bearded seals hauled out on the ice may temporarily avoid an ore carrier at distances up to 500 m. The avoidance of ships is expected to be localized and short-term.
- Disturbance due to icebreaking – It is estimated that approximately 18 bearded seals may exhibit temporary avoidance of an ore carrier passing through the LSA during a single vessel passage. It is possible that some bearded seals will be affected multiple times by icebreaking during the course of a single ice-covered season.
- Disturbance due to aircraft – Bearded seals are most abundant in areas with pack ice. During the Construction Phase, airborne sounds of aircraft (Boeing 737s) will be diminished by the time the aircraft reaches pack ice south of Steensby Inlet. During periods of open-water, seals will be more dispersed and individuals may be exposed to sound levels that cause minor disturbance responses.
- Hearing impairment – Bearded seals are not expected to be exposed to underwater sound levels high enough to elicit temporary decrease in hearing sensitivity. Bearded seals are not predicted to be exposed to in-air sound levels from aircraft overfilghts that exceed thresholds for hearing impairment in pinnipeds.
- Masking of environmental sounds – It is possible that an ore carrier passing through pack ice or the landfast ice edge area in Steensby Inlet during late spring and early summer may mask bearded seal calls. However, any masking that might occur along the shipping route, as a vessel passed by, would occur for a shorter time relative to the interval between transits. The amount of masking will be a function of how close to the ship's path the bearded seals occur.
- Mortality – It is possible that a bearded seal pup encountered within an hour or so of birth may not be able to avoid an approaching icebreaker and that it could suffer mortality. This is expected to occur infrequently since the period of time that pups are unable to move off the ice is so limited. The risk of bearded seals experiencing mortality from blasting is negligible.

Beluga

- Habitat change – The small area of the dock footprints is a negligible part of nearshore habitat. Belugas can re-use

areas of pack ice changed by the passage of an ore carrier. Less than 1 % of pack ice-cover in Hudson Strait will be changed during a single transit to Steensby Port.

- Disturbance due to construction – Belugas are expected to occur in low numbers at the Steensby port site during the open-water period and will be absent when the port sites are encompassed by landfast ice. All construction activities, with the exception of blasting, will occur in the open-water period. Belugas are estimated to avoid the immediate area around construction sites in Milne and Steensby inlets.
- Disturbance due to shipping – Based on acoustic modelling, it is predicted that belugas would avoid ore carriers travelling during the open-water period along the Steensby Inlet shipping route by 6 to 7 km depending on location and vessel speed. If belugas do occur near port sites they may exhibit localized avoidance of tugs and other vessels.
- Disturbance due to icebreaking – It is estimated that approximately 5,000–10,000 belugas may exhibit avoidance of an icebreaking ore carrier passing through Hudson Strait during a single transit. This corresponds to an estimated 15-20 km avoidance distance. There is uncertainty in terms of this potential effect and about the duration of the effect. These uncertainties will be addressed in a monitoring plan.
- Disturbance due to aircraft – Beluga whales are not expected to occur in large numbers in Steensby Inlet, but any individuals that do occur there, particularly those under the direct flight path of the Boeing 737, may exhibit a disturbance response and potentially swim away from the site.
- Hearing impairment – Belugas may incur temporary hearing impairment from exposure to continuous sources of sound of sufficient level and duration, however this is highly unlikely given that belugas are expected to avoid at least the immediate area around ore carriers.
- Masking of environmental sounds – Most of the sounds important to belugas are predominantly at much higher frequencies than shipping noise and the intermittent nature of construction activities sounds, it is unlikely that masking would significantly affect belugas.
- Mortality – It is unlikely belugas will experience mortality from collisions with vessels because belugas exhibit avoidance of vessels. Additionally vessels will reduce speeds to 7.5-11 km/h in areas of pack ice reducing risk of collision. With mitigation measures in place, no mortality is expected.

Narwhal

- Habitat change – Narwhals are considered uncommon in Steensby Inlet where the majority of construction activities will occur. In Hudson Strait, an ore carrier will transit through potential narwhal overwintering habitat roughly every two days, the area of pack ice that will be disrupted temporarily by a single ore carried passage is estimated at 44 km^2 during maximal ice-coverage – this represents less than 1 % of pack ice in Hudson Strait.
- Disturbance due to construction – Narwhals are uncommon in Steensby Inlet and the individuals that could occur in the area may exhibit localized avoidance during construction activities.
- Disturbance due to shipping – It is predicted that narwhals would avoid ore carriers travelling during the open-water period along the Steensby Inlet shipping route by 6-7 km, depending on location. Narwhals are more common along the shipping route through Milne Inlet that will be used occasionally during the Operation Phase of the project.
- Disturbance due to icebreaking – It is estimated that approximately 430–500 narwhals may exhibit avoidance of an icebreaking ore carrier passing through Hudson Strait during a single transit. This corresponds to an estimated 15 to 20 km avoidance distance.
- Disturbance due to aircraft – Narwhals may be exposed to aircraft sound; individuals that occur in Steensby Inlet, particularly those under the direct flight path of the Boeing 737, may exhibit a disturbance response and potentially swim away.

- Hearing impairment – Narwhals could incur temporary hearing impairment from exposure to continuous sources of sound of sufficient level and duration, however narwhals are not expected to be exposed to continuous sound level thought to cause a temporary decrease in hearing sensitivity.
- Masking of environmental sounds – Sound that are important to narwhals are predominantly at much higher frequencies than shipping noise and the intermittent nature of construction activity sounds, it is unlikely that masking would significantly affect narwhal.
- Mortality – It is unlikely that any narwhals will experience mortality from collisions with vessels because narwhals exhibit avoidance of vessels. With mitigation measures in place, no mortality is expected.

Polar Bear

- Habitat change – Polar bears primarily occur in areas of pack ice. Ore carriers are estimated to temporarily change 76.5 km^2 of pack ice during a single transit to and from Steensby Port; this represents much less than 1 % of pack ice in Hudson Strait, Foxe Basin and near Steensby Inlet. During the open-water period, the footprint of dock structures at Steensby Inlet may result in very small change in available shoreline habitat to polar bears.
- Disturbance due to construction – Polar bears may avoid or approach construction sites. In the first year of construction, drilling and blasting will occur at the Steensby dock site during April and May, when polar bears will have emerged from dens and will be foraging, so they will likely avoid the immediate area around drilling and blasting operations.
- Disturbance due to shipping – Interactions between polar bears and vessel traffic along the shipping routes during the open-water period will be limited because bears are primarily located on shorelines and islands at that time.
- Disturbance due to icebreaking – Some polar bears will exhibit localized avoidance of icebreaking vessels. Available evidence suggests that at 500 m from an icebreaker polar bears will generally move away. Polar bears may be temporarily excluded from roughly 90 km^2 and 1500 km^2 of landfast and pack ice habitat, respectively, during a single transit of an ore carrier. This represents 2.6 % of available landfast ice in Steensby Inlet and less than 1 % of available pack ice in Foxe Basin and Hudson Strait. Some individual polar bears may be affected multiple times by icebreaking during a single ice-cover season.
- Disturbance due to aircraft – It is unknown how polar bears in Steensby Inlet will react to overflights by a large aircraft like the Boeing 737 that will make daily flights during the Construction Phase. Polar bears are common in northern Foxe Basin, and terrestrial areas in southeast Steensby Inlet are thought to provide good denning habitat. It is considered to be very unlikely that bears inside of dens in southeast Steensby Inlet (or on the islands, e.g., Rowley Island, in northern Foxe Basin) would be affected by aircraft overflights. Polar bears travelling or foraging in and near the flight path may exhibit startle and avoidance responses at Steensby Inlet. Polar bears may habituate to daily overflights or they may avoid the area. The numbers of affected bears is predicted to be low.
- Mortality – There is a risk of polar bear mortality as a result of interactions with humans associated with the Project. Mitigation measures (e.g., use of local Bear Monitors, having a clean work site, educating workers about bear safety) will greatly reduce the potential for mortality. With mitigation measures in place, polar bear mortality is considered unlikely. In the event of polar bear mortality as a result of the Project, it is anticipated that the mortality will be deducted from the harvest quota and that appropriate compensation will be provided to hunters.

The approach taken to consider Project effects on harvesting is to set out a framework (Table 4-4.2) that can be used to consider the various dimensions/determinants of harvesting activity and the continuums along which each of these determinants can change.

Many characteristics of contemporary (i.e., baseline) harvesting activities are not well documented. For this reason, the framework presented below is a purely “conceptual” tool. It is intended to serve more as an aid to considering various effects more than as a predictive device. It should, nonetheless, be of value in

understanding the points at which the Project may interact with harvesting and the direction these interactions have in moving harvesting along the various continuums associated with each dimension. It is acknowledged that some of the "harvesting dimensions" may have more than one continuum end-point. There is, therefore, opportunity for readers to consider alternative or additional dynamics to harvesting "evolution" and how Project interactions set out in the FEIS might affect these dynamics.

4.3.1 A Framework for Understanding Changes to Harvest Patterns and Culture

Inuit harvesting activities are a critical component of Nunavut's mixed economy. Harvesting serves to transfer Inuit cultural and environmental values, knowledge and skills to the next generations; to produce country food that is recognized for its important contribution to northern food security; and to maintain a human presence across vast territories of the North, thereby contributing to Canadian Arctic sovereignty and security objectives.

Many factors combine to determine harvesting patterns. Table 4-4.2 sets out, in the first column, important dimensions of harvesting. Each of these dimensions is subject to change due to many factors. Project effects are only one source of influence. The second and third columns set out points on a continuum between the "traditional" practices and what might be considered a "potential future state." The "potential future state" conditions are not intended to represent a prediction of the future but rather simply serve as an alternative and meaningful end-point for the continuum. To the extent that current trends are understood, these have been considered in setting these theoretical end-points.

Table 4-4.2 A Conceptual Framework to Assist in Understanding Changes in Harvest Activities

Harvesting Dimension	Past/Traditional	Possible Trend/Future State
Why people harvest	Survival, economic necessity, preserve self-reliance	Cultural expression, well-being, economic opportunity, preserve self-reliance
What people harvest	Wide diversity of species from sea, land, fresh water, and air	Focus on smaller number of preferred species
How wildlife is used	Shared across extended kin group	Shared and sold
When people harvest	Open-ended hunting trips, year-round	Defined duration hunting trips, select times of year
Where people harvest	Preferred Destinations and Exploratory Travel - wide range	Preferred Destinations – more narrow range
Who harvests – transfer to youth	Youth learn complex skills and are fully engaged in harvesting	Youth learn only basic land skills or none at all. Many are not engaged in harvesting.
Knowledge, Skills & Technology	High knowledge and skills. Lower technology reliance. (Knowledge of terrain, skills to travel across ice and through weather, survival skills for when things go wrong.)	High reliance on technology, lower reliance on knowledge and skill (Powerful machines, GPS navigation, satellite phones and search and rescue for when things go wrong.)
Cost in dollars	Lower	Higher
Cost in time	Higher	Lower
Language of harvesting	Inuktitut – holds complex knowledge	English and "Inuktitut-light"
Wildlife populations	Regional fluctuation, but healthy populations	Regional fluctuation, local wildlife scarcity unhealthy or contaminated wildlife

Source: Brubacher Development Strategies, 2011. Prepared for this document.
Note: The "potential future state" conditions do not represent a prediction of the future but rather serve as a possible alternative end-point for the continuum.

4.3.2 How the Project May Directly Affect Harvesting Dimensions

The conceptual framework set out above considers how Project interactions may act on the multiple dimensions and determinants of harvesting. In this section, the framework dimensions identified above are considered individually. In Section 4.3.3 below, the aggregate or "net" effects are considered. Section 4.3.4 presents a conceptual risk analysis of Project – harvesting effects based on this framework.

Project interactions identified in the FEIS

The FEIS presents an assessment of the Project's interactions on factors affecting harvest activities. These include assessments of direct effects on Inuit wildlife harvesting success per level of effort, travel and camps. Interactions on factors that may have indirect effects on harvesting were also assessed—wage employment, life skills and population stability.

In addition to these "key indicator" assessments, several "subjects of note" of relevance to understanding how the Project may affect harvesting are also discussed under various VSECs. These include traditional harvesting (under Livelihood and Employment VSEC); traditional economic activities (under Economic Development and Self-Reliance VSEC); food security (Human Health and Well-Being VSEC); and cultural well-being (Cultural Well-Being VSEC).

Why people harvest

The Project is not expected to have a substantial influence on the rationale for harvesting. Based on our current understanding, there appear to be several contributing motivations which act in concert to encourage or drive someone to harvest wildlife:

- Economic necessity / food security – a means to put food on the table and/or as a means of being productive, similar to why people participate in the wage economy.
- Recreation – it is enjoyable and rewarding to be out on the land focused on a goal, and enjoying the environment and the fruits of the harvest with companions or family.
- Heritage – wildlife harvesting is a central component of Inuit heritage, and persons are motivated by instinct or by a conscious desire to practice and retain Inuit land skills.
- Status – there is a social benefit to harvesting, in terms of providing for family and community, and being recognized as an important leader or provider in this regard.

If current harvesting decisions are driven (in whole or part) by economic necessity, then access to Project income might relieve this motivation by enabling households to purchase store food rather than harvesting. However, lack of income is frequently identified as a barrier to harvesting. Therefore, Project income may actually improve ability to harvest in order to meet food security and household economic objectives.

In terms of recreation, we know that this in an important element of harvesting, as families who can do so make a point to go spend "family time" camping out on the land, particularly during the summer. Non-Inuit living in the north, as well as southern Canadians similarly enjoy hunting and fishing as a recreational activity. As with economic drivers to harvesting, the Project may improve the ability of people to harvest for recreation, because harvesting is expensive and employment income from the Project will make more money available in the community.

In terms of the heritage rationale, Elders have indicated that they "crave" certain country foods at certain times. This is certainly a motivation for harvesting. As indicated in the list above, to some in the community harvesting is and will continue to be an important part of their life; something they may have grown up with

that they instinctively want to spend time doing ("it is what they do" or part of who they are). Others will pursue harvesting because it is part of their heritage, but perhaps something that is not integrated into their current life and something they consciously seek to do as part of being Inuit or immersing themselves in an activity central to Inuit life in the past and present. We heard a number of people in the communities talk about the sense of connection with their forefathers by hunting and camping in the same location as their ancestors, as evidenced by archaeological or more recent remains from camping.

The status aspect of harvesting is not well understood. We know that Inuit harvesting and the required land skills are rightfully a source of pride within the Inuit community. We understand anecdotally from the Elders in the community there is pressure on youth to participate in harvesting as an important part of Inuit life. We also know from speaking to a small sampling of youth that their interests in how to spend their time are oriented towards more mainstream life, and that some prefer store-bought food over some country foods. It is believed that the Project will have little influence on this motivation to harvest.

What people harvest

The Project is not expected to influence the wildlife species people choose to harvest. This arises from an expectation that no interactions will arise that would influence local dietary preferences. A possible exception to this expectation is that if Project income serves to increase the ability of households to harvest, the "taste" for certain country food species might be maintained—or even expanded—beyond where existing trends might otherwise lead. This is considered to be speculative, given lack of baseline information on the determinants of current food preference trends in the LSA.

How wildlife is used – "sharing" versus "sale"

The Project might influence the continuum between "sharing" and "sale" of certain species of country food in several ways.

For example, some individuals who take on full-time jobs may find they have money but little time to engage in harvest activities. This could increase the demand for country food available for purchasing either through formal retail avenues (stores and Hunter and Trapper Organisations) or directly from harvesters. However, the rotational nature of Project employment is likely to be less likely than other forms of full-time employment to cut into the harvest opportunities of those who wish to engage in these activities. Further, it is not uncommon in Nunavut for those with income to provide fuel or lend equipment to others who have time to harvest in exchange for some of the country food that is harvested. This may be seen as reinforcing rather than weakening traditional sharing culture.

Revenues from the Project that flow to Inuit or government might be used to support local country food enterprises. Some communities have included development of commercial fish plants within their economic development plans. Should these funds be used to set up such a plant or plants, this would increase the local demand for harvesters to supply country food. Further, Baffinland intends to procure country food to serve at the Project. This may provide a modest increase in the demand for commercial country food. Expansion of local commercial markets for country food could provide a source of income to harvesters. How this income would be used by harvesters' households is not known—it might support hunting for household use and for sharing—or it might be used for other purposes.

When people harvest

Personal time use and time management is likely to be influenced amongst those individuals who gain employment at the Project. How this relates to the amount of time allocated to harvesting prior to and

during Project employment will be highly variable, depending on previous time-use and personal characteristics.

Some individuals who previously engaged in intensive harvest activities and then go on to work at the Project may experience a substantial decline in time available to harvest. Others who are not employed but do not engage in intensive harvest activities may find they continue to have the time they need to carry out their desired level of harvesting. Some individuals may find that they acquire new time management skills and/or motivation from Project employment and that these skills enable them to make better use of their off-time than when they were not employed and had more time available to them.

Individuals who are not employed in the Project may or may not be affected in terms of the time they have available to pursue their desired harvesting activities. Some individuals who have partners employed at the Project may find they have increased obligations—such as child or elder care—during the period their partner is working. This could lead to a loss of flexibility in the ability to allocate time to preferred tasks. This could be a particular challenge for those who work regular jobs in the community, and thus don't have the option to make up these lost opportunities during the two weeks the partner is not working at the mine.

In most cases, individuals who don't have a close connection to the Project through employed family members should not experience Project-induced changes to the time they have available to harvest. The one possible exception to this will be the increased time that will be required to detour around the Steensby ship track. The increased "commute time" to access preferred harvesting areas may serve to decrease the time available to spend harvesting, particularly amongst those who have defined windows of opportunity for harvesting.

Where people harvest

Based on efforts to map out harvesting areas, presented in Appendix 4C, Project activities are not expected to prevent access to preferred harvesting destinations. However, as noted above, some interference with the ability to travel freely throughout the area will arise from the Project.

Accessibility issues are addressed in the Project effects on travel and camps (Section 10.5). The ship track through Steensby Inlet will require a detour for those wishing to harvest at the other side. This will add time to getting to that particular destination.

These effects will be experienced by those who seek to harvest in the affected areas regardless of whether or not they are involved in the Project through employment or business relationships.

Who harvests – transfer of harvesting culture to youth

Based on anecdotal information, there appears to be a general decline in per capita harvesting intensity over successive generations; Elders have stated that youth are in school all day, are not hunting, and therefore need jobs. This finding is not contradicted by southern food import data which, as noted in Appendix 4A, shows a substantial increase in the per capita imports of food from the south.

The Project is not expected to directly influence the transfer of harvesting values, culture, or skills from generation to generation. However, indirect effects arising from Project interactions on household income and individual life skills may serve to remove barriers that some youth face with respect to their involvement in harvesting. Income flowing from the Project to Inuit and government may also serve to remove fiscal capacity barriers to the implementation of on-the-land programs that these agencies seek to provide. Should such programs be implemented, these could serve to support intergenerational transfer of harvesting skills and culture to the next generation.

Knowledge, Skills and Technology

Knowledge and skills

The Project is a remote Project operating year-round in a harsh Arctic environment. As such, individuals who are employed at the Project will utilize their land and survival skills in the course of their work. Individuals who may not have gained these skills will acquire some degree of land skills through pre-employment and on-the-job training. This is expected to include knowledge related to assessing risk, responding to emergency situations, as well as skills related to travel across the land. While the skills gained through the Project will not be adequate to support traditional harvesting activities, they will be relevant and could lead some individuals to seek to gain further knowledge and skills from experienced harvesters and Elders.

Individuals who are not employed at the Project may gain some exposure through programs that might be supported through community initiatives funded through the IIBA. For example, during the bulk sample work, BIM provided support for on-the-land programs.

Based on these considerations, the Project is expected to value and support the maintenance and acquisition of knowledge and skills relevant to harvesting.

Technology and its affordability

The Project is not expected to directly influence the balance between "knowledge" and "technology" in terms of how people engage in harvest activities. It will, though, affect the affordability of technology. Affordability of harvesting equipment and supplies will improve for those who gain employment at the Project and for individuals who may be part of the sharing networks of these individuals.

Individuals who do not benefit from Project-derived income are not expected to experience any change in affordability. The local cost of these items should not experience price inflation since they are supplied from large external markets that will not be influenced by small local spikes in demand.

Language of harvesting

Harvesting knowledge and the ability to efficiently communicate critical information while engaged in harvesting activities is closely tied to language. The Inuktitut language has developed within the context of the Arctic environment and is well-suited for this task. English is expected to be the main language used on-the-job at the Project. However, the Project is designed to also support Inuktitut language in association with English, as described in the Human Resources Management Plan (Appendix 10F-3). The context in which Inuktitut will be used at the Project is somewhat similar to the context in which it is used during harvesting activities. For example, weather conditions will be highly important and will be the subject of many conversations. Inuktitut terminology related to knowledge of weather patterns and forecasts should be expected to be maintained and perhaps strengthened. The Project is not expected to exert pressures leading to a decline in Inuktitut land and harvesting-related language.

Wildlife populations

The Project was assessed for its effect on caribou, marine mammals, and fish. Adverse impacts to these wildlife populations were determined to be "not significant." The Project is not expected to affect wildlife populations either in the context of wildlife population health nor for the purpose of harvesting.

4.3.3 Combined Effects of the Project on Harvesting

The FEIS assesses the significance of specific Project-related effects on a wide range of key indicators related to harvest activities. These include effects on key wildlife species as well as on effects that may influence travel and camps, and hence access to wildlife. None of the Project interactions were considered to lead to significant impacts on any of the indicators related to harvesting. However, some agencies have asked in response to the DEIS how multiple "non-significant" residual effects might combine over the course of the Project. The possibility for such aggregations of residual effects is acknowledged, however, given what is known about Inuit land-use and harvesting practices the probability that any such combination would lead to a significant adverse effect on Inuit harvesting is considered to be unlikely. The following points provide a rationale in support of this conclusion:

- Households that gain access to better transportation and harvesting equipment directly or indirectly related to Project-derived income may improve their opportunity to harvest. This is important to intergenerational transfer of harvesting values, culture and knowledge to the younger generations.
- Contribution of the Project to trends related to "sharing" versus "commercialization" of harvested country food is considered to be complex and multi-directional. Some aspects of the Project may support the development of commercial harvesting activity, while others may serve to strengthen traditional sharing networks.
- To illustrate the previous point, the culture of sharing harvested food is difficult to maintain among families that are dependent on social assistance for their sustenance. The ability of members of these households to gain employment may, for some, present the ability to have enough income that groceries, money, hunting equipment, or the proceeds of harvesting can be shared beyond the immediate household. This sharing could serve to maintain and strengthen traditional sharing cultures by enabling a greater portion of the population to participate in sharing relationships.
- The Project may contribute to trends in the adoption of technology by harvesters. It will provide some households with the income they need to acquire and support this technology. This could lead to a divergence between those harvesters who have access to the technology and those who do not. However, current income differentials already exist amongst households in the LSA. Those with access to the largely public sector jobs have far more income than households who have no substantial wage income. Introduction of mine jobs may lead to improved wealth distribution in communities. Traditions of sharing equipment in exchange for country food should serve to further reduce the gap between technology "haves" and "have-nots."

4.3.4 Implications for the Impact Assessment

This section has explored the complexity of factors that are understood to affect trends in Inuit harvesting activities. It has considered how Project interactions on a wide array of VECs and VSECs may interact with these factors. Further consideration of Project effects on these VECs and VSECs that has been carried out during the period technical review between the DEIS submission and the FEIS has not led to changes in the determination of significance of Project impacts. The integrated analysis of the combined effects of these VEC and VSEC interactions presented here does not lead to an assessment of adverse effects generated by the Project on harvesting activities. The interactions are expected to be complex and highly inter-twinned with other factors affecting harvesting in the LSA. The potential for beneficial outcomes is equally or more highly anticipated than the potential for negative effects. The analytical framework that has been developed

here will be carried forward into the monitoring program, as described below, in order to follow through on this important issue.

4.3.5 Follow-up Monitoring Related To Harvesting

Monitoring of specific Key Indicators that relate to Inuit harvesting—such as effects on wildlife habitat and populations and effects on employment—will be carried out as described elsewhere in the FEIS. However, given the complex and indirect nature of many of these interactions—along with the concurrent influence of many other trends and interactions unrelated to the Project— these narrowly focused monitoring initiatives are not on their own expected to generate an integrated understanding of how Inuit harvesting may be affected from the combination and accumulation of these individual interactions. Baffinland will participate with Inuit and other agencies to support monitoring initiatives related to changes in Inuit land-use and harvesting, and associated culture and skills, by making available relevant data the Company generates.

Baffinland will also follow the outcome of socio-economic monitoring that is carried out by other agencies and companies. This will include reviewing the annual socio-economic monitoring reports to NIRB from projects such as the Meadowbank mine. This approach to collaborative monitoring is described in more detail in Section 15. The Company has already made progress in this area by attending the meeting of the Kivalliq Socio-Economic Monitoring Committee held in Baker Lake in October 2011. At this meeting there was no presentation of issues or data related to any changes to harvesting or traditional pursuits arising from interactions with the mining sector. Baffinland will continue to follow the experience of that community in this regard.

4.4 WAGE EMPLOYMENT

For many residents, a key element of the Project is its potential to provide substantial new employment opportunities. The assessment question related to this indicator is:

- Will the number of residents who gain employment at the Project be significant relative to the current labour market?

4.4.1 Assessment Methods

Two parameters are used to assess the effect of the Project on wage employment:

- Labour demand created by the Project (“jobs creation”); and
- Labour supplied by residents of the LSA (“local employment”).

A focus on hours of labour demanded and supplied allows for analysis to be carried out independently from the work patterns of those hired. Conversion between hours of labour and full-time jobs is accomplished by applying a factor of 2,080 hours of labour per full-time, full-year job.[11]

Parameters for rating the magnitude of both job creation and local employment are:

Low	<2.5 % change in baseline labour
Medium	2.5 % to 5 % change in baseline labour
High	5 %+ change in baseline labour

[11] A worker at the Project will work this number of hours over a full year, in a two week in / two week out rotation.

In the North Baffin, where the wage economy has generated an estimated two million hours of labour demand, a medium magnitude change will correspond to an additional 25 full-time, year-round jobs. The addition of 50 additional full-time, year-round jobs would be assessed as a high magnitude change.

During the period of territorial division, between 1996 and 2004, the average annual rate of job creation for males in the North Baffin was 1.5 % and for both genders was 1 %.[12] These magnitude ratings are therefore considered conservative relative to these baseline levels.

4.4.2 Project Effects and Proposed Mitigation

The Project will affect wage employment through these closely related effects:

- Creation of jobs;
- Direct employment of residents of the LSA; and
- Employment in indirect jobs (Subject of Note).

Creation of Jobs in the LSA

A summary of the number of workers for each Project phase is provided in Volume 3, Table 3-1.1. These jobs will be filled by qualified workers accessing the Project through six point-of-hire communities in the Baffin (Iqaluit, Hall Beach, Igloolik, Arctic Bay, Pond Inlet, and Clyde River) and through a point-of-hire community in the south. The Company will also seek to provide employment to Nunavummiut in the Baffin Region and outside of the points-of-hire.

Construction Phase Labour Demand

Estimates of the construction phase workforce, as presented in Volume 3, Table 3-1.1, range from 1,710 to 2,680 individuals on payroll over four years. This represents a peak demand of approximately 7.3 million hours of labour, and an average demand of some 5.5 million hours of labour or 2,000 workers on average.

Project Operations Labour Demand

Project operations are estimated to generate an annual labour demand of roughly 950 payroll positions, or 2.0 million hours of labour.

Closure Phase Labour Demand

The expected duration of the closure phase is three years followed by an expected five year post closure period to meet closure objectives. During this time a subset of the Operation Phase workforce will be retained to carry out reclamation activities at Project 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.

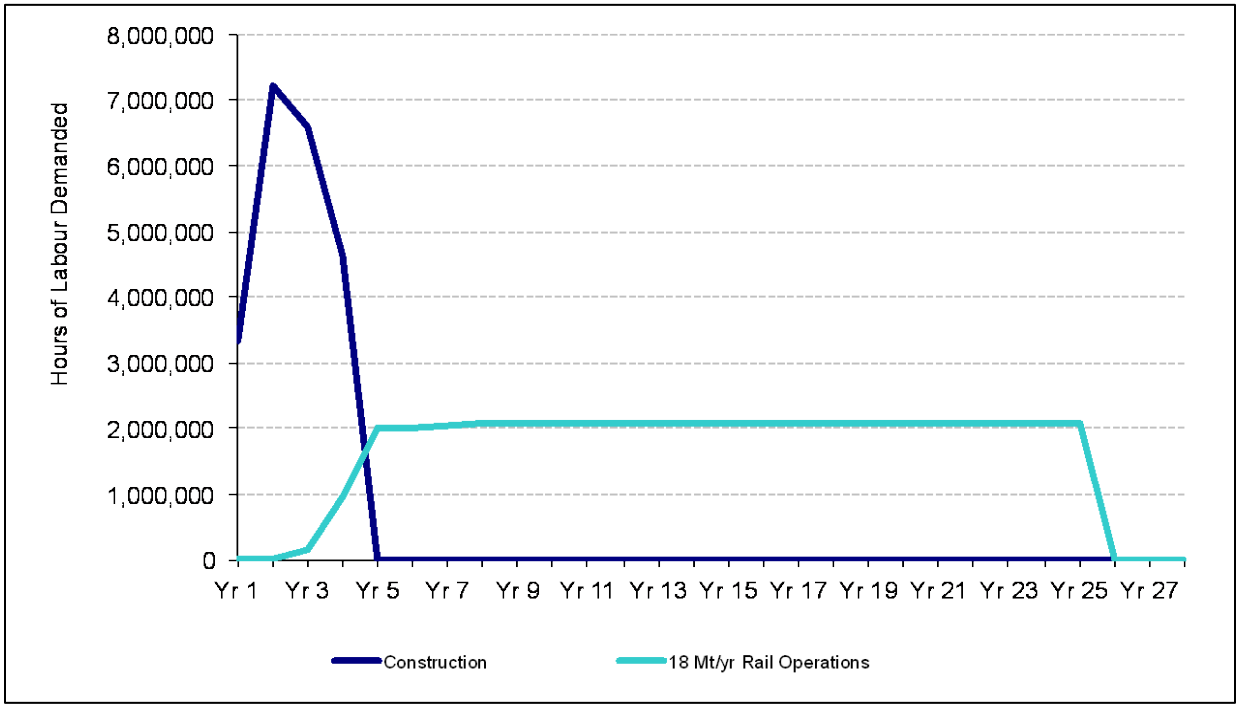
Skill Levels Associated with Project Jobs

The National Occupational Classification (NOC) matrix (HRSDC, 2006) has been used to assign Project job categories to skill levels. The five NOC levels have been condensed into three levels for the purpose of this assessment: level B or higher (designated as “B+”), level C, and level D:

- Level B and higher occupations are jobs that usually require apprenticeship training or college/university education. This level includes jobs such as, industrial trades, train crew operating, drillers and blasters, supervisors, administrative occupations, technical occupations, managers, professional occupations.

[12] Refer to Appendix 4A, Table 14, “Growth of Jobs Relative to Growth of the Inuit Working-Aged Population.”

- Level C occupations usually require secondary school and/or occupation-specific training. This level includes jobs such as heavy equipment operators, administrative support, scheduling jobs, and occupations in food and beverage services.
- Level D jobs are those where on-the-job training is usually provided. These may include kitchen helpers, cleaners, security guards, trades helpers, and labourers.



NOTE(S):

1. ANNUAL CONSTRUCTION PHASE LABOUR DEMAND IS OBTAINED BY MULTIPLYING THE NUMBER OF PAYROLL POSITIONS BY 2,700 HOURS PER POSITION PER YEAR, REFLECTING A TYPICAL 4 WEEK ON / 2 WEEK OFF ROTATION FOR CONSTRUCTION WORKERS. RAIL OPERATIONS PHASE POSITIONS ARE CONVERTED TO HOURS OF LABOUR USING A FACTOR OF 2,080 HOURS PER POSITION PER YEAR, REFLECTING A 2 WEEK ON / 2 WEEK OFF ROTATION.

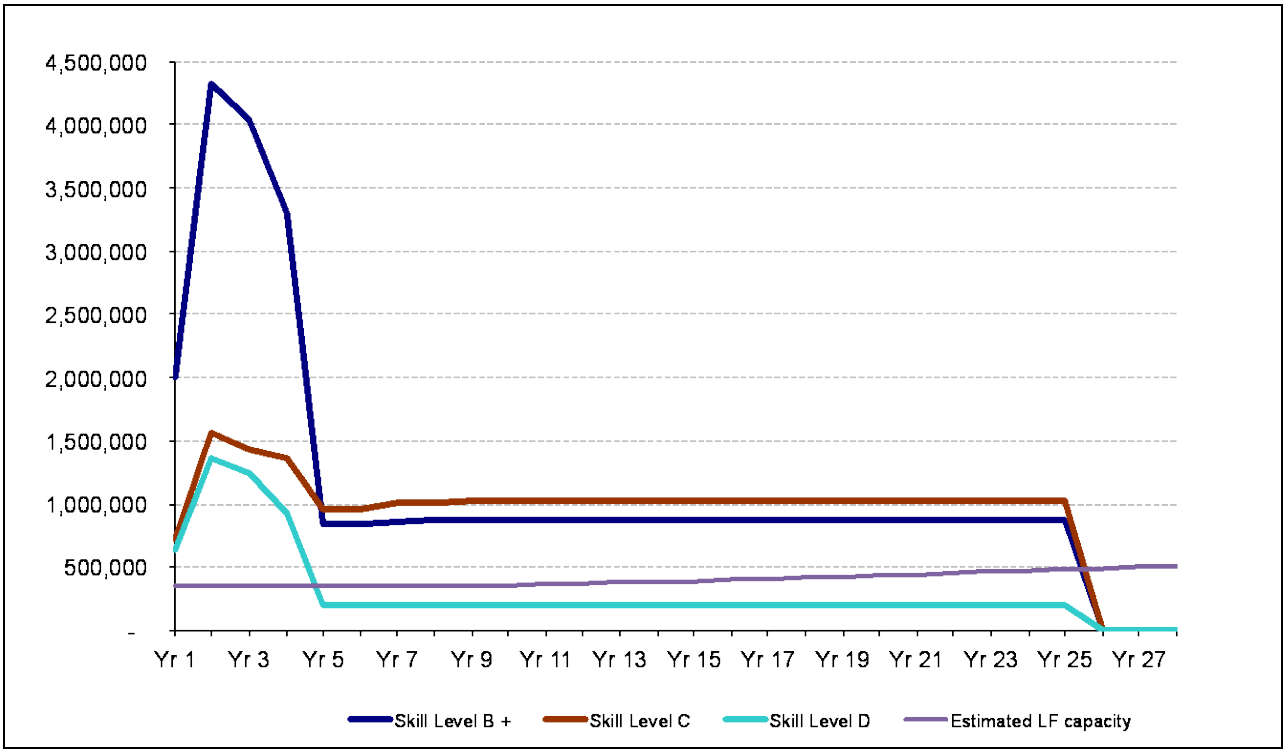
Figure 4-4.1 Total Labour Demand by Project Phase (hours of labour per year)

Most of the labour demanded during the construction phase will be for skilled trades workers and equipment operators. At its peak, the construction phase is estimated to demand 4.3 million hours of Level B or higher skills and 1.6 million hours of Level C skills. Demand for unskilled Level D labour will range from a low of 0.6 million hours to a peak demand of 1.4 million hours.

During operations, the demand for unskilled (Level D) labour is estimated at 200,000 hours per year, the equivalent of roughly 95 full-time, full-year jobs. During the four years of Project construction, demand for Level D skills will be much higher, averaging some 1 million hours, equivalent to some 380 full-time, full-year labour jobs.

Demand for Level C skills during operations is estimated at 1.0 million hours per year, or 475 full-time, full-year job equivalents. During the four years of Project construction, demand for Level C workers will average roughly 1.3 million hours, or some 470 full-time, full-year construction jobs.

Demand for workers with trades and higher level skill sets (Level B and higher) is estimated at 800,000 hours, or 375 full-time, full-year jobs, per year during operations. Demand for this skill level during construction is estimated to average some 3.4 million hours, or 1,260 full-time, full-year jobs.



NOTE(S):

1. SKILL LEVELS RELATE TO THE NATIONAL OCCUPATIONAL CLASSIFICATION (NOC) SKILL LEVELS ASSIGNED TO MANPOWER ESTIMATES. ANNUAL LABOUR DEMAND DURING OPERATIONS IS OBTAINED BY MULTIPLYING THE NUMBER OF PAYROLL POSITIONS BY 2,080 HOURS PER POSITION PER YEAR. A CONVERSION FACTOR OF 2,700 HOURS PER POSITION IS USED FOR CONSTRUCTION PHASE EMPLOYMENT.
2. THE ESTIMATED LABOUR FORCE CAPACITY OF THE LSA (NORTH BAFFIN AND IQALUIT) IS ASSUMED TO INCREASE GRADUALLY OVER THE COURSE OF THE PROJECT.

Figure 4-4.2 Total Labour Demand by Skill Level (hours of labour per year)

Employment of LSA Residents

Many factors will influence the number of Nunavummiut who take up work at the Project. These include factors related to the labour force itself—the number of people available to work, their skills and experience, the availability of other livelihood options, the willingness of people to engage in remote fly-in/fly-out industrial work, and specific attributes of the Project that serve to influence the desirability of Project employment. Some of the key factors are identified in table 4-4.3.

Table 4-4.3 Factors Determining Employment of LSA Residents

Labour Force Characteristics	Labour Market Demand-Side	Internal Project Characteristics
Working-aged Population Employed Looking for work Willingness to engage in fly-in/fly-out work "Essential skills" profile	Availability of accessible jobs Wages and benefits	Accessibility of jobs Wages and benefits Workplace characteristics Career progression opportunities

Estimated Labour Supply Potential

The amount of labour that the LSA labour force will be capable of providing to the Project is expected to be affected by the following hiring practices and entry level requirements:

- Must be 18 years of age or older;
- Minimum educational requirements/equivalency related to position applied to;
- Criminal record does not automatically preclude employment; and
- Pre-employment medical check-up.

People seeking to meet entry requirements will be supported by, for example, courses to build the essential literacy skills needed to function safely on-site are planned to begin prior to Project start-up. Access to follow-up counselling will be provided if and as needed, and individuals will have other chances to succeed in meeting entry requirements. These measures are identified in the HRMP (Appendix 10F-3).

An estimate of the potential labour supply available from the LSA was arrived at by applying the peak labour supply provided from Pond Inlet during the 2008 bulk sample work. Pond Inlet delivered 63,000 hours of labour to exploration and bulk sample activities in 2008 from a local labour market of approximately 289 full-time jobs, equivalent to 520,000 hours of labour.[13] This is equivalent to supplying an additional 12 % labour over the baseline labour force estimate. Applying this 12 % level to the total North Baffin LSA labour market of 1.9 million hours suggests a potential for the North Baffin labour force to supply a total of 230,000 hours of labour to the Project.

Consideration of only the male component of the labour force indicates that men provided 55,000 hours in 2008, from a labour market of 295,000 hours of labour, equivalent to an additional 19 % of labour above the baseline labour market. Applying this 19 % level to the male North Baffin LSA labour market of 1.12 million hours would suggest a potential for the male labour force to supply 213,000 hours of labour from the North Baffin LSA. During the 2008 bulk sample activities, a total of 112,000 hours of labour was sourced from Iqaluit — roughly 2 % of the entire Iqaluit labour market.

While these are considered to be rough estimates, they do provide some insight into the magnitude of labour that the LSA is capable of supplying to the Project:

- North Baffin LSA supply potential is estimated at 230,000 hours of labour;
- An additional 112,000 hours of labour supplied from other LSA (Iqaluit); and
- The total potential labour from the entire LSA is estimated at 342,000 hours of labour.

[13] Refer to Appendix 4A, Section 4.3.1.1.

Capacity of LSA to Meet Project Labour Demands

During the four year construction phase of the Project, the following amounts of labour will be demanded (see Figure 4-4.2, "Labour Demand by Skill Level"):

- 0.6 million to 1.4 million hours of unskilled (NOC Level D) labour;
- 0.7 million to 1.6 million hours of Level C labour; and
- 2.0 million to 4.3 million hours of Level B or higher labour.

During operations the Project is expected to generate demand for:

- 200,000 hours of unskilled (NOC Level D) labour;
- 1,000,000 hours of Level C labour; and
- 800,000 hours of Level B or higher labour.

Comparing these anticipated levels of labour demand with the estimated capacity of the LSA labour force to supply labour to the Project provides insight into how the Project is expected to affect employment in the LSA. For the purpose of this comparison, it is assumed that three-quarters of LSA labour will initially be in entry level labour positions (Level D), with one-quarter in skill Level C or higher jobs.

Based on these estimates and assumptions, the initial employment profile from the LSA is anticipated to look something like this:

- The LSA will be able to supply 85,500 hours of Level C or higher labour, equivalent to 40 full-time, full-year workers. The Project will generate 475 Level C positions during operations and many more during construction. Therefore, the Project is expected to provide plenty of opportunity for LSA workers who have this level of skill and wish to work at the Project.
- Only modest turnover of southern workers will be needed to ensure positions are available for workers from the LSA as they attain Level C and higher skills. For example, a 15 % turnover rate applied to 435 positions filled by southern workers would create 65 job openings per year. It is assumed that turnover will be more than sufficient to support this scenario.
- During the four years of construction the Project is expected to generate average demand for some 1 million hours of demand for Level D skills, or 380 jobs in this skill category. The LSA is assumed to be able to supply 256,000 hours of Level D labour, equivalent to 125 full-time full-year workers. Demand for local labourers will exceed the ability of the local labour force to supply this labour. This means that there should be plenty of opportunity for LSA workers who seek to engage with the Project during construction. Addressing job readiness and life skills challenges may help to address this gap early in the Project.
- During operations, demand for Level D labour skills is expected to decline to 200,000 hours per year, or the equivalent of some 95 jobs. This is a lower demand for unskilled labour than the estimated 125 positions the LSA can supply.
- Substantial labour force development will need to take place to raise local employment participation in the Project from these anticipated levels and to move workers out of unskilled positions into Level C and Level B and higher positions. This will include helping those who seek to work at the Project to meet the entry requirements; reducing turnover rates so that workers are able to move toward more regular rotational employment on a full-year basis; and increasing the skills of these workers so they can progress from Level D positions to higher level jobs.

Job Retention and Turnover

Exploration and bulk sample activities data provides a baseline for job retention and turnover related to remote fly-in/fly-out work. The baseline suggests that over a one-year period, approximately two individuals were hired per job filled by LSA residents from both Iqaluit and North Baffin communities.[14] Over a three year period, three individuals were hired for each job filled by North Baffin residents and two individuals per job filled by residents of Iqaluit.

The long duration of the Project is expected to allow workers to develop the work skills and fly-in/fly-out coping strategies to enable them to maintain employment over time, thereby increasing the hours of labour each worker is able to supply and increasing worker job retention. It is recognized, though, that not all residents will seek to engage in a full-time fly-in/fly-out mining livelihood. Rather, three categories of work experience can be anticipated: "trying-it-out;" "casual attachment as an occasional source of income;" and "career-focused." Each of these motivations for seeking work at the Project will have different profiles in terms of their patterns of job retention.

Summary of Employment Effects

Taking the assumed rates of turnover into account, along with the expected supply of labour from the LSA, the following employment effects are anticipated.

- Some 300 LSA individuals will be involved per year, supplying some 340,000 hours of labour to the Project, equal to approximately 165 full year job equivalents.[15]
- The number of residents involved in the Project may exceed these levels during the first few years as many individuals "try out" the fly-in/fly-out lifestyle. Over a short time frame, estimated at five to eight years, this is expected to settle down. At that time two groups may emerge—those who seek to engage in a longer-term, career-focused way and those who engage year after year but on an occasional basis.
- Normal turnover rates amongst the entire workforce will provide on-going openings for employment at all skill levels, allowing for individuals acquiring new skills to gain promotion.
- It is assumed that the turnover rate will be higher during the initial phases. As Inuit become familiar with work patterns and lifestyle changes, the turnover rate should stabilize. It is not possible to predict this rate based on the baseline data. Monitoring will include data on turnover.

These employment effects are recognized to be approximations. For the purpose of other aspects of this assessment, however, they will be used as the best available assumptions related to the magnitude of direct employment by residents of the LSA.

Proposed Mitigation

Barriers to increased levels of engagement in the Project range from individual employability and "readiness to work" to the inherent demands of fly-in/fly-out industrial shift work to the specific skills that are required by the Project.

Project design and mitigation measures are proposed in the HRMP (Appendix 10F-3) to improve the ability of the labour force to participate in the employment opportunities. Some of these will be implemented

[14] Refer to Appendix 4A, Table 43.
[15] This estimate takes into account a turnover rate of 1.8 experienced during the 2008 bulk sample work.

directly by Baffinland; however, others will involve third parties as both funding and delivery partners. The proposed measures fall into four areas:

- Life skills and work readiness;
- Worker recruitment and retention initiatives, including a Human Resources Management System;
- Skills development through education and skills training; and
- Support for community initiatives through the INPK fund.

Baffinland Human Resources Management System

As part of its Human Resources Management Plan (Volume 10, Appendix 10F-3) Baffinland intends to develop a Project-focused human resources information system to support meeting its operational labour force needs, and to assist in achieving the mutually defined objectives arising from the IIBA and overseen by the joint Inuit – Baffinland Executive and Management committees. This information management system will include the ability to identify individuals who are interested in working in various positions of the Project so that as opportunities arise, people can be recruited by the Company and by its major contractors. As described in Volume 10, Appendix 10F-3, Section 5, the information system will include:

- Job description and posting;
- Electronic record of job applicants and their qualifications;
- Employee communications; and
- External communications through Baffinland Liaison Officers in the five North Baffin LSA communities and Inuit Employment & Training Coordinator.

Baffinland currently has liaison officers hired in Igloolik and Pond Inlet, along with a senior manager in Iqaluit. The company is in the process of hiring liaison officers in the remaining North Baffin point-of-hire communities. These staff people will play a key role in identifying individuals interested in work at the Project and identifying their skills, experience, and specific interests. It will also serve to identify training needed to enable individuals to gain access to Project positions.

These initiatives will be combined with a hiring policy that will give Inuit preference over other applicants. Priority will be given to Inuit from the communities of Pond Inlet, Igloolik, Clyde River, Hall Beach and Arctic Bay.

4.4.3 Assessment of Residual Effects

The creation of jobs and employment of LSA residents are assessed separately, as job creation does not lead automatically to employment of LSA residents. The effect of the Project on indirect job creation is discussed as a subject of note.

Component Assessment: Creation of Jobs in the LSA

Ratings for significance criteria for the effect of the Project on creation of jobs are presented in Table 4-4.4. During its 21 years, the Project will generate a total direct labour demand of approximately 1.5 million hours per year and substantially more than this during construction. As previously noted, under baseline conditions, the labour market of the North Baffin LSA is estimated to generate a labour demand of 2.0 million hours per year, while the Iqaluit labour market generates an estimated demand of 4.7 million hours of labour per year.

Thus the Project, during operations, will increase the labour market of the LSA by 30 %. The peak of the construction phase, the Project will increase the LSA labour market by 7.2 million hours of labour, from a

baseline total of 6.7 million hours, an estimated 107 % increase. The level of job creation is therefore assessed to be of high magnitude, both in the North Baffin LSA as well as in Iqaluit.

Job creation is a positive effect that will be experienced by way of the six point-of-hire communities. The effect may be experienced across the community as an opportunity for residents across the demographic spectrum. The availability of jobs may have beneficial effects even for those not employed; for example, it may encourage students to see the value of education or consider the livelihood paths they wish to pursue.

Given the relatively high turnover rates that are normal within fly-in/fly-out mine operations, job openings are anticipated to be plentiful throughout the life of the Project. Therefore, the Project is expected to generate continuous labour demand up until closure. When the Project ends, direct Project-generated labour demand will end spontaneously.

Table 4-4.4 Effects Assessment Summary - Wage Employment

Key Indicator: Wage Employment		
VSEC: Livelihood and Employment		
Effect	**Creation of Jobs in the LSA**	**Employment of LSA Residents**
Design / Mitigation Measure(s)	LSA points-of-hire	Recruitment strategy Inuit hiring policy Management commitment
Direction	Positive	Positive
Geographic Extent	Point-of-hire communities	Point-of-hire communities
Social Extent	Community	Family
Equity	Bystanders	Engaged individuals
Magnitude	High	High
Frequency	Continuous	Continuous
Duration	Medium	Medium
Reversibility	Spontaneous	Spontaneous
Significance of Adverse Residual Effects	No adverse residual effects	No adverse residual effects
Significance of Beneficial Residual Effects	Significant	Significant
Probability of effect occurring	High	High

Significance Determination

Based on the high magnitude and continuous frequency of labour demand, the positive effect of Project job creation on wage employment is assessed to be significant. This assessment is in line with community perceptions about the Project.

Component Assessment: Employment of LSA Residents

Ratings for the significance criteria for employment of LSA residents are presented in Table 4-4.4. Based on the best available understanding of baseline labour force conditions, including the employment experience during exploration and bulk sample activities, an estimated 300 individuals are expected to be

engaged each year, supplying some 342,000 hours of labour to the Project. In order to achieve and sustain these employment effects, the mitigation efforts described earlier will be required and will need to be successful. In particular, success will be required to move individuals hired into labour positions into higher skill level jobs.

This employment is a positive effect that may be experienced across the study area by way of the six point-of-hire communities. The effect may be experienced across the labour force, though some demographic groups are more likely than others to be attracted to fly-in/fly-out work. Individuals engaged in the Project, along with their families, will be the primary beneficiaries of employment.

The magnitude of LSA employment creation in the North Baffin is estimated at 230,000 hours of new employment, in a baseline environment that creates an estimated 2.0 million hours of labour per year. This is equivalent to an 11 % increase over the baseline—a high magnitude effect. The anticipated effect on the Iqaluit labour market will be 110,000 hours of new labour in a baseline environment where 4.7 million hours of labour are delivered. This is equivalent to a 2.4 % increase over the baseline—on the border line between a low and a moderate magnitude effect.

Employment at the Project is anticipated to be gained by residents across the LSA, although some communities may experience more employment than others. The frequency of employment will be continuous throughout the duration the Project. At Project termination, the jobs will spontaneously end; however, the experience of having worked at a major industrial operation will be long-lasting and is, therefore, essentially non-reversible.

Significance Determination

With the mitigation proposed, the beneficial residual effects of the Project on wage employment of North Baffin LSA residents are assessed to be significant. Positive effects on employment of Iqaluit residents may also be significant. This determination is in line with community expectations that the Project will lead to substantial employment for LSA residents.

4.4.4 Prediction Confidence and Risk Analysis

Component Assessment: Creation of Jobs in the LSA

Confidence in the prediction is high. The large percentage increase over the threshold level provides a cushion to offset any uncertainty related to the precision of the labour demand estimates.

A potential risk to this assessment lies in the assumption that turnover rates will be high enough to maintain continuous job openings throughout the Project life. If turnover is negligible, then few opportunities will become available in the future once the Project gets "staffed up." The probability of this is considered to be very low.

Component Assessment: Employment of LSA Residents

Confidence in the assessment of significant residual effects on employment of residents of the LSA is moderate. Substantial mitigation (i.e., successful human resource development and training) efforts are required to address job readiness and life skills issues that will be needed in order to reach employment expectations. The outcome of these efforts is something that Baffinland cannot control and this precludes a higher level of prediction confidence.

Past experience with the Nanisivik mine suggests that achievement of local employment intentions will not happen passively. The achievement of significance is contingent on effective mitigation that includes "soft"

elements such as the on-going Corporate commitment to bring the goal of Inuit employment into the culture of the Project, as well as the implementation of the specific measures identified in the HRMP (Appendix 10F-3). It is also contingent on the choices and preferences of Inuit with regard to employment and livelihoods. Baffinland can strive to create an accessible work environment and can implement specific capacity-building programs, but has no control over Inuit cultural change.

Several risks to the assessment of significant Inuit employment merit consideration. First, the fly-in/fly-out nature of the Project will suit the lifestyle of only a portion of the local labour force. This is an inherent, or fixed, characteristic of the Project that is not open to mitigation. While the assessment of expected labour supply capacity is based on empirical evidence derived from exploration and bulk sample activities, those activities were over a relatively short period of fly-in/fly-out work. Long-term experience with fly-in/fly-out work has not been experienced recently in the North Baffin. It is not known if many residents will chose to work fly-in/fly-out over a long time horizon; on the other hand, a period of adaptation may lead more workers to choose this option.

Within this context, levels of Inuit employment will be influenced by the success of the mitigation measures that have been identified. The company has significant control over commitment to the goal of Inuit employment, over hiring practices, and over the programs established to support recruitment and retention efforts, but not over the success of these programs. This "uncontrolled" dimension introduces a source of risk to the assessment. Other aspects of the labour force development initiatives will involve third parties. These initiatives may be vulnerable to changing priorities and capacities of parties outside the direct influence of the Proponent, over a long time frame.

A final source of risk relates to the threshold for determination of significance for Inuit employment. These thresholds are conceptually linked to community perceptions of what level of employment is considered to be "sufficient" for the community to feel the Project is a "success." These perceptions may change over time, potentially making the threshold a moving target.

4.4.5 Follow-up

Monitoring by Baffinland will include in its regular monitoring activities data related to total employment, employment in representative occupational categories, absenteeism, and the reasons employees terminate their employment with the Project. This information is addressed in the monitoring framework outlined in Section 15.

4.5 JOB PROGRESSION AND CAREER ADVANCEMENT

In addition to an interest in the number of jobs that may become available to residents, the community expressed a keen interest in the quality of these jobs. Therefore a second indicator, "career advancement," is assessed to look at the potential for progression from entry-level, low-skill jobs toward higher skilled positions. The assessment question is:

"Will the Project increase opportunities for individuals to advance in their working careers?"

4.5.1 Assessment Methodology

Baseline data was not available to support a direct assessment of the expected effects of a major Project on individual job promotion and career advancement. Therefore, the assessment focuses on conditions created by the Project that may reasonably be anticipated to affect career advancement. The extent to which LSA residents succeed in advancing their careers will depend on the nature of these conditions, as well as on characteristics of the LSA labour force itself.

A qualitative assessment of significance in this context will be made if the Project introduces new paths toward advancement that are reasonably within the reach of substantial portions of the LSA labour force.

4.5.2 Potential Effects and Proposed Mitigation

The Project will affect the opportunity for career advancement through these effects:

- Introduction of new career paths; and
- Provision of on-going training programs for employees.

New Career Paths

For the purpose of understanding how the Project may affect the ability of residents to progress in their jobs and careers, the following determinants of job progression are assumed to be of importance:

- Availability of jobs where advancement opportunities are available;
- Progressive "steps" that are within reach;
- Availability of vacancies at the next job level;
- Length of worker retention; and
- Adequate foundation of education to support on-going training.

New Jobs and New Career Paths

The Project offers the potential for people to observe a new range of jobs at close hand, thereby gaining an appreciation and understanding of what these careers entail. Some access to this insight will become available passively, simply by having the occasional local resident engaged in these new jobs. Nunavummiut employed at the Project will gain further exposure to jobs and may have opportunities to observe these jobs and gain an appreciation of whether or not such a career would appeal to them.

Promoting knowledge of job diversity will be important in ensuring that residents, especially youth still in school, have an appreciation of the opportunities available to them. An important factor contributing to successful completion of post-high school education programs is appropriate program selection in relation to an individual's interests. In small economies where many jobs simply do not exist, it can be difficult for a student to gain a reasonable appreciation of what a job may actually entail. A student may embark on a path of learning only to discover that the field of study leads to jobs or careers that are not what was expected. This may lead to a loss of months or years of study and associated investment.

The Project will have an intermediate beneficial effect on appropriate selection and successful completion of specialized programs of study by increasing familiarity of fields of study and their career prospects. This effect could be enhanced to a major beneficial effect should partnerships be established to provide adult students with more active exposure to career opportunities.

A Career Ladder with Narrow "Steps"

The Project presents a potential to expand the labour market and add job categories that span a wide range of skill sets and qualification requirements. This should present access to entry-level jobs that are connected to a multitude of career paths characterized by small "steps" that individuals will be able to negotiate with the support of accessible education and training requirements.

"Room at the Top" to Advance Into

As discussed earlier, there should be plenty of entry-level jobs available during the construction phase. However, most of the labour demand during operations will be for jobs at higher steps up the industry career

ladder. There is a reasonable expectation that turnover rates will be adequate to present good probabilities that there will be openings at these higher level positions for LSA residents who are ready to advance.

Barriers to Advancement - Casual Employment, High Turnover

Two groups are expected to emerge in relation to employment at the Project. One group may consist of individuals who are only interested in occasional employment. This group may include individuals whose lifestyle focus is outside the formal wage economy or outside the mining sector and who work simply to earn a little additional money to support other priorities.

A second group may consist of individuals who are more strongly attached to the wage economy and seek to build a career, either at the Project specifically or in fields where the Project is seen as a means to advance. Within this group, some will have the skills and attributes needed to succeed. Others may struggle with the challenges inherent in the fly-in/fly-out lifestyle or may lack essential life skills for success in the wage economy.

The Project will provide employment opportunities for both of these groups. While most positions will be for regular, year-round employment, there will be opportunities for more casual or seasonal employment, including summer programs and sea-lift; general site-specific clean-up, maintenance and repairs; and special projects that will be carried out from time to time.

Among those who seek more regular wages, several important barriers to career advancement are anticipated. The first is associated with the fly-in/fly-out rotation. While the rotation is considered to be optimal compared to longer work cycles and/or shorter off cycles, this is expected to remain a challenging lifestyle for many. Measures to address some of the stress on individuals and families are described in the Human Health and Wellbeing VSEC (Section 6.0). Nonetheless, some individuals who may otherwise be candidates for successful advancement may simply find the compromises are not worth making.

A second barrier to advancement at the Project may be associated with low levels of education, literacy and numeracy amongst entry-level workers. Many LSA residents may be able to gain entry level jobs with their existing education; however, those who lack a solid educational foundation may encounter barriers to learning as they progress. These barriers may include literacy, numeracy, critical analysis and problem-solving, and a wide range of other foundational skills that are gained through general education programs.

Finally, a barrier may arise in relation to the process typically associated with job interviews. Inuit workers who may be qualified to advance to the next step might not “interview” as well as their southern counterparts. This is a perception that has been identified in other projects such as the Voisey’s Bay mine in Labrador.

Mitigation to Support Career Advancement

Measures to support career advancement will encompass stay-in-school initiatives to increase the probability that entry-level recruits have the foundational skills they will require. Additional measures are intended to, support job retention and reduce turnover; provide opportunities to gain technical skills needed for entry into higher level positions; and Inuit preference in hiring and promotion decisions. These measures are described in the HRMP (Appendix 10F-3) and have been summarized under Section 3.4.2 (Education & Training VSEC), above.

4.5.3 Assessment of Residual Effects

The multiple dimensions, or attributes, related to job progression and career advancement are assessed collectively under one effect, "new career paths."

4.5.3.1 Component Assessment: New Career Paths

Ratings for significance criteria for the "new career paths" residual effects are presented in Table 4-4.5. These residual effects are contingent on the successful implementation of a range of important mitigation measures as described above.

Table 4-4.5 Effects Assessment Summary - Job Progression and Career Advancement

Key Indicator: Job Progression and Career Advancement	
VSEC: Livelihood and Employment	
Effect	**New Career Paths**
Design / Mitigation Measure(s)	Individual career support Inuit hiring/promotion policy Management commitment
Direction	Positive
Geographic Extent	Point-of-hire communities
Social Extent	Community
Equity	Engaged individuals
Magnitude	Moderate
Frequency	Continuous
Duration	Long-term
Reversibility	Spontaneous
Significance of Adverse Residual Effects	No adverse residual effects
Significance of Beneficial Residual Effects	Significant
Probability of effect occurring	High

The introduction of accessible career advancement opportunities is a positive effect that will apply mostly to point-of-hire communities and will be experienced mostly by individuals involved in the Project on a regular, year-round employment basis. Since the opportunities will be potentially available to anyone, the social extent of this effect will at the community level.

It is assumed that not all LSA residents will choose to engage in the regular multi-year employment that is needed for job progression. Amongst those who do, however, the potential for advancement will be good under the mitigation that has been outlined in the HRMP (Appendix 10F-3). As the Project progresses it is assumed that the level of turnover will decline, as workers find strategies to support their fly-in/fly-out lifestyle. The magnitude of job advancement is therefore assessed to be moderate during the early years, due to higher worker turnover, but should become high after the workforce stabilizes, probably within the first five to eight years of the Project. On-going turnover amongst the southern workforce will lead to on-going job openings at all skill levels. Therefore the frequency of access to progressively higher-level jobs will be continuous.

It is noted that the magnitude of this effect will be influenced by the number of individuals who seek to achieve career goals in any of the broad areas of opportunity presented by the Project. This may initially be only low, since baseline constraints in the labour market have created limited career aspirations among many individuals. However, as the Project proceeds and more role-models emerge locally, more and more individuals will be able to visualize the options that may be open to them. The duration of these effects will be over the life of the Project and the effect will be essentially non-reversible, to the extent that this shift in the labour market leads individuals to envision a career path and to take steps to accomplish their goals.

In light of the commitments to Inuit career development outlined by Baffinland and identified in the HRMP (Appendix 10F-3), the probability of these effects is considered to be high.

Significance Determination

Considerable scepticism exists within the North Baffin population that significant numbers of Inuit will gain access to higher level jobs at the Project. This scepticism is recognized. The concern is that local residents will be stuck in low-skill labour jobs. This perspective may be based on past experience with projects such as the Nanisivik and Polaris mines.

However, with the mitigation described in the HRMP (Appendix 10F-3), including a corporate vision that is dedicated to Inuit advancement, along with the more “mechanical” training initiatives that are planned, the Project is considered to represent a major opportunity for local residents to expand their employment and career development options.

The creation of new career paths by the Project is therefore assessed to have a significant beneficial effect on job promotion and career advancement for LSA residents.

4.5.4 Prediction Confidence and Risk Analysis

Confidence in the assessment of significant career advancement opportunities for LSA residents is moderate.

This arises from the high level of dependency of the assessment on mitigation combined with the inherent challenges that arise from the fly-in/fly-out lifestyle and the labour force baseline. Residents will need to choose this lifestyle and mitigation if their advancement is to be effective.

Risks to the assessment, therefore, arise from the high dependence on mitigation and on personal choices. While support measures can be provided to residents to succeed in achieving the opportunities that the Project presents, actual advancement will depend on individual choices and successes. If an adequate number of Inuit do progress early on, this will serve as a visible sign to others that career planning and advancement is possible. If early success is not adequately achieved, higher level jobs may be considered to be out of reach and not therefore not worth working toward.

The expectation that the Project may introduce a broad range of niche jobs for Nunavummiut to pursue is contingent on some form of active guidance and support so that individuals gain exposure to these jobs, are able to identify their personal interests, and are then able to pursue the specialized training and preparation needed. If local residents do not succeed in gaining entry to these specialized jobs, the outcome would be lost opportunity and a reduction in the potential beneficial effects that might otherwise be leveraged from the Project.

4.5.5 Follow-up

Career progression will be monitored during the Project, using appropriate indicators, such as employment by representational occupational groups, drawn from the human resources data system. Monitoring will include employees of contractors, as well as those working directly for Baffinland.

4.6 SUBJECTS OF NOTE

4.6.1 Employment of Specific Demographic Groups

Employment of Young Adults

Employment for young adults is important to Elders and adults in the LSA and as to Baffinland itself, as youth represent a critical component of the labour force that will be needed to achieve significant employment over the Project's life.

Much of the mitigation put in place to support employment and job retention will be of particular value to employment of youth over the age of 18. Specific measures are addressed in the HRMP (Appendix 10F-3).

Employment of Women

Women face several specific barriers to success in fly-in/fly-out mining operations in addition to the generic challenges. They may feel uncomfortable in a traditionally male-dominated job. The potential for harassment that exists on the job may be amplified by the remote, residential dimension of camp life. Evidence from women gathered during community research suggests that success in employing women may benefit from the achievement of a critical mass of women on-site.

The achievement of a substantial level of employment of women will require specific planning and intentional recruitment efforts. These may include steps ranging from camp facility design, assurance of security for all workers, inclusion of gender issues in orientation, and robust anti-harassment policies and practices. These efforts need to be supported by focused recruitment efforts, as well as promotion of opportunities for women to gain non-traditional skills through training initiatives.

The design and mitigation measures that Baffinland intends to implement to support the success of women at the Project are described in the HRMP (Appendix 10F-3). These include the following components designed to promote Inuit women's access to employment in the Project workforce:

- An analysis of the project workforce, which will assess any potential differential impact on women and men of policies, strategies, procedures, practices and conditions applicable to the project workforce. Where appropriate, Baffinland will use the result of this analysis to revise employment and training policies, strategies, procedures and practices.
- A process to be developed by Baffinland to work with the QIA, Nunavut, and federal government agencies, and Inuit women's groups to assist Inuit women to prepare for jobs with Baffinland and its contractors.
- A workplace environment that is welcoming to Inuit women, and workplace policies that help them to retain their positions.

4.6.2 Employment Of Individuals From Outside LSA Points-of-hire

While most local workers are expected to be hired from the six communities identified as points-of-hire, it is recognized that some individuals from communities outside the LSA may seek employment at the Project.

These individuals would make their way to a point-of-hire community where they could pick up the charter flight to the Project site. Iqaluit is expected to be the point-of-hire community used for this purpose, given its position as the transportation hub within the Baffin Region and as the gateway to the Baffin Region from elsewhere in the RSA.

Nunavut workers from outside the LSA may face challenges related to their commute through the capital city. The additional commute time and potential need for overnight accommodation may serve to make this option less desirable. Transport will be planned to avoid overnighting requirements whenever practical. When overnighting is required, BIM will work with local accommodations provider to adequately plan for accommodation in Iqaluit and other locations.

In addition, Baffinland may in the future consider other communities as points-of-hire if the Company deems there are sufficient individuals from these communities available to work at the Project. Given the uncertain levels of this source of labour Baffinland will monitor the numbers of employees coming from outside the LSA.

4.6.3 "Boom", "Bust" and Closure Effects

Residents of the North Baffin LSA, particularly those from Arctic Bay, have experienced mine closures first-hand with the shut-down of the Nanisivik mine in the mid-2000s. In the Kitikmeot Region of the RSA, the Jericho mine closed in 2008 following a brief period of operations. The Lupin mine, also in the Kitikmeot, operated for some 16 years before entering temporary "care and maintenance" in 1998. Since that time, it has experienced several start-ups and closures over the years (Brubacher Development Strategies, 2009). There have been many other advanced exploration and mining projects in the Kitikmeot during these periods of mine closure, including the NWT diamond mines. These have provided opportunities for laid-off workers to seek employment elsewhere in the mining sector. In the Baffin Region the local opportunities for mine sector engagement have been more limited—with the emergence of Baffinland's advanced exploration activities being perhaps the most substantial. These experiences across the RSA illustrate important characteristics of mine-related job cycles.

Typical mine job creation cycle

Job creation related to mining follows a typical cycle with a few jobs during early exploration, expansion during advanced exploration, massive growth during the construction phase ("Construction Boom"), followed by shedding of construction jobs at the start of operations ("Bust I"). Job numbers typically remain stable during the Operations Phase, barring the occasional slowdown due to market factors, but eventually drop off at closure ("Bust II").

Construction to operations

The Project can reasonably be expected to follow this typical pattern, with peak labour demand reaching some 7.3 million hours per year during construction and then dropping to 2.0 million hours per year through the Operations Phase. Labour demand will therefore decline as the Project evolves into the Operations Phase and will decline further during the Closure and Reclamation Phase. Demobilisation will take place carefully to ensure that employees are fully aware of their period of employment, given adequate notice at the close of their employment and provided with opportunities to apply to positions in the operations team.

Given that the LSA is estimated to have a labour supply capacity of roughly 0.35 million hours, this first "bust" should not be experienced by workers recruited from the LSA. The level of employment demanded during the Operation Phase is expected to exceed local supply capacity.

However, this analysis assumes that LSA residents are able to gain access to the jobs that remain during the Operations Phase. As discussed earlier, the demand for labour or Level D workers will decline substantially, from roughly 1 million hours per year to 200,000 hours. The LSA was estimated to be able to supply 256,000 hours of skill Level D labour. This means that during the four year construction phase, training efforts to bring these entry-level workers up to the higher Level C positions will need to be adequately successful if a construction-phase to operations-phase employment "bust" amongst this labour component of the workforce is to be avoided. Training initiatives to be implemented during the construction phase, the "Construction Training Program" (HRMP, Appendix 10F-3) are designed to achieve this outcome.

Demand for Level C and higher skill level workers are expected to exceed the supply capacity of the LSA. This is the case even if all of the Level D workers who participate in the construction phase succeed in advancing to these higher level jobs. Therefore, no "bust" effects are anticipated for these higher-skilled workers. The number of LSA residents employed in specialized construction positions who could not be transferred to post-construction positions is believed to be negligible.

Temporary shut-downs or slow-downs

As with other mine projects, the Project will be susceptible to temporary slow-downs or shut-downs arising from a range of factors. These include global economic conditions that lead to major declines in the demand for steel and, as a consequence, iron ore. The resulting impact on price and/or quantity of ore that can be sold might lead to lay-offs. Some mitigation may be had by entering into long-term supply contracts.

Temporary slow-downs and lay-offs could also result from events that disrupt the flow of ore from the mine to its markets. This might include disruption to the rail line such that substantial time is required get the trains running again (e.g., major damage to the tracks requiring a substantial period of time to repair), disruption of the shipping component for a long enough period to require slow-down in mining and transportation of ore to the port site, or labour disruptions either at the Project, amongst the shipping component, or at the final destination ports.

These events are not expected to occur, however they are considered to be credible risks to the consistent operation of the mine and could lead to lay-offs of uncertain duration.

Final mine closure

At closure, it is anticipated that local labour disruption may occur. The level, location, and nature of this disruption will depend on the pattern of employment that results during the Project and the nature of the territorial, regional, and community economies at the time of mine closure. Full-time, long-term employees may experience closure effects quite differently from occasional, short-term employees. Those who have gained specialized or highly demanded skills sets may experience closure effects differently from those who engage in the Project as labourers.

It is possible that some individuals may move away from their communities in search of new employment opportunities. However, it is equally possible that alternative fly-in/fly-out projects may emerge that would enable skilled workers to maintain a similar lifestyle. Given the time frame of planned final closure, it is not possible to reliably predict how it will affect migration or households.

The timing of this event is uncertain, given the possibility that further exploration efforts might lead to additional years of mining following termination of the Project. Nonetheless, mining at Mary River will end and jobs at the Project will be lost.

Effects of lay-offs

Job loss will affect both individuals, their households and their communities. The intensity of job-loss effects for the LSA will depend on the level of success the Project has in recruiting workers from the local labour force and on the nature of the employment relationship these workers have with the Project.

Workers who have maintained their employment for a long-enough period will be eligible to receive Employment Insurance (EI) benefits. For shorter-duration disruptions, EI coverage may be sufficient to tide someone over to the re-starting of operations.

Individuals who grow into long-term employment relationships with Baffinland may be affected more intensely than those who maintain a more casual work relationship. However, long-term workers may also be more highly sought by other employers since they will have a strong employment history. Project-termination effects can be prepared for through career planning and counselling early on during the Project, so that individuals consider their interests and capabilities and use the Project as an opportunity to build the skills that they hope to carry forward into the future. Financial planning, incorporated into more general money management orientation materials, may also assist individuals in preparing for future uncertainties.

Households and communities generally will be affected by loss of the income earned by workers and businesses. The intensity of community-level effects will depend on the degree of involvement. Designation of multiple points-of-hire—six within the LSA—may have the effect of spreading the closure "pain" more thinly across a broader region. As the Project proceeds, it will become apparent which communities are most involved and what level of income they are enjoying.

While the Project jobs are certain to terminate at some point in the future, the potential that employment and income generation may lead to sustained employment benefits has been noted by some community residents. The mechanism for this to happen — essentially using the Project to leverage sustained economic development — would be through the tools of community economic development. One dimension is anticipated in the area of human resources development. Employment at Baffinland will provide North Baffin residents with a set of skills that can be transferable to other positions found in the public and private sectors. In the case of an economic downturn or at the end of the mine life, the skills acquired on the Project could be applied with future employers or provide the necessary skill set to become self-employed.

4.6.4 Indirect Job Creation

The increased economic activity brought about by the Mary River Project will lead to a substantial number of indirect jobs being created the private sector, as increased personal income earned by Nunavummiut employed at Mary River enters into the local economy. New positions are also expected to arise in the public sector, reflecting increased government revenues from personal and corporate taxation, and within Inuit organizations that will gain revenues from the Project through royalties, rents, and IIBA contributions.

The extent of job creation in the private sector will depend on the capacity of local businesses to respond to the growing spending power of residents by offering the goods and services they demand. Business capacity and development prospects are discussed under the Contracting and Business Opportunities VSEC (Section 8.0). The extent of this effect will be influenced by the partnerships and investments implemented to support a significant positive outcome in this area.

Some insight into the potential for employment creation in these areas is provided by macro-economic modeling (see Appendix 4B). Based on the historic economic relationships observed in Nunavut, this

modeling suggests that over the period from Project construction through to closure, the Mary River Project could generate more than 1,000 jobs per year in the goods sector, most created by the Project itself. An additional 900 indirect jobs could arise across the RSA in the service sector and some 600 to 700 jobs in the government sector associated with increased personal income and government revenue, respectively. Job creation in the public sector will be influenced by the political decisions related to the allocation of increased revenues to government that are generated by the Project.

"Will residents of the LSA have the skills needed to fill these indirect jobs?"

The involvement of study area residents in these indirect jobs will initially reflect the current baseline labour market conditions and the kinds of jobs generated. It is reasonable to assume that many of these jobs will be filled by employees recruited from outside the territory, as is the current baseline situation.

4.7 IMPACT STATEMENT

The Project is assessed to have no significant adverse residual effects on the Livelihood and Employment VSEC. With successful implementation of planned mitigation, it is assessed to have significant beneficial effects on this valued component.

Impact Statement for Key Indicator 1 - Wage Employment

The Project will have a positive effect on wage employment in the North Baffin by introducing new job opportunities and assisting local residents to access these jobs.

Impact Statement for Key Indicator 2 - Job Progression and Career Advancement

The Project will have a positive effect on the ability of local residents to progress in their jobs and career choices. This effect will arise as a result of the new career paths that will be introduced to the region, from entry-level through step-by-step advancement to higher level jobs.

Potential for Cumulative Effects

No negative residual effects are assessed to arise from the Project in relation to the Livelihood and Employment VSEC and therefore no cumulative effects are expected.

SECTION 5.0 - ECONOMIC DEVELOPMENT AND SELF-RELIANCE

The Economic Development and Self-Reliance VSEC address interactions between the Project and the economy of the LSA and RSA. Effects of the Project on the traditional economy are addressed under the Livelihood and Employment and the Resources and Land-use VSECs (Sections 4.0 and 10.0, respectively). Effects on the business sector are addressed under the Contracting and Business Opportunities VSEC (Section 8.0).

5.1 BASELINE SUMMARY

The following section provides a summary of baseline data that is of relevance to the Economic Development and Self-Reliance VSEC. Further detail and underlying data is provided in the Socio-economic Baseline Report, Appendix 4A and in the Economic Impact Report, Appendix 4B.

5.1.1 Baseline Conditions

Size and Composition of the Nunavut Economy

Government Sector

The public sector accounts for a large portion of Nunavut's economic activity. Public administration accounted for $271 million (24 %), of the territory's total $1.1 billion GDP in 2008 (Government of Nunavut, 2010a). Education and health expenditures account for another $202 million. Combined, these public expenditures account for 42 % of the territory's GDP. Publicly funded construction activity—social housing, and various public infrastructure—further bolsters the contribution from the public sector.

The GN Department of Finance (2010a) notes that public sector jobs in administration, education and health areas account for about half of all earnings in the territory. As observed by the Conference Board of Canada (2010) this large public administration sector provides stability to the territory's economy. In the study area, this will particularly be the case in Iqaluit. In the LSA, the communities of Igloolik and Pond Inlet can be expected to be more insulated from economic ebb and flow in the private sector, since these communities have a significant number of decentralized government jobs.

Mining Sector

Nunavut's mining sector is once again expanding following the closure, in the previous decade, of the Nanisivik and Polaris mines in the Baffin Region and the Lupin and Jericho mines in the Kitikmeot Region. The recent opening of the Meadowbank Mine outside the study area in the Kivalliq region is expected to begin contributing over $90 million to Nunavut's GDP now that it has entered production (Government of Nunavut, 2010a). Medium-term prospects for expansion in the sector include Newmont's Hope Bay development in the Kitikmeot, and AREVA Resources' Kiggavik project in the Kivalliq region.

The Mary River Project is the only project In the LSA that has progressed to the point of having completed a project description and a definitive feasibility study. Exploration has been taking place at Roche Bay, and early exploration activities are being carried out by Peregrine Diamonds in the South Baffin Region, particularly at their Chidliak Property. A number of exploration activities, mostly related to diamonds, are at a very early stage of exploration.

A major challenge for the territory is to develop the labour force and entrepreneurial capacity to participate in the economic activity generated by the mining sector. The Conference Board of Canada (2010) points out

that the shortage of skilled workers is expected to lead to local workers filling 15-20 percent of Meadowbank jobs. Major investments in training will be required to improve these numbers.

The Nunavut Government (2005) formally recognizes the potential for the mineral sector to contribute to sustainable community development and the need for communities, government, and the mining companies to work effectively together to achieve this potential. For example, the following statements are made under "Pillar 2 Community Benefits" of the territory's strategy for mineral exploration and mining:

> "The *mineral exploration and mining industries have the potential to contribute significant and sustainable benefits to Nunavummiut, including infrastructure, jobs, education, skills, career development and local business opportunities*."
>
> "*Economic development, however, also has the potential for negative socio-economic impacts, which could include wealth mismanagement, loss of traditional lifestyle, and increased stress on already struggling community social infrastructure*."
>
> "*It is essential that strong and functional relationships between developers, government and communities be established to manage impacts and maximize benefits, and to ensure that the development of Nunavut's mineral resources is beneficial to all Nunavummiut*."

Construction

The construction industry in Nunavut is driven by a combination of government-funded infrastructure projects and major private sector developments such as the Meadowbank mine, where construction peaked in 2008, contributing some $250 million to territorial GDP that year. Residential construction is also an important component; for example, residential construction in Iqaluit varied between $33 million and $53 million from 2006 to 2009 (Government of Nunavut, 2010a). For the 2010-11 fiscal year, a total expenditure of some $111 million is envisioned in the territorial government's capital expenditure plan, with another $23 million in capital projects funded jointly by the territorial government and various third-party funders (Government of Nunavut, 2010b).

Planned capital expenditures for the LSA total $32.3 million for the five-year planning period, 2010-11 to 2014-15, while $33 million is planned for Iqaluit. Across the territory, a total of $381.6 million in capital expenditures is envisioned.

Transportation

The transportation sector provides a critical link between Nunavummiut in small communities to the specialized medical and educational services that are available only in larger centres. For the 2010-11 fiscal year, for example, the territorial government has budgeted $47.9 million for medical travel, an expenditure that has increased at a rate of 6.9 % year over year, from a level of $32.6 million in 2005-06.

The GN Department of Finance (2010a) notes that imports of goods into Nunavut by air and marine transport totalled $900 million in 2008, and notes that the Iqaluit airport moved into the top 20 busiest airports in Canada, based on number of flights. In spite of the tremendous importance of air and marine transport, the sector is largely based outside of the territory. As a result, transportation contributes less than $21 million to the territorial GDP.

Locally, snow machines, ATVs and small boats are important components of the transportation sector, used for harvesting country food and for inter-community travel along well-used traditional routes.

The high cost of transportation means that many Nunavummiut face limited mobility options. For example, ownership of snow machines, ATVs or boats is out of reach of those who are solely dependent on social assistance. Passenger airfares, typically in the $1,000+ range, are also well beyond reach. For many Nunavummiut, medical travel or other publically-provided travel becomes the only means to get out of town.

Renewable Resources

Nunavut has a small commercial offshore fishery based on turbot and shrimp, primarily in Baffin Bay and Davis Strait. Nunavut's share of this fishery has grown significantly during the past half decade. Turbot quota allocated to Nunavut interests totalled 9,350 tons for the 2010 season, up from 5,326 tons in 2005. This increased quota has come as a result of concerted efforts by Nunavut industry and government to influence federal decisions on stock allocation. In addition to gaining access to the resource, and the "royalty" value inherent in this access, the territory has worked hard to maximize the value of this fishery to Nunavummiut through ownership of fishing vessels and supply of labour. These offshore products enter the market as commodities.

In addition to the offshore fishery, some commercial char production is carried out at plants in Pangnirtung, Iqaluit, Rankin Inlet and Cambridge Bay. Although the economic value is modest, the quality of this product is high; potential for value-added processing and marketing, including supplying the local Nunavut market where high retail food prices are the norm, continues to be realized. A modest commercial caribou and musk ox harvest is also carried out, the former predominantly from Coral Harbour and the latter from Cambridge Bay. As with the char fishery, these products high-value specialties that sell for premium prices. Recent changes in the federal food subsidy program (Food Mail) might facilitate intercommunity trade of these products.

Given the importance, and precedence under the Nunavut Land Claims Agreement (NLCA), of the traditional non-commercial harvest of these species, the potential for expansion of commercial fish and wildlife operations is subject to inherent biological limitations.

Tourism, Arts, and Cultural Industries

Most visitors to Nunavut come to the territory in the course of their work activities. These business travellers are estimated to account for approximately three-quarters of all tourists[16] to Nunavut. Between 3,000 and 6,000 visitors come to the territory each year for purposes not related to their work; this component spends $6-12 million annually (see GSGislason and Associates Ltd., 2005).

Among these expenditures, an estimated $4-8 million is allocated to non-hunting tourism-related expenditures, of which no more than an average of ~$100,000 per year (10-20 %), would be spent in these smaller Nunavut communities.[17]

Applied to the five North Baffin communities, a total estimate of some $500,000 is allocated each year across the LSA to tourism outside the business travel and sport-hunting areas. These expenditures include those of cruise ship visitors, visitors to the national park, and adventure tourists.

An estimate of the value of cruise ship tourism is suggested from the Arctic Bay Community Economic Development (CED) Plan (Hamlet of Arctic Bay, 2007), which noted three cruise ship visits in 2006 with

[16] It is common to include business travelers within the broad "tourist" category. Their expenditure pattern is similar to that of other visitors—hotel accommodations, food, transportation, purchase of souvenirs and gifts.

[17] GSGislason and Associates (2005) considered seven communities ranging from Pangnirtung and Pond Inlet to Kugaaruk and Repulse Bay. They note that Pangnirtung would attract the largest expenditures.

between 20 and 100 passengers who spend an average of between $70 and $100 each. This leads to a total local expenditure in the neighbourhood of $15,000 from the cruise ship sector for one community.

As noted frequently over the past decade, tourism in Nunavut is characterized more by its "potential" than its current reality.[18] The Hamlet of Arctic Bay (2007) CED Plan notes that in addition to the three cruise ships, there were also, in 2006, six sport hunters. The plan implies that visitors who come for business purposes may be the real target for generating increased revenues: "There are no tourists per se that really come to Arctic Bay, mostly business people, government officials, contractors, doctors, dentists and optometrists." The plan goes on to note that "There aren't any tours offered through [by] the hotel. There aren't any tour guides and again, this should be developed with the ever-growing potential tourism market in Nunavut." The potential for development and marketing of one or two-day packages that start from the hotel is recognized by local governments and the GN.

The market for local arts and crafts is an important benefit of the tourism sector, for both business travellers and for those engaged in of recreational tourism. A challenge for artists is to build up inventory that is adequate to meet demand. This can be particularly challenging during cruise ship season, when several hundred passengers may come through the community over the course of a few weeks.

5.1.2 Expected trends in the absence of the Project

Nunavut's economy generated some $1.1 billion (in 2002 dollars) in economic activity in 2008, with some 10,000 jobs being generated by the territorial economy. This is forecast by the Conference Board of Canada (2010) to grow to $1.5 billion (in 2002 dollars) by 2020 with 11,800 jobs being generated. This estimate does not include the Mary River project, so under baseline conditions, the Nunavut economy is expected to add 1,800 jobs and $0.4 billion in economic activity over the coming decade.

Despite the importance of the public sector to the territorial economy, future economic expansion is not expected to be driven by growth in federal transfers to Nunavut but in the private sector (see Clinton and Vail, 2008).

5.2 ISSUES SCOPING

Contribution to Economic Development Objectives

Major economic projects present opportunities to support achievement of local development aspirations. The mechanisms that drive these opportunities typically include project effects on human resources development through training and employment, expansion of local business opportunities by raising the level of disposable income available to purchase local goods and services, and by offering opportunities to supply goods and services to the project, and in development of local and regional infrastructure through direct contributions as well as through increased government revenue.

During an economic development scoping workshop, an expectation was raised that the benefits of a major mine project need to go beyond simply "levelling out" the negative effects a project may generate. Rather, a project like Mary River should actually contribute to the positive development direction of a community.[19]

[18] For example, Clinton and Vail (2008), suggest the "tourism industry remains largely undeveloped." The Department of Finance (2010a) suggests "tourism has sizeable potential to add value."
[19] Meeting with the Pond Inlet EDC, January 2007

Project Closure Concerns

Community residents are familiar with mine closures. During a scoping meeting, one local leader asked, "What happens when the project is finished?" The following exchange took place at one of Baffinland's public meetings:

> [Local MLA]: *"I am very much in favour of employment being created. The feeling is that the mine is the only place where they can obtain employment…but there are other places. There will be probably other problems that will arise in the future that will be taken care of. I have a son who is 18 and by the time he is 36 the mine will close. What do we do with their future?"*
>
> [Baffinland Representative 1]: *"Job opportunities and skills development lead to other opportunities to apply it to other things. We see that work opportunities at the Project not only support the project but have the potential to support a wider range of activities. There will be new skills acquired that can be transferred."*

This exchange highlights the need and expectation that the opportunity provided by one mine project needs to be used as a springboard to other future opportunities. Capacity development will be an important factor in determining these future opportunities.

5.3 GENERAL SUBJECT OF NOTE: ANALYSIS OF CONSOLIDATED EFFECTS ON ECONOMIC DEVELOPMENT

This section is intended to provide an overview of the overall, consolidated outcomes on economic development in Nunavut that may be expected to arise from the Project. Given that the processes that drive economic development involve all of the VSECs assessed throughout this Volume, this analysis is treated as a "general subject of note." The assessment of the Project's significance on each of the VSECs is provided under the appropriate sections of this Volume.

Following this general analysis of Project effects on the economy, an assessment is provided to support the significance determination on the specific VSEC of Economic Development and Self-Reliance. This assessment is presented in this Volume, Section 5.4.

5.3.1 Project Effects on the Foundations of Nunavut's Economy

Consideration of potential Project effects on Nunavut's economy presented above is implicitly based on a "four capital" model.[20] This model assumes that the foundation for economic development involves four critical dimensions or forms of "capital." These are:

- Human Capital: the ability of people to live healthy, secure and productive lives;
- Natural Capital: land, resources, ecological functions, and the knowledge associated with these;
- Physical Capital: buildings, equipment, communications networks, transportation networks; and
- Social & Organizational Capital: the structures in place to organize activity—families, kinship groups, community institutions, government, business, Inuit organizations, laws and regulations.

This model assumes that economic development requires capacity in each of these areas. Weaknesses or gaps in any area may become a barrier to the achievement of development objectives.[21]

[20] This model was used by the GN Department of Sustainable Development as early as 1999, and adopted in the development of the first "Nunavut Economic Outlook" prepared by Conference Board of Canada (2001) and in the Nunavut Economic Development Strategy (2003).

The Project is expected to affect formation of each of these foundations of Nunavut's local, regional and territorial economy through the following interactions:

- Employment, training, experience, and wages;
- Purchase of goods and services from local businesses;
- Payments of taxes to government;
- Payments of royalties, and negotiated IIBA benefits to Inuit institutions; and
- The biophysical "footprint" of the Project.

Employment, training, experience, and wages

Local employment will increase Human Capital through multiple interactions. These Project effects include increased skills and experience and improved life skills arising directly from employment opportunities (see Section 4.0) as well as through education and training (see Section 3.0).

In addition, employment will lead to wealth creation by providing wages that will enter households as income (see Section 6.0). This income will further support Human Capital development (through improved food security as just one example). The potential that this increased income may lead to challenges as well as to benefits is also considered in Section 6.0. Some of this increased household income will enter into the local economy creating improved opportunities for business development (see Section 8.0)—one aspect of Social and Organizational Capital expansion. Increased household wealth will reduce the economic dependency of households on government social welfare programs. This will reduce government entitlement program spending obligations (see Section 12.0). Increased household wealth also has the potential to support productive engagement in the land-based economy through harvesting and other related activities (see Section 4.3).

The increased competition for skilled labour that arises from Project-related employment may also affect the ability of local employers to hire the labour they need. It is expected that a more competitive local labour market may lead to short-term challenges for municipal employers, but should improve labour force capacity over the longer-term. This relates to Social and Organizational Capital (see Section 7.0).

The fly-in/fly-out options provided by Project employment, combined with the multiple points-of-hire and increased household wealth means that mobility options will increase for some households. The possible effects this has on population demographics and on community fabric (a dimension of Social & Organizational Capital) is considered (see Section 2.0 and 4.0).

Purchase of goods and services

The Project will purchase a substantial value of goods and services for on-going operations and especially, for the construction of the Project. These expenditures will include fuel, heavy machinery, rail and rolling stock, professional engineering services, and a wide diversity of additional goods and services. By their nature, these products will be sourced from across Canada and globally. A portion will be sourced from Nunavut from existing, expanded, or newly-formed businesses, thereby increasing the Organizational Capital—business capacity—of the territory. Assessment of how Project interactions are expected to affect Nunavut businesses is provided in Section 8.0.

[21] For the purpose of this assessment, the fundamental development objective is an attainment of a "high and sustainable quality of life." This definition was introduced in the first "Nunavut Economic Outlook" prepared by Conference Board of Canada (2001), and subsequently adopted in the Nunavut Economic Development Strategy (2003). Refinement and definition of what this means in the Nunavut context has evolved, such as in the *Tamapta* mandate of the Third Legislative Assembly, 2009 to 2013.

Payment of taxes, royalties, and other contributions

The Project will generate tax revenues for both the territorial and federal governments as described in Section 12.0. These revenues will help to strengthen the fiscal position of the territorial government and are considered to contribute to building Organizational Capacity.

As the owner of subsurface mineral rights, NTI will also receive revenues from the Project. This is described in Section 12.0, along with a description of NTI's policy related to resource revenues. Other payments to Inuit organizations will include land rents, gravel or quarry royalties, and IIBA cash payments that will be negotiated between Baffinland and the QIA. These revenues are also considered to contribute to economic development by building Organizational Capacity of regional and territorial entities.

In Nunavut, most municipalities receive their revenues from the territorial government. Within the LSA, only the City of Iqaluit also generates revenues from its own tax base. Baffinland recognises that, although the municipalities of the LSA are the levels of government most closely affected by the Project, these local governments will not receive tax revenues flowing directly from the Project. Further under the terms of the land claims agreement, impact and benefits agreements related to major projects are negotiated with the Designated Inuit Organisations, not with local municipalities. In the case of the Project, and as noted previously, the IIBA will be with the QIA; for these reasons, the financial benefits flow to Inuit organizations and to levels of government that do not include the municipalities. Whether revenues paid to the Government of Nunavut by Baffinland find their way to local communities will be determined by governments as mediated through the political process.

Biophysical "footprint"

The potential that the Project's physical "footprint" may have economic interactions is considered both in the context of the land-based harvesting economy as well as the commercial wage-based economy. The impact of shipping and rail traffic on Inuit land-use and harvesting is addressed in Section 10 and in Section 4.3. The potential for biophysical interactions with other economic sectors such as tourism and commercial fisheries is addressed in Section 5.4.

5.3.2 Putting it all Together

Effects on the territorial economy

How will these various interactions combine to create "net outcomes" in the economy? Nunavut's economy is a complex system, influenced by a wide range of factors. These include decisions made by households, business, and government. They also include national and global factors that affect investment, prices, and markets. Project interactions will be just one of many things that will affect economic outcomes and achievement of development goals.

Notwithstanding this complexity, the potential ways by which the Project may affect Nunavut's economy "as a whole" can be considered. Two questions will help to focus this analysis:

- Will the Project affect the nature of territory-wide economic functions? and
- Will the Project affect the magnitude of economic flows across the territory?

Some territory-wide effects are expected to arise from Project interactions. The following points can be made:

- Government: Increased government revenues may be substantial. Increased tax revenue will increase government capacity to invest in the foundations of the economy. Whether and how government expenditures do affect the functions of the economy will depend on the nature of these expenditures. These would be beneficial effects.
- Inuit institutions: Increased revenues flowing to Inuit institutions—NTI and QIA—may also be substantial. Allocation of these funds may serve to strengthen some aspects of Nunavut's economic foundation. Whether and how these Inuit institutional expenditures do affect the functions of the economy will depend on the nature of these expenditures. These would be beneficial effects.
- Labour market: A wide range of new fly-in/fly-out jobs will be created directly by the Project. These are expected mainly to be "effectively located" in the six point-of-hire communities. Indirect employment is expected to be created through increased government and Inuit institutional capacity arising from Project-derived revenues. Indirect jobs may also be created through expansion of the business sector. These indirect jobs may be created across the territory.
- Labour imports: Under current conditions, much of Nunavut's demand for skilled labour is met through "imports" of workers from the south. This may include individuals who work for weeks to months at a time on specific projects. The Project will increase the amount of imported labour; however, unlike many of the southern workers currently engaged in the territory, these individuals are not expected to reside in Nunavut communities, since they will generally travel to Project sites directly. Through its "human capacity" development effects, the Project is expected to improve local labour force capacity over time. This should serve to decrease labour imports over time.
- Business: The potential for a "qualitative expansion" of business capacity (i.e., "moving it to the next level") is recognized as a possibility. For example, if Nunavut's construction sector gained the capacity and the market to enable Nunavut construction to be carried out by local firms, this would be an important "territorial economy" advancement.
- Incremental increase in "economic flows" leading to critical mass effects: Increases in personal and government expenditures, including construction and other "capital formation" activities arising directly and indirectly from the Project is expected to permeate all corners of the territorial economy. It is possible that some opportunities that formerly were not viable may achieve a critical mass—in terms of market expansion, human skills, government capacity, or critical infrastructure—and become viable. These positive effects would not necessarily be confined to communities or regions directly associated with the Project and are, therefore, considered to be "territorial effects."
- Transportation: Improvements to scheduled passenger air service caused by direct Project demands are not anticipated since transportation is expected to be provided between point-of-hire communities and the Project through charter service. However, the possibility that increased household wealth may lead to increased mobility and hence to greater passenger air service is acknowledged. Improvements to territorial marine transport services are not anticipated since Project marine transport is expected to be dedicated to Project needs.

- Consumer spending: Increased consumer wealth arising from direct and indirect Project effects is expected to lead to increased consumer spending. This is due to a "pent-up demand" for a wide range of goods including food as well as durable items such as furniture and so forth.
- Consumer prices: Increased consumer spending is not expected to lead to increased prices for consumer goods. Most of these goods are imported into Nunavut from large southern markets. Nunavut demand will continue to be small relative to these markets and is expected to have no inflationary effect on prices of imported goods.

Effects on community and regional economies

The question of whether a major project like Mary River will lead to sustained economic development is an important one. The Nanisivik Project in Arctic Bay is one example that suggests that large projects don't necessarily guarantee meaningful or sustained regional economic development.[22]

The Mary River Project represents an opportunity to achieve community and regional economic development objectives. Accomplishing this will require that good results are achieved in the development of labour force capacity and business/entrepreneur capacity. The Project is expected to have positive effects on important determinants affecting labour force and business capacity, such as education, experience and skills, opportunities for career advancement and for business, and wealth available for consumption and investment.

Since part of the outcome will depend on community-specific attributes, the prospect for diverse regional outcomes is recognized. Some point-of-hire communities may gain more from the opportunities presented by the Project than others. Different access to jobs between point-of-hire and other communities is expected to lead to different levels of employment at the Project.

Will these lead to intra-regional differences in terms of local economies? This should be expected. As the economic base expands with the addition of Project opportunities, there will be increased opportunity for specialization and economic differentiation amongst the affected communities. Some communities will supply more labour than others. Some communities may host businesses that supply more services than others. Will this differentiation lead to economic disparity amongst these communities? That is a possible outcome. In particular, if some communities succeed in supporting a substantial number of residents in fly-in/fly-out employment at the project, local wealth will increase. This might serve to create the "critical mass" of opportunity for local consumer-oriented businesses to emerge.

However, different levels of economic engagement with the Project may be off-set somewhat by government and Inuit organization investments and expenditures that may be made to create opportunities for those communities that, for whatever reason, do not enjoy the same degree of economic benefit from the Project. It is noted that NTI's resource revenue policy is designed to share revenue with all three Regional Inuit Organizations (see Section 12.4.1).

Effects on household economies

Within communities, households are expected to be affected in various ways including: income, expenses, roles, time allocation, internal communications, and degree of income equality with other households.

[22] See, for example, Brubacher, 2002. "The Nanisivik Legacy in Arctic Bay."

Household income and expenditures

Households that include one or more previously under-employed members working at the Project will experience increased income. Based on previous mining experiences, it may be expected that some households will have fairly "casual" employment relationships with the Project, leading to modest levels of income. Others will maintain more regular, year-round employment, earning substantial annual incomes. During the final years of the Nanisivik mine it was found that a large number (58 %) of all workers from Arctic Bay earned less than $10,000 in a year, while only 16 % earned more than $55,000[23]. Both modest and substantial levels of earnings will have importance for households. As suggested in that report:

> "*The interviews indicate that income from Nanisivik work has clearly been an important component to the household economy of Nanisivik workers. Many comments were heard about how this income provided some financial breathing room so that, for example, groceries could be purchased without worrying about where the money would come from. Other comments referred to the shift toward a money economy and how the ability to earn money is now very important*."

It is also anticipated that households engaged in the Project will experience increased costs. Some of these costs will be "hard" costs arising from increased economic self-reliance — and reduced dependency on government transfers of income through social assistance and shelter through subsidized social housing. Other "hard" costs may arise as families seek to purchase services to replace those previously provided by the now-absent worker. Childcare/baby-sitting costs are an obvious area.

Other increased expenditures may arise from social expectations for sharing. For example, a former worker at the Jericho project described how personal savings objectives took a back seat to the needs of the extended family:[24]

> "*Another worker [Former Worker 9] spoke about how his earnings would get spent. When he was working at Jericho he was earning maybe $15 to $20 an hour. He'd come back from a rotation with about $3,150. He'd try to put half of this away and give the other half to his parents. When asked if he had been able to make any major purchases, he said he'd hoped to be able to save for a machine…but he ended up having to help his extended family…aunts, uncles, siblings, as well as parents….not much left. Lots of the money went to food and other basics*."

Commenting on this pressure, an observer of the Jericho experience explained that:

> "*Family obligations take precedence over individual goals. Younger people may try to put funds aside toward a major purchase, but if a family member or elder needs money, the expectation is that the person will hand it over. A younger family member with good credit may also be expected to take out a loan when another family member is not eligible to access a loan*."

There is, of course a positive side to these sharing expenditures. The Nanisivik – Arctic Bay retrospective documented numerous comments related to how this sharing helped to support access to equipment and supplies for harvesting.

Expenditures of households that do not have a direct work or business relationship with the Project may be affected as well. For example, expansion of local consumer-focused businesses may improve the quality of life for these household members by offering access to services that were previously not locally available.

[23] Brubacher and Associates. 2002.

[24] Brubacher Development Strategies. 2009. "Jericho Diamond Mine—2007 Socio-Economic Monitoring Report," prepared for the Kitikmeot Socio-Economic Monitoring Committee.

This might, for example, include local restaurants or new recreational opportunities. Experience-to-date in Nunavut has not provided strong evidence that this sort of local business effect will emerge. Neither the Jericho mine nor the Nanisivik mine, for example, led to identifiable expansion of local private sector services.[25]

Roles and time allocation

Roles and responsibilities within households are expected to evolve as a result of Project engagement. This will arise in response to the new economic contributions that Project workers will bring to the household structure, as well as to the evolving care-giving responsibilities and other roles that will emerge due to changes in time allocation associated with fly-in/fly-out work. The area of time-use and effects of fly-in/fly-out employment on time-use within households has not been well documented.

Internal household communications

New income and new earners within households should be expected to generate new subjects for serious discussion within households. Income allocation, budgeting, how spending decisions are negotiated—these may be new areas for discussion as the stakes increase with increased income. For example, a woman whose partner worked at Nanisivik describes her role in money decisions: "My partner gives me the money — I decide how it is spent."[26] Not all communications are so easy, as illustrated in the following comment:[27]

> *"When I was at Lupin, I tried a budget thing with my spouse, but every time I went out (on rotation) she'd kind of lose interest…like she wanted this, before I came home, and she'd kind of say, 'I bought this, without your permission.' I didn't keep the money separate from her."*

The potential for economic consequences of poor decisions may also increase due to the increased expenses associated with employment. This may further raise the stakes related to learning effective communication skills in these areas. The area of money management and household money decisions is a subject that can be addressed through pre-employment training and Project orientation.

Household income equality/inequality

Social relationships amongst households may be expected to be affected by new patterns of income earning that may be introduced by the Project. As some households increase their economic self-reliance and their purchasing power, other households that remain dependent on government for the bulk of their income may feel they are left behind. Income inequality is a concern as it can affect social integrity.

The focus here should not so much be on those households that gain increased incomes but on those that fail to successfully grasp the opportunities that are presented. It should also be emphasized that typical measurements of inequality look narrowly at income. It is recognized that money is not the only factor to determine achievement of a "high and sustainable" lifestyle. A more traditional household may gain equal enjoyment from a lifestyle requiring low income levels as another household that burns through more money in order to engage in a high consumption lifestyle.

Baseline conditions suggest that community economies are quite polarized (see Appendix 4A). The expansion of economic opportunity that the Project represents is expected to create opportunities for

[25] See Brubacher and Associates, 2002, and Brubacher Development Strategies, 2009.
[26] Brubacher and Associates. 2002.
[27] Brubacher Development Strategies. 2009.

households that have previously not been able to gain employment through, say, the local government sector. This would be expected to improve income equality.

Project effects on income inequality — and more meaningfully — on the relative "well-being" of individuals, households and communities will not be simple or deterministic. Nonetheless, efforts to remove barriers to participation in the economic opportunities presented by the Project are considered in Section 4.4.2.

5.3.3 Sustainable Development – Risk analysis

Attainment of sustained socio-economic development will be susceptible to several risks:

- Nunavummiut employment levels don't meet expectations;
- Nunavummiut employment levels don't meet expectations;
- Local business capacity fails to emerge; and
- Allocation risks related to Project financial benefits.

These risks are considered to be more risks of lost opportunity than they are risks of direct adverse impacts. Achievement of benefits in these areas will generate capacity across the territory's productive capital, thereby contributing to benefits that will flow to future generations.

Risk 1: Nunavummiut employment levels don't meet expectations

Local employment is considered to be the area where the Project can generate the most important contributions to economic development in Nunavut. The Project is expected to actively provide opportunities for residents to acquire skills and capacity in many relevant areas. Measures to support success in this area are planned by Baffinland. Opportunities for collaborative efforts to support human capacity development will also be created.

However, there are several areas of risk that could affect achievement in this area. These include:

- Baffinland labour force capacity development mitigation measures are not effective;
- Training and other human capacity development partnerships do not emerge or are not effective;
- Individuals are unable to engage in the opportunities presented by the Project; and
- Residents choose not to engage with the Project due to real or perceived disincentives to earning income.

Should any or all of these emerge, the nature of work with the Project is likely to be more heavily weighted toward short-term rather than longer-term employment relationships. This would lead to households earning modest levels of income rather than higher income levels. The possible economic development implications of these alternative household income patterns have been postulated in the context of the Nanisivik – Arctic Bay experience.[28] Long-term earnings of high levels of income may be conducive to investment in areas such as business or home ownership. Short-term earnings at lower levels of income are more conducive to enhanced spending power but may not lead to major investment in the local economy.

Casual employment would also be expected to be less conducive than longer-term employment relationships to career advancement and development of higher-level skill sets. This has implications for

[28] Brubacher and Associates. 2002. The essence of those discussions were that lower income levels can be important in food security and maintenance of access to equipment and supplies associated with harvesting activities. Higher income levels are equally important in these areas, but are also likely to eventually lead households to face decisions related to savings and investment—presenting possibilities for new economic development initiatives.

the achievement of the kind of sustained development outcomes that would otherwise be expected. This would be a lost opportunity.

A further effect arising from reduced employment outcomes will be that the overall flow of income into community households will be lower than would otherwise be achieved. This has implications for local consumer-focused business development and would be experienced as a lost opportunity.

Risk 2: Local business capacity fails to emerge

The potential for the Project to generate capacity amongst local entrepreneurs to expand their businesses serving both consumers and industry is an important opportunity. Project support for business development is described in Section 8.0 and includes measures to assist business access to Project contract opportunities as well as general support for business development.

The stakes related to business capacity are important. They include:

- A general expansion and diversification of the local and regional economic base, leading to improved economic resilience and diversity.
- Creation of local jobs that do not necessitate regular fly-in/fly-out lifestyles.
- Improved capture of economic flows into the local and regional economy leading to accumulation capital and improved economic resilience.
- Diversification of consumer services leading to improved quality of life.

Substantial achievement of these outcomes could have transformative value for long-term and sustained economic development in those communities where this occurs. Failure to achieve positive business outcomes is, as with employment, a risk of "lost opportunity."

Risk 3: Allocation risks related to Project benefits

Tax payments will flow to the federal and territorial governments due to the Project. Resource revenues will flow to NTI and to QIA under terms of mineral access and the IIBA, respectively. The nature of these financial benefits is described in Section 12.0. Residents of local communities have on occasion expressed concern that money that may flow to these large institutions may not be used to benefit the people at a community level. This is recognized to be an "allocation risk." The potential that the decisions related to benefits allocation may disproportionately benefit some communities over others is also acknowledged as a risk of "lost opportunity."

5.4 ECONOMIC DEVELOPMENT AND SELF-RELIANCE

5.4.1 Assessment Methodology

Project interactions on many of the VSECs and VECs that contribute to the Economic Development and Self-Reliance VSEC are assessed elsewhere throughout the FEIS. For this reason, a modified approach has been taken to assess the significance of the Project's effects on this VSEC. This approach involves considering the interactions between the Project and the strategic areas identified in Nunavut's economic development strategy. Since the other VECs and VSECs all contribute to this valued component, this assessment is essentially an integration of these other effects assessments.

The Nunavut Economic Development Strategy, 2003 to 2013 (NEDS), identifies four key areas and thirteen strategic priorities essential to successful development of the Nunavut economy. A consideration of how the Project is expected to interact with each of these areas will provide a basis for coming to an overall assessment conclusion for this valued component.

For the purpose of assessment, the four strategic areas are considered individually with an overall assessment then being made for the VSEC. The NEDS areas and related strategic priorities are as follows:

Area	Strategic Priority
The Land	Respecting the land
	Maintaining our mixed economy
	Building on the knowledge of our elders
Our People	Economic development for our youth
	Education and training
	Basic needs - housing, hospitals and schools
Our Community Economies	Community capacity building and organizational development
	Small and Inuit business development
	Building the knowledge base in our communities
Our Territorial Economy	Putting the NLCA to work
	Sector development and support systems
	Infrastructure - from buildings to broadband
	Accessing the global marketplace

5.4.2 Potential Effects and Proposed Mitigation

The Project is expected to interact with each of the four areas identified in the Nunavut Economic Development Strategy. These interactions are identified below with reference made to areas of the FEIS where they are assessed in more detail.

Land

The Project effects on the "land" component of the NEDS are addressed under the biophysical VEC assessments presented in Volumes 5 through 8. Project effects on resources and land-use are addressed in this Volume, Section 10, and acknowledged to potentially affect harvesting activities. The complex interactions between these multiple Project interactions and Inuit engagement in land-based livelihoods have been addressed in this Volume, Section 4.3.

Residual Project effects on "Land" include increased use of land as described and assessed in the various VEC-related residual effects assessments presented in Volumes 5 through 8, along with the integrated effects on harvesting related to the land-based economy as discussed in this Volume, Section 4.3. The VEC residuals are, by their nature, negative in direction and have been carried over to the cumulative effects assessment in Volume 9. The integrated analysis of the combined effects of these VEC and of the range of VSEC interactions presented in Section 4.3 does not lead to an assessment of adverse effects generated by the Project on harvesting activities.

People

The Project is expected to provide a significant level of employment to residents of the LSA (this Volume, Section 4.0). Given the young population profile of the region, much of this employment is expected to be taken up by young adults over 18 years of age. This effect falls directly in line with the "economic

development for our youth" strategic priority of NEDS. The Project is also assessed to have a significant beneficial effect on the Education and Training VSEC (this Volume, Section 3.0). Here again, it provides a direct contribution to achievement of one of the strategic priorities of the territorial economic development strategy.

Project effects on the strategic priority area of "basic needs – housing, hospitals and schools" will involve demand for services as well as the ability to access these services in order to meet basic needs. The Project is expected to interact both with the level of demand for services as well as with the ability of government to deliver services (see this Volume, Sections 7.0 and 12.0). As a private corporation, Baffinland will not take on responsibilities to deliver government-like services related to basic areas. Nonetheless, employee and family assistance support in areas of personal counselling and money management may serve to assist households engaged in the Project. Contributions to the INPK community fund may also serve to address some basic service needs at the community level.

Although the NEDS does not explicitly identify "human health and well-being" as a strategic priority, this is implied in considering "People" as a strategic area. The effect of the Project on this dimension of economic development and self-reliance is addressed in this Volume, Section 6.0. The interactions are expected to be complex, with residual adverse effects being experienced amongst some households and positive residual outcomes being experienced in others. Although the potential for some adverse effects is acknowledged, positive overall effects are expected to be more prevalent.

Considering these combined interactions on this strategic area, the Project is expected to have an overall significant, beneficial effect in terms of increased capacity and well-being on the "People" component of importance to Nunavut's economic development objectives.

Community Economies

A general increase in household wealth brought about by Project employment and local procurement may be expected to enhance the success of community economic development initiatives. Local development will be easier to achieve when there is more local wealth to support local business or to apply toward self-employment initiatives.

The regular absence from the community of a substantial number of residents may adversely affect some local organizations and their capacity. While this effect is assessed to be not significant, it is a factor that may interact in a modest way with some organizational capacity. Another factor that may affect organizational capacity in an adverse direction is the anticipated out-migration of some residents. Planned mitigation that may help to counter these includes Baffinland contributions to a fund intended for community support and capacity building. The INPK fund is described in the HRMP (Appendix 10F-3) with the terms of Baffinland's participation described in the IIBA.

Also described in the HRMP (Appendix 10F-3), and discussed under the Contracting and Business Opportunities VSEC (Section 8.0), is the expected contribution the Project will have on Inuit and small business development. The measures set out in the HRMP (Appendix 10F-3)—reflecting the IIBA—will provide for support to Inuit businesses and Inuit business development. These contributions are expected to have positive residual effects in the area of this strategic objective.

Finally, monitoring initiatives will contribute to an understanding of the progress that is made in employment, education and training, and procurement from the local business community. This information will help to build the knowledge base available to communities through bodies such as the Q-SEMC. This knowledge,

as recognized in the NEDS, is crucial to supporting on-going and responsive community economic development planning processes.

The combination of these effects is assessed to lead to a positive residual effect on communities by improving their ability to achieve their strategic community development objectives. There is potential for a significant beneficial effect on community development, however confidence in such an outcome is only moderate. This is due to the complexity of community developmental processes and uncertainties related to Project interactions in areas such as business development and household allocation of time and resources. This positive impact is, therefore, conservatively assessed to be not significant.

Territorial Economy

The Project will substantially advance the NEDS strategic priority to "put the NLCA to work" through implementation of the IIBA that will be signed with QIA. In addition, resource revenues will flow to Inuit under the terms of the NLCA.

With regard to the "sectoral development and support systems" strategic objective of the NEDS, the Project will lead to a substantial increase in economic flows across the territorial economy. The Economic Impact Report presented in Appendix 4B models the Project's contributions to Nunavut's GDP, to employment across the territory, and to personal income. The economic impact model has utilised estimates and assumptions provided by Baffinland based on inputs to the Company's definitive feasibility study carried out in 2008. These include estimates related to tax payments, resource royalty payments, capital investments, and labour demand. Estimation of the magnitude of these "inputs" to the model will change as the factors affecting these inputs change. For example, tax and resource royalty payments are contingent on Project profitability which in its turn is influenced by global economic factors such as foreign currency exchange rates, interest rates, commodity prices (iron ore, steel, oil), and labour costs. It will also be contingent on corporate strategy and bargaining power related to Project financing, marketing, transportation, and input costs. These variables lead to considerable uncertainty related to the precise magnitude of Project inputs to the economic impact model. Notwithstanding potential changes to the model inputs since 2008, and consequently to the model outputs, the broad conclusions regarding the scale of the Project's economic impact is expected to remain unchanged.

The following highlights from the Economic Impact Model give a sense of the Project's scale. Readers interested in more detailed insight are referred to this Volume, Appendix 4B. Nunavut's annual GDP will increase by an amount of some $0.7 billion dollars from 2020 on to the end of the Project. Under baseline conditions, the Nunavut economy is forecast by Conference Board of Canada (2010) to grow by $0.4 billion in economic activity by 2020. Under these projections, the Project will nearly triple GDP growth, and will generate 1,300 direct and indirect jobs by 2020 and 2,400 jobs during the peak years. This will nearly double the level of job growth forecast by Conference Board of Canada for 2020, and easily exceed it thereafter.

The reintroduction of a substantial new sector to the LSA economy — that of mining — will diversify economic opportunities available to communities of the region. This is of particular importance given the narrow breadth of the existing economy and its reliance on the public sector for jobs and business opportunities.

As pointed out in the NEDS, the challenge for Nunavut will be to capture these increased economic flows and these newly created jobs into the economies of LSA and RSA communities. This will require development of business and local labour force capacity. The beneficial effects of the Project on the

Strategic Area of "People" identified above will help in achieving this objective. The long duration of the Project provides enhanced opportunity for this capacity development to occur, since this is a process that will take time.

The combined contribution of these effects on the Strategic Area of "Territorial Economy" is considered to be a positive residual effect. Given the magnitude of economic flows related to the Project, this positive effect is assessed to be significant.

5.5 SUBJECTS OF NOTE

Traditional Economic Activities

The potential for the Project to interact with traditional economic activities is recognized. Considerable public and agency concern related to the potential for adverse effects on this critically important area of Nunavut's economy has been raised during community consultations and throughout the DEIS technical review.

Effects on harvesting have been considered in detail in this Volume, Section 4.3. These may arise from changes to Inuit livelihoods associated with Project employment, from Project effects on land-use or wildlife, or from combinations of these effects. The potential for the Project to interact with specific key indicators related to harvest activities has also been considered. These include effects on key wildlife species as well as on effects that may influence travel and camps, and hence access to wildlife. None of the Project interactions on these individual Key Indicators were considered to lead to significant impacts on any of these individual indicators related to harvesting.

However, might the combination and accumulation of multiple non-significant residual effects lead to significant net impact when they are considered all together? How do these individual effects accumulate over the course of the Project? For example, might a modest decline in marine wildlife density—occasional death of a walrus due to collisions, for example—combined with changes in travel routes—detours around the ship track, say—and a feeling of disadvantage relative to other, wealthier hunters—due to reliance on older and slower snow machines—lead an individual to consider a formerly preferred hunting location to be less preferred?

The possibility for such complex aggregations of residual effects is acknowledged. However, given what is known about Inuit land-use and harvesting practices the probability that any such combination would lead to a significant adverse effect on Inuit harvesting is considered to be unlikely. This has been discussed in more detail in Section 4.3, with a summary of the rationale leading to this conclusion presented in Section 4.3.3.

Impairment of the "Wilderness Experience" of Tourists

Land-use activities associated with the Project—particularly activities located at Milne Inlet and shipping along the transportation route—has the potential to disrupt the "wilderness experience" of tourists. The best available baseline information suggests that the frequency of such interactions will be low, given the small eco-tourism sector in the region.

In consideration of the wilderness experience during open water when sea kayakers may be using the park, Baffinland will engage with Parks Canada with respect to shipping schedules into Milne Port.

The implication of Project interactions on tourism for economic development and self-reliance is considered to be negligible.

Impact on commercial fisheries

The project is not expected to affect commercial char fisheries supplying the existing plants in Pangnirtung, Iqaluit, Rankin Inlet and Cambridge Bay. A potential for loss of some experimental char quota is acknowledged.

The availability of commercial and experimental char quota near the Project is presented in Section 4.1.5 of this Volume, Appendix 4C. It is noted there that, "In 1985 the Department of Fisheries and Oceans (DFO) assessed a number of rivers in the Foxe Basin for potential commercial fisheries. Refer to Figure 4.2 of Appendix 4C for the DFO Arctic char commercial fishing quotas for North Baffin Rivers. The DFO established quotas for each river but no commercial fisheries developed."

In a study of opportunities for inter-settlement trade in Nunavut, access to the resource was not considered to be a blocking factor. For example, only 27 % of available commercial char quota in the Qikiqtani Region is recognized as harvested for commercial purposes:

> "*In general, quotas are not a limiting factor for those species considered to be of interest in commercial intersettlement trade. In most areas, available commercial quotas are not fully utilized. It was suggested by some interviewees that the reason for this is that generally it is not economically feasible to do so without additional subsidies*."[29]

The potential for the Project to support commercial fisheries establishment in the North Baffin is acknowledged. This beneficial outcome may arise through expansion of the local market for commercial char—due to Project interest in purchasing suitable country foods for camp use—or through improved capacity of institutions to subsidize and/or invest in such endeavours. This result is not predicted, however, given the dependence on multiple factors that are contingent on negotiation, third-party decisions, and issues of economic feasibility that have not been assessed.

Temporary and Final Closure

Temporary closures or slow-downs in production will reduce benefits flowing from the Project. Loss of employment will be partially off-set by workers' eligibility for employment insurance payments. At final closure, Project employment will cease and individuals will be eligible for Employment Insurance (EI). During their EI benefits period, former workers may seek work elsewhere, either in the local economy or in the broader job markets.

The effect of job loss on individuals and households will depend on personal circumstances. Those who take advantage of the opportunities to acquire education and improved technical skills should have better prospects for employment than those who do not. Personal money management decisions may also affect the effects of job loss. Maintaining savings, staying up-to-date on rent and utilities obligations, and other good personal finance practices will help to ease the effects of temporary or permanent term layoffs from the Project. The inclusion of money management as a component in the training and EFAP program is outlined in the HRMP (Appendix 10F-3).

Temporary closure and final closure will also affect local businesses that take on opportunities with the Project or serve the increased consumer demand. This is an inherent risk of business. Businesses that may be most affected will be those that develop specifically to supply the Project. Clearly, when Project

[29] Aarluk, 2005, "Review Of Intersettlement Trade Opportunities For Arctic Food Products In Nunavut." For GN Environment.

demand ceases, these companies will either need to quickly seek out new customers, change their product or close.

Mitigation measures to enhance the capacity of entrepreneurs to make informed decisions related to risk and reward are addressed in the HRMP (Appendix 10F-3). In particular, Baffinland will support the QIA's efforts to enhance Inuit business capacity through its contribution to a business capacity and start-up fund.

5.6 IMPACT STATEMENT

The overall direction of the effects of the Project on the Economic Development and Self-Reliance VSEC are assessed, with a high level of confidence, to be positive. Direct and indirect economic expansion associated with the Project will create new opportunities for employment and business across the RSA, and particularly within the LSA. The Project will enhance labour force capacity and may increase Inuit business capacity. The assessment of Project interactions on land and land use dimensions of this VSEC suggest that these effects will be multi-dimensional. No significant adverse effects on the underlying VECs are assessed. The integrated analysis of the combined effects of the Project does not lead to an assessment of adverse effects on harvesting. Considering the Project's interactions with these multiple dimensions related to Economic Development and Self-Reliance, the residual effects are assessed to be positive and significant.

Potential for Cumulative Effects

No negative effects are assessed to arise from the Project in relation to the Economic Development and Self-Reliance VSEC. Therefore no residual effects are carried over to the cumulative effects assessment.

SECTION 6.0 - HUMAN HEALTH AND WELL-BEING

The Human Health and Well-Being VSEC addresses a wide range of indicators related to individual, family and community well-being.

6.1 BASELINE SUMMARY

The following section provides a summary of baseline data that is of relevance to the Human Health and Well-Being VSEC. Further detail and underlying data is provided in the Socio-economic Baseline Report, Appendix 4A.

6.1.1 Baseline Conditions

Population Health Status

Life Expectancy

Life expectancy at birth in Nunavut is 10 years shorter than it is for the Canadian population overall. Between 1999 and 2001 life expectancy was 68.7 years (Government of Nunavut, 2004); it has ranged from 67.5 years during the early 1990s to 70.4 years in the mid-1990s. In comparison, life expectancy at birth across the overall Canadian population has increased steadily from 77.9 years during the early 1990s to 79.3 years by the beginning of the new millennium, and to 80.3 years as of 2007 (CIA, 2007). Life expectancy at birth in Nunavut is only slightly lower than that of Greenland, which was 70.2 years in 2007.

Life expectancy at age 65 is fairly similar among the male populations of Canada and Nunavut, who have additional expectancy of 17.1 years and 16.3 years respectively. For women, however, the picture is much different. Canadian women age 65 can expect to live an additional 20.6 years while Nunavut women can expect only 11.4 years, on average.

Birth Rate

In Nunavut the birth rate is roughly twice that of Canada generally, and has remained consistent between 2003 and 2006. In 2005–06, for example, the rate in Nunavut was 23.5/1,000 whereas in Canada it was 10.8/1,000. As noted by the Conference Board of Canada (2010), Nunavut's high fertility rate will more than make up for net migration out of the territory, leading to continued population growth into the future.

Infant Health and Mortality

The incidence of pre-term delivery and low birth weight are both high in Nunavut compared to Canada overall. One in 10 births in Nunavut (10.4 %) is pre-term. The incidence of low birth weight (under 2,500 g) births in Nunavut between 1991 and 2003 was between 6.7 % and 8.0 %. This is slightly higher than the rate of 5.7 % for Canada overall.

Nunavut's infant mortality rate has been improving. From 1991 to 2001, the number of infants who die before their first birthday has declined from a rate of 18.3 infant deaths per 1,000 live births, to 13.9, an improvement of 24 % over 10 years. However, these rates are much higher in Nunavut than in other regions of Canada. In 2001, for example, the Nunavut infant mortality rate of 15.6 per 1,000 births was 3.5 times the Canadian rate of 4.4. The comparable rate for the NWT was 4.9 and for Yukon was 8.7. The current rate of infant mortality in Greenland is quite similar to that of Nunavut, at 15 per 1,000 births. Globally, infant mortality rates vary widely, ranging from 3 in countries like Singapore, Sweden and Japan, to over 75 in poor tropical countries, and more than 150 in some war-torn regions of the world. The median rate among 221 countries is 20 deaths per 1,000 births (CIA, 2007).

Self-Assessed Health Status

Middle-aged men in Nunavut perceive themselves to be experiencing significant health issues more frequently than their peers across Canada and more frequently than women of a similar age in Nunavut. More men than women reported "health problems that limit activities or participation" in the 2005 Canadian Community Health Survey. The difference in this perception of health between the sexes was small among the 12-19 and 20-34 age groups; however, among those 35 to 44 years, more than 40 % of men reported some activity-limiting health problem, compared with fewer than 15 % of women.

Cause-of-Death and Death Rate

The major causes of death in Nunavut are cancer, suicide, heart disease and accidents. Cancer accounted for 23 % of deaths in 2004, suicide made up 20 %, heart and other cardiovascular diseases accounted for 17 %, and accidents were responsible for 12 %.

The profile of causes of death in Nunavut differs from that of Canada overall, where cancer and cardiovascular disease account for 30 % and 32 % of deaths. Suicide is much less prominent, accounting for only 2 % of deaths in 2004.

However, Nunavut has a very young population. It is known that the rate of cancer increases with age and that most suicides are committed by the younger segment of a population. To gain insight into what cause of death can tell us about Nunavut's population behaviour, it is necessary to separate the influences of the territory's age profile.

Age-standardized death rates for provinces and territories reported by Statistics Canada (2004) can be used to compare death rates in Nunavut's young population with those of the aging Canadian population. These transformed data allow the following observations to be suggested:

On an age-standardized basis the proportion of deaths by suicide in Nunavut is nearly four times that of Canada.

- Transportation-related deaths are more than twice as common in Nunavut as in Canada.
- Cancer accounts for a slightly higher share of deaths in Nunavut than in Canada.
- Heart and other cardiovascular disease account for a lower share of deaths in Nunavut.
- Other causes of death account for a greater share of deaths in Canada than in Nunavut.

Social Issues Related to Health and Well-being

Alcohol and Drugs in the LSA

The use of alcohol is considered a serious issue across the territory because of its link to domestic abuse, violence, fetal alcohol effects, and impacts on the local economy. Interview data from community members, frontline workers and health officials in the Baffin region reveal that spousal assaults, violence, and numbers of children in care are often linked to alcohol abuse. Thus, many communities have chosen to put controls on legal access to alcohol.

There are three distinct approaches to alcohol access across Nunavut. Iqaluit is an "open" access community, where alcohol can be ordered by individuals for personal use and where one can walk into a bar and buy a drink. Other communities have voted to legally designate themselves as "dry" communities, where no alcohol is allowed. The most common policy for communities across the territory is a "restricted" alcohol policy, requiring residents to apply to bring in wine, beer or spirits.

In the Baffin region, Iqaluit is the only "open" community; Kimmirut, Pangnirtung, and Sanikiluaq are the only "dry" communities, and the rest of the region has "restricted" access. The five communities of the North Baffin LSA have policies in place to restrict access to alcohol. Residents in each case apply to a local Alcohol Education Committee (AEC) with their requests for wine, beer or spirits. The amount of alcohol allowed depends on the community.

Quantitative data related to alcohol and drug use in the LSA were not available. Across Nunavut's legal alcohol sector, beer is by far the drink of choice. NLC sales by volume are: 87 % beer, 7 % spirits, 4 % wine, and 2 % coolers.[30] It is expected that the bootleg sector focuses more on spirits, with vodka being an important segment of this market.

Incidents of Reported Crime

The rate of violent crime in Nunavut is the highest across Canada, varying from between six and eight times the national rate between 1999 and 2007. The incidence of total reported crime ranks second, behind the Northwest Territories, and has been four to six times the national rate.

The rate of violent crime across the LSA has been essentially stable over the past decade. Violent crime has been particularly high in Iqaluit, at an incidence rate of 100 per 1,000 population, ten times higher than the national average of 10 per 1,000 people. The rate of violent crime across the North Baffin LSA has been slightly over half the rate in Iqaluit, or five times higher than the rate in Canada generally.

A territorial breakdown of crime incidents provides insight into the nature of this violence. The rate of sexual assault across the territory reached a peak in 2003 at 10 per 1,000 population—well over ten times the national rate. While rates continued to be high into the latter part of the decade, a significant decline has been noted, with the 2008 rate of 6.7 being the lowest of the ten years for which data were available.

The rate of other assaults, including domestic violence, also peaked in the mid-2000s. The slight decline in 2005 and 2006, however, appears to be losing ground, with rates in 2008 setting a new high of 67.8 per 1,000. Disturbingly, assaults with weapons and those causing bodily harm have increased consistently and dramatically over the decade. The 2008 rate of 11.7 per 1,000 more than tripled the 1999 rate.

Accidents and Unintentional Injury

Potential years of life lost (PYLL) amongst the male population across Nunavut is 3,465 per 100,000 population per year. The corresponding rate for Nunavut women is 673 per 100,000 population. This is the equivalent of roughly 110 PYLL per year for men and women due to unintentional injury in the North Baffin LSA and 140 PYLL in Iqaluit.[31]

Workplace injury frequency is measured in days of work lost or modified. In the Nunavut/NWT mining sector an average of 27 days of lost/modified work is experienced per 200,000 hours of labour supplied. Over a three-year period these territories experienced one workplace fatality, which could be equivalent to up to 60 PYLL.[32]

[30] Nunavut Liquor Commission, personal communication, 2010.
[31] Refer to Appendix 4A, Section 6.5.1, "Injury in the Community."
[32] Refer to Appendix 4A, Tables 60 and 61.

Housing

Across the communities of the North Baffin LSA, approximately four of six people live in social housing. In Iqaluit, only one in six people avail of social housing.[33]

The amount of rent paid by social housing tenants varies across the LSA. Two-thirds of tenants in Igloolik pay $60 per month, while in Hall Beach the rate is less than half this level. Hall Beach is also the community with the highest proportion of social housing units assessed $1,000 or more per month. Clyde River and Pond Inlet also stand out as communities with relatively more tenants paying rents at the higher scale.

Insight into the level of inadequate housing can be gained from the waiting list for housing. In the LSA communities 4 % to 6 % of the population is living in housing arrangements that are sufficient to motivate individuals to maintain an active application for improved housing and to be approved for inclusion on the waiting list. Criteria for inclusion involves factors ranging from housing standards (numbers of people per room), to the placement of children over the age of five into separate bedrooms, and other factors such as personal safety and multiple generations living in the same unit.

The waiting list is highest in Clyde River and Arctic Bay and lowest in Iqaluit. In Igloolik and Pond Inlet, the population living in inadequate housing has been stable over the past few years, while in other communities it has been edging upward. After a jump in Clyde River toward the end of 2007, new construction has served to bring the waiting list more in-line with other communities.

Household Income

The level of household income across the LSA is influenced tremendously by the configuration of the household structure.[34] Lone parent (single-parent) families have income levels that are substantially lower than those of couple (two-parent) families. In four of the five communities of the North Baffin LSA, the median income of lone-parent families ranged between $19,760 (Clyde River) to $23,830 (Igloolik) in 2007. The median income in Hall Beach was substantially higher, at $28,930 in that year. This contrasts with a median income for this household configuration of $42,390 in Iqaluit, a level twice that of Arctic Bay and Clyde River, and substantially higher than the other communities of the LSA.

Two-parent families appear to be better off financially. The median income of these households ranged between a high of $66,440 (Pond Inlet) to a low of $48,400 (Clyde River). Again, the picture in Iqaluit is one of much higher incomes, at a median of $104,730 in 2007.

Couple families have also improved their financial position at a greater rate over the past decade than have lone-parent families, in most cases. The 2007 median incomes for Arctic Bay and Clyde River couple families increased at twice the rate as those of lone-parent families in these communities. Couple families in Pond Inlet fared even better, with median incomes nearly doubling, while single-parent families experienced less than a one-third increase.

The situation in Hall Beach and Igloolik is different, with more narrow differences between couple families and lone-parent families. A similar situation is seen in Iqaluit where the rate of increase of median income of lone-parent families kept pace with that of couple families, though, as previously noted, at a much lower level.

[33] Refer to Appendix 4A, Table 76.
[34] Refer to Appendix 4A, Section 7.3.

Children Living in Lone-Parent Families

The number of children living in lone-parent versus couple parent family situations is a relevant indicator of the economic well-being of children, in light of the significantly lower incomes experienced by lone-parent versus couple parent families. The rate of children living with a single-parent is generally similar to the Canadian rate of 28 %, ranging from a low of 14 % in Arctic Bay to 31 % in Pond Inlet. The picture in Hall Beach is a little different, with 40 % of children living with a single parent. In Iqaluit nearly half of all children live in a lone-parent setting. Generally, the proportion of children in lone-parent settings has increased during the past decade. Arctic Bay is an exception, with a modest decline.

Income and Gender

The distribution of income among men and women provides some insight into the economic structure of households. Who is bringing in the income? There is also a reasonable expectation that the individual who brings income into a household is going to have some greater degree of influence over decisions about how this income is allocated.

Across North Baffin, women have somewhat less income than men, ranging from a low of about two-thirds that of men, in Arctic Bay, to slightly more than 45 % in Igloolik and Pond Inlet. Generally, the proportion of income reported by women has increased over the past decade or so. The most dramatic changes have been in the communities of Igloolik and Pond Inlet, where the proportion of income reported by women has increased from 38 % in the mid 1990s to 47 % and 45 %, respectively, in 2007. This can be explained by the decentralization of territorial government positions between 2000 and 2002, when the proportion of income to women jumped by 5 %. Women in Iqaluit also reported some 45 % of total income, although the rate of increase has been modest, increasing only 2 % from a level of 43 % in 1995.

Most of the increase in income among men can be accounted for by an increase in the number of individuals reporting incomes of $75,000 or more. In the North Baffin communities, this number grew from under 20 to more than 170 over the past decade.[35] Among women, growth in income can be accounted for by a doubling of the number of individuals reporting incomes in the $15,000-$35,000 range, as well as the emergence of a significant number reporting incomes of $75,000 or more. Before 2002 the number of high income earning women was negligible. The situation in Iqaluit is similar; most of the growth in income is accounted for by an explosion of both men and women earning incomes above $75,000. Again, however, there has been a significant growth in women earning lower income levels—in this case, at the $35,000 to $75,000 level. This latter group presumably relates to those in the clerical and other modest-paying jobs generated by the Iqaluit economy.

Food Security

The fundamental importance of wildlife as a key food source was made during many public meetings and in sessions with the HTOs and other community groups. Across the North Baffin LSA, an estimated 830,877 kg of edible food is harvested each year, equating to approximately 150 kg per person. By way of comparison, at the time of the Nunavut Wildlife Harvest Study (Priest and Usher, 2004), the purchase of "nutritious, perishable foods" from local retailers totalled approximately 165 kg per capita in 1999. It is clear that country food is a critical component of the diet for many households.

Some limited research on nutrition in North Baffin households has been carried out. A study commissioned by the federal government under the former food mail program estimated that country food accounted for

[35] Refer to Appendix 4A, Table 81, Table 82, Figure 54 and Figure 55.

over half of the protein and more than one-third of Vitamin A consumed by residents of Pond Inlet in 1997. At the same time, this source of nutrition added only 6 % of sodium and less than one-quarter of the saturated fat of local diets—supporting the widely-held understanding that country foods are nutritionally superior.

Insight into the per capita consumption of retail foods can be gained by considering the level of foods shipped to local retailers. Nutritious perishable foods have been highly subsidized through the federal government's food mail program (now the Nutrition North program), which offsets the high cost of air transport. Records of food shipments indicate that the amount of nutritious, perishable food shipped per person to the North Baffin LSA has increased by 52 % [36] since 1999.

This increase in per capita retail food consumption is consistent with an increasing reliance on retail foods to meet household nutritional requirements. While updated harvest data are not available,[37] a reasonable expectation is that the per capita harvest of country food is decreasing. This does not, though, imply that the total harvest has declined, since population growth has been robust over the same period.

A consequence of increasing reliance on retail foods is the increasing importance of household income for purchasing. A positive relationship appears to exist between increasing income reported by women and the amount of nutritious, perishable foods purchased from retailers. This relationship does not extend to income reported by men, possibly suggesting gender differences in household spending decisions.[38]

Capacity in the Health and Social Sector

Human resource issues are a challenge across Nunavut. With small populations and many positions to fill, vacancies are common. High turnover rates also lead to ongoing staffing challenges. In 2008, for example, more than one-third of Nunavut's social worker positions were unstaffed.

The Qanukkanniq report (North Sky Consulting Group, 2009) notes challenges related to human resources in the health field:

> *"Mental illness has been steadily increasing in the community and we don't have the health care to help. If we had psychiatric care in Nunavut it would be good. Mental health workers come and go – no follow up or consistency (Iqaluit)."*
>
> *"Agency nurses are really not able to give the same level of care as GN nurses – they are not interested in the community and don't stay around long enough to know us and learn our health histories (Iglulik)."*

Organizational issues can also lead to capacity challenges. Day cares, in particular, require a significant level of both human resource capacity to ensure reliable staffing, as well as solid financial and administrative capacity to keep the books in order. Weak links in these areas can lead to loss of day care services, even when physical space and demand for the service might be in place.

[36] Data for "nutritious, perishable foods" is from Canada Post records of Food Mail A shipments to retail and individual customers in the five LSA communities.
[37] The NWHS has not been repeated and its data is now more than a decade old.
[38] This analysis is based on community-level rather than household-specific data (which was not located). It should be considered indicative only. Further investigations into household expenditure and decision-making would be useful here.

Related to organizational capacity, but at a higher level, are comments made from across Nunavut (North Sky Consulting Group, 2009) that refer to the trade-offs between cost-effective service delivery and desire to use service delivery as a vehicle for regional development or to meet other political objectives:

> *"Can the Medical Transportation office in Pangnirtung moved back to Iqaluit for a better service? Lots of money is being wasted by GN by running the transportation office out of Pang and patients are calling Pang office themselves (Pond Inlet)."*

> *"Our health centre is half-empty. Maybe we should just be realistic and say we can't get the staff we need here and stop trying to pretend that doctors want to come and live here. Then we could address our health care needs in a way that reflects reality (Cambridge Bay)."*

The need for social services to be delivered in a rational or coordinated way was noted during the Qanukkanniq consultation process:

> *"There are too many organizations (Social Services, Wellness Organization, Mental Health, Youth Committee, Youth Justice Committee, Alcohol Committee, RCMP, Elders' Group) that are trying to deal with social problems in our community and they are not connected nor coordinated (Arctic Bay)."*

Capacity issues have also been raised in relation to family violence across Nunavut. Pauktuutit (2006) noted that in Nunavut, the rate of reported spousal abuse is 6.5 times the national rate. They suggested that the following capacity issues adversely affect the territory's ability to respond to domestic violence:

- There are a few safe shelters and little in the way of alternative housing.
- There are increasing numbers of "hidden homeless" or "couch surfers" in northern communities.
- Women often depend on relatives to put them up for the short term.
- Many must leave their communities to access a regional shelter to escape domestic violence.
- Inuit women might lose custody of their children when they leave abusive relationships.

With regard to the prospect of a major mine development and its implications for LSA health services, a health insider suggested that mitigation measures implemented at the project should be linked with the community and be community-driven. This respondent noted that the local health committees have a big role to play in healthy communities, and therefore support for these local health committees is important.[39]

Gaining access to information about health and healthy living might be one area where progress can be made. As one resident noted: "On the health front, we have been getting more information about disease and health issues from the health centre. There is more openness today to talk about health issues, like HIV and so forth." 40

Funding for child and family programs

The Canadian Prenatal Nutrition program (CPNP) is funded by Health Canada and operated through various organizations in most communities in Nunavut. All communities in North Baffin and Iqaluit, as of 2008, have CPNP programs operating. The annual operating budget for this program in 2006-2007 was $855,720 and, of this, $331,128 was dedicated to maternal and child health.

Community level organizations can also access funding through Health Canada's Brighter Futures program that focuses on Inuit children and strives to improve the physical, mental and social wellbeing of the

[39] Public Sector Key Person #18, interviewed 2008.
[40] Resident #5, interviewed 2008.

individual, their family and their community. The operating budget for this program in 2006–2007 was just over two million dollars, of which $435,000 was provided to LSA communities (including $200,000 to Iqaluit)

Of particular relevance to the LSA is the non-profit organization Ilisaqsivik Society, based in Clyde River. In 2007 this organization had a project-based operating budget of $1.8 million. Ilisaqsivik runs projects that are rooted in Inuit culture and are community-driven. The organization runs several programs related to maternal and child health, including a pre-school drop in program, a moms and tots group, Canadian Prenatal Nutrition program, and a Youth hip hop drop-in program. Ilisaqsivik also runs the North Baffin Alcohol and Drug Training Mentorship, a course designed to teach a culturally relevant approach to drug and alcohol counselling.

The availability of day care services varies across the LSA and Iqaluit. Access to these services also varies over time, with established daycares sometimes closing due to issues related to management, access to adequate staff, and access to space.

6.1.2 Expected Trends in the Absence of the Project

Social and health conditions are expected to improve slowly, into the future. For example, there has been little change in life expectancy, while the infant mortality rate has improved. This may be due to increased spending in medical services. Underlying factors affecting health and well-being are expected to be a concern into the future: high smoking rates; poor nutrition; and risk-taking behaviours related to sexual activity and alcohol consumption. Progress in addressing crowded housing conditions is anticipated to continue into the future.

These underlying factors present ongoing risks to the prospect of improved health and well-being into the future. Without substantial improvements in areas such as smoking cessation, nutrition, and risk-taking behaviours, increasing demand for medical services will continue to divert limited public funds away from other social priorities.

6.2 ISSUES SCOPING

Additional Experience from Nunavut Mines

Several important issues are raised from scoping activities in relation to how the Project may affect the broad area of human health and well-being. These include positive mental health effects associated with employment and the opportunity for training and advancement that many residents do not currently enjoy. Additional benefits are anticipated in relation to the income associated with employment as this is expected to reduce economic stress within households and improve food security by improving the ability to purchase groceries and undertake harvesting activities.

However the potential for negative effects is also associated with employment and income. Community residents raised specific concerns about unhealthy spending decisions that may lead to increased substance abuse and the associated effects. Alcohol abuse is a particular concern. The potential for fly-in/fly-out employment to support binge drinking was identified from a review of similar projects from elsewhere in the RSA (see Brubacher Development Strategies, 2009).

Fly-in/fly-out work presents challenges to households. The literature suggests that while many are able to adopt successful strategies to make this work, others are unable to find a comfort level with the lifestyle. Of particular concern are children who find themselves in the midst of families trying to make it work. The well-being of children involved in fly-in/fly-out households is therefore an issue of particular importance.

6.2.1 Effects of Fly-In/Fly-Out Work on Children, Families, Communities

Experience from Nunavut & Canada

Several themes were often raised during scoping interviews, community workshops, interviews with workers having fly-in/fly-out experience, and other community research. These related to the effects of absence of workers from their family, and on the effects of the fly-in/fly-out work style on relationships. In addition, several suggestions were provided on how families might be supported in their efforts to cope with the challenges presented by engagement in the project.

It was noted that the Project does not represent the first time that individuals would experience separation from families. In North Baffin, a number of people worked on a rotational basis at the former Pan Arctic Gas project, the Polaris Mine project, and on various DEW Line clean-up projects. The nature of fly-in/fly-out work is therefore reasonably familiar to many families. Other non-work experiences that also regularly separate individuals from their families were also noted. In particular, medical travel for those with cardiac conditions or chronic health issues may require repeated trips to Iqaluit or Ottawa.[41] Incarceration at the Baffin Correctional Centre facility in Iqaluit was raised as another situation that has exposed some families to the challenges of adjusting to the absence of a family member.[42]

Effects of Absence

…on Children

Effects on children are identified to arise from parental absence brought about by fly-in/fly-out work rotations. One person noted that sometimes relatives may step in to babysit, "but a lot of people don't have family to do this." In a separate interview, the issue of availability of reliable babysitters was also raised. Parents seeking quality care for their children while they work or attend school are said to face serious concerns about drug use and child safety when placing children in private care situations.

A woman whose husband also worked away from the community described how her fly-in/fly-out work affected her children:[43]

> *"They were O.K. …[Before my husband started fly-in/fly-out work] he was taking care of our kids. There was no problem at all. The only thing was when he got hired, I went on my rotation a week later than he did. It was hard for me, for my 10-month old baby. For the other kids it's O.K. I can talk to them."*

Some concern was raised about child welfare in relation to parental absence:

> *"Something that Baffinland is going to have to be aware of, especially during construction when you're doing four [weeks] in, two out, is being real careful about hiring a husband and wife team… where does that leave the kids? ...In the case where two parents are working at the same rotations, you'll be looking at extended family being involved. The point is that you've got to make the company aware this could be an issue for people."* [44]

Local childcare facilities and programs are often lacking. In Arctic Bay the local daycare facility is currently closed. In Pond Inlet, there is a "parents and tots" program and a pre-natal program that addresses cooking, diet and other issues. The programs are scattered across different buildings with "some things in

[41] This situation was raised by a government health worker in the North Baffin region.
[42] It was noted by a government representative that the length of incarceration at BCC is typically in the range of several months.
[43] Worker G, interviewed 2008.
[44] Arctic Bay Economic Development Committee Workshop. May, 2008.

one place, and other things in some other place." A desire to accommodate all these various functions in one location was expressed.

The emotional effects of parental absence were also raised during various interviews with workers. One woman noted that they don't tell their three-year-old child when his father is heading out on rotation or is scheduled to get back home. These departures are difficult for the child and travel is uncertain [from Nanisivik to the Mary River site]. If a flight is delayed or cancelled after the good-byes are said, they simply have to go through it all again the next time.

The potential to bridge the gap between children and parents by showing children what goes on at a mine site was suggested. "It would be good to take kids to a functioning mine to illustrate what we are talking about." Still, a parent talked about how he tries to explain to his four-year-old that he has to work to buy a house and support the family.

> *"My son sees the videos and I tell him about the work we do, and the helicopters and everything. I talk to him about how I need to work to buy a house. My son is very young but he knows this [that you need to work to live]…but it comes to the point where he says, "I don't want a new house. I like the one where we are, as long as you stay home it's OK."* [45]

Concern about the effects of parental absence on older children was also raised:

> *"If you do have family [parents working at Mary River], you're going to have kids running around in the community who have nothing to do. …and you'll have kids saying [to their working parents], "send me money" and they'll be sending money, and if there is no-one at home to monitor where the money's going it's going to be going, …well you could say to drugs and alcohol, but even just diet. If you're a kid 13 or 14 years old …they're going to be buying pop, chocolate, chips, frozen pizza…so what kind of a healthy lifestyle is that person going to have…and you're going to have increased diabetes… if you don't have activities for youth to do… your workers in the future are not going to be healthy."* [46]

On the positive side, the observation was also made that:

> *"It is better for children when the father is working. He is a role model to his children and to the whole family. He will have more respect."* [47]

> Concern about the effect of parental absence on children was expressed during an Arctic Bay workshop:[48]

> *"How do you build those healthy and happy individuals when their parents are away half the year? Because you're working away for two weeks at a time and then home for two weeks at a time — that means the parents are away for half the time. …Now you throw school in there and you throw in all the other distractions…there is not a lot of time. …And then you take away the parents!"*

…on Care-Givers

The issue of access to child care is a source of concern, even stress, for some. One North Baffin woman described how responsibility for care of children and parents leads to stress:

[45] Worker interview, 2007.
[46] Arctic Bay Economic Development Committee Workshop. May, 2008.
[47] Local Health and Social Services Workshop, Pond Inlet. February, 2008.
[48] Arctic Bay Economic Development Committee Workshop. May, 2008.

"When he's not working, [my husband] supports the family by babysitting the children. On weekends he goes hunting by Skidoo. When he is out working, babysitting is an issue." [49]

Another partner of a fly-in/fly-out worker spoke about the stresses associated with starting a family when one parent is away:

"At the beginning in a relationship there are just two people. Then babies. Stress, more fights, more fights—how to raise a family, how to treat the children. I wanted no more children but [my husband] wanted a daughter. Now there is stress." [50]

This respondent went on to note that her parents are also getting old and will need care, and that a younger sibling is having a baby and has no babysitter lined up to help. The responsibilities of helping the family lead to more stress.

Another woman described how the absence of her husband, combined with lack of daycare services, affected her childcare arrangements:

"For me, I was used to being a single working mom. Before, I used the daycare and would work at the hamlet. When the daycare closed it was harder to work."

When she got married and had a child with her husband, her husband would help look after the infant while the woman worked at a local job. When her husband started work at Mary River, he was no longer able to help out:

"I'm getting used to it….[sigh]… it's not easy." [51]

As parents try to cope with childcare demands, other family members may gain new responsibilities. As one front line government worker suggested, older children may find themselves "forced through circumstance to babysit." A similar conclusion was drawn by a small group asked during a workshop setting to identify the effects of a mine on children, youth, women, and men. They noted that for youth, "Youth will have to take care of kids on their own when their father is away." This situation was also described by a male worker who had experience with fly-in/fly-out work at Mary River:

"We have seven kids. The oldest usually takes care of his sisters and brothers. Next time [I go on rotation] we won't get a babysitter, my son will look after all of the other six kids." [52]

During a workshop with local business people, the local lack of access to daycare was described as a problem:

"Daycare is a problem that prevents some of the women from proper employment; it's a disincentive." [53]

However, while subsidies are available to parents to offset the costs of daycare, expansion of the local daycare requires expansion of the building itself and that would entail capital costs for which funds are harder to come by.[54]

[49] Resident 23, interviewed 2008.
[50] Wife of a fly-in/fly-out worker, 2008.
[51] Wife Of Worker 1, interviewed 2008.
[52] Worker 5, interviewed 2008.
[53] Public Sector 1, Small Business Workshop, Pond Inlet, February 2008
[54] Small Business Workshop, Pond Inlet, February 2008.

…on Families

A participant at the socio-economic workshop hosted by ED&T indicated that he'd be interested in seeing a mining community/camp located near the site where families could live. If that's not possible, perhaps improved day cares are a solution:

> *"Rotation is tough on families—what do we do to help if it's not by allowing people to live nearby? …Maybe it's a need for childcare. Set up daycares…?"*

One woman spoke about how she worries when her husband is away on a work rotation:

> *"It is harder when [my husband] is gone. What if something breaks down? He is the one who looks after house things. [I am] more stressed when he's out—who do I get to help?"* [55]

Another woman indicated that while both she and her husband support the proposed Mary River for the jobs it will create, wives do not like the absence of their partners, "there is no one to help out with everything… cooking, babysitting, transportation."[56]

A similar observation was provided in a different setting:

> *"There are already things affecting women. When their men are working, they are practically single for four weeks while the men are away. They are struggling to take care of kids, pay bills before things get cut off."* [57]

Another woman wondered what kind of "social preparation" will be undertaken for the project. She suggested that there may be a need for "some sort of support network for women whose partners are involved" in the Project.[58]

An Elder spoke about how women in the past often lived alone while the man was away:

> *"In the past, a woman could not survive without a man. …As we move into the future, mothers will slowly start to learn how to live alone with the children. We learned this in the past – we would be alone in the igloo or tent with the children because we had no choice when the man was out hunting. If the man was not out hunting, we would have no food or heat. This was something that can be learned, how to be alone. This is a part of maturing that young worker need to learn – this is a part of getting money for food, and supporting your family."* [59]

Another man who has previous fly-in/fly-out work experience observed that,

> *"Two weeks in and two week out is a great job for a young, single person…but once you're married and you've got kids, …it's not so good."* [60]

One man noted that he has been doing rotational work previously on DEW Line cleanup projects, so his family is familiar with the lifestyle. But he noted that those projects were only during the summer months—working at the Mary River exploration project would be the first time he'd be away over the winter.

[55] Resident 24, interviewed 2008.
[56] Resident 25, interviewed 2008.
[57] Meeting with several women in Pond Inlet, March 2008.
[58] Public Sector 9, interviewed in 2007.
[59] Comment by Elder 4, February 2008.
[60] Resident 9, interviewed 2008.

He sees that as a different situation than being away in the summer—"we'll see how it works." He noted that he keeps in touch with his children by phone and through the Internet. "One of my daughters taught me how to use the internet."[61]

An effect on family life was also noted: "A disadvantage is that I'd be going out for day trips if [my husband] were home…we'd have family time. When he gets home [from his current rotation] we won't be able to go out much because of the melting ice."[62]

During an IQ session held in Arctic Bay, discussion of the family raised some points that are relevant to understanding the interaction of the proposed Project with a particular segment of the population: [63]

> [Resident 4]: *"Young people without parents will often earn money, but then other young people will come and ask for some of that money. People without parents cannot get guidance from parents on money management."*
>
> [Resident 30]: *"A lot of children without parents will abuse alcohol and drugs and might go to jail. Kids who have parents who abuse alcohol and drugs are just like kids who do not have parents. They don't have parental support."*

While parental absence is seen to create challenges for families, the benefits of having a working parent are also understood to affect the family:

> *"When a father is proud and confident, it affects the whole family."* [64]

In response to the challenges families are expected to face relative to the rotational work offered during project construction and operations, a suggestion was made to establish some sort of family support program:

> *"In terms of employee care…in Ottawa, for Inuit living in that city, there is a family resource centre. In Yellowknife, they have a family resource centre for the military…in Edmonton on the bases they have family resources centres…[employees] are working for two weeks and we don't know what goes on and what problems they are dealing with, and then they come back here…what I'm thinking is to have a family resource centre, some place where families can go if they are struggling and having a hard time…because social services is stressed, mental health is stressed, the nurses are stressed."*[65]

The notion that families need to actively prepare for or adjust to the involvement of a family member in fly-in/fly-out work was expressed by a small group during a breakout session of Inuit involved in health and social services in Pond Inlet:

> *"Overall, the family needs to learn how to have a person working at Mary River."*[66]

…on Workers

Some of the challenges faced by workers engaged in fly-in/fly-out rotational work were raised during one-on-one interviews. One man in his late 20s spoke about being away from his extended family.Even though he and his former partner were no longer together, he found that being away from his extended

[61] Worker 7, interviewed 2007.
[62] Resident 24, interviewed 2008.
[63] Exchange during conference of working groups held in Arctic Bay, March 2008.
[64] Pond Inlet HSS Workshop, February 2008.
[65] Arctic Bay EDC Workshop, May 2008.
[66] Pond Inlet Health & Social Services Workshop, February 2008.

family for two weeks at a time was hard. He missed out on things going on at home. He'd miss his nieces and nephews. They'd do things that he was not a part of. He noted that "it was a good thing we had a satellite phone up there...helped to keep in touch." He'd indicated that he would talk to his parents as well as to his former partner.

Another worker suggested that the biggest challenges are faced by those who have a family. He indicated that he doesn't have kids, so being away from the community was not an issue for him—"no big thing." He doesn't feel that he's giving up anything to be working on a rotation. His parents are supportive, "As long as I'm happy with it, they don't mind." However, for those with families, it's very different, much more challenging in terms of being away. He suggested that one way to help families would be to, "Make this an artificial community so people can come and live here with their families."
Pressure to quit work can be felt. One worker spoke about how most of the guys working at the Project have kids at home. He had a tent-mate whose common-law spouse wanted him to quit work and come home.

Several people who spoke about their fly-in/fly-out rotational work experience spoke about personal breakups with girlfriends and wives. Being away from home on rotation was considered to have been a factor in these situations. However, these events did not necessarily lead to loss of support for the rotational lifestyle. One North Baffin resident whose girlfriend had left him suggested that he'd work at the mine "as long as it is there…I don't usually quit my jobs." Another individual noted that "a mine site is a mine site. It is the way it is."

In another setting, one LSA resident noted the effect that rotational work can have on the ability to engage in community life: "[When I worked fly-in/fly-out at another project] I found that you don't belong in either community. You are not around half the time, so it doesn't work to get involved in any structured activities..."[67]

…on Relationships

Concern about negative effects of remote fly-in/fly-out work on relationships is frequently expressed by North Baffin residents. During the course of scoping and community workshops and consultations several ways in which mine work can contribute to breakups were presented, along with various suggestions to support couples.

The importance of communications between workers at a remote mine site and partners back home was raised as a means of keeping relationships strong. During a focus group session with several women from Pond Inlet, it was suggested that orientation of workers should include encouragement to call their partners often. The women thought that this form of communication helps to strengthen relationships.[68]

One resident noted that at Nanisivik it was the alcohol that caused problems:

> *"I grew up in Arctic Bay when Nanisivik was open. Some families separated because of the mine—because of the alcohol. The alcohol led to people sleeping around. I think it would be easier if there were counsellors on site to help people."*[69]

[67] Comment during workshop, 2008.
[68] Focus group with women in Pond Inlet. Richard Akoto. March 2008.
[69] Workshop in Pond Inlet with Inuit workers in HSS field, February 2008.

A less direct reference to the link between mine employment and breakups was made by another North Baffin resident who suggested the relationship problems could result from the increased money and time spent away—"improper spending…relationship problems."

Another North Baffin resident, a woman, noted the connection between infidelity and drugs and alcohol:

> *"Younger people have more jealousy. Some partners are more into drugs/alcohol and may "go with" people…the younger ones are tempted with drugs and booze. Then they end up going with another partner."* [70]

This issue of jealousy, suspicion and lack of trust between partners was noted by a mine site supervisor:

> *"The jealousies and worries about girlfriends back home — guys get worried that their girlfriends go with other guys when they are away. …There is not much you can do about this other than shortening up the rotation — but with shorter rotations then you get into [other] issues."*[71]

> *"Some get very homesick…the girlfriends and wives [working at the camp], they can become very jealous and think the guys are messing around. And the guys [at the camp] think their partners are messing around. That creates havoc. The two week in/two week out schedule seems to help…they are not gone from the community for too long…but this still leads to guys having to get home to make sure [things are alright]."*[72]

This issue of absence and jealousy was also raised by a woman whose partner worked at a fly-in/fly-out job. While he was away, other men were gossiping about her past, and she and her partner had to talk about it over the phone. This same woman also noted that:

> *"Absence is harder for younger people because there is more jealousy. They have to call each other constantly to check up on the other person."*[73]

Some women find themselves at risk from other men when their partner is away at work. One woman indicated that she does not feel safe when her partner is on a work rotation. This scenario was echoed during a separate scoping interview where a male respondent suggested that he would not leave his partner alone in the community for an extended time while he worked at a remote site. He felt his partner might be in danger from other men.

In a different setting, a resident noted that:

> *"What everyone is thinking but no one is talking about is the effect of absence on couple's relationships and jealousy. [During DEW line projects families have broken up when] one of the partners goes with someone else and moves away. These breakups are very hard on people and can lead to suicides."*[74]

A young woman also spoke of concerns related to absence and jealousies:

> *"Can I raise another concern?…When a person is working out there, and their partner worries about them cheating. For me, I have a boyfriend who works at the mine, and he can be gone for, like, four weeks. I can worry about him cheating on me out at the site, and he can worry about me cheating on*

[70] Resident 24, interviewed in 2008.
[71] Supervisor 1, interviewed 2007.
[72] Supervisor 1, second interview in 2008.
[73] Resident 24, interviewed 2008.
[74] Resident 11, interviewed 2007.

him here in town…My worry is that the people are so busy out there and don't have time to be in contact, and I don't really know what is happening over there."[75]

However, absence and remote worksite employment is sometimes seen to have some benefits for a relationship:

"On the positive side, the kids are not hearing fights and arguments while [my husband] is gone. Also, financially, [he] is starting to help out, so it's not just me trying to pay the bills….Also, since the worksite is 100 % drug-free, [my husband] had to quit drugs for the job."

Another spouse of a rotational worker suggested that the rotational work "makes us stronger—I know that if I become a widow I can do it. The absence gives us a break from each other, but it's hard." Still, this same woman, who has been with her husband for over 20 years, suggests that "separation is difficult." She notes, though, that absence is easier for those like herself and her husband, who have been together for years, than it is for younger couples.

Suggestions for Supporting Families

One wife of a fly-in/fly-out worker suggested that to make absence easier, there could be radio shows about relationships. She also suggested that partners of workers could go to the camp for a weekend or for a rotation to see how their partner lives and works.[76] Tours of the site for family members were also recommended by the wife of another worker.[77]

A suggestion by a front-line government worker was to produce a film about life at mine camps. It is thought that this would help to alleviate some of the "fear and tension" in the community about what is going on at the mine site. Since fly-in/fly-out mining and its related activities are new to the community, such a film could help the community to better understand what friends, relatives and family members are doing at the site.[78]

The potential to develop family wellness and counselling services was noted during the 2007 ED&T workshop in Pond Inlet. Steps in this direction are being taken in several communities. These services should build on life skills and knowledge of Elders.

Additional Research and Analysis Related to Fly-In/Fly-Out Work

A substantial body of research has emerged related to the particular challenges and coping strategies associated with fly-in/fly-out patterns of work. The following references are intended to simply point toward some of the highlights of this research.

Nunavummiut have participated in fly-in/fly-out work to varying degrees for more than thirty years. A summary of research carried out during the 1970s of Inuit experiences in the seasonal oil and gas exploration fields, as well as of the experience of workers from Igloolik and Arctic Bay working 42-day in/14-day out rotations at Nanisivik is provided by Hobart (1976 and 1978). Hobart found that both the Coppermine Inuit workers and their wives were supportive of having access to the work. Concerns for the welfare of their families during the worker's absence were identified, as were the economic advantages of employment. He does note, though, that local permanent employment was highly preferred.

[75] Focus group session with several women, Pond Inlet, 2008.
[76] Resident 24, interviewed 2008.
[77] Wife of worker 1, interviewed in 2008.
[78] Public Sector 13, interviewed in 2008.

More recently, conversations were carried out with workers having experience at the Jericho diamond mine that had operated in the Kitikmeot region (Brubacher Development Strategies 2009). Several insightful observations by workers were made about a "cycle of emotions" that can be experienced during fly-in/fly-out rotational work:

> *"One woman …described the overall feeling she associated with her partner working fly-in/fly-out was that of being left alone. The emotions varied, however, over the course of the rotation:*
>
> *"When he first gets home she's glad he's back…*
>
> *"By the second week, around three or four days before he goes back to work it's "please go!" This is a time when arguments tended to happen.*
>
> *"When he's gone, there seemed to be a mix of emotions, changing between "missing him" and comfort at being alone again."*

The Jericho research also noted how relationship issues may build up during the "on-the-job" period. These may remain unresolved until they get carried back home with the worker:

> *"Then there is also the catching up on issues — the guy gets home and just wants to relax. So they may drink alcohol. And then as he overdoes it, he starts thinking back to the phone calls and arguments or rumours that he heard that she was drinking with so and so and everything comes back and he takes it out on his wife. Sometimes he might beat his wife. More in the middle or toward the end of the two weeks at home. At the beginning he just wants to sleep. At the same time, the wife may have expectations for him to start catching up on loose ends at home."*

Another Jericho worker noted:

> *"Sometimes, when the guy gets home from rotation, everyone is kind of walking on egg-shells, trying to be quiet so he can rest. And then everything gets back to normal…and then before he has to go back to work he can start getting edgy…like he's itching to get back to work."*

The role of alcohol in the fly-in/fly-out cycle was noted by another Jericho worker:

> *"…it was only probably the first two or three days when I got home that I'd be drunk. Then I'd sort of relax and mellow out and get used to being home again."*

The same worker noted that stresses related to fly-in/fly-out work, compounded with alcohol are not uniquely felt by northern workers:

> *"I think it was harder for the guys from down south to stay together. Up here, we don't have a bar, and if the spouse wants to make an order, then we both have to agree on what we are going to order [to sign the permit]. Down south there is easy alcohol and more temptations than we have here in the north."*

Research reported from northern Saskatchewan uranium mines (InterGroup Consultants 2005) suggested that effects of fly-in/fly-out work on families varies with the age of the children:

> "There was a general sense that things got easier for the parents as children got older. This could be linked to the fact that children become more independent and require less personal care, or to the fact that many families begin to rely on older children to help fulfil household duties. One Community Member from Athabasca noted that this practice, in turn, has implications for the older child who essentially begins to assume a parental role at a fairly young age."

The Saskatchewan research also highlighted an effect that parental absence might have on extended family who step in to help out:

> "A handful of community members suggested that there were in fact impacts on the extended family, in particular on the grandparents. As one Community Member from the West Side noted "The Elders are getting depressed and tired but they have no choice but to help raise the kids." Another Community Member from La Ronge, however, felt that this parental role assumed by grandparents "provides some stability for the child."

International Experience

In a study of 32 western Australian families that were successfully engaged in the fly-in/fly-out lifestyle, Gallegos (2006) reported that "most couples were keeping an open mind about their children's welfare and were willing to consider discontinuing fly-in/fly-out if they considered their children were not managing the situation." The author also concludes that "the majority of families were not concerned about their children's reactions to fly-in/fly-out especially if their children were under the age of four. …In families who did have concerns about their children, the fly-in/fly-out arrangement had generally commenced when children were three years and older."

Some of the strategies cited by Gallegos (2006) that successful fly-in/fly-out parents use to support their children include:

- Explaining fly-in/fly-out and the reasons for doing it in terms children understand;
- Giving children space to express their feelings;
- Facilitating on-going telephone contact;
- Concentrating on the positives;
- Talking about the worker on a daily basis while they were away;
- Having photographs of the worker in the house and beside the child's bed;
- Putting the worker's voice on the answering machine and playing it on the speaker; and
- Giving children and the worker space to reconnect.

Strategies found to be effective in managing transitions include:

- Establish particular tasks for the worker to pick up on return;
- Establish a consistent routine;
- Try to maintain parenting consistency and a "united front" regarding children's behaviour—commitment to dual parenting, keeping in contact by telephone during the work cycle when needed;
- Prepare the child for departure and arrival of working parent; and
- Maintain regular communication during work period.

Gallegos (2006) emphasizes the importance of social networks developed by parents to provide support and companionship for when the working partner is away. These may include family, friends, mother's groups, childcare providers, organized services (medical, parenting support, parenting help lines, the employer). Preparation for crisis is important, particularly in a situation where the parent at home becomes ill:

> "*Sit your family down and really have a good talk about it and get everyone on side because if not, if your kids aren't on side, it's not going to work …sit them down and explain how long you're going to be away for, what's involved with it, what type of work, [and] try to*

arrange so you've got communication while you're at work and …keep the dialogue things open."[79]

Interviews with mothers whose partners worked in fly-in/fly-out mine settings in Australia have been carried out by Sibbel (2001). The following observation is of particular relevance:

"*Fly-in/fly-out employment imposes both physical and emotional constraints on communication between fly-in/fly-out employees and their families. As indicated by the mothers, problems with communication can be a significant source of family stress. Further research, including both the fly-in/fly-out employees and their partners, would clarify the particular areas that are of concern, and could recommend appropriate strategies to facilitate better communication*."

These interviews with the women "left at home" highlight that in addition to the stresses that may be experienced by workers themselves, other family members, particularly women and mothers are also affected by this style of work:

"*The fly-in/fly-out mothers in the present study identified issues associated with attachment difficulties, communication, security of employment, maintaining relationships, roles in the family, roster cycles, social aspects and safety. In addition they expressed concern about being "voiceless", that is, no one was interested in their feelings about their fly-in/fly-out lifestyles*."

In a recent study carried out by Clifford (2009) in Australia, interviews were carried out with 137 fly-in/fly-out workers and 59 partners of workers to learn about issues related to this form of work. This research found that most workers and partners of workers reported only moderate negative effects related to this style of work. However, a small percentage of workers (3 %) and a minority of partners (21 %) did experience high stress levels.

Clifford's research then explored the underlying factors that related to dissatisfaction around fly-in/fly-out work and vulnerability to fly-in/fly-out work-related stress:

"*The specific impacts of fly-in/fly-out that employees found most dissatisfying were missing important events with loved ones due to being onsite and their ability to participate in ongoing community events and/or team sports, as reported by approximately three quarters of employees. Partners reported the most dissatisfying aspects of fly-in/fly-out were the employee missing important events due to being onsite, feelings of loneliness when the employee is away and worrying about the employee being able to come home in the case of a personal emergency*."

This study suggests that levels of worker dissatisfaction were higher among those with lower levels of social support and among those who were less satisfied with their jobs. Levels of social support as well as the "depth" of a couple's relationship were factors in determining the level of dissatisfaction among partners of workers, with those in lower depth relationships more dissatisfied.

Kaczmarek and Sibbel (2008) reviewed the effects of parental absence on children arising from various work-related causes, including merchant marine as well as fly-in/fly-out mining work. They identified a

[79] Worker, as quoted in Gallegos, 2006

complex issue that clearly is deserving of better understanding. Their observations include the following points:

- Mothers of children of merchant seamen report behaviour problems, nervousness and lack of self-restraint among their children, while the children report feelings of sadness and depression associated with concern for their father's safety.
- One study suggested that relatively brief parental absences under routine conditions exerted minimal effects on a specific group of children's psychosocial well-being.
- Fly-in/fly-out-related variables that need to be investigated in future studies include the age at which children began a fly-in/fly-out lifestyle. Those children who were born into the lifestyle and have always experienced their fathers' regular absences may cope differently from those children who originally had their fathers at home and were subsequently introduced to fly-in/fly-out at a later age.
- There is some evidence …that only those families who are able to cope remain in fly-in/fly-out employment for any length of time. Those who remain are families who have adjusted, adapted or learned to cope with the lifestyle.
- Previous research reported families feeling different levels of loneliness and anxiety at different times during the roster cycle.
- Family structure and level of family income seem to be relevant factors. Children from original nuclear families have a much lower incidence of mental health problems than those from single-parent or blended families. In addition, higher family income has been associated with better mental health. Quality of parenting and better family functioning can also act as protective factors.

6.2.2 Alcohol and Drug Abuse

Local concerns about the effects of the Project on alcohol abuse and increased drug use were frequently raised during community sessions. The main concern is the effect that income will have on levels of substance abuse:

> *"Imagine how things could worsen here. Alcohol is already here. When more money is being made, more alcohol will come in to some houses. This will mean people face more problems, and may not come to work."*[80]

> *"I think it [alcohol] could cause Baffinland to lose a lot of employees, because they might not want to choose between partying and jobs. I don't know because I've never felt that pressure."*

In addition to the direct effect of increased income on substance abuse, there is an expectation that the "level of service" provided by the bootleg alcohol and illegal drug traders may "improve" as local wealth increases.

This raises concerns on two fronts. First, the volume of alcohol that may become available through illegal channels may increase, potentially reducing the ability of the local alcohol education committees to moderate alcohol flow into the communities. Secondly, access to drugs has, to date in the North Baffin, been predominantly limited to marijuana, a "soft" drug not generally associated with violent or socially dysfunctional behaviour. The concern is that increased wealth may attract dealers of the harder drugs.

[80] Comment during focus group with several women in Pond Inlet, March 2008.

This scenario is also suggested in the "Communities and Diamonds" report of the effects of the diamond mines in the NWT (Government of Northwest Territories, 2008):

> "*The violent crime rate has gone up in Yellowknife. No trend is noted in Small Local Communities. Alcohol plays a large role in most of the NWT's violent crime. An increase in drug use may also lead to an increase in violent crime rates. Higher incomes from diamond mine employment may be related to more drug use*."

6.2.3 Food Security

Residents of the LSA perceive a need to gain income in order to support activity in the harvest sector. This relationship was well expressed during an exchange between an Elder and a young woman at the Arctic Bay meeting of North Baffin working groups:

> [Elder]: *"As an Elder, I want you to work, but I also want you to go hunting."*
>
> [Youth]: *"Thank you. Yes, prices are going up. And, to buy hunting equipment, we need jobs. Gas prices go up and unemployed people can't afford to hunt. You want to keep both sides, but this can't always work in the future. After experiencing this personally, I know that future generations won't survive unless we have graduates and people who have good jobs. Through the radio you can hear people selling off their belongings to make money. Money will be very important."*

Reliance on retail foods, as indicated by per capita increases in the federal food subsidy program, is another dimension of food security that relates to a growing demand in the LSA for income and jobs. As one worker noted, reliance on income earners and on traditional values of sharing is an important dimension of food security:

> *"Retirement savings? No. I don't have anything left for that. It's too expensive up here. Groceries for our family — it's about $100 to $200 per day for our family members plus others who come by— we feed about 14 people. Son and his kids and common-law. Sometimes we cook from scratch rather than prepared food. Whoever comes by, we'll share what we have — I don't like to have leftovers…"*

6.2.4 Summary of Issues and their Treatment in the Assessment

Based on the issues that arose during scoping three "key indicators" are identified:

- Well-being of children;
- Substance abuse; and
- Community social stability ("community fabric").

In addition, the following "subjects of note" are discussed:

- Household income and money management;
- Food security;
- Change in household composition;
- Personal safety and security in community;
- Human health; and
- Distribution of impacts and benefits within and between communities.

6.3 WELL-BEING OF CHILDREN

The assessment focus is:

- Will the Project substantially affect the well-being of children?

6.3.1 Assessment Methods

For the purpose of assessing the effects of the Project on the well-being of children, the following are assumed to be important determinants of improved child well-being in the LSA:[81]

- Increased household income;
- Better nutrition and food security; and
- Care-giving, parenting, and parenting skills.

Determination of the significance of the outcomes of the Project on the well-being of children is accomplished by considering the effects of the Project on these key determinants.

Based on the previous assessment that the Project will have a significant beneficial effect on employment, it is assumed that it will also have a significant beneficial effect on household income and that some of this income will put food on the table. Therefore, these effects are, for the purpose of understanding Project effects on children, considered together.

The effect of the Project on "care-giving, parenting, and parenting skills" will include multiple components with variable directions, both positive and negative. These are considered together for the purpose of assessment, but will be discussed separately in order to understand the issues at play.

For the purpose of this qualitative assessment, it is assumed that Project employment will be one of many factors that affect the quality of parenting. In this context, "magnitude" will refer, in a purely conceptual manner, to the Project-induced effects on parenting relative to all the other things that affect the baseline parenting conditions.

The following criteria are used to rate the magnitude of negative Project-induced changes to parenting:

- Low, negative - changes may be perceived in individual children, but do not change the dynamic of groups of children such as in a classroom or day-care setting;
- Moderate, negative - changes lead to a noticeable change in dynamics of groups of children, but don't cause major concern;
- High, negative - changes lead to a noticeable change in dynamics of groups of children, and are a cause of major concern;
- The following criteria are used to rate the magnitude of positive Project-induced changes to parenting:
- Low, positive - changes may be perceived in individual children, but do not change the dynamic of groups of children such as in a classroom or day care setting;
- Moderate, positive - changes lead to a noticeable change in dynamics of groups of children; and
- High, positive - changes lead to a noticeable change in dynamics of groups of children, and are considered to be substantial.

[81] Income and diet are the two most important factors, and parenting quality the third-listed significant factor affecting family functioning, as identified in the Western Australian Aboriginal Child Health Survey (Silburn et. al, 2006).

In making a determination of effect significance, the benefits experienced by some children are not considered to offset adverse effects experienced by others, rather, net effects at the individual level are considered in order to arrive at conclusions related to the overall outcomes for two groups of children—those who generally benefit and those who do not—as a result of their parents' involvement in the Project. For this reason, two assessment questions are addressed separately:

1) Will the number of children who experience overall positive outcomes from the Project be significant relative to the baseline well-being of children? and

2) Will the number of children who experience overall negative outcomes from the Project be significant relative to the baseline well-being of children?

These questions will simply be used to guide the qualitative analysis to an overall conclusion related to significance. Appropriate baseline data is not available to support a more formal analysis.

6.3.2 Project Effects and Proposed Mitigation

Two effects of the Project that relate to child well-being are the effects on household income and on food security and nutrition. These have been addressed as subjects of note elsewhere. For the purpose of assessing their effect on child-well being, these are considered together as household income and food security.

In addition, the Project may affect the "care-giving, parenting and parenting skills" determinant of child well-being in three ways: parental absence; "transition effects" inherent in the fly-in/fly-out lifestyle; and changes in parenting due to effects on parental life skills, stress, and alcohol use. These are considered together as changes in parenting.

Mitigation Related To Human Health and Well-Being

Baffinland recognizes the challenges that arise from fly-in/fly-out employment. In order to mitigate potential adverse effects, Baffinland will provide pre-employment/work readiness orientation for LSA residents considering employment with the Company; will implement an Employee and Family Assistance Program for workers and their family members; and has negotiated an agreement with the QIA whereby the Company would contribute to the *Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat* (INPK) community projects fund.

Pre-employment / Work Readiness Training

Pre-employment preparation training has been described earlier under the Education & Training VSEC. This training is designed to prepare individuals for the experiences and challenges they are likely to encounter if they succeed in gaining employment at the Mary River Project. Components of the training will include issues related to the adaptation of family members, including children and partners, to the rotational lifestyle. The aim will be to ensure that prospective workers and their partners take some time to anticipate the challenges, consider their goals, learn about how they can find support, and to develop the "survival tools" that will assist them in making it work. This training is not expected to solve all problems, but it should encourage individuals associated with the Project to identify these problems and to seek out assistance earlier rather than later.

Employee and Family Assistance

Baffinland will participate in an Employee and Family Assistance Program (EFAP) that will provide advice and assistance for employees on a range of issues, including drug and/or alcohol dependency and work-related stress management. All programs will respect the individual's confidentiality.

INPK Community Fund

This fund, to be administered by an Inuit organization, has the following objectives:

- Creating opportunities for capacity building and synergy with existing capacity in the communities;
- Ensuring equity and fair distribution of impacts and benefits within and between communities and across generations;
- Maintaining consistency with community development goals;
- Ameliorating social and cultural consequences if a proposed mitigation or enhancement is unsuccessful or in the event that unanticipated impacts emerge;
- Promoting mutual understanding and learning; and
- Ensuring transparency and accountability.

Activities supported by the Fund may include, but are not limited to:

- Participation in community projects;
- Youth and Elder programs;
- Hunter support activities;
- Family and community-wide activities and programs;
- Cultural learning and revitalization programs;
- Social support programs for families and individuals;
- Individual and family financial planning;
- Educational incentives;
- Counselling and healing programs; and
- Seed funding or operational funding for local charities and social organizations.

Coordination with Health and Social Service Providers

Baffinland recognizes the value for the initiatives it supports and those initiatives supported through public social and health services to be consistent and complementary. It also recognizes that the effectiveness of all these initiatives may be enhanced through monitoring for effectiveness and that this monitoring may require the sharing of data and information between multiple parties. For these reasons, Baffinland intends to develop good working relationships with key service providers in order to achieve improved outcomes from the delivery of these various social initiatives.

Some of the means by which effective collaboration is envisioned include the following:

- Open regular channels for communication between Baffinland and GN (particularly the Departments of HSS, Education, and Justice). This could be through the Q-SEMC or some other means such as the Inter-Departmental Working Group on Wellness.

- Establish good relationships with local service providers in LSA communities (e.g., health clinic, social workers, RCMP, Alcohol Education Committees, schools). Baffinland recognizes that some of these relationships may require some formal approvals and terms of reference from the appropriate Departments in order to set out parameters for sharing of data and information so that confidentiality is not breached. In some instances formal agreements may be useful to facilitate this process.

- Share relevant data generated from Baffinland activities with these key partners through the Q-SEMC or other effective arrangements. Again, data sharing will be done with due consideration given to issues of confidentiality.

Household Income and Food Security

For the purpose of assessing their effect on child well-being, it is assumed that money management decisions will generally be made so that children will benefit from the increased income of households of workers earning wages from the Project. One important element underlying this assumption is that substantial amounts of income are allocated to buying healthy groceries or to support harvesting activities. It is also assumed that appropriate amounts are set aside to pay the increased rent that those living in social housing will be assessed as household income increases.

For some individuals, these money management decisions will be made without any additional mitigation; others, however, may benefit from orientation and training sessions related to money management. To address this widely identified need, money management will be included as a component of pre-employment training, as described in the HRMP (Appendix 10F-3).

Effects on Parenting

Four factors are assumed to be of importance to how the Project will affect parenting:

- Parental absence due to two-week in/two-week out work rotations;
- Effects on family structure and parenting transitions;
- Changes to parents themselves; and
- Housing as a contributing factor to child well-being.

Parental Absence

The fly-in/fly-out nature of the Project means that parents working there will be away from their children for two weeks at a time. The main issues for children include: parents missing special events such as birthdays and school or sporting functions; inconsistency in household routines, roles, and expectations; transitions associated with parental leaving and returning; and parental stresses associated with the fly-in/fly-out lifestyle. These effects are broadly associated with fly-in/fly-out work (Gallegos, 2006; InterGroup Consultants, 2005; Sibbel, 2001).

The outcomes experienced by children as a consequence of parental absence will vary according to individual situations, and will be influenced by:

- Age and physical/mental health status of the affected child;
- Family structure: couple family or single parent;
- Employment status of stay-at-home parent: Does the mother or father work in the community?
- Presence of older children or relatives able to provide care, and the child's relationship with these alternate care-givers; and
- Access to formal daycare: do these facilities have capacity to accept new children?

Project design and mitigation measures to address parental absence include first and foremost the rotational schedule. For this Project, two-week in/two-week out rotation will be instituted for workers from the LSA during all phases, including construction. This rotation will apply to employment by contractors as well as by Baffinland directly. Individual exceptions may be made on a case-by-case basis during the construction phase, at the request of a qualified tradesperson since longer rotations are typical amongst the

construction trades. The two-week in/two-week out rotation will be instituted as the norm for employees of the Project as well as for employees of all contractors with LSA staff on-site.

The baseline situation is one where access to daycare facilities is already limited to non-existent. With a family member away for two weeks at a time, the demand for regular child care and for occasional child care assistance is expected to increase. Baffinland, as described in the HRMP (Appendix 10F-3), will contribute to a socio-economic fund that will specifically contribute to social support programs and activities. The managers of this fund may choose to include support for child care services, in addition to other more general family-support activities.

"Transition Effects" and Changes to Family Structure Inherent in the Fly-in/fly-out Lifestyle

Observations by workers with experience at the Jericho mine provide insight into some of the transitional effects that can be experienced during fly-in/fly-out rotational work. The following excerpts from a report (see Brubacher Development Strategies, 2009) on the Jericho mine's socioeconomic effects illustrate the "cycle of emotions" that can be associated with fly-in/fly-out work:

> *"When he first gets home she's glad he's back…By the second week, around three or four days before he goes back to work it's "please go!" This is a time when arguments tended to happen. When he's gone, there seemed to be a mix of emotions, changing between missing him and comfort at being alone again."*

The Jericho research also noted how relationship issues may build up during the on-the-job period. These may remain unresolved until they get carried back home with the worker:

> *"Then there is also the catching up on issues—the guy gets home and just wants to relax. So they may drink alcohol. And then as he overdoes it, he starts thinking back to the phone calls and arguments or rumours that he heard that she was drinking with so-and-so and everything comes back and he takes it out on his wife. Sometimes he might beat his wife. More in the middle or toward the end of the two weeks at home. At the beginning he just wants to sleep. At the same time, the wife may have expectations for him to start catching up on loose ends at home."*

Another Jericho worker noted:

> *"Sometimes, when the guy gets home from rotation, everyone is kind of walking on egg-shells, trying to be quiet so he can rest. And then everything gets back to normal…and then before he has to go back to work he can start getting edgy…like he's itching to get back to work."*

These cycles of emotions are also described from research carried out by Gallegos (2006), which research identifies emotions starting with excitement as a partner at home anticipates the worker's return, followed by "relief," "anger/grumpiness" and a period where arguments are more likely, then "happiness" and support, anxiety, grumpiness, cranky and excited leading to the next departure. Relief and sadness/affection may be felt just before the worker leaves home again. Once he's away, the stay-at-home partner may feel anxious/nervous, the feelings of resignation and loneliness and stress/tiredness from having to do all the parenting alone. Then excitement builds in anticipation of the worker's return again. As one partner who was interviewed for the Gallegos study suggests:

> *"I get this sort of sick feeling when he goes, like…being by yourself. I feel anxious…I've got a task ahead of me. When he arrives home I'm very excited and very happy…When he's*

> *just arrived, I get a sense of, I think I've built myself up so much, I'm so happy and so excited that he's come home and then he comes home and he's tired and I feel deflated about, maybe for the first day…So mixed emotions on that day and then we just get into the routine."*

A further factor affecting transitions between home and work will be weather-related travel delays. These will lead to uncertainty related to departure times and to delays in a working parent's return home. These delays and uncertainties may lead to an increase in stress amongst some children and parents. One partner of a fly-in/fly-out worker spoke about how they have adapted to this reality in communicating with their young child, as the following researcher notes suggest:[82]

> *"They don't tell their 3-year-old that dad is going off to work. One consideration in adopting this approach is that travel is so uncertain. He'll head out to the airport… but the flight may or may not happen. Similarly, he may or may not get home on schedule."*

Clearly, these changes in the family structure will require care and support to make things work. Children who are living in these settings will do best when the parents are coping well with these transitions.

General mitigation that may serve to support families involved in fly-in/fly-out lifestyle includes the socio-economic fund, as described in the HRMP (Appendix 10F-3). Worker orientation training addressed in the HRMP (Appendix 10F-3) may also serve as mitigation if this also involves family members (partners) and is designed to include "survival strategies" related to the fly-in/fly-out lifestyle.

Changes to Parents that Affect Parenting

Engagement in the Project through employment or the employment of a spouse or partner may lead to many effects on individuals that affect how they perform as parents:

- Improved mental well-being from having a job and income;
- Increased domestic conflict arising from factors such as jealousy, money decisions;
- Improved communication and conflict management skills gained from employment;
- Increased or decreased substance abuse;
- Increased confidence/financial independence—option to get out of unhealthy relationships;
- Increased physiological stress and fatigue associated with intensive shift-work; and
- Stress, loneliness, fatigue, anxiety associated with being alone during partner's absence (i.e., for some parents who may depend on their partner for social interaction, or who may not be confident in their parenting ability).

For some parents, the net effect of the Project may be neutral or beneficial to their ability to provide effective parenting. Others who are exposed to the same effects may respond in ways that have adverse outcomes for children in their care.

The ability to manage these effects will contribute to the longevity of involvement in the fly-in/fly-out lifestyle. Knowing there is an option to leave if things go wrong has been identified as a factor that may actually help improve success. For example, LaForte (1991) suggests:

> *"From [the wife of a miner's] personal experience…long distance commute mining is adequate only on a short-term basis. One can cope if one knows there is an end in sight."*

[82] Interview with wife of worker, 2008.

Along a similar theme, Gallegos (2006) writes that:

> *"In most cases fly-in/fly-out was not seen as a long term option and participants in this study looked toward a future that did not include fly-in/fly-out…There tended to be a mutual understanding on future goals whether the these were financial or career, and in the vast majority there was an "out-clause." In the great majority of cases, there was a realistic appreciation of the costs and benefits of the fly-in/fly-out lifestyle, compared with any other, coupled with a sense that it was temporary."*

Absence from the family and transitions between leaving and returning cannot be avoided. Mitigation may be helpful, however, in alleviating some of the challenges. For example, family support services for the parent and children left at home during a worker's rotation may reduce stress for both the care-giver in the community as well as for the parent away at the Project.

Family support measures are one of the areas that may be supported through the *Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat* fund that will be administered by the QIA. Additional mitigation addressed in the HRMP (Appendix 10F-3) may include orientation to the challenges and "survival strategies" related to the fly-in/fly-out lifestyle.

Housing as a Contributing Factor to Child Well-being

Housing arrangements may influence children's response to the effects of the Project on parents. For example, under the existing baseline conditions many residents of the LSA live in crowded housing situations. In these situations, the potential for stress and conflicts may be higher than in situations where people have more private space. A worker coming off a night shift rotation may want peace and quiet for a period of time—this may be difficult in crowded situations.

At the same time, employment and increased wealth is typically associated with beneficial effects on housing situations. In Nunavut, though, the high fixed costs and risks associated with home ownership, along with complex social housing policies related to waiting lists, income-tied rent assessments, income-tied eligibility and so forth make it difficult to anticipate how Project effects on housing will play out. The direction of the effect is expected to be positive, but the magnitude is too uncertain to predict.

6.3.3 Assessment of Residual Effects

The effects that the Project may have on parenting and on increased income and food security are assessed for their potential impact on the well-being of children. An overall assessment follows the assessment of these individual components, providing an opportunity to consider how these two determinants of child well-being interact.

Component Assessment: Parenting

Ratings for significance criteria for residual effects related to parenting on the well-being of children are presented in Table 4-6.1. Some children will experience overall beneficial effects related to their parent's involvement with the fly-in/fly-out lifestyle; others are expected to experience negative outcomes. The different response to the same Project interactions will arise from parental responses as well as from those of children.

These effects will primarily be experienced by children in the point-of-hire communities, since that is where most Project employment will occur. Therefore, the social extent is considered to be the family, and those children who are affected are considered to be engaged in the Project through family involvement. It is

recognized that well-being of children is a factor that extends into the community, especially through the schools, so that some community-level effect may also be experienced by bystanders, such as classmates. These bystander effects, however, are considered to be minor.

Positive changes are expected to be expressed often and by a sufficient number of children that a recognizable change will be perceived frequently by those who work with children, particularly teachers. Therefore the "magnitude" of these positive changes is rated as moderate and the frequency as continuous. In other words, a teacher who has worked with children in the community for many years will notice a positive change in the class population.

Negative changes are expected to be expressed on occasion by some children whose parents are involved with the Project. In the school setting, teachers may perceive this as raising concern for individual students, rather than as a change in overall classroom dynamics. Therefore, the magnitude of negative effects on children is assessed to be low, relative to the baseline, and the frequency as occasional.

Table 4-6.1 Effects Assessment Summary - Well-Being of Children

Key Indicator: Well-being of Children		
VSEC: Human Health and Well-Being		
Effect	**Changes in Parenting**	**Increased Household Income and Food Security**
Design / Mitigation Measure(s)	Orientation and training related to fly-in/fly-out adaptation, Fund to support family services	Money management, Orientation and training components related to health and well-being
Direction	Variable	Positive
Geographic Extent	Point-of-hire communities	Point-of-hire communities
Social Extent	Family	Family (extended)
Equity	Engaged families	Bystanders
Magnitude	Low, negative Moderate, positive	High
Frequency	Intermittent, negative effects Continuous, positive effects	Continuous
Duration	Long term	Long term
Reversibility	Spontaneous	Spontaneous
Significance of Adverse Residual Effects	Not significant	No adverse residual effects
Significance of Beneficial Residual Effects	Significant	Significant
Probability of effect occurring	High	High

NOTE(S):

1. THE BENEFITS EXPERIENCED BY SOME CHILDREN ARE NOT CONSIDERED TO OFFSET THE NEGATIVE EFFECTS THAT MAY BE EXPERIENCED BY OTHER CHILDREN. THEREFORE, BOTH GROUPS-CHILDREN WHO ENJOY OVERALL BENEFICIAL EFFECTS FROM THEIR PARENT'S WORK, AND CHILDREN WHO EXPERIENCE OVERALL NEGATIVE EFFECTS ARE ASSESSED SEPARATELY.

The frequency of occurrence of these negative residual effects is expected to be occasional, provided that mitigation measures are effective in:

- Helping parents develop strategies to avoid adverse effects; and
- Improving early detection of concerns arising among individual children so that parents can take corrective actions to avoid escalating harm to their child.

Detecting and addressing adverse outcomes experienced by children will minimize the accumulation of negative effects, thereby avoiding higher levels of concern.

While Baffinland can provide assistance (financial and managerial support), the active involvement of the community, the administrative Inuit organization and third parties are paramount for the success of these programs.

This assessment may be interpreted as meaning that a teacher who has worked with children in the community for many years will identify issues of concern arising amongst individual children from time to time, but will not perceive that these are the cause of an overall negative change in the class population.

Significance Determination

With the mitigation proposed, the negative residual effects of Project-induced changes to parenting on the well-being of children is expected to be of low magnitude, limited to occasional instances with individual children. These residual effects are therefore assessed to be not significant. The positive residual effects are expected to be more prevalent (moderate magnitude) and of continuous frequency. These effects are therefore assessed to be significant.

Community perspectives related to the effects on children and parenting seem to be reasonably well aligned with this assessment. In particular, comments related to the mental health benefits of having work, such as, "When a father is proud and confident, it affects the whole family,"[83] point to general expectations of benefits for children.

Component Assessment: Household Income and Food Security

Ratings for the residual effects of Project-induced increases to household income and food security on the well-being of children are presented in Table 4-6.1.

The direction of this effect is positive and will be experienced mostly in point-of-hire communities where most employment is experienced. The social extent of these benefits will be the family. It is recognized that this may include extended family members and others through the effect of sharing networks whereby income, snow machines and food are distributed beyond the immediate family. Some residents may be socially situated outside these networks, and for this reason the social extent is not considered to be the entire community. Since some of those who benefit from this sharing will be outside the immediate family of Project workers, the equity of the effect will apply to bystanders as well as to those directly engaged in the Project.

Magnitude of the residual effects of increased income and food security on child well-being is high and will be continuous over the life of the Project. These effects will end spontaneously when the Project is completed.

[83] See Baseline Report, Appendix 4A (Brubacher Development Strategies, 2010).

Significance Determination

The residual positive effect of Project-induced increases in household income and food security on the well-being of children is assessed to be significant. This assessment is in line with community expectations that employment income is an important factor in improving food security.

Overall Assessment of the Project's Residual Effects on Child Well-being

The effect of a parent gaining employment at the Project is expected to be experienced as an overall benefit by the majority of children. This will arise from multiple factors, including the improved well-being their parents gain from having a good job, reduced financial stresses in the family, and improved food security.

For a minority of children, challenges related to parental absence, transition between parental comings and goings, changing parental expectations, and the response of parents to the stresses and issues brought about by fly-in/fly-out employment are expected to lead to adverse residual effects. The characteristics that determine which children do well and which will not are not well understood. The literature does suggest that children who are born into fly-in/fly-out families may do better than those who are used to the presence of both parents and then have to make a transition to regular arrivals and departures. Clearly, parental coping strategies will also affect how children respond to this lifestyle. Recognizing this, Baffinland will include the issue of children and fly-in/fly-out lifestyles as part of pre-employment orientation training. The Company will also contribute to community programs through the *Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat* fund.

Significance Determination

The residual positive effects of the Project on child well-being are determined to be significant. The residual negative effects of the Project on child well-being that are expected to occur are assessed to be not significant.

6.3.4 Prediction Confidence and Risk Analysis

Component Assessment: Parenting

Confidence in the prediction that most children will experience net benefits from their parent's employment is high. There is moderate confidence in the prediction that the number of children who experience net adverse effects in spite of planned mitigation will be low,.

The assessment that the outcome on the well-being of children of negative residual effects on parenting will be not significant is dependent on appropriate parental responses to the challenges of raising children in a fly-in/fly-out environment. Baffinland's planned mitigation and the partnerships that may be supported in the communities should help to establish an environment to support parents in making good choices. However, how individuals respond is out of the control of the Company; this introduces a degree of uncertainty to the assessment. In particular, parents will need to make effective decisions based on the information they receive during pre-employment orientations.

Should children remain in situations where their experience of adverse effects is prolonged, the result may affect their long-term outcome and become largely non-reversible. The accumulation of these effects might then lead to higher ratings of magnitude over time. Steps to provide early identification of children who may be struggling to cope will help to reduce adverse effects when these do occur.

Component Assessment: Household Income and Food Security

Confidence in the prediction of significant beneficial residual effects on child well-being from increased household income and food security is high.

Overall Assessment of the Project's residual effects on Child Well-being

Confidence in the prediction that most children will experience net benefits from the Project is high.

Confidence is moderate in the prediction that only a small number of children will experience net adverse effects. A risk is that some parents may fail to adequately monitor the effect of their lifestyle on their children or, if they perceive that their children are not coping well, may fail to make the best decisions in response to the situation.

6.3.5 Follow-Up

Component Assessment: Parenting

The complexity of potential effects makes it difficult to anticipate where support may be needed. The next best approach will be for those who care for children—parents and schools—to recognize when adverse situations may be arising and to respond effectively. This is a normal responsibility of parents and institutions that work with children. Baffinland recognizes that as a private company it is not a lead player in this area.

However, the Company will participate as a partner to support the efforts of those who do work with children—parents, schools, day care programs, and health centres—to carry out "precautionary" or "surveillance monitoring," as noted in Section 15.5. In addition, orientation sessions with parents—both the worker and the stay-in-community parent—will include components related to children, their responses to parental absence, and the steps a parent should take if warning signs are seen.

Component Assessment: Household Income and Food Security

No follow-up is required.

Overall Assessment of the Project's Residual Effects on Child Well-being

The risk of adverse outcomes for children can be addressed by enhancing the level of monitoring of children by front-line workers who deal with them. Early detection, combined with family support, will allow parents to decide on the best course for their family.

6.4 SUBSTANCE ABUSE

The assessment question related to substance abuse is:

- Will the Project substantially affect levels of substance abuse in the LSA relative to the baseline?

6.4.1 Assessment Methods

The assessment of Project effects on substance abuse is carried out by considering how the Project is likely to affect the factors that influence it. For the purpose of this assessment the following are assumed to be important determinants of substance abuse in the North Baffin LSA:

- Availability;
- Affordability;

- Individual and peer-group attitudes; and
- Addictions and dependencies.

The following assumptions are made:

- Consumption of alcohol and drugs is constrained by low income across the LSA;
- In the North Baffin LSA, alcohol consumption is further constrained by availability;
- Attitudes and practices related to alcohol consumption are variable. It is assumed that most alcohol is consumed responsibly; however, binge-drinking patterns are common and this is sometimes associated with anti-social and criminal behaviours; and
- Current drug use in the North Baffin primarily involves soft drugs.

Direct Interactions between the Project and Substance Abuse

Determination of the significance of Project effects on alcohol abuse will consider the possible interactions and then use this understanding to generate a qualitative assessment on the expected outcomes of these interactions on substance abuse. The following potential effects are considered:

- Transportation of drugs and alcohol through the Project site;
- Ability to afford drugs and alcohol; and
- Attitudes toward drug and alcohol use and desire to overcome addictions.

While these effects are related to each other, they are not interdependent. A change in attitude toward alcohol will affect "substance abuse", regardless of whether there is any effect on transportation or on the ability to afford alcohol. Likewise with the other potential effects. Therefore these are assessed separately.

Outcome of the Direct Interactions on Substance Abuse in the LSA

The effect of the Project on any of the interactions described above does not determine the outcome in terms of alcohol abuse levels. Therefore, a second-level assessment will be carried out to consider the overall outcome. This assessment will be very qualitative in nature, but is useful in establishing a conceptual frame for understanding Project interactions.

For the purpose of this second-level assessment, it is assumed that for some residents of the LSA, the net effect of the Project may be neutral or beneficial with respect to their use of substances. Others who are exposed to the same effects may respond in adverse ways. The combination of these individual responses will determine the overall significance of the residual effects on substance abuse in the LSA. This overall effect is assessed in a qualitative manner with the following index used to come to a significance determination:

- Low, negative outcome - increased substance abuse may be perceived in individuals but is not noticeable at the community level by those who deal with these issues, such as RCMP, health, and social service workers;
- Moderate, negative outcome - increased substance abuse is noticeable at the community level and is considered by those who deal with these issues, such as RCMP, health, and social service workers, to be associated with the Project. However, the increase does not cause major concern;
- High, negative outcome - Increased substance abuse at the community level is widely perceived by community members as well as by "front-line" workers to be a cause of major concern and is considered to be associated with the Project;

- Low, positive outcome - decreased substance abuse may be perceived in individuals but is not noticeable at the community level by those who deal with these issues, such as RCMP, health, and social service workers;
- Moderate, positive outcome - decreased substance abuse is noticeable at the community level and is considered by those who deal with these issues, such as RCMP, health, and social service workers, to be associated with the Project; and
- High, positive outcome - decreased substance abuse at the community level is widely noticed by community members as well as by "front-line" workers to improve the quality of life of the community, and this is considered to be associated with the Project.

6.4.2 Potential Effects and Proposed Mitigation

The Project may affect substance use in three ways:

- Availability due to transportation of substances through the Project sites;
- Ability to afford drugs and alcohol; and
- Influence attitudes toward substances and addictions.

Transportation of substances through the Project sites

Increased mobility between sources and the North Baffin communities could facilitate transportation of both alcohol and illegal drugs, with the Project site serving as a transfer point. To avoid this scenario, the Project includes measures designed to prevent the import of alcohol and drugs through the site and the use of these substances at the site. These are described in the HRMP (Appendix 10F-3), and include a no-drugs, no-alcohol policy and effective baggage searches for all employees and contractors.

Curtailment of Imports through Shipping Component

In addition to imports from the south through the mine site, the possibility that substances may enter Project sites through marine shipping routes has been identified. This will be mitigated through arrangements with the shipping companies to require ship captains to implement preventative measures. For example as is done at site, any baggage coming off vessels can be searched. Baffinland has initiated meetings with Transport Canada and Canada Customs and will continue to liaise with the appropriate authorities. This collaboration is expected to include the GN Department of Justice and RCMP to ensure they are satisfied with proposed mitigation measures. Baffinland will look to these agencies for recommendations and suggestions in this area.

These issues are identified in Sections 4.4.1 and 4.4.2 of the Shipping and Marine Mammals Management Plan (Volume 10, Appendix 10D-10):

Port Security

Port security is governed by the Port Securities Transportation Act (Transport Canada). The aim of this legislation is to reduce the risk of security threats by preventing unlawful interference with the marine transportation system. This is achieved, in part, by conducting background checks on marine workers who perform certain duties or who have access to certain restricted areas.

Smuggling Prevention

Customs and Immigration clearance are required for:

- Foreign registered vessels arriving from or sailing to an overseas destination; and
- Canadian registered vessels arriving from an overseas port.

Measures to prevent smuggling include:

- Bonded lockers are to be locked and sealed by Customs and Immigration officials on the vessel's arrival.
- The Master of each ship will inform crew that no alcohol or tobacco is permitted to be taken ashore.
- Any crew member who, on disembarking the vessel, is found to be carrying alcohol or drugs, or is suspected of being under the influence of alcohol or drugs, will be returned onboard the vessel by security staff and will face disciplinary action.

Affordability of Drugs and Alcohol

Increased income from direct employment at the Project is expected to increase the ability of residents to afford these substances.

Attitudes toward Substance Abuse and Addictions

The Project is expected to raise the stakes (or "opportunity cost") related to substance abuse. Increased income will be contingent on an ability to work without access to substances for two weeks out of four, and an ability to maintain the discipline needed to show up on time for travel. For those who have addictions problems, these constraints will introduce positive incentives to come to terms with them.

On-site counselling services and awareness programs will be available to all employees. Such programs will positively influence changes in attitudes.

There is a potential that some individuals will find the alternation between the availability of alcohol (during time off work) followed by unavailability (during the work rotation) may encourage binge drinking. This potential has been suggested in interviews carried out during a review of the Jericho project in the Kitikmeot region (see Brubacher Development Strategies, 2009).

Design and Mitigation Measures

Steps to address these potential effects, and to support individuals who are seeking to deal with their addictions, have been considered in the design of the Project.

- The use of these substances at the site will be prohibited, introducing a period of enforced abstinence.
- Planned orientation and training programs will 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 individual choices.
- An employee and family assistance program (EFAP) will be implemented, and this may support some individuals in recognizing and dealing with their addictions.
- Community support programs funded through the INPK.

These measures should create a supportive environment for those seeking to make healthy choices, and may lead some individuals with substance abuse problems to recognize this and to begin to seek help.

6.4.3 Assessment of Residual Effects

Project effects on three components contributing to substance abuse are assessed. These include the effect of increased transportation linkages on substance availability, the effect of increased household income on affordability, and the effects of the Project on attitudes.

Component Assessment: Transport of Substances through Project site

Ratings of the significance criteria for this effect are presented in Table 4-6.2. Transportation of substances through the Project site is considered to be a negative effect, since this would constitute illicit importation. If this were to occur, it would potentially affect the North Baffin LSA communities that supply workers to the site, since access to drugs and alcohol in these communities is either controlled (in the case of alcohol) or prohibited (in the case of illegal drugs). The social extent of this effect would be the entire community, as these substances could be sold on the black market. Therefore, the effect would affect bystanders.

With the planned mitigation in place, the magnitude and frequency of this potential effect are both assessed to be low. While it is possible that some drugs may not be detected, it is considered unlikely that substantial quantities of these substances will be undetected, relative to the baseline. Control at site, involving search of baggage, will be more stringent than that of the regular transportation links into the LSA communities.

Determination of Component Significance on Substance Abuse

With described mitigation in place, the importation of drugs and alcohol through the Project site is considered not to be significant relative to the baseline for illicit importation into the North Baffin LSA.

Therefore, the effect of importation of substances through the Project site on substance abuse in the LSA is assessed to be not significant.

Component Assessment: Affordability of Substances

Ratings of the significance criteria for this effect are presented in Table 4-6.2. The Project is expected to have a significant positive effect on household income, given the level of local employment that is expected to be gained. This income may, therefore, make drugs and alcohol more affordable to those who choose to purchase them. Therefore the “direction” of this effect is to increase affordability. Whether this is considered to be “negative” or “positive” will depend on attitudes and practices. Therefore the direction is determined to be “neutral.”

This “affordability” effect may be particularly relevant to legal purchases of alcohol obtained through permits issued by the local alcohol education committees. Black market “bootleg” alcohol may either become more affordable—if supply keeps up with demand—or simply become more expensive if supply fails to keep up with increased demand. It is expected that a mid-point will be found where prices rise and the increased profitability encourages more effort to supply the market. Affordability of illegal drugs is expected to increase with increased income, as it is assumed that transportation is less of a limiting factor to the volumes supplied.

The geographic extent of this effect will be the point-of-hire communities where employment will be mostly be experienced. The social extent is expected to be the family. Families will also share in the other benefits and challenges associated with engagement in the Project. The magnitude of increased affordability of substances is expected to be high, relative to the income of many households in the absence of Project employment. This effect will be experienced continuously over the duration of the Project, and will

spontaneously reverse when Project employment ceases at the termination of the Project. The probability that substances will become more affordable is considered to be high.

Significance of the Project on this Component

Increased household income is expected to increase the affordability of substances in the LSA. Whether this improved affordability will lead to significant negative effects will depend on attitudes and behaviours related to substance use. Therefore, determination of significance is deferred to a consideration of these combined effects, below.

Table 4-6.2 Effects Assessment Summary - Substance Abuse

Key Indicator: Substance Abuse			
VSEC: Human Health and Well-being			
Effect	**Availability – Transport of Substances through Project Site**	**Affordability of Substances**	**Attitudes toward Substances and Addictions**
Design / Mitigation Measure(s)	"No-drugs no-alcohol" policy, Baggage search	No mitigation	Focus on health and safety, Employee assistance, Addictions counselling
Direction	Negative	Neutral	Positive
Geographic Extent	North Baffin point-of-hire communities	Point-of-hire communities	Point-of-hire communities
Social Extent	Community	Families	Community
Equity	Bystanders	Engaged families	Bystanders
Magnitude	Low	High	Moderate
Frequency	Intermittent	Continuous	Continuous
Duration	Medium	Medium	Long term
Reversibility	Spontaneous	Spontaneous	Non-reversible
Significance of Adverse Residual Effects	Not significant	Not significant	
Significance of Beneficial Residual Effects	No beneficial residual effects	Not significant	
Probability of effect occurring	Moderate	High	High
NOTE(S): THE SIGNIFICANCE OF "AFFORDABILITY" AND "ATTITUDES" ARE NOT ASSESSED, AS THEIR RELATIONSHIP TO SUBSTANCE ABUSE IS COMPLEX AND INTERRELATED. INCREASED INCOME FROM THE PROJECT IS ASSESSED TO BE SIGNIFICANT, THEREFORE AFFORDABILITY OF SUBSTANCES FOR THOSE WHO WISH TO SPEND THEIR INCOME IN THIS MANNER MAY BE SIGNIFICANT. HOWEVER, WHETHER THIS WILL HAVE A NEGATIVE OR POSITIVE EFFECT WILL DEPEND ON ATTITUDES TOWARD SUBSTANCE USE AND ABUSE. LIKEWISE, IMPROVED ATTITUDES ARE EXPECTED TO BE SIGNIFICANT, BUT WHETHER THIS LEADS TO POSITIVE OUTCOMES ON OVERALL SUBSTANCE ABUSE WILL DEPEND ON THE BEHAVIOURS OF THOSE WHOSE ATTITUDES DO NOT CHANGE.			

Component Assessment: Attitudes toward Substances and Addictions

Ratings of the significance criteria for this effect are presented in Table 4-6.2. The Project is expected to provide positive incentives for individuals to reduce their level of substance abuse and to address addictions. Those who manage to develop healthy behaviours toward alcohol, for example, will be better able to maintain their employment and progress in their jobs. Therefore, the direction of Project effects is positive. This will mostly affect employed individuals, therefore these effects will be mostly experienced at point-of-hire communities, where, the change in attitudes amongst employed individuals is expected to affect other family members and peer groups as well. Therefore, the social extent is expected to extend to the entire community, and will include bystanders not directly engaged in the Project.

These positive changes in attitudes toward substance abuse and decisions to deal with addictions issues are not expected to be adopted by all workers who have issues. However, with the planned mitigation measures (creating space during orientation to address substance abuse and its effects, and employee and family assistance supports), combined with the increased consequences of uncontrolled substance abuse behaviours, it is expected that a noticeable change will be detectable by front-line workers. Therefore a moderate level of magnitude is assigned to this effect. The influence will be continuous throughout the life of the Project. The change in attitudes, however, will extend beyond the life of the Project and will be essentially non-reversible.

Significance of the Project on this Component

The Project effect related to improved attitudes and behaviours toward substance abuse is expected to be significant. Whether this will lead to significant positive effects on overall levels of abuse will depend on how affordability issues play out amongst those whose behaviour does not change. Therefore, determination of significance is deferred to a consideration of these combined effects, below.

Determination of Overall Significance of the Project on Substance Abuse

The overall effect of the Project on substance abuse is expected to be determined by the balance between two contrasting effects:

- Increased affordability of drugs and alcohol due to increased income; and
- Changing attitudes toward substance abuse due to increased incentive to get addictions and abuse under control in order to succeed at work, combined with employee assistance.

Planned mitigation described in the HRMP (Appendix 10F-3)—including no drugs/ no alcohol policy and the employee and family assistance program—may reduce residual adverse effects on substance abuse and should assist those individuals seeking to develop healthy attitudes towards substances and to bring their addictions under control. Baggage checks at the Project will minimize any potential to introduce new transportation routes for illegal importation of substances. The local alcohol education committees have the ability to control and limit access to legal supplies of alcohol, and the RCMP has the mandate and authority to control illegal imports.

Attitudes toward the use and abuse of substances are expected to change more slowly than affordability. As a consequence, there may be a period of adaptation during which higher levels of wealth, mixed with baseline attitudes and practices, may lead to increased substance abuse. This outcome is anticipated by community residents and by front-line workers.

In the medium term, the consequences of substance abuse with respect to Project employment, combined with mitigation activities designed to assist individuals in recognizing and dealing with addictions, is expected to reverse any initial wealth-induced spike in substance abuse.

The net effect is expected to be that Project workers who initially come to the Project with substance abuse issues will either learn to control their behaviours or will lose their positions, along with the associated income.

Significance Determination

Concerns related to the effect that increased Project income may have on substance abuse were raised by community residents and stakeholders. These concerns are recognized and are consistent with the assessment that increased wealth may lead some individuals to increase their consumption of substances. However, the Project is also expected to have a positive overall effect by raising the "opportunity cost" of substance abuse and by providing knowledge and support to actively encourage individuals to recognize and deal with their addictions and unhealthy practices.

Considering these interactions, there is a reasonable probability that a moderate negative outcome may be noticeable during a transitional period of adaptation to the income generated by the Project. If this occurs, some increase in substance abuse would be noticed by front line workers. This overall negative residual effect on substance abuse is assessed to be not significant due to its short duration and moderate magnitude.

Over the medium term, and extending beyond Project termination, an overall positive residual effect on substance abuse is anticipated to arise due to improved attitudes and increased "opportunity cost" brought about by the Project. This positive effect is expected to be moderate—noticeable by front-line workers but not necessarily perceived generally in the community. This positive residual effect is assessed to be not significant based on the moderate magnitude and a moderate level of uncertainty related to its occurrence.

Prediction confidence and risk assessment

Component Assessment: Transport of Substances through Project Site

Confidence in the assessment that importation of drugs and alcohol through the Project site will not have a significant effect on substance abuse in the North Baffin LSA is high. This confidence is contingent on proposed mitigation, including the prohibition of substances on site, effective ship-to-shore security, and the on-going implementation of effective baggage search protocols throughout the life of the Project.

Determination of Overall Significance of the Project on Substance Abuse

Confidence in the assessment that the Project has no significant adverse effect on levels of substance abuse is moderate, due to the complexity of the factors determining substance abuse.

A risk to the assessment may lie in the level of engagement of family members in mitigation programs designed to support healthy living and healthy attitudes toward substance utilization. Project-generated income may enter the entire household, but orientation and training activities and other on-going measures might tend to focus more on workers than on their partners. The planned mitigation does provide access for support to family members; however, there is uncertainty about how well this will be picked up by those individuals.

6.4.4 Follow-up

Component Assessment: Transport of Substances through Project Site

The incidence of seizures of drugs or alcohol at the Project site will be monitored.

Determination of Overall Significance of the Project on Substance Abuse

The potential adverse effects of the Project on substance abuse is probably the social issue of greatest concern raised by community residents. Baffinland will be able to monitor and evaluate the effectiveness of programs it implements to support employees seeking to address addictions and substance abuse behaviours. Baffinland can also track the number of individuals whose employment with the Company is terminated as a result of substance issues.

Monitoring of substance abuse-related incidents in the community is currently carried out through regular police incident reports. Additional monitoring could be carried out at the community level through the Q-SEMC or through the local alcohol education committees, should local community leadership determine this is needed. Baffinland intends to participate as a partner on the Q-SEMC and, as has been noted, will support community initiatives through its contributions to the *Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat* (INPK) fund.

As a major employer, Baffinland considers itself to be a stakeholder in the issue of substance abuse in the population. As such the company will participate through its Environmental Health and Safety adaptive management program as well as through partnerships with the territorial government to advance understanding of trends and best practices.

6.5 COMMUNITY SOCIAL STABILITY ("COMMUNITY FABRIC - DIMENSION II")

The assessment relates to the following question:

- Will the absence of workers employed at the Project be sufficient to affect the social stability or "fabric" of communities in the LSA?

6.5.1 Assessment Methods

The significance of the absence of workers from their communities (fly-in/fly-out work), is determined by considering the anticipated rate of labour supply from the communities and comparing this to conceptual thresholds for the magnitude at which perceptible effects would be experienced. Since the anticipated labour supply is uncertain, and as threshold for this effect on Inuit community functioning are not available, the assessment is qualitative in nature.

The following conceptual magnitude parameters have been established as conceptual thresholds:

- Low - the absence of individuals is noticed but does not raise concern for the functioning of community activities or institutions;
- Moderate - the absence of individuals begins to create challenges for some institutions or community activities, but these are able to be addressed; and
- High - the absence of individuals from the community creates challenges that cannot be adequately addressed, leading to a decline in the capacity of institutions or a reduction or cancellation of some community activities.

6.5.2 Potential Effects and Proposed Mitigation

One effect arising from the Project is assessed for its potential as a significant influence on social stability of communities in the LSA population:

Absence from the Community during Work-Rotation

Fly-in/fly-out work means that community residents engaged at the Project will be absent from the community during their "on" rotation. This has implications for workers and their families, but also for the life of the community. For example, participation in community events and sports activities can be affected. At low levels of employment, this is unlikely to affect community processes, as other individuals may step in to take the place of those who are engaged at the Project.

Absence from North Baffin communities arises under the baseline conditions for many reasons. These include extended hunting trips, medical travel, and other situations that keep people away for periods of time. However the magnitude and regularity of absence arising from fly-in/fly-out work may create a new dynamic of absence. At some threshold level, this regular absence of workers may begin to affect community life.

Baffinland has implemented a two week in/two week out rotation that provides a balance between work away and life back in the community. Individuals and communities will need to adapt to this lifestyle. Generally, this may involve flexibility and innovation on the part of individual workers as well as amongst community organizations, with some degree of accommodation provided from the Company side.

6.5.3 Assessment of Residual Effects

The effect of the Project on the social processes that make up the fabric of a community is addressed by considering the implications of having a number of residents absent from the community at regular intervals.

Ratings of the significance criteria for this effect are presented in Table 4-6.3. The absence of workers from the community may lead to negative effects on community processes across the point-of-hire communities that supply labour to the project. These effects would be experienced at the community level and could affect bystanders.

Based on anticipated levels of employment from the LSA communities, the magnitude of the effect of worker absence at the community level is not expected to exceed the moderate rating in any community; this means that while, some organizations and some activities may be affected, they will be able to adapt and carry on their functions. In some point-of-hire communities, employment levels will be lower, leading to only low level magnitude effects; this may involve the absence of individuals involved in recreation, coaching, local politics, and various social organizations. The occurrence of moderate magnitude levels of employment is expected to be continuous over the life of the Project.

At these anticipated levels of frequency and magnitude, the outcome is not considered to fundamentally alter the social fabric of the community. The effects should spontaneously reverse when employment at the Project terminates and therefore the duration of these effects will be limited to the life of the Project. When the Project is finished the effect will spontaneously end.

Table 4-6.3 Effects Assessment Summary - Community Social Stability

Key Indicator: Community Social Stability	
VSEC: Human Health and Well-Being	
Effect	**Absence from the Community during Work-rotation**
Design / Mitigation Measure(s)	Short rotation (two week in / two week out)
Direction	Negative
Geographic Extent	Point-of-hire communities
Social Extent	Community
Equity	Bystanders
Magnitude	Moderate
Frequency	Continuous
Duration	Medium
Reversibility	Spontaneous
Significance of Adverse Residual Effects	Not significant
Significance of Beneficial Residual Effects	No beneficial residual effects
Probability of effect occurring	High

Determination of Significance

The effect of worker absence on community processes is assessed to be not significant.

6.5.4 Prediction Confidence and Risk Analysis

Confidence in this assessment is high.

A risk to the assessment lies in the potential that a greater proportion of a community's residents may engage in the Project and that these individuals may be the same group that "makes things happen" in the community. The absence of known thresholds related to the resilience of Inuit community processes to this kind of effect contributes to uncertainty.

6.5.5 Follow-up

Community leadership and the social organizations involved in community life, as well as the Company, should monitor the effects of worker absence in these areas. This will improve the management of any adverse effects.

6.6 SUBJECTS OF NOTE

6.6.1 Household Income and Money Management

The largest source of income to individual households arising from the Project is expected to be direct employment. The contribution of Project-related business activities to household income is expected to be lower and more narrowly focused in terms of the number of households affected.

Patterns of wage income are expected to change over the first few years as the rate of worker turnover declines and residents settle into longer-term employment and more stable full-time work. During the early years, it is expected that a larger number of households will earn smaller amounts. Over time, as

individuals succeed in developing strategies to maintain regular, full-year employment, the proportion of workers earning full-time wages will increase.

The amount of income earned by households is relevant to effects at the household level and in terms of effects on the local economy. The opportunities for the use of income will be very different in cases where a household gains relatively small amounts of income through occasional work, than when full-year wages are earned. In the former case, modest increases in income may be expected to improve grocery purchases, ability to harvest, and modest discretionary purchase. A household where there is a full-year income will have income levels that provide substantial discretionary purchasing power, including large-item purchases such as vehicles, boats and other big-ticket items.

The effects of earned income on households will be influenced by decisions about how this income is managed and spent. In general, increased income is assumed to be a positive effect on the well-being of households, as well as on the local economy.

The potential for poor decisions to reduce the positive outcomes of income is also recognized, however. Based on comments provided during the community scoping activities, improved money management skills are assumed to be needed in some households.

The Project is expected to indirectly improve money management amongst some households simply by increasing income, increasing the choices that must be made, and raising the stakes or the "opportunity cost" associated with poor choices. On its own, this effect is expected to improve money management amongst some residents through a gradual process of trial and error.

To expand the extent and increase the rate of acquisition of good money management skills, Baffinland has indicated that the worker orientation and training program will include components designed to support effective money management practices and decision-making. This is identified in the HRMP (Appendix 10F-3).

6.6.2 Food Security

The issue of food security is of high importance to residents of the North Baffin LSA. The tremendous importance of the harvesting sector to the well-being of households was clearly articulated throughout the community scoping and socio-economic research.

Many households face challenges in acquiring adequate nutrition for their families. The factors influencing food security challenges are assumed to include:

- Ability to carry out land-based harvesting activity;
- Affordability of retail food relative to household income;
- Knowledge required to choose cost-effective nutrition options; and
- Spending choices and money management.

The Project is expected to have beneficial effects on food security, associated primarily with increasing household incomes amongst those employed there. This will improve the affordability of land-based harvested and retail-purchased foods.

The potential for the Project to affect harvesting activities and country food consumption is recognized. The diverse and complex Project interactions with Inuit harvesting activities have been discussed in Section 4.3, above. In addition to these interactions, Baffinland's intention to provide access to country food at site—described in HRMP Section 3.6 (Appendix 10F-3)—may support the role of country food in the attainment of improved local food security. The Company recognizes the importance that country food plays in the LSA

and intends to work closely with QIA and the HTOs in accessing country food so that this does not interfere with local utilisation of the resource. The Company will also work with the GN HSS to determine the appropriate facility and inspection protocols that are needed to meet public health requirements. To this end, Baffinland intends to engage with QIA and the GN to discuss access to country food for use at the Project.

The expectation of overall beneficial effects on food security is contingent on the individual decisions on spending Project-derived income. Based on anecdotal interviews with workers and family members involved with the former Nanisivik and Jericho mines (see Brubacher and Associates, 2002; and Brubacher Development Strategies, 2009), as well as with the worker interviews carried out during exploration and bulk sample activities of the Mary River Project (Appendix 4A), substantial portions of income earned from Project employment are expected to be allocated to purchase groceries as well as equipment that may be used to support harvest activities.

To improve the beneficial effects of income earned from Project employment, pre-employment training and on-site orientation measures will include components on money management. The potential to also include components on personal health and well-being—including nutrition—is recognized as a possibility.

6.6.3 Change in Household Composition

Several direct and indirect Project interactions have the potential to influence household composition within the LSA. One mechanism would be through an influx of single non-Inuit men coming from the south for work. This would increase the proportion of households comprised of "non-economic family persons." However, as assessed above, the level of in-migration of non-Inuit workers from the south is expected to be low, so this effect is not expected to occur. Similarly, in-migration of Inuit into North Baffin is expected to be infrequent, limited to those with family ties in the community or who have established relationships with local residents.

A second mechanism could be the effect of increased household wealth on family structure. This might be expressed as an increase in the proportion of young working adults able to afford to live on their own. The outcome of this effect would be mostly positive, as it would involve addressing inadequate housing situations for many of those involved.

6.6.4 Safety and Security

Personal Injury at the Worksite

The Project is designed to include a strong focus on worker safety, as this is considered by Baffinland to be "priority number one." Components of this program are addressed in the Health and Safety Management Plan (HSMP) (Volume 3, Appendix 3B, Attachment 5) as well as through orientation, training and human resource policies, described in the HRMP (Volume 10, Appendix 10F-3). Baffinland's Sustainable Development Policy addresses health and safety:

- We strive to achieve the safest workplace for our employees and contractors; free from occupational injury and illness from the very earliest of planning stages. Why? Because our people are our greatest asset. Nothing is as important as their health and safety.
- We report, manage and learn from injuries, illnesses and high potential incidents to foster a workplace culture focused on safety and the prevention of incidents.

- We foster and maintain a positive culture of shared responsibility based on participation, behaviour and awareness. We allow our workers and contractors the right to stop any work if and when they see something that is not safe.

It is acknowledged nonetheless that accidents leading to personal injury may occur. Most injuries should be minor; however some serious and potentially life-changing or even fatal injuries may occur.

Insight into the magnitude of injuries can be gained by projecting the Nunavut and NWT mining sector injury frequency rate of 27 days of lost time or modified work per 200,000 hours of labour to the anticipated level of labour provided by residents of the LSA. At an assumed labour supply rate of 300,000 hours of labour per year from the North Baffin and Iqaluit LSA, an average of some 40 days of lost time or modified work could be anticipated per year. This is the equivalent of roughly one year of "lost time" per 1,000 full-time, year-round workers. Baffinland will monitor and report on injury rates and this will serve to support targets for continual improvement in the area of safety.

Comparable baseline data for personal injuries in the community are not available. However, data for the years of life lost are reported (see Appendix 4A). Across the RSA, unintentional injuries amongst men, the group most likely to experience personal injury at the Project worksite, accounts for 35 lost years of Project life per 1,000 population. With a population of some 12,000 residents living in the LSA, the baseline represents over 400 years lost due to accidents.

Personal Safety and Security in the Community

Major determinants of personal safety and security of community residents while they are in the community are assumed to include the following:

- Personal attitudes and knowledge related to risk-taking; and
- Abuse of alcohol.

The Project is not expected to lead to direct interactions that would generate personal safety and security concerns in the LSA communities. Unlike the road that connected Arctic Bay with the Nanisivik mine, for example, there will be no means for casual movement between the Project and local communities. Anecdotal reports of incidents at Nanisivik where local residents, particularly young women, traveled to the site for parties and found themselves in harmful situations have been recorded (see Brubacher and Associates, 2002). This situation should not occur at the Project.

The Project is expected to positively influence personal attitudes toward risk, as safety and risk assessment skills learned on the job and during safety training are transferred to the household and community setting, creating a new safety culture that will migrate back to the communities. This effect has been documented from the experience of Inuit at the Jericho mine (Brubacher Development Strategies, 2009).

Emergency Services

The Project will introduce what are, for the purposes of emergency planning, essentially three more settlements in the North Baffin LSA. The Mary River, Milne Inlet, and Steensby camps will be "home" to substantial numbers of workers. The safety and emergency planning measures that will be implemented to ensure their safety are described in the Health and Safety Management Plan (Volume 3, Appendix 3B, Attachment 5) and the Emergency Response and Spill Contingency Plan (Volume 3, Appendix 3B, Attachment 5).

6.6.5 Human Health

The potential of effects to human health of non-workers is highly limited due to the distance of the Project from local communities. Potential effects on the health of workers are mitigated through Occupational Health and Safety legislation including the *Mine Health and Safety Act*, *Public Health Act*, and *Safety Act*.

To protect workers from fugitive dusts during construction and operation employees will be provided with and required to follow applicable health and safety procedures.

Potable water will be used within Project Camps and by incidental land-users. Milne Camp treated effluent will discharge into Milne Inlet. At the Mine Site, treated effluents will meet discharge limits before discharging into Camp Lake, Sheardown Lake and the Mary River, thus having a negligible effect on the suitability of these waters for drinking. For the Rail Camps, all sewage effluent will be transported to either the Mine Site treatment plant or the Steensby treatment plant. At Steensby Port, limited dust deposition will occur within the freshwater environment, and the treated effluent will be discharged to Steensby Inlet via an outfall. In summary, effects to the availability of potable water by incidental land-users are not expected.

Safety precautions and procedures will be developed to protect workers from elevated noise levels, particularly in the crushing and screening plant. Noise exposure limits are followed as per Occupational Health and Safety requirements and the Mines Safety Act. Worker exposure will be limited and where exposure is unavoidable, employees will be provided with personal protection equipment as required.

Given the climate of Baffin Island, Baffinland is aware that potential extreme weather conditions may occur. To protect the health of workers under such conditions, planned or emergency shut-downs due to blizzard or white-out conditions will be implemented.

Bioaccumulation resulting from the consumption of country food such as blueberries and caribou is assessed in Volume 6, Appendix 6G-1 and 6G-2. Based on the assessment conducted, it is considered unlikely that ore dust deposition from the Project would result in effects to human health, if consumed. This conclusion is based on consideration of the areas expected to be affected by ore dust deposition, the location of blueberry harvesting areas, and the home range of caribou.

6.6.6 Distribution of impacts and benefits within and between communities

Distribution of benefits

The issue of distribution of Project effects stems from concerns related to potential disparity that can result from increased and decreased wealth within a community and between communities. Inuit strongly value the equitable distribution of wealth and opportunity across communities. This has been well-demonstrated by the intentional de-centralization of territorial government agencies in order to provide job opportunities to many regions across Nunavut. Within communities, there is also concern that those who have chosen to engage in highly valued traditional harvesting lifestyles are not “left behind” in a material sense by those who engage in wage economy jobs.

Baseline conditions suggest that community economies are quite polarized in terms of wealth distribution (Appendix 4A). The expansion of economic opportunity that the Project represents is expected to create opportunities for households that have previously not been able to gain employment through, say, the local government sector. This would be expected to improve income equality. Social relationships both within and amongst households may be expected to be affected by new patterns of income earning that may be introduced by the Project. As some households increase their economic self-reliance and their purchasing

power, other households that remain dependent on government for the bulk of their income may feel they are left behind. Income inequality is a concern as it can affect social integrity.

Distribution of impacts

Inuit harvesters perceive a risk that the wildlife they harvest may be affected by the Project. The assessment of these perceived effects is addressed in the appropriate VEC Volumes. However, this implication for distribution of impacts and benefits is addressed here. This sort of impact would have the effect of placing a "cost" on individuals and households who may not be participating in the benefits arising from the Project—in terms of employment or business income. Inuit therefore ask, what specifically would be put in place to enable to hunters to practice their right to hunt in the event that impacts to animals occur?

As with wildlife effects, the possibility that social impacts may arise amongst those who do not share in Project benefits are also raised. These may relate to substance abuse, crime, and Inuit family and community cohesiveness.

These issues of distribution of the Project effects have been included on an indicator-by-indicator basis in the assessment of Key Indicators through the inclusion of three attributes, "geographic extent," "social extent," and "equity." At a broader level, however, the complexity social and economic interactions arising from Project effects precludes reliable assessment of how the Project will, in the end, affect wealth distribution, social status, and changes to livelihoods across the LSA and RSA.

Opportunities to address equity

Project effects on income inequality—and more meaningfully—on the relative "well-being" of individuals, households, and communities will not be simple or deterministic. Nonetheless, efforts to remove barriers to participation in the economic opportunities presented by the Project are considered.

One avenue for this discussion will be the management structure established under the IIBA. Baffinland's Human Resources Management Plan (Appendix 10F-3) describes the joint management structure that will be established within the framework of the IIBA to administer and monitor the potential effects of the Project on communities.

In addition to efforts that Baffinland may make in collaboration with other agencies to remove barriers to participating in the Project and sharing in the benefits of this participation, financial benefits flowing to agencies from the Project may also serve to improve equity in distribution of benefits. For example, the following considerations are noted:

- The INPK fund, along with IIBA payments to QIA, provides resources that can be used to support equity and the fair distribution of impacts and benefits within and between communities and across generations, as seen fit by QIA;
- NTI resource revenues policy provides for the distribution of 35 % of resource revenues ("royalties") to RIAs across the territory, partly based on population. This will provide funds that can be to further ensure equity within and across communities.
- NTI resource revenues policy provides for allocation of 50 % of resource revenues to an endowment fund. This provides funds that can be used to distribute benefits of the Project into future generations.
- Revenues that flow to the territorial government, as described in Section 12, below, may be allocated in ways that provide benefits to residents of affected communities as well as to residents of other

communities of the territory. Investments of revenues into the physical, environmental, and human capital of the territory may serve to carry Project benefits into the future for the benefit of generations to come.

6.7 IMPACT STATEMENT

The positive residual effects of the Project on the Human Health and Well-being VSEC are assessed to be significant. Improved income is a major factor in this assessment, as it will improve the well-being of most children whose parents work at the mine. Some negative residual effects are expected to occur in relation to the well-being of some children and arising from absence of workers from the community. These effects are not expected to reach levels that would cause significant adverse effects on the VSEC, however. The Project will have positive and negative residual effects on substance abuse, but these are not assessed to be significant.

Impact Statement for Key Indicator 1 - Well-Being of Children

Positive residual effects of the Project on human health and well-being are anticipated to significantly improve the well-being of most children of parents working at the Project. The potential that some children may experience an overall decline in well-being is acknowledged, and is assessed to be not significant, based on low magnitude and infrequent occurrence.

Impact Statement for Key Indicator 2 - Substance Abuse

During an early period of transition, the potential for negative residual effects of substance abuse is acknowledged but assessed to be not significant due to its short duration and moderate magnitude. Over the medium term and extending beyond Project termination, an overall positive residual effect on substance abuse is anticipated. This is assessed to be not significant based on the moderate magnitude and a moderate level of uncertainty related to its occurrence.

Impact Statement for Key Indicator 3 - Community Social Stability

Negative residual effects arising from the absence of workers from the community are recognized to occur, although not at a high enough magnitude for significant effects on community social stability, and are therefore assessed to be not significant.

Potential for Cumulative Effects

The potential for negative residual effects related to substance abuse and absence from the community to interact with other projects in cumulative ways is acknowledged. These residual effects have therefore been carried over for consideration in the cumulative effects assessment.

SECTION 7.0 - COMMUNITY INFRASTRUCTURE AND PUBLIC SERVICES

The Community Infrastructure and Public Services VSEC addresses indicators related to local services and infrastructure.

7.1 BASELINE SUMMARY

The following section provides a summary of baseline data that is of relevance to the Community Infrastructure and Public Services VSEC. Further detail and underlying data is provided in the Socio-economic Baseline Report, Appendix 4A.

7.1.1 Baseline Conditions

Public investment in public infrastructure typically arises from government sources. Nunavut is composed of 25 communities which are, with the exception of Iqaluit, incorporated as hamlets. With no tax base, these hamlets are dependent on contributions provided by the territorial government. These allow them to deliver such local programs and services as:

- General government services;
- General works;
- Protective services (e.g., bylaw enforcement, emergency planning);
- Transportation (road maintenance, access roads);
- Building maintenance;
- Utilities (water, sewage);
- Recreation facilities and program coordination;
- Land administration; and
- Community planning administration.

Iqaluit was incorporated as a city in 2001. It raises revenue from its business and residential tax base. Given the small size of this tax base, equalization grants are provided by the territory to help the city maintain programs and services.

Per capita value of municipal infrastructure across the North Baffin LSA ranges from $12,475 in Igloolik to $25,958 in Arctic Bay. Generally, the per capita values are higher in the smaller communities, reflecting the high cost of basic infrastructure required to support the community, regardless of its population. Essential infrastructure and services include water and sewage treatment facilities, water and sewage trucking services, public roads to provide access for water and sewage haulage. Power generation and fuel storage are also essential services that require dedicated infrastructure.

Additional needed Infrastructure to support community economic and social well-being may include harbours or docks, recreational facilities, training and educational facilities, youth drop-in centres, community centres, access roads. Across the LSA and RSA, this level of infrastructure is often inadequate to meet local demand for services.

These infrastructure gaps are frequently suggested as presenting important barriers to business, social and cultural development in communities across the LSA. Hamlet CED plans, for example, call for many types of infrastructure: space for small businesses, workshop space for carvers, visitor centres, fish plants, swimming pools, day cares, youth centres, healing centres.

7.1.2 Expected Trends in the Absence of the Project

The level of community infrastructure and public service is dependent on territorial wealth. A component of these expenditures is considered essential services: energy infrastructure, water and sewage treatment and transportation, and road maintenance. Others areas such as investments in recreational facilities, community halls, and family services, although considered vital to healthy communities, are more discretionary.

In the absence of the Project, territorial wealth will increase based on the discretion of the federal government in providing fiscal transfers to the territory and on increased revenues generated by other resource projects. Under current conditions, neither of these sources is expected to fundamentally change the status quo picture of territorial wealth.

Future development of community infrastructure and services in the absence of the Project is therefore expected to be slow, incremental, and focused on essential infrastructure and services. Increasing population, combined with growing social entitlement expenditures in the area of income support, housing, and medical travel are expected to strain the capacity of government to meet these additional non-discretionary demands.

7.2 ISSUES SCOPING

Loss of Hamlet Staff to the Project

Limited capacity in the local labour force raises concern that hiring of skilled equipment operators may lead to a loss of capacity amongst the hamlet workforce. For example, as one hamlet official suggested during a scoping session:

> *"…you're going to strip the labour and we need to start at the bottom — we train people to a certain level and they go to other jobs."*

The effect of the Project on local employers may also be influenced by worker preference for community-based or fly-in/fly-out work. During research carried out for this project, questions were posed in the course of worker interviews that relate to job location preference:

> *"If the pay is the same, I'd rather work here [in the community]. …over there [at Mary River] the work was hard physical work. …here there are fewer rules. …But for "a couple bucks" more per hour I'd take a job at Mary River."*

Another worker who operated heavy equipment expressed a preference for working in the camps, rather than in the community setting:

> *"I like working in camps, not in towns or communities—there are too many people there [in the community] — when you are operating heavy equipment, you have to be careful when people are around."*

For many people, full-time jobs are not available in the communities. If they find work, it is likely to be casual or part-time. One applicant indicated that if he were successful in getting a job at Mary River he'd "Do more stuff, instead of waiting to do my [part-time] job here in town [at the hamlet]." He further noted that his friends look forward to getting back to work at Mary River when they are on their off-rotation. This problem of casual rather than full-time jobs in the hamlets may be, in part, brought about by tight budgets

and low local employment rates, as the following comments made during a scoping workshop in a North Baffin LSA suggest:

> [Participant 1]: *"For casual workers, the union rule is that the hamlet cannot hire casuals for more than four months at a time—after that they need to be provided with benefits. So casuals are laid off after four months. The hamlet rule, then, is that once a casual worker finishes a four month stint, they can't be rehired within the next four-month period after being laid off. This makes it hard for the hamlet to find the drivers they need."*
>
> [Participant 2]: *"…The hamlet may have been thinking, probably, to circulate those jobs around the eligible residents. Give everyone a chance to work."*

Increased Demand for Infrastructure and Services arising from the Project

The potential that increased personal wealth may lead to increased demand for services is noted. More vehicles, for example, may have implications for local road infrastructure. As previously noted, effects of fly-in/fly-out work may also increase demand for childcare and family support services. This may also have implications for local social infrastructure.

Potential for Synergistic Partnerships

Partnerships that might be entered into between communities and the Project are seen as opportunities by some community residents. Some of these beneficial interactions could be passive, such as increased access to Mary River soapstone due to the increased air transportation brought about by the Project.

Other interactions may arise from intentional efforts to make Project capacity available to local communities. For example, the high cost of transportation led to questions about whether personal goods might be brought north using the company's shipping capacity:

> "*Shipping will be year-round, if you get approval, when you start operating. Can you bring anything in from Montreal for personal items?"*

A similar question was raised during a meeting with the same HTO and the socio-economic researcher:

> *"Might Baffinland be willing to assist in transportation of big ticket items (like snow machines/ATVs/boats)? Bring them up on the project sea-lift and drop them off at Milne Inlet where people can come and pick them up."*

The potential for transportation synergies were also raised during a government-hosted meeting in Pond Inlet. Here a government official commented that, "maybe there'd be opportunities to use the Baffinland port at Steensby to get sea-lift in by deep water vessel and then deliver locally from there to Igloolik and Hall Beach." These questions are addressed under Subjects of Note, below.

7.3 RECRUITMENT AND RETENTION OF HAMLET WORKERS

7.3.1 Assessment Methodology

For the purpose of assessing the effect of the Project on recruitment and retention of hamlet workers, it is assumed that the following factors are important to the ability of hamlets to maintain essential staffing levels:

- Full-time versus part-time characteristics of hamlet employment;
- Availability of qualified workers; and
- Wage and benefits.

The assessment considers the effect that the Project may have on these areas, with an overall assessment provided for the net effect. As preference for work is expected to be highly variable, and since little baseline data were available to provide insight into the major groups of hamlet employees, this assessment will be qualitative in nature.

7.3.2 Potential Effects and Proposed Mitigation

The Project is expected to affect the ability of hamlets to maintain their staff contingent through two opposing interactions.

- Increased competition for local workers; and
- Increased capacity in the labour force.

It is expected that some individuals who currently work for the hamlets may choose fly-in/fly-out work at the Project. Community concerns related to this effect are typically raised in the context of a tightening of the labour market for licensed drivers and heavy equipment operators. However, other staff positions may also be affected, as the Project will have many positions offering employment, training, and opportunities for job progression in a wide range of career areas.

The introduction of a new employer offering work to the local labour force is expected to lead to some adjustments for hamlet employers as the labour market transitions from what has been effectively a buyer's market to a more competitive market for employment. Some full-time workers may choose to leave hamlet jobs; the pool of workers formerly drawn on by hamlets for casual work may be reduced as these individuals find full time work at the Project. Factors that are expected to influence individual choice may include hours of work available (full-time versus part-time), the fly-in/fly-out work, potential for a wage and benefits differential, supervisory support, and career development opportunities.

For individual residents, the shift from a buyer's market to a seller's market for labour supply will be a good thing. However, the potential for disruption of municipal services is recognized to be a negative effect. It is this latter effect that is assessed here.

The HRMP (Appendix 10F-3) addresses this negative effect by identifying training initiatives designed to increase the capacity of the LSA labour force. These initiatives are planned to start during the construction phase, so that the labour supply will increase alongside the increase in Project-generated demand for labour. Some of these initiatives, in fact, began during the exploration and bulk sample phase, as evidenced by the training MOUs signed with QIA and DOE in 2008, and by the expenditure of some $1.7 million by Baffinland for training activities.

Over the short to medium term, these training activities, combined with work experience are expected to increase the pool of skilled workers in the local labour force. Individuals who participate in these programs will be free to work where they wish. Therefore, in the short to medium terms, the Project as well as hamlet and other employees should have better access to skilled workers.

7.3.3 Assessment of Residual Effects

Ratings of the assessment criteria for labour market competition and for labour force capacity on the ability of hamlets to recruit and retain the workers they require are presented in Table 4-7.1. Over the short term, increased competition for labour is anticipated to be a negative effect by some hamlets, as they may face challenges in their ability to retain and recruit workers. When this occurs the entire community may be affected, including bystanders who are not engaged in the Project. The community-level outcomes may include longer wait times for water delivery or sewage pump services, or reduced levels of service in other

areas of hamlet responsibility. These outcomes may on occasion be perceived as an inconvenience but are not expected to lead to any serious health or safety concerns, as hamlet management will be able to allocate its resources to these areas on a priority basis.

As the effects of work experience and increased skills begin to accrue to the labour force, the ability to recruit qualified and capable workers for hamlet positions is expected to increase beyond baseline levels. This positive effect will improve local services to the entire community.

Table 4-7.1 Effects Assessment Summary - Hamlet Staff Recruitment and Retention

Key Indicator: Hamlet Staff Recruitment and Retention		
VSEC: Community Infrastructure and Services		
Effect	**Competition for Skilled Workers**	**Labour Force Capacity**
Design/Mitigation Measure(s)	Early start for skills training	On-going training, Employment experience
Direction	Negative	Positive
Geographic Extent	Point-of-hire communities	Point-of-hire communities
Social Extent	Community	Community
Equity	Bystanders	Bystanders
Magnitude	Moderate	High
Frequency	Occasional	Continuous
Duration	Short term	Project life
Reversibility	Reversible	Non-reversible
Significance of Adverse Residual Effects	Not significant	No adverse residual effects
Significance of Beneficial Residual Effects	No beneficial residual effects	Significant
Probability of effect occurring	High	High
NOTE(S): 1. FOR INDIVIDUAL RESIDENTS, THE SHIFT FROM A "BUYERS" MARKET TO A "SELLERS" MARKET FOR LABOUR SUPPLY WILL BE A GOOD THING. HOWEVER, THE POTENTIAL FOR DISRUPTION OF MUNICIPAL SERVICES IS RECOGNIZED TO BE A NEGATIVE EFFECT, HENCE THE "NEGATIVE" DIRECTION.		

The magnitude of short-term staffing challenges is expected to be low to moderate. There may be disruption as individuals try out the fly-in/fly-out lifestyle. Some will prefer Project work over community-based employment and may remain unavailable to local employers. The possibility for these workers to provide occasional labour to the hamlet is recognized—particularly in instances of transitory shortages. Others who try out the fly-in/fly-out lifestyle may choose to return to hamlet jobs, and as they return to the community, they will bring improved skills and work experience that should enhance hamlet labour capacity. Therefore, while the challenges to hamlet hiring will be short-term and reversible, the improvements will continue over the Project life with increased labour force capacity continuing as a non-reversible benefit into the future.

Significance Determination

Negative residual effects of the Project on hamlet recruitment and retention are determined to be not significant, due to the short duration and low magnitude of these effects. Significant positive residual effects are expected to accrue in the medium to long term as training and experience build in the local labour force.

7.3.4 Prediction Confidence and Risk Analysis

Confidence in the prediction is high.

7.3.5 Follow-up

Baffinland will participate on the Q-SEMC and will include municipalities in its stakeholder engagement initiatives so that issues such as recruitment, local labour force capacity, and local services can be discussed.

7.4 SUBJECTS OF NOTE

7.4.1 Synergies

Baffinland will not take on government responsibilities in the area of municipal services and infrastructure. However, some of the measures it intends to implement or support are expected to achieve mutually beneficial, synergistic effects. For example, Baffinland contributions to the *Illagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat* (INPK) fund, as detailed in this Volume, Section 6.3.2, will interact with existing community development and service initiatives in positive, synergistic ways. Baffinland will also cooperate with communities to identify areas where opportunities for synergies might emerge for consideration in the future.

7.4.2 Demand for and Investment in Hamlet Infrastructure and Services

Demand for Infrastructure and Services Generated by the Project

The Project will create substantial demand for infrastructure, particularly related to transportation. Generally, Baffinland will develop these facilities as part of its Project, as detailed in the project description (Volume 3).

Iqaluit Airport

There is a recognized potential for a major project such as this Project to lead to further congestion of Iqaluit's airport infrastructure. However, transportation design options are anticipated to avoid placing demands on the airport's facilities beyond its capacity. For example, regular use of the terminal during peak demand times will be avoided as much as possible. Transportation of workers from the south to the mine is not expected to include deplaning into the Iqaluit terminal.

With regard to unexpected grounded flights in Iqaluit or North Baffin communities, Baffinland recognizes that the communities frequently do not have ready accommodations for plane-loads of unexpected guests. This is similar to the situation faced by regularly scheduled commercial flights. Baffinland has begun to plan for these contingencies and will continue to work with local authorities to resolve these operational issues.

Progress to date

- A meeting was held October 21 with Baffinland and GN authorities responsible for the Iqaluit Airport. The outcome was that potential congestion can be avoided through operational decisions that are available for implementation by Baffinland.
- As operational details related to Project transportation plans continue to be developed, Baffinland intends to maintain a proactive relationship with the airport authority.

Emergency Medical Services

Direct impact on medical service demand will arise from increased medical check-ups as well as work-related injuries that will arise at the mine site. This demand will be mitigated by Baffinland establishing their own medical capabilities on-site and by bringing in medical staff to carry out work-related check-ups. Some medical emergencies may require medical evacuation to hospital facilities in Iqaluit or Ottawa. These incidents are expected to be infrequent, as discussed under the Human Health and Well-being VSEC (Section 6.0), but will draw on the capacity of the public health care system when they occur. Baffinland has considered the experience from the NWT where government med-evac procedures for communities also apply equally to the mines in that territory. Baffinland will work closely with the GN to ensure that med-evac procedures will also apply to the Mary River site.

Keeping in mind these initiatives to harmonize and apply government med-evac procedures, the following extract is provided from Section 2.0 of the Health and Safety Management Plan (Volume 3, Appendix 3B, Attachment 5):

Interaction with Nunavut's medical system

The current intervention procedure for injuries will be as follows:

1. Stabilize the injured person and administer medical treatment within the capabilities of the medical professionals at site.
2. Depending on the nature of the injuries, the patient might be flown to Pond Inlet for stabilization and then flown by med-evac aircraft to Iqaluit.
3. If the patient is stabilized and is low risk to transfer to the Iqaluit Regional Hospital, they will be taken by aircraft chartered by Baffinland.
4. Depending on the severity of the injury, the patient will be flown to a major hospital (Montreal/Ottawa) as soon as possible.

Key responders and medical professionals will be trained in current first aid and cardiopulmonary resuscitation (CPR) techniques.

In addition and automated external defibrillator (AED) will be located in strategic locations and all responders and medical professionals will be properly trained in its use.

During all phases of the project, Baffinland will establish a first aid room at Steensby Port. The existing first aid facilities at Mary River and Milne Inlet will continue in operation where qualified medical staff will attend to medical emergencies. These facilities will remain functional for the entire duration of the project. The existing med-evac procedure will continue to be used or Baffinland will establish a remote link with an existing hospital facility and medical team.

Baffinland recognizes and will adhere to the Government of Nunavut's policy on medical evacuation of non-Nunavutmiat.

These procedures address Baffinland's current plans for coordinating with GN Health and Social Services in cases of injury and medical emergencies. Baffinland will continue to engage with the Department to adapt these procedures as needed.

Strategic implications – transportation and other infrastructure

Project infrastructure will be limited to sites that are specific to the Project and remote from other locations. For this reason, the air, port, road, and rail infrastructure developed for the Project is not currently considered to present substantial strategic value to Nunavut. However, discussions with government, including the Department of National Defence, may lead to future considerations of strategic synergies.

Upon Project completion, it is not anticipated that these facilities would find a viable use for other purposes. There is much public interest in what will happen to Project facilities at final closure, an issue that arose during the recent closure of the Nanisivik mine. Generally, Project infrastructure is not expected to be available for post-Project use because there is a high probability that additional mining projects may emerge to use this infrastructure. For this reason, public discussion of post-Project use of this infrastructure is considered premature, pending advancement of on-going exploration activities in the area. However, the Milne Inlet Tote Road could be left operational, provided the landowners (mainly the QIA) are interested in taking over responsibility; otherwise, the road will be decommissioned, bridges and culverts will be removed and the roadbed will be breached to restore natural drainage.

Some residents expressed an interest in a perceived potential that the Project might lower the cost of freight through providing "return shipping" services. The nature of the bulk carrier vessels is not conducive to this use; therefore, this is not expected to be an option.

In summary, although Baffinland will develop most of the infrastructure and provide most of the services demanded by the Project, some incremental costs may be imposed directly and indirectly on public infrastructure and services. As with all use of public facilities, the cost is paid for through the general regime of taxation and user fees. In Nunavut, this will be predominantly through taxation. The various forms of tax that Baffinland will be assessed are described in the Benefits, Royalty, and Taxation VSEC (Section 12.0).

Local Demand for Improved Infrastructure and Services

Increased disposable income arising from Project employment may lead to increased demand for hamlet infrastructure. For example, Project employees may purchase vehicles; that could lead to a need for improved intersections or other measures.

Increased personal mobility may increase demand for levels of services that more closely approach those of the larger centres. Improved services and infrastructure might be envisioned as a means to encourage residents to remain in the North Baffin. Infrastructure to support communities (harbours or docks, recreational facilities, youth drop-in centres, community centres, and access roads), are all typically identified as priorities.

Investment in Infrastructure and Services

The Project will have some beneficial effects for travelers, including the installation of emergency shelters along the Milne Tote Road. These emergency-only refuges are designed for Project use but will be available to anyone in an emergency. During construction, the camps along the railway line will also serve as emergency infrastructure. In addition, Baffinland will offer a hot meal to people travelling in the area.

Baffinland will provide a level of direct contribution to communities through the INPK fund. As described in Section 6.0, this fund is expected to provide positive benefits in terms of services in the LSA communities.

Baffinland's tax and royalty payments, described in Section 12.0, will contribute to the capacity of government and Inuit agencies to invest in infrastructure and services as they see fit.

7.5 IMPACT STATEMENT

The assessment of the Project's residual effects on the Community Infrastructure and Public Services VSEC, combined with a consideration of the subjects of note, leads to a conclusion that the Project will have a significant positive effect on this valued component.

This conclusion is based on an assessment of no significant adverse residual effects on community infrastructure and services arising from competition for skilled workers, and on an assessment of significant, positive, labour force capacity development.

Impact Statement for Key Indicator 1: Recruitment and Retention of Hamlet Workers

The Project may lead to some residual adverse effects on the ability of hamlets to recruit and retain workers, as the level of competition for these workers increases through Project hiring. However, these effects are not considered to be significant, based on their short-term duration as Project-initiated training leads to improved levels of skill and experience in the labour force. As training and experience increases this labour force capacity development effect will lead to significant positive outcomes on hamlet abilities to recruit workers.

Potential for Cumulative Effects

The potential for negative residual effects that the Project may have on competition for skilled public service workers over the short term is carried over to the cumulative effects assessment.

SECTION 8.0 - CONTRACTING AND BUSINESS OPPORTUNITIES

The Contracting and Business Opportunities VSEC addresses indicators related to Project effects on the business sector of the RSA and LSA economy. General effects on economic development are addressed under the Economic Development VSEC (Section 5.0).

8.1 BASELINE SUMMARY

The following section provides a summary of baseline data that is of relevance to the Contracting and Business Opportunities VSEC. Further detail and underlying data is provided in the Socio-economic Baseline Report (Appendix 4A) and in the Economic Impact Report (Appendix 4B).

8.1.1 Baseline Conditions

Local Business Profile

The business community of the LSA is small, reflecting their small populations and low income levels. This is particularly the case in the North Baffin LSA communities, where two dozen businesses are registered with NTI as Inuit firms, and/or with the *Nunavummi Nangminiqaqtunik Ikajuuti* (NNI) program as Nunavut firms. The business sector in Iqaluit is substantially larger, with 129 enterprises registered with either or both of these registries.

A number of businesses have not registered with either the NTI or the NNI programs. These generally include enterprises such as local bed-and-breakfasts, taxi services, outfitters and others. As an example, while seven businesses in Arctic Bay are registered with NNI and/or NTI, the Arctic Bay Economic Development Plan (2007) identifies a total of 26 local businesses. A total of 25 local businesses are identified in the Pond Inlet CED Plan (2010), compared with the 11 listed with either or both of the registries.

Self-employment is an important indicator of entrepreneurial capacity, as it can be a stepping-stone toward larger-scale business activities. The level of self-employment across the RSA is fairly low, as is the amount of income earned there from. In 1996 a total of 270 Baffin residents reported some income from self-employment; by 2004, this number had increased to 410. Most (six out of ten) of these self-employed entrepreneurs live in Iqaluit, with the remaining 40 % being distributed across the other Baffin communities. In the North Baffin LSA, approximately 70 individuals reported self-employment income in 2004.

Most North Baffin LSA residents reporting self-employment income earned less than $5,000 through their business activities. In Iqaluit, these earnings are a little higher, with half of the self-employed reporting more than $5,000, and one-fifth reporting $35,000 or more.

One in four self-employed income earners in Iqaluit had family incomes with no other source of market income. Most people, however, live in families where there is also wage income. This other income can be substantial. In Iqaluit in 2004, 100 of the 240 self-employed income earners (42 %) had family wage incomes of $85,000 or more. In the rest of the Baffin Region, a similar proportion of self-employment earners (24 %) have no other family wage income. However, in these communities, the level of other family wage income is lower, with only 41 % of families earning wages of $35,000 or more.

These data suggest that employment income plays an important role as a spring-board to self-employment. While a few families rely on self-employment as their main source of income, it is more common that self-employment activities are supplemented by the wage employment earnings of the self-employed person or

a family member, or both. This pattern appears to be stronger in Iqaluit than in the other communities of the Baffin region.

Capacity to Capture Business Opportunities

The capacity of local business to take advantage of the opportunities presented by a major project such as the Baffinland Project is an important issue. This is particularly the case for smaller businesses and sole proprietorships. In the absence of intentional and proactive measures, in the end, little progress may be made. In a study carried out for the Government of Nunavut just before the Nanisivik mine closure, (see Brubacher and Associates, 2002) a local hamlet leader perceived that there were some lost opportunities with Nanisivik:

> *"Nanisivik has had relatively little impact on the local business community. Things could have been different. The mine should have been more visible in the community so opportunities would be known."*

Clearly, the achievement of community economic development goals doesn't happen simply because an opportunity arises. Achievement of these goals requires work on the part of many people and organizations.

Supply of Goods and Services to the Mining Sector

During the course of exploration and bulk sample activities, from 2006 through August 2010, Baffinland procured a total of $49.7 million worth of goods and services from vendors based in the North Baffin LSA and Iqaluit. Of this amount, $10 million was purchased from businesses based in the North Baffin LSA and $39.9 from vendors based in Iqaluit. These expenditures accounted for 3 % and 11 % of total procurement, respectively (see Table 4-8.1, below).

8.1.2 Expected Trends in the Absence of the Project

Gradual improvements are expected in the local business sector given the on-going efforts of territorial business development programs. These are particularly anticipated in the capital city; however, in the North Baffin LSA, the fundamental barriers of high operating costs; ephemeral business opportunities associated with small local markets; and low levels of disposable income can be expected to prevail into the future.

The potential that increased global attention to the Arctic, combined with the recent and rapidly expanding opportunities for electronic commerce, may generate new opportunities for business. However, these opportunities are speculative at this time. Within reasonably predictable scenarios, in the absence of the Project, there is little reason to anticipate substantial change to local business capacity, particularly in the North Baffin LSA.

Table 4-8.1 Procurement by Baffinland during Exploration and Bulk Sample Activities

North Baffin LSA Vendors

	2006	2007	2008	2009	2010	
donations	4,286	36,000	12,399	11,429	29,524	
food & accommodation	1,848,865	1,699,429	2,983,050	169,208	217,441	
fuel	177,419	1,447,988	555,166	-	-	
labour	106,857	163,954	146,696	3,172	16,111	
NTI fees	-	-	34,948	36,348	34,514	
office lease	-	26,051	53,444	23,332	7,200	
ground transportation	-	2,899	3,840	122	540	
other	2,286	29,631	76,020	11,563	6,304	
Total	*2,139,713*	*3,405,952*	*3,865,562*	*255,173*	*311,634*	*9,978,035*

Iqaluit Vendors

	2006	2007	2008	2009	2010	
advertising	-	7,401	7,915	1,024	2,724	
donations	-	4,762	9,524	-	-	
equipment	1,030	-	44,025	-	27,600	
food & accommodation	-	69,773	257,019	9,169	10,831	
freight & transportation	54,812	47,658	175,977	102,124	178,423	
fuel	-	182,693	1,713,963	160,189	126,992	
3rd party contract	1,020,270	11,060,807	15,645,694	2,884,527	1,061,884	
other	67	33,763	35,385	25,637	4,131	
property leases	7,500	7,500	1,064,233	641,539	166,057	
royalty lease	-	-	2,334,318	37,573	6,263	
supplies	1,752	170,345	338,241	2,891	2,306	
	1,085,430	*11,584,701*	*21,626,293*	*3,864,672*	*1,587,209*	*39,748,305*

Source: Baffinland, September 2010. Note: The "3rd party contract" includes supply of labour, catering, and a road contract.

8.2 ISSUES SCOPING

Business Opportunities Related to the Project

During a workshop session in Pond Inlet, local business owners expressed an expectation that opportunities would be available for small local business as well as for the larger birthright corporations:

> *"The communities need to have more benefit in terms of contracts, and the QC/QL are being used now…. There needs to be more incentive for the business owners. …Baffinland will need to say these are the contracts or services that we need in operation."*

Some ideas for business opportunities were raised during community research. One suggestion was for Baffinland to provide some space for a privately-run tuck shop on-site. The potential to sell local products such as carvings to the southern workers at the Project was also raised:

> *"When Nanisivik was operating carvers would just go to the site to sell their carvings. Here there's going to need to be a different way to get carvings to the guys who may want to buy them. I'm sure some of the southern employees are going to want something to take back home with them."*

Opportunities for Local Business Generated by Increased Wealth

Increased household income that will flow into and around the North Baffin LSA communities (as a direct result of employment and the indirect spin-off effects generated by the Project) is perceived by community

leaders as an opportunity for local business. A local entrepreneur observed that effects of exploration and bulk sample activities on local income were visible and that more money was spent locally.

How this money is spent will depend on the capacity of the local business sector to offer goods and services. As one worker engaged in the bulk sample program suggested:

> *"You already see changes, economic changes. People have more money to do more things with. So the issue is, 'what is there to spend money on?'"*

8.3 OPPORTUNITIES FOR BUSINESS

8.3.1 Assessment Methodology

For the purpose of assessing the effect of the Project on the opportunities for business, two broad factors for business success are assumed to be of importance:

- Availability of markets for goods and services; and
- Ability of entrepreneurs to grasp these market opportunities.

The Project will have direct effects on the opportunities for business, created through increased availability of markets. This is therefore assessed as a key indicator. The ability of entrepreneurs to take advantage of these improved market opportunities has a more indirect connection to the Project and will be addressed as a subject of note.

The Project may have direct and indirect effects on markets for goods and services. Both are considered with an overall qualitative assessment of their significance to business opportunities. Given the absence of LSA-specific business data, a conceptual index will be used to assess the magnitude of Project effects on market opportunities:

- Low - opportunities that are accessible to local business arise from time to time but are sporadic and are not considered by the front-line business community to change the environment for business;
- Moderate - accessible opportunities for local business are enhanced and are considered by the front-line business community to improve the environment for business;
- High - accessible opportunities for local business are enhanced and the improved business environment is readily apparent to the general population through clear evidence of business expansion.

8.3.2 Potential Effects and Proposed Mitigation

Market opportunities available to local businesses may be affected by the Project through two effects:

- Expanded markets through direct demand for services; and
- Expanded markets through growth in demand for consumer goods and services.

The Project will also have an effect on the ability of businesses to capture these opportunities. Some of this effect will be passive, arising simply from the nature of the Project itself. Baffinland will actively undertake to enhance local business capacity through mitigation implemented in partnership with QIA. These dimensions of business opportunity mitigation are discussed as here Improving the capacity of local business to capture opportunities.

Expanded Markets through Direct Demand for Services

It is expected that, during Project operations, the demand for services that may be supplied by local businesses will increase substantially. Table 4-8.2 provides an overview of the areas where contracts may typically arise in a project such as the Mary River Project, along with a general presentation of the types of jobs and labour demand that these contract areas typically require. Some opportunities to supply goods may also arise, particularly in the supply of appropriately-inspected country food.

Table 4-8.2 Contract Opportunities and Associated Jobs

Contract Opportunity Area	Typical Job / Labour Requirements
Security Services	Security guard
Camp/catering operations	Food preparation, some cooking Kitchen assistant Cleaner, housekeeper General labour
Temporary construction / rough carpentry structures	General labour Truck driver of light vehicles i.e., pick-up trucks
Site services	General labour Light maintenance
Environmental	Obtaining samples-liquid, solids Monitoring activities Wildlife management
Logistics/warehousing	Offloading trucks Tool crib assistant General labour in warehouse

The ability of local business to capture Project contracts is likely to be modest, under baseline levels of business capacity. The scale of opportunities generated by the Project may well be greater than what existing local businesses will be prepared to capture. In the absence of mitigation, these opportunities may therefore go to southern firms with greater capacity.

In a review of the socio-economic effects of the Nanisivik mine in Arctic Bay, total expenditures by the mine at local businesses were estimated to be “probably under $75,000 per year” (Brubacher & Associate, 2002). Similarly, the 2007 report of the socio-economic effects of the Jericho diamond mine in the Kitikmeot suggested that, “the qualitative data gathered during interviews with Kitikmeot workers and key people suggests that the Jericho project did not have significant direct effects on local business” (Brubacher Development Strategies, 2009). More likely, in the absence of mitigation, the larger and more sophisticated businesses of the Inuit birthright corporations may be expected to have capacity to gain some service contracts with the Project.

Expanded Markets through Growth in Demand for Consumer Goods and Services

Increased household income from employment at the Project, as well as from indirect effects such as increased local business activity, will lead to greater consumer spending power. This has been a major barrier to development of consumer-focused businesses, particularly in the North Baffin LSA.

The increased wealth generated by the Project may help to address the challenge of low disposable income as a constraint to local business development. How much of this increased wealth will flow through the local economies and how much will leak out will depend on the availability of local consumer-focused businesses

and on the spending decisions of individuals. As suggested during the community scoping activities (see Appendix 4A), leakage of cash toward the black market bootleg alcohol and drug trade has been an economic as well as a social issue.

Baffinland commitment in the IIBA for contributions to a QIA-managed fund to support managerial and financial expertise to Inuit entrepreneurs should enhance the skill set of local businesses and thereby increase the range of local services available to residents.

Mitigation to Improve the Capacity of Local Business to Capture Opportunities

The Project is expected to have several inherent or "passive" effects on the capacity of businesses, particularly smaller Inuit businesses in the LSA, to take advantage of new business opportunities. The following positive effects on business success are anticipated to arise without the need for any additional mitigation:

- The long-term nature of the project is beneficial as it provides a long period of time for business development processes to take place;
- Potential for the emergence of stable, year-round, and long-term business relationships may lead some part-time entrepreneurs to commit full-time to their businesses; and
- Increased household income derived from Project employment may provide some would-be entrepreneurs with the financial security needed to support the launch of self-employment endeavours of family members.

In addition, some risks and potential negative effects may emerge that local businesses will need to navigate.

- The scale of the Project may offer opportunities for tremendous business growth. However, this may introduce risk of over-extending a business's management, human resources, or financial capacity.
- The potential for Project slow-down may exist based on factors out of Baffinland's control. This may leave local businesses in vulnerable positions, particularly if they have over-extended themselves in order to capture large contracts.
- Local businesses that develop solely for the Project and depend on its operation will, if they do not expand their clientele beyond the Project, cease when the Project slows or closes.
- In the short term, there may be labour shortages for some types of business if the Project attracts potential local employees away from local business. Over the medium term, Project effects on education and training are expected to improve access to an experienced and capable labour force. It is anticipated that some individuals will prefer the fly-in/fly-out rotations, while others will prefer work in the community. There is also a potential for synergy as some workers may blend occasional work at the Project with seasonal work available through local business to create a year-round livelihood.

To enhance the capacity of LSA businesses to capture opportunities generated from the Project, Baffinland will implement active mitigation measures to support business development. As identified in the HRMP (Appendix 10F-3), Baffinland will:

- Assist Inuit firms to develop capacity in the bidding process;
- Identify opportunities to break down large contracts into smaller components to improve the capacity of Inuit to bid on and carry out contracts;

- Encourage contractors to break down large sub-contracts into smaller components to improve the capacity of Inuit firms to bid, and the ability of Inuit firms to bid on and carry out contracts; and
- Help QIA or a QIA subsidiary organization establish a Business Capacity and Start-Up Fund to assist Designated Baffin Inuit Firms with business start-ups and development of capacity in the following areas:
    - Locating start-up capital and financing;
    - Management development;
    - On-going business management;
    - Financial management;
    - Contracts and procurement; and
    - Human resources management.

These measures will be implemented as established in the signed IIBA. QIA will administer the Business Capacity and Start-Up Fund, and the joint Baffinland – QIA Executive Committee will provide on-going oversight. Baffinland will provide funds both for the fund itself as well as to assist in the cost of fund administration. All contractors will be required to comply with the obligations and requirements of the signed IIBA. These obligations will "flow through to the companies" and will be embodied in the contracts between Baffinland and these companies.

To encourage access to contract opportunities presented by the Project, Baffinland's Procurement and Contracts group will regularly visit communities to report on and advise of opportunities. This group will assist with maximizing the capacity of existing businesses to allow them to participate in the Project. Baffinland intends to work closely with the Project liaison office in Iqaluit to support on-going communications with North Baffin LSA communities so that local entrepreneurs are aware of the future contracts being prepared.

Collaboration to Support Business Capacity Development

In addition to the business support provisions arising from the IIBA, Baffinland recognizes the value of collaboration with Nunavut agencies that are actively engaged in business capacity development in the LSA and RSA. The company is committed to engaging with these agencies in order to achieve mutually desired local business development outcomes.

Progress to date:

- Business inventories have been accessed (NNI, NTI, BRCC, WSCC employers list).
- Meetings and workshops with Community Economic Development Officers and Economic Development Committees, 2007 to 2008, Doug Brubacher.
- Participation in Socio-Economic Workshop hosted by EDT, Pond Inlet, November 2007. Len Kutchaw, Sean Malloney, Dave McCann, Doug Brubacher.
- Information exchange meeting with Kakivak Association, Manager of Business Services, October 18th, 2011, Anne Pearce, Doug Brubacher.

8.3.3 Assessment of Residual Effects

Project effects on three components contributing to contracting and business opportunities are assessed. These include the effect on the market for goods and services to industry, the market for consumer goods and services, and the capacity of local business.

Component Assessment: Expanded Market for Business Services to the Project

The ratings for significance criteria for this effect are presented in Table 4-8.3. The Project will create a new market for business-to-business contracts, representing a positive effect, particularly in the small economies of the North Baffin LSA. Since business can be very mobile, the geographic extent of this positive effect will be across the LSA and RSA. The social effect will extend to business shareholders, as well as to those who gain employment with these expanding businesses. In many cases this may include widely-held businesses such as Inuit beneficiary-owned corporations and local Co-op businesses. Therefore the effect is expected to be felt at a community level amongst these engaged shareholders and employees.

The magnitude of enhanced accessible opportunities for RSA businesses is expected to be moderate to high. For LSA business, the magnitude of enhanced accessible opportunity is uncertain as it is subject to many factors related to both capacity and to entrepreneurial interest. For this reason, the magnitude of the positive effect of the Project on the market for business services is considered uncertain.

Frequency of opportunity should be continuous, with a duration extending throughout the Project life. These opportunities will cease spontaneously when the Project ends—although any capacity developed through the process may be retained for application to new opportunities. Businesses that develop solely for the purpose of supplying the Project and which do not expand their client base can be expected to cease operations as Project activities slow and eventually close down. The capacity gained by owners and entrepreneurs will have long-term duration.

Significance of the Project on this Component

The Project is expected to have a positive effect on the market opportunities for businesses to supply goods and services to the Project. This effect is expected to be substantial due to the magnitude of opportunity as well as to the continuity of this opportunity over the life of the Project.

Component Assessment: Expanded Market for Consumer-focused Business

The ratings for significance criteria for this effect are presented in Table 4-8.3. The Project is expected to have a positive effect on the local market for consumer goods and services across the point-of-hire communities, based on increased income from direct and indirect employment. To the extent that local businesses are able to improve their services to consumers, this will have benefits across the community and will affect bystanders. People will have more options to purchase local goods and services.

This effect is considered to be of moderate magnitude—recognizable but not dramatic. The effect is expected to emerge gradually over the course of the Project, since it will take time for business to respond to emerging opportunities. However, expansion should be continuous over the life of the Project.

Since this effect is fuelled by Project-generated consumer discretionary income, it may be expected to spontaneously reverse once employment ends with the closure of the Project.

Table 4-8.3 Effects Assessment Summary - Business Opportunities

Key Indicator: Business Opportunities		
VSEC: Contracting and Business Opportunities		
Effect	**Expanded Market-Business Services to Project**	**Expanded Market-Consumer Goods and Services**
Design/Mitigation Measure(s)	Contract provisions, Business development fund	No mitigation
Direction	Positive	Positive
Geographic Extent	LSA and RSA	Point-of-hire communities
Social Extent	Community	Community
Equity	Engaged individuals	Bystanders
Magnitude	High	Moderate
Frequency	Continuous	Continuous
Duration	Medium term	Medium term
Reversibility	Spontaneous	Spontaneous
Significance of Adverse Residual Effects	No adverse residual effects	No adverse residual effects
Significance of Beneficial Residual Effects	Significant	Significant
Probability of effect occurring	High	High

Significance of the Project on this Component

Based on the long duration of the Project and Baffinland's commitment to hiring workers from the LSA communities, it is expected that discretionary household income will increase substantially and that local business will respond by offering improved access to consumer goods and services. Therefore, the positive effect of the Project on the consumer-focused business sector is assessed to be significant.

Determination of the Overall Significance of the Project on Opportunities for Business

The overall effect of the Project on opportunities for business in the LSA and RSA is expected to be positive due to a direct Project-related expansion of markets for industry-focused supply of goods and services. In addition, growth in local consumer wealth through income generated by the Project will lead to an expansion of markets for consumer-focused goods and services.

Significance Determination

The Project will increase opportunities for businesses in both the LSA and the RSA. This increase is considered to be significant, with a high level of confidence.

8.3.4 Prediction Confidence and Risk Analysis

Confidence in the prediction that overall effects on contracting and business opportunities will be positive and significant is high.

The issue of how well local businesses are able to capture these opportunities is addressed as a subject of note, below, due to the complex nature of entrepreneurial decision-making and capacity. The mitigation measures planned by Baffinland to support business capacity development should help to support

businesses in grasping these opportunities; however, the company has little control over local entrepreneurial decisions. If local business does not capture the opportunities early on during the life of the mine, a perception may arise that the Project does not offer business opportunity. This is a risk to the assessment.

8.3.5 Follow-up

Monitoring of direct procurement of goods and services by Baffinland and its contractors will provide insight into the level of business with LSA and RSA companies. Changes in the value of these contracts over time will provide some insight into capacity development. Direct discussions with the local North Baffin business community—including entrepreneurs, local economic development officers, and other business support agencies—will be undertaken periodically.

8.4 SUBJECTS OF NOTE

Entrepreneurial Capacity and Support

While the Project will create significant opportunities for business, the ability for local business to capture these opportunities is less certain. This is particularly the situation with smaller businesses where capacity is low. Recognition of the need for planning and for a manageable rate of growth for local businesses was expressed during community research:

> *"We need to know what Baffinland needs to plan for Projects, financing, expansion. It would be good to identify opportunities that can start small and then grow as the Project expands."*[84]

Recognition that the current business community might be unprepared to benefit from opportunities generated by the Project was also expressed during the Pond Inlet small business workshop:

> [Local entrepreneur]: *"We need both political will and organization/leadership. …Without leadership, this won't fly."*

Some of the specific challenges faced by local businesses were identified during community discussions. One local economic development officer spoke of the difficulties faced by business people in doing their paperwork—bookkeeping, applying for funding, preparing business plans. Keeping up with the administrative and tax-filing side of business can be difficult. Many entrepreneurs do not have access to affordable business support services to assist with bookkeeping, remittance of tax instalments, remittance of payroll source deductions, tax filing and so forth. Baffinland mitigation measures outlined in the HRMP (Appendix 10F-3) and identified in Section 8.3.2, above, may help in this area.

With this planned mitigation in place, the probability that some enhanced business activities will be initiated is considered to be good. However, uncertainty arising from the many factors affecting entrepreneurial capacity beyond the influence of the Company prevents confident predictions of the likely outcome. The Project will clearly offer opportunity, but it will be up to individual entrepreneurs to grasp these opportunities.

[84] North Baffin resident 6, Small Business Workshop, Pond Inlet, February 2008.

Local and Regional Business

The Project will be a major economic driver in Nunavut and may promote the development of new local and regional businesses related to the supply of industrial goods and services:

- Expansion of Nunavut construction sector during construction phase;
- Potential for on-going maintenance related contracts;
- Potential for provision of seasonal services related to sea-lift or other shut down related work at the site;
- Potential for supply of inspected country foods; and
- Potential for supply of industrial supplies (i.e., safety equipment, parts, etc.).

Assessment of the feasibility of individual business opportunities will need to be carried out by existing businesses or potential entrepreneurs. For example, it is expected that country food products would need to come from processing plants that include appropriate food safety inspections. Opportunities for Nunavut's existing plants to sell product to the Project will depend on availability of product and cost. Whether a viable opportunity exists for a new plant to be developed in North Baffin would need to the subject of feasibility assessment.

Labour Force Challenges

The Project is likely to enhance the skill set of local and regional businesses, enabling them to provide a wider range of services, to Baffinland and to the broader regional economy. However, the local business community should also anticipate running into the same temporary hiring issues that have been discussed in relation to hamlet recruitment and retention of workers. In the medium and long term, the enhanced skills and experience generated by Project employment may be expected to improve the ability of local business to hire skilled workers. In the short term, some competitive pressure may arise.

8.5 IMPACT STATEMENT

The direction of the effects of the Project on the Contracting and Business Opportunities VSEC are assessed, with a high level of confidence, to be positive. Baffinland, through the IIBA, is committed to work closely with the QIA and will fund an initiative for capacity building that will be administered by the QIA. The company is also committed to an Inuit contracting policy adapted to the capacity of Inuit firms.

The successful implementation of these mitigation measures, and the active participation of individuals in these programs, will largely determine the significance of the Project's residual effects on contracting and business opportunities. In light of the mitigation measures adopted by Baffinland, the residual effects are assessed to be positive and significant.

Impact Statement for Key Indicator 1: Opportunities for Business

The Project will have a significant positive effect on the level of opportunities available for local businesses. These opportunities will be available over the relatively long-term horizon of the Project, and many will be available on a continuous basis. These are considered to be important attributes of the Project's effect on business opportunities, as they should support the developmental context seen in the LSA.

Potential for Cumulative Effects

The Project is not expected to generate negative residual effects on the business sector. No residual effects are carried over to the cumulative effects assessment.

SECTION 9.0 - CULTURAL RESOURCES

9.1 BASELINE SUMMARY

9.1.1 Regional Context

9.1.1.1 Cultural History

The North American Arctic and Greenland represent one of the last frontiers colonized by the human species. The arid and extreme conditions of this environment required extraordinary adaptation from the first explorers who ventured into this new territory. The precise homeland of those newcomers remains unclear, but most researchers agree on an Alaskan or Siberian origin.

The prehistory of Arctic Canada is currently thought of in terms of two successive populations: Paleo Eskimo and Neo-Eskimo. The Paleo-Eskimo sequence is divided into Early Paleo-Eskimo (4,500 to 2,500 before 1,950 (B.P.)) and Late Paleo-Eskimo (2,500 to 500 B.P.) periods. People generally referred to as Paleo-Eskimo, bearers of the Arctic Small Tool tradition, originally populated the eastern Arctic around 4,500 years ago. Their earliest traces are known by the names Independence I, Pre-Dorset, and Saqqaq. Their subsistence efforts appear to have focused on hunting land mammals, as well as taking fish and birds. Sea mammal hunting appears to have been important in only a few areas and was largely limited to the hunting of seals. The Paleo-Eskimo expansion occurred during the closing phases of a warm period called the postglacial thermal maximum, i.e., about 2,000 B.C., when the animal population increased due to improved climatic conditions, which were somewhat warmer than those of today.

After approximately 3,500 years ago, the size and number of Paleo-Eskimo occupations of most regions decreased. Some areas, including most of the High Arctic islands, appear to have been abandoned. At the same time, evidence suggests that Pre-Dorset occupations spread across the Barren Grounds region between Hudson Bay and the Mackenzie drainage southward as far as the northern portions of the Prairie Provinces. These changes in territorial distribution have been attributed to a climatic cooling generally evidenced across the Arctic after about 3,500 years ago. Decreases in terrestrial productivity may have terminated Paleo-Eskimo occupations of some northern areas and encouraged a southward movement of these Arctic-adapted peoples into areas which had previously been occupied by Indian groups adapted to the subarctic.

Around 2,500 years ago, a new Paleo-Eskimo culture known as Dorset developed from Pre-Dorset. This widespread change involved a general increase in the importance of sea mammal hunting throughout the central and eastern Arctic, which in turn appears to have resulted in larger and more stable local populations. In some regions, Dorset people began to build winter villages with semi-subterranean houses. A more permanent habitation, even if only used for part of the year at the same location, suggests a more efficient hunting economy and less transient hunting patterns than those of their earlier ancestors.

The development of Dorset culture seems to have occurred during a period of continued climatic cooling evidenced in most Arctic areas. It is possible that the shift in emphasis from terrestrial to marine resources at this time was related to declining caribou availability and to the simultaneous increase in the seasonal duration and extent of stable sea-ice conditions. To the Paleo-Eskimo, who lacked the sophisticated maritime hunting equipment of later Inuit peoples, increased sea ice may have provided a stable hunting platform that allowed development of an efficient ice-hunting economy.

Eventually, Dorset culture became widespread throughout the eastern Arctic and lasted until around 1,000 years ago and possibly later in some areas. The second major culture, known as Neo-Eskimo, represents the direct ancestors of modern Inuit in the eastern Arctic. Sometime around 1,000 years ago, Neo-Eskimo people known to archaeologists as "Thule" Inuit migrated into the eastern Arctic from Alaska. In many areas, the Thule population appears to have achieved relatively high population densities, based in some regions on the hunting of very large bowhead whales (Maxwell, 1985; McGhee, 1996). Most aspects of this cultural sequence have been established. One area that is still not clear is the unresolved issue concerning the relationship between peoples of the Late Dorset and those of the Thule culture.

Until recently, most archaeologists working in the region accepted that Dorset society survived into the second millennium AD to meet and be displaced by Thule immigrants. This opinion was based primarily on the many radiocarbon dates attributed to Dorset occupations, some of which appeared to indicate occupation as late as AD 1500 (Maxwell, 1985). Additional categories of evidence cited in support of Dorset – Thule coexistence include evidence of material exchange, as indicated by Dorset artifacts recovered from Thule houses or Thule artifacts recovered from Dorset contexts as well as evidence of borrowing of construction or manufacturing techniques by Thule from Dorset or vice versa (Maxwell 1985; Park 1993).

The Thule way of life slowly changed to what the early Arctic explorer observed and reported. Climatic deterioration following the thirteenth century is probably the cause of the Thule people modifying their way of life into the way of life of the various Historic Inuit groups.

9.1.1.2 Previous Archaeological Investigations by Others

While no archaeological studies were completed within the Mary River Project area prior to Baffinland's 2006 survey, some previous archaeology work in nearby parts of northern Baffin Island has been reported. Some of the earliest archaeological studies in the Arctic included research in this region.

In 1923, Mathiassen excavated at Pond Inlet, at sites called Mitimatalik and Qilalukan, and at Button Point on Bylot Island (19276). In 1924, expedition member Peter Freuchen continued excavations at Qilalukan. On his departure, the site was further excavated by the local RCMP officer and the HBC station manager (Mathiassen, 1927). From 1962 to 1965, Mary-Rousselière conducted various excavations of sites throughout the North Baffin region. He excavated at Button Point and at Mitimatalik near Pond Port, at Tunit in Paquet Bay, at Eqaluit in Tay Sound, and at Nadlua in Navy Board Port (Mary Rousselière, 1968, 1969, and 2002). During his journeys throughout the region, he recorded features at many sites: Paleo-Eskimo occupations have been recognized at 14 sites in the Pond Inlet-Eclipse Sound-Navy Board Inlet area (Mary-Rousselière, 1976); one is a site known as Agliruujaq (PaHb-1) situated on the southeastern shore of Milne Inlet (Figure 4-9.1).

The Agliruujaq site seems to have been frequently inhabited. Several Thule and more recent houses can be seen, together with numerous tent rings. On a gravel terrace, 40 m above sea level, two old looking tent rings were found. Mary-Rousselière also found traces of the Dorset and Pre-Dorset cultures on the site (Mary-Rousselière 1976).

No archaeological work was completed in most part of northern Steensby Inlet prior to the intention of Baffinland in establishing a port in the area. Most of the previous archaeological research has been concentrated in northern Foxe Basin, mainly on the Jens Munk Island and Igloolik areas, where the human occupation was important.

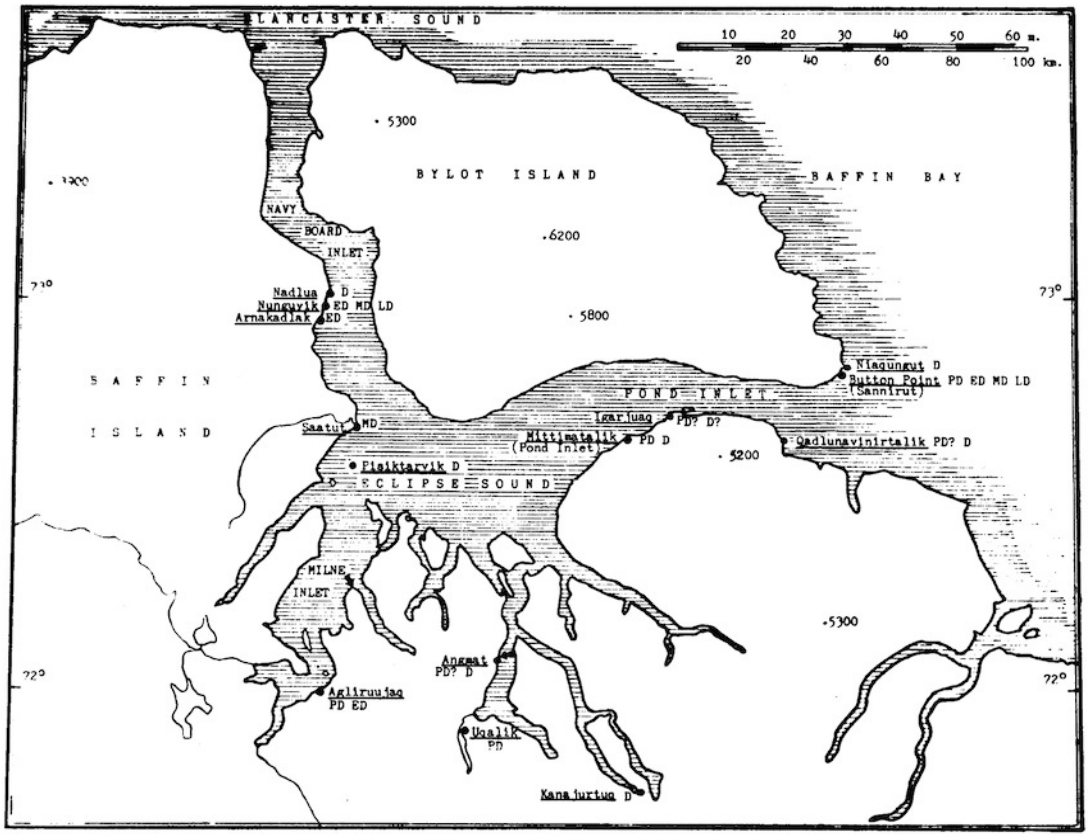


Figure 4-9.1 Paleo-Eskimo Site in the Pond Inlet Area (from Mary-Rousselière 1976)

The first archaeological research in Foxe Basin was done by Graham Rowley (Rowley, 1940) at the Dorset site at Abverdjar, near the Igloolik island. In 1954 and 1957, Jorgen Meldgaard (1960, 1962) completed excavations at Alarnek (Alaniq) on Melville Peninsula. In 1954 at this location, Meldgaard discovered 208 Dorset houses along 2.5 km of coastline. Meldgaard also work on Igloolik and Jens Munk islands. This pioneering archaeological research in Northern Foxe Basin provided the framework on which later Paleo-Eskimo research in the Canadian Arctic was based (Figure 4-9.2).

In the late 1980s, Susan Rowley (Rowley and Rowley, 1997) carried out fieldwork on Igloolik island and later help establish a field school in the early 1990 (Rowley, 2002). Rowley's work in the late 1980s added 110 archaeological sites to the five previously recorded on the island, representing the different cultural periods found in the Arctic (Pre-Dorset to recent Inuit) (Rowley and Rowley, 1997).

In 2002 and 2003, James Savelle and Arthur Dyke surveyed a number of areas in Foxe Basin; parts of Koch Island, Jens Munk Island, and Steensby Inlet in 2002 and parts of Rowley Island and Jens Munk Island and the remainder of Koch Island in 2003 (Savelle *et al*., 2009). They recorded a total 1,061 features within 206 sites on these three locations (Savelle, 2004). A total of 183 sites were recorded on Jens Munk Island, consisting of 419 Paleo-Eskimo dwelling features and 127 Neo-Eskimo dwelling features (Figure 4-9.3). Within the Kapuivik site area, 282 Paleo-Eskimo features and 74 Neo-Eskimo features were recorded. The Neo-Eskimo features included all those up to early historic qarmats. Abandoned recent wooden cabins were also recorded (Savelle *et al.* 2009).

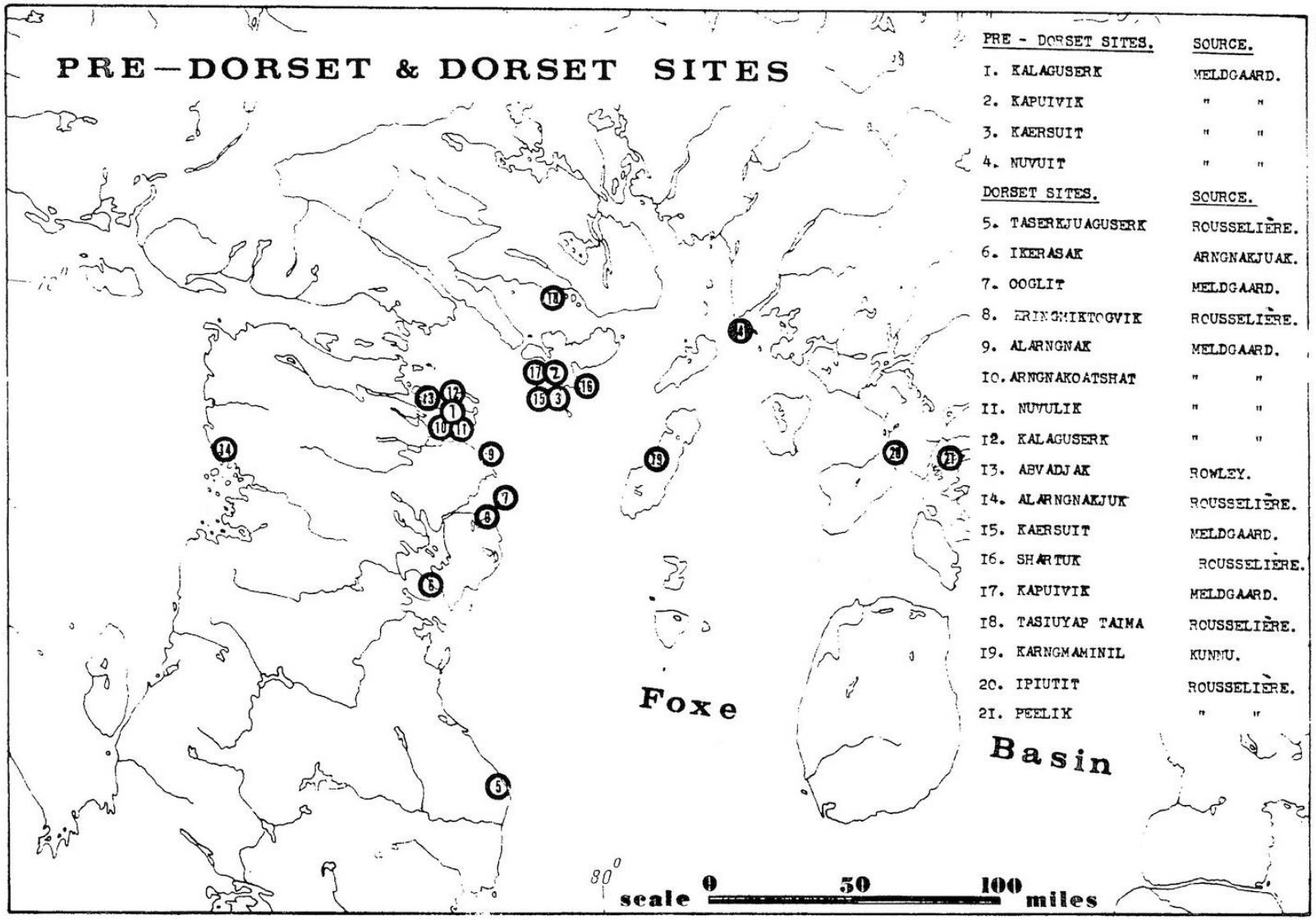


Figure 4-9.2 Distribution of Paleo-Eskimo Sites in northern Foxe Basin (from Crowe, 1970)

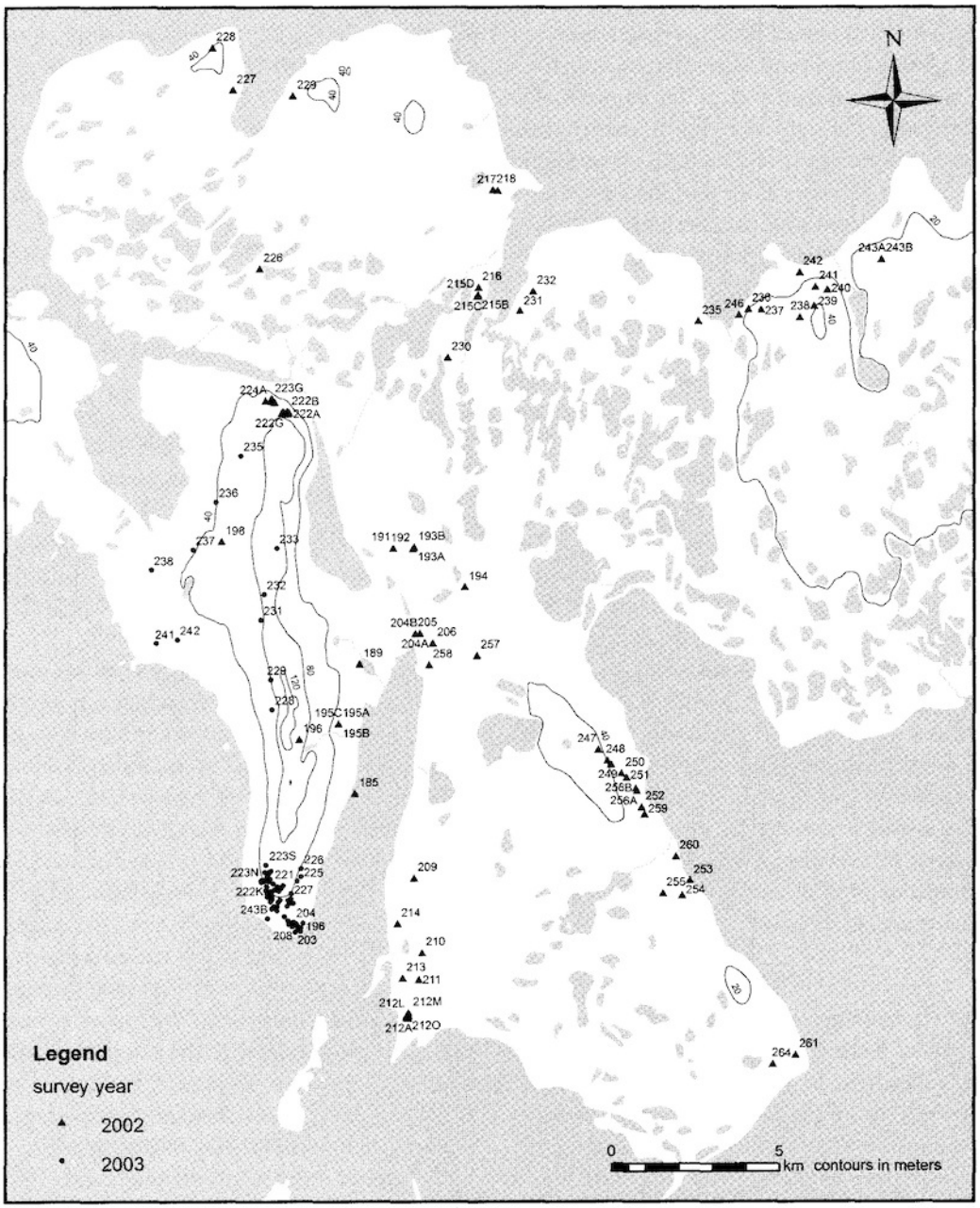


Figure 4-9.3 Location of Archaeological Sites Recorded on Jens Munk Island (from Savelle 2004)

One of these sites was Manertoq, recorded as NkFt-1. More relevant to this study because of closer proximity are sites that were reported at Cape Thalbitzer and Rowley River by Arthur Dyke, on the same project. Of particular interest are seven sites recorded in the vicinity of the Rowley River mouth and one near the Ravn River. These sites were reported to contain from one to numerous tent rings, caches and cairns.

9.1.1.3 Concept of a "Core Area of Occupation" in Northern Foxe Basin

The core area concept arose in the late 1960s and early 1970s, but appears to have attained its current form with the work of different researchers at a conference in 1973 in Santa Fe, New Mexico (Maxwell, 1976). A large body of biological, oceanographic and paleoclimatological data is available for the Eastern Arctic. All this evidence points to a particular region in which no one food animal is uniquely numerous but in which the number of available species and individuals within each species is sufficiently great to ensure a constantly favourable amount of food energy for the amount of work it takes to extract it from the environment. This diversity appears to be effective within a wide range of environmental conditions and animal behaviour. These conditions, offering persisting quantities of food to be acquired by reasonable amounts of labour, appear to be best met in the Baffin Island, Hudson Strait, Foxe Basin, and northern Labrador regions, which collectively have been called the "core area" (see Figure 4-9.4, from Maxwell, 1985 and Figure 4-9.5, from Vestey, 1974).

Figure 4-9.4 The Core Area of Occupation (from Maxwell, 1985)

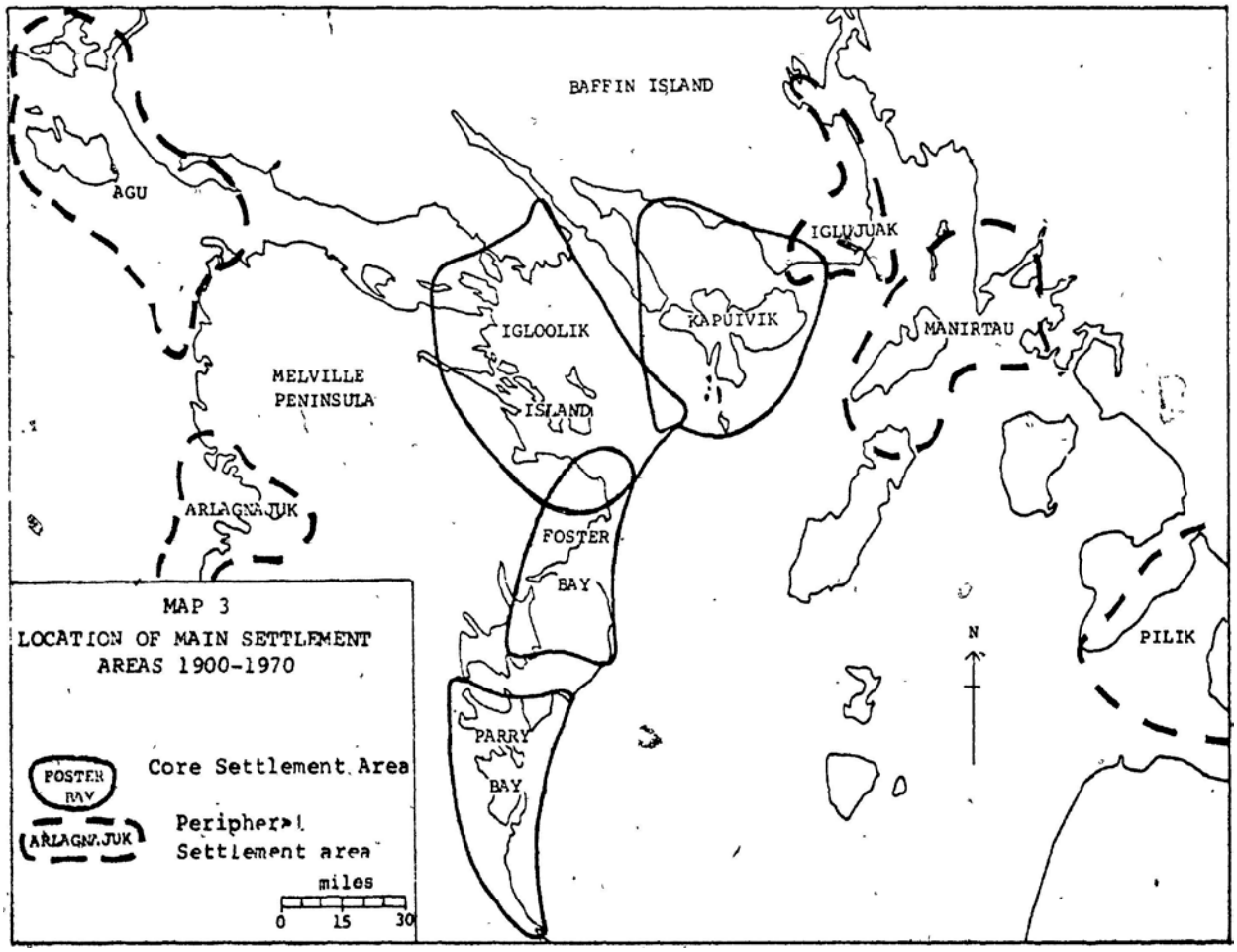


Figure 4-9.5 Location of Main Settlement Areas 1900-1970 (from Vestey, 1974)

At that time, several of the participants saw the ecologically rich area surrounding Foxe Basin as a region continuously occupied for what was then thought to be 3,000 years of Eastern Arctic Paleo-Eskimo prehistory (Odess 2002). At the same time, in peripheral regions occupation was characterized by periodic abandonment followed by the expansion of new Paleo-Eskimo groups out of the core area. Furthermore, significant contact between Paleo-Eskimos and the newly arriving Thule ca. 800-1,000 years BP were believed to have resulted in considerable exchange of cultural traits between the two populations (Savelle *et al*., 2009). The core area model was based primarily on the report by Meldgaard of extensive excavations at Alarnerk on Melville Peninsula and on Igloolik and Jens Munk islands in the northern Foxe Basin undertaken in the 1950s.

An enormous amount of research has taken place in the eastern Arctic since Meldgaard's pioneering work, and it is now generally agreed that there was essentially a direct transition from Pre-Dorset to Dorset and that much of this transition was centered in the "core area" (Savelle *et al*., 2009). The pioneering work by Meldgaard and others in surveying Foxe Basin and adjacent areas and in developing the Paleo-Eskimo core are a concept has long been recognized as instrumental in influencing later research on Paleo-Eskimo occupations in these and other areas.

9.1.2 Project Specific Archaeological Findings

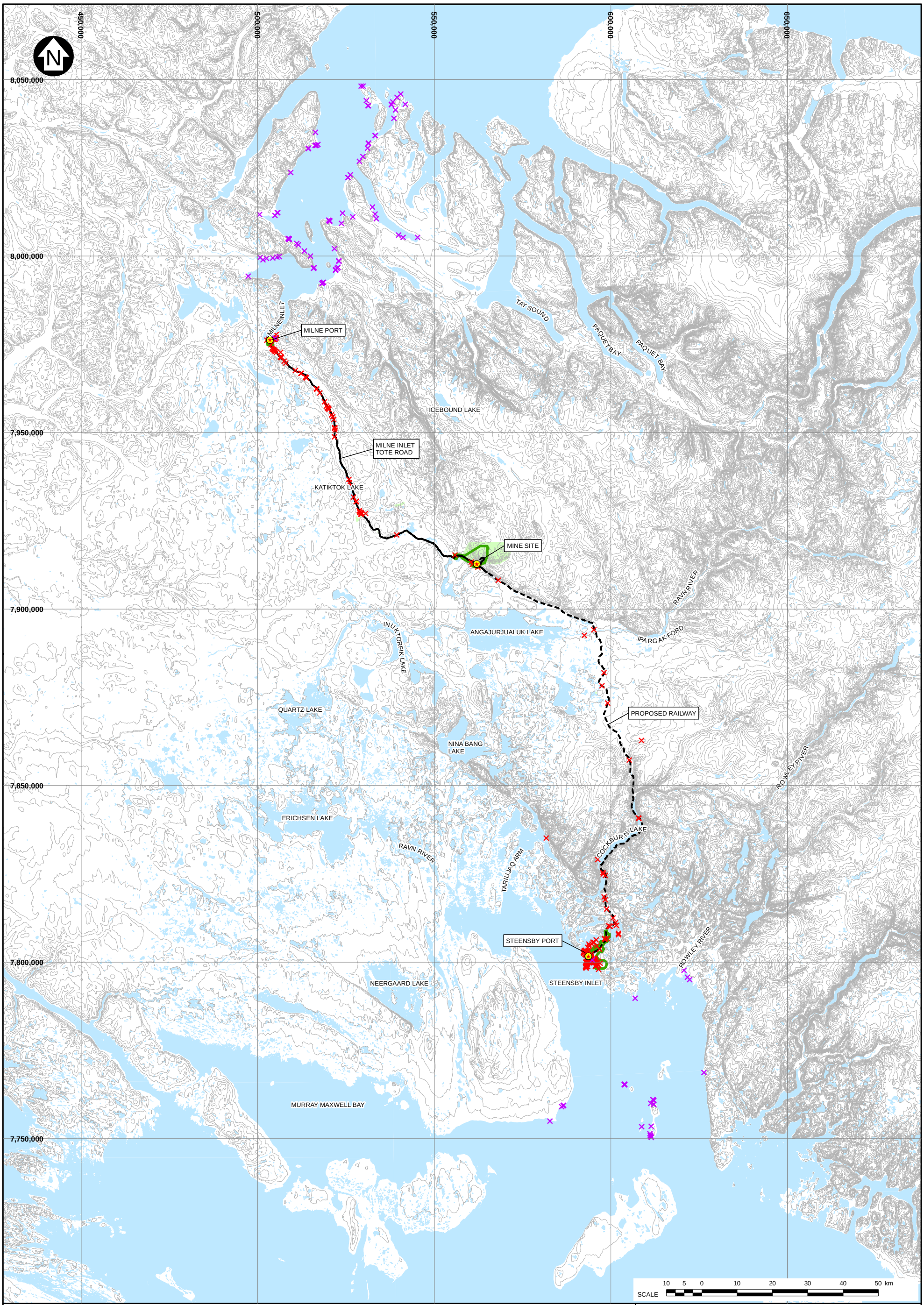
Archaeological studies were conducted in field seasons in 2006, 2007, 2008, 2010 and 2011. A more detailed summary appears in Appendix 4D. Areas assessed for the presence of cultural resources have included the Milne Inlet Tote Road and associated borrow areas, Milne Port, the Mine Site, the proposed Railway between the Mine Site and Steensby Port, proposed camps and quarries along the Railway, and proposed port and rail infrastructure at Steensby Port. High-resolution coastal shoreline photographs of Milne Inlet and Steensby Inlet were reviewed by a licensed archaeologist to identify sites to provide a regional context (Appendix 4D). Figure 4-9.6 shows the areas surveyed and identified archaeological sites from all these activities, at a 1:1,000,000 scale. Detailed figures showing archaeological sites in relation to the Project have been submitted confidentially to the Department of Culture, Language, Elders and Youth (CLEY).

The sites recorded contain a variety of stone features, including circles that probably represent tent rings, caches, traps, cairns and Inukshuit as well as more recent features such as wood cabins and modern artifacts such as a plastic sled runner. The remains found throughout the study area cover a long period of occupation from the earliest Arctic Small Tool Tradition (up to 4,500 years old) to the present. Some of the sites contain remains from a variety of stone tools and by-products of their manufacture. Several artifacts that may be attributable to the Arctic Small Tool Tradition have been recovered.

Mitigation measures implemented and proposed have included systematic data recovery (SDR), including detailed mapping and excavation, as well as staking and flagging or roping off sites to facilitate their avoidance and archaeological exclusion zones that will be marked as off limits to Project employees.

These investigations have established that this general area has seen substantial degrees of use throughout the human past. Milne Port and Steensby Port have revealed high densities of archaeological remains indicating repeated use both now and in the past. The presence of large numbers of sites in the Phillips Creek valley has confirmed its importance as a travel corridor to the interior for a considerable time. No sacred places or burial sites were found. The knowledge gained from this work has been used to locate Project facilities away from important archaeological sites where possible, to assess any residual effects and to formulate preservation and mitigation plans for any important archaeological resources to be affected by Project development.

In addition, “old things” were included in the scope of Inuit knowledge (IQ) studies carried out for the Project (Appendix 2B). Figures 4-9.7, 4-9.8 and 4-9.9 present the identified locations of Special Places, Historic Sites and Gravesites, respectively.



LEGEND:

- ARCHAEOLOGY SITE
- COASTAL ARCHAEOLOGY
- RIVER/STREAM/DRAINAGE
- MILNE INLET TOTE ROAD
- PROPOSED RAILWAY ALIGNMENT
- WATER
- POTENTIAL DEVELOPMENT AREA

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. CONTOUR INTERVAL VARIES. CONTOUR INTERVAL IS IN METRES.
4. PROPOSED RAIL ALIGNMENT PROVIDED BY CANARAIL AUGUST 2010.
5. COASTAL ARCHAEOLOGICAL SITES IDENTIFIED FROM OBLIQUE PHOTOS TAKEN FOR COASTAL SENSITIVITY MAPPING (HORIZON ARCHAEOLOGY, DEC 1, 2008.)

BAFFINLAND IRON MINES CORPORATION

ᓄᓇᕗᑦ ᐅᓴᖏᓐᓄᑦ MARY RIVER PRJECT

ARCHAEOLOGICAL SITES

Baffinland Iron Mines Corporation

REF NO. BL_Vol4_GIS_002

ᑎᑎᕋᐅᓯᖅ FIGURE 4-9.6

REV 0

Figure ID: BL_Vol4_GIS-002 Archaeological Sites Figure 4-9.6.mxd

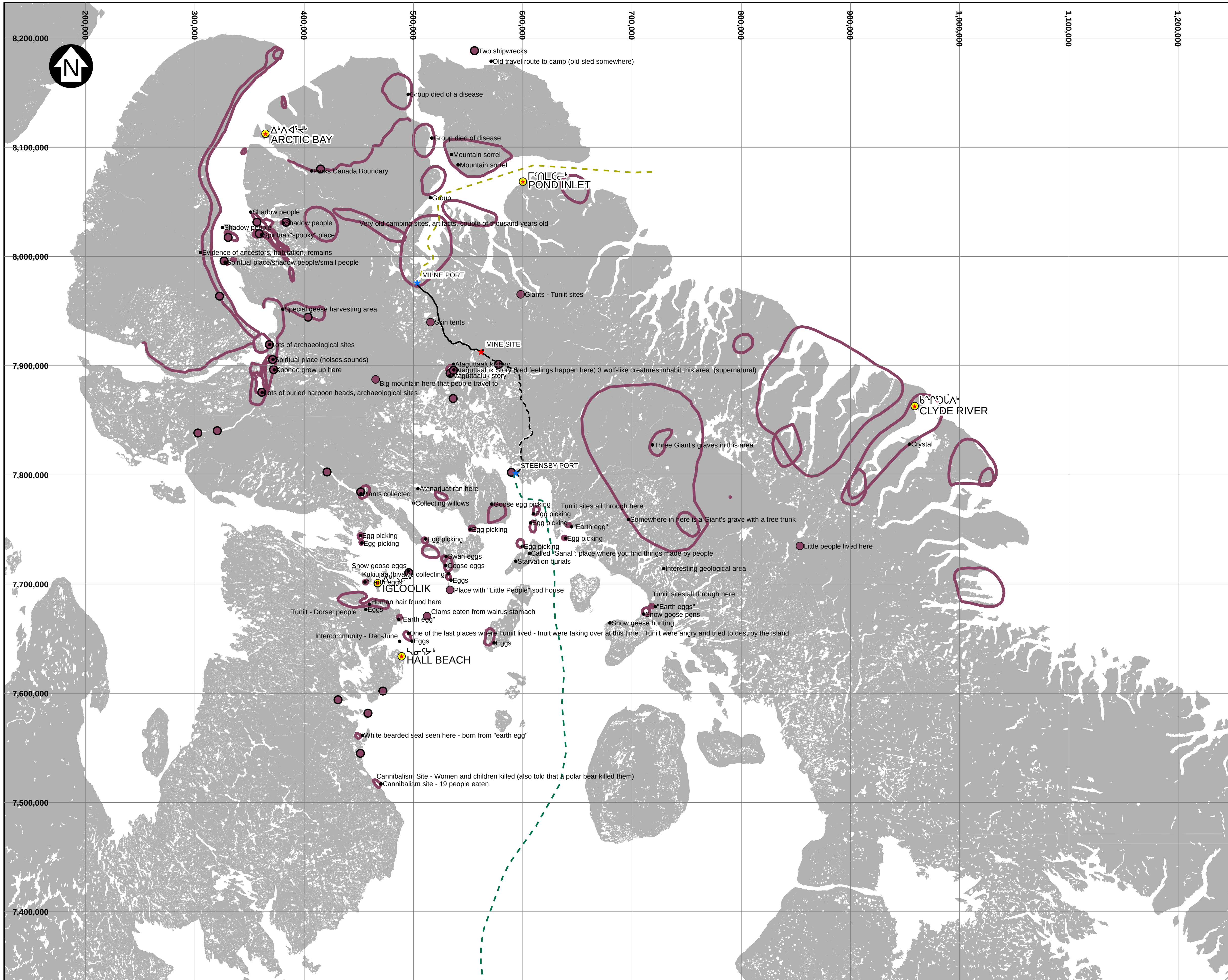


Figure ID: BL_Vol4_GIS_003 Special Places-North Baffin Region (Workshop Results) Figure 4-9-7.mxd

LEGEND:

- SPECIAL PLACES
- MILNE INLET TOTE ROAD
- PROPOSED RAILWAY ALIGNMENT
- NOMINAL SHIPPING ROUTE - YEAR-ROUND
- NOMINAL SHIPPING ROUTE - OPEN WATER SHIPPING ONLY

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. THIS MAP WAS PRODUCED FROM INFORMATION COLLECTED DURING INUIT QAUJIMAJATUQANGIT WORKSHOPS IN THE COMMUNITIES OF ARCTIC BAY (JULY 22-23, 2008), CLYDE RIVER (JULY 18-19, 2008), HALL BEACH (JULY 8-9, 2008), IGLOOLIK (JULY 10-12, 2008) AND POND INLET (JULY 15-17 AND SEPTEMBER 4, 2008). THIS INFORMATION SHOWS PATTERNS OF LAND USE AND LOCAL KNOWLEDGE OF THE LAND. THE MAP IS NOT INTENDED TO BE A COMPLETE REPRESENTATION OF WHAT IS KNOWN.

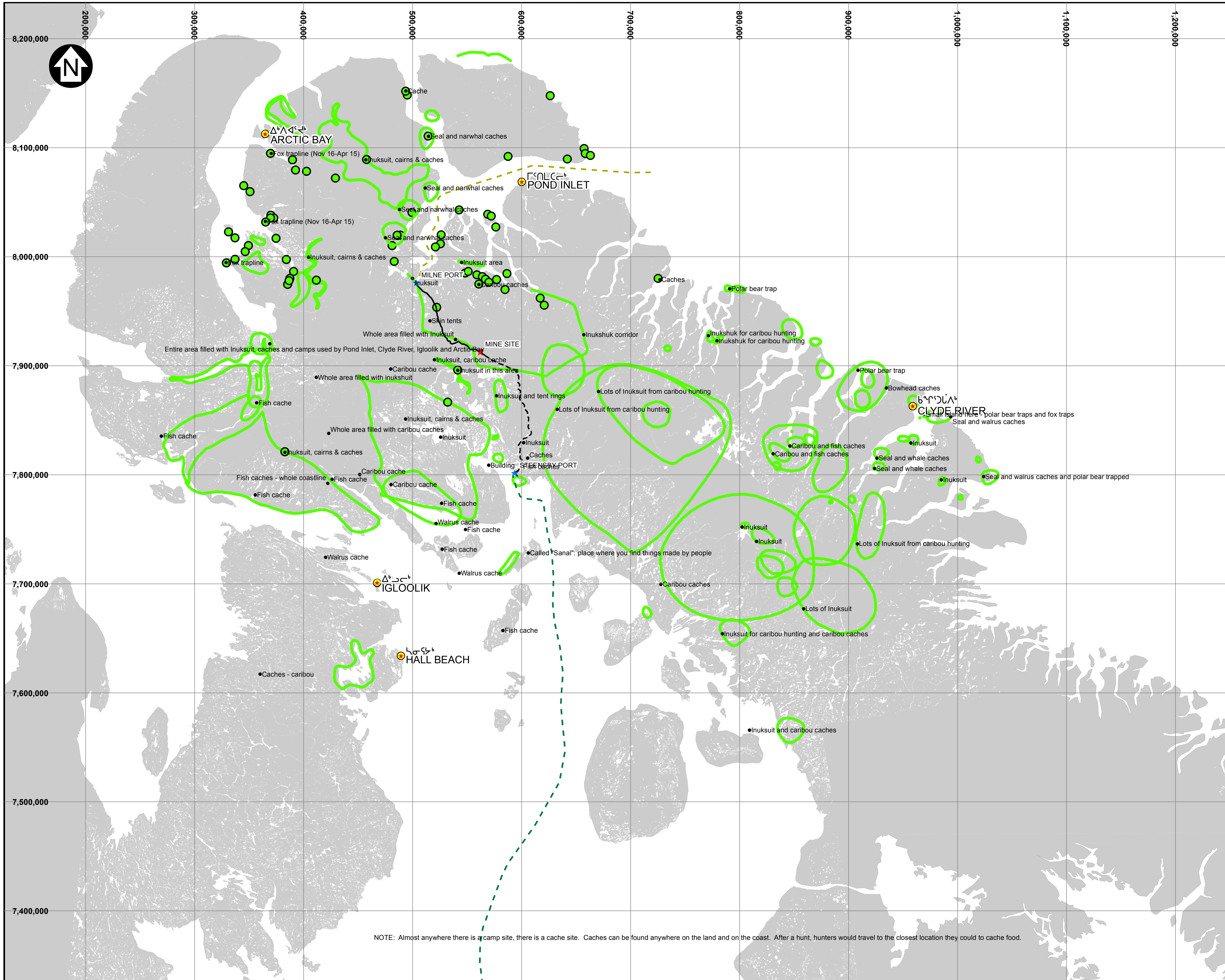
SCALE 35 17.5 0 35 70 105 140 175 km

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

SPECIAL PLACES - NORTH BAFFIN REGION (WORKSHOP RESULTS)

REF NO.	REV
BL_Vol4_GIS_003	0
FIGURE	4-9.7



LEGEND:

- OLD MAN-MADE ITEMS/FEATURES
- MILNE INLET TOTE ROAD
- PROPOSED RAILWAY ALIGNMENT
- NOMINAL SHIPPING ROUTE - YEAR-ROUND
- NOMINAL SHIPPING ROUTE - OPEN WATER SHIPPING ONLY

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. THIS MAP WAS PRODUCED FROM INFORMATION COLLECTED DURING INUIT QAUJIMAJATUQANGIT WORKSHOPS IN THE COMMUNITIES OF ARCTIC BAY (JULY 22-23, 2008), CLYDE RIVER (JULY 18-19, 2008), HALL BEACH (JULY 8-9, 2008), IGLOOLIK (JULY 10-12, 2008) AND POND INLET (JULY 15-17 AND SEPTEMBER 4, 2008). THIS INFORMATION SHOWS PATTERNS OF LAND USE AND LOCAL KNOWLEDGE OF THE LAND. THE MAP IS NOT INTENDED TO BE A COMPLETE REPRESENTATION OF WHAT IS KNOWN.

SCALE: 35 17.5 0 35 70 105 140 175 km

BAFFINLAND IRON MINES CORPORATION

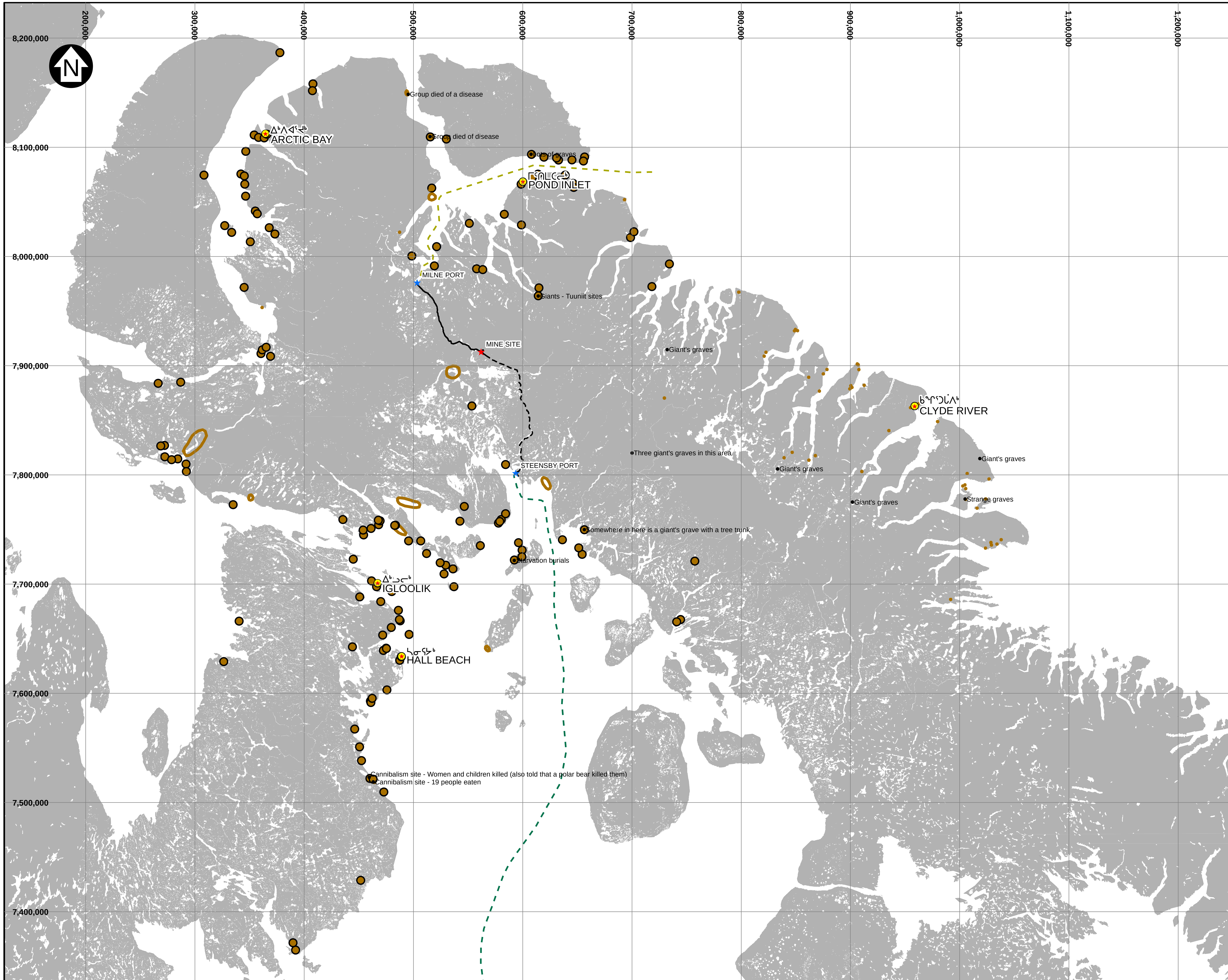
MARY RIVER PROJECT

HISTORIC SITES - NORTH BAFFIN REGION (WORKSHOP RESULTS)

Baffinland Iron Mines Corporation

REF NO.	REV
BL_Vol4_GIS_004	0

FIGURE 4-9.8



LEGEND:

- OLD GRAVES AND HUMAN BONES
- MILNE INLET TOTE ROAD
- PROPOSED RAILWAY ALIGNMENT
- NOMINAL SHIPPING ROUTE - YEAR-ROUND
- NOMINAL SHIPPING ROUTE - OPEN WATER SHIPPING ONLY

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. THIS MAP WAS PRODUCED FROM INFORMATION COLLECTED DURING INUIT QAUJIMAJATUQANGIT WORKSHOPS IN THE COMMUNITIES OF ARCTIC BAY (JULY 22-23, 2008), CLYDE RIVER (JULY 18-19, 2008), HALL BEACH (JULY 8-9, 2008), IGLOOLIK (JULY 10-12, 2008) AND POND INLET (JULY 15-17 AND SEPTEMBER 4, 2008). THIS INFORMATION SHOWS PATTERNS OF LAND USE AND LOCAL KNOWLEDGE OF THE LAND. THE MAP IS NOT INTENDED TO BE A COMPLETE REPRESENTATION OF WHAT IS KNOWN.

SCALE 35 17.5 0 35 70 105 140 175 km

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

GRAVESITES - NORTH BAFFIN REGION (WORKSHOP RESULTS)

Baffinland Iron Mines Corporation

REF NO.	REV
BL_Vol4_GIS_005	0
FIGURE	4-9.9

Figure ID: BL_Vol4_GIS_005 Gravesites-North Baffin Region (Workshop Results) Figure 4-9-9.mxd

Archaeological Survey Findings - Milne Port

Two sites with potential direct effects have been identified, as have nine with potential indirect effects. An additional four sites have already been mitigated.

The archaeological remains found at Milne Port indicate repeated use over a long period of time, from over 2000 years old to more recent times after the year 1900. Stone tool manufacture is clearly represented at sites in this area. The sites recorded are distributed in an almost linear manner on the beach ridges along the shore from Phillips Creek to the east of the unnamed eastern creek valley, and features have been observed along the latter creek. One of the sites has a large scatter of artifacts, one site contains numerous stone features suggestive of a range of time periods, and other sites exhibit smaller quantities of remains of stone tools and their manufacture.

Archaeological Survey Findings - Milne Inlet Tote Road

Twenty-seven sites with potential direct effects were identified along the Milne Inlet Tote Road and five sites with potential indirect effects. Another 21 have been mitigated.

Most of the sites were found in the area of Phillips Creek. Fewer sites were found along the remainder of the length of the road. The large number of sites in the Phillips Creek Valley has confirmed its use as a travel corridor to the interior over a long period. The numerous remains include some of the oldest known in the Eastern Arctic and are therefore very important. Discovery of a completely buried site provides confirmation that surface indications for all sites cannot be expected. The sites contain stone features heavily dominated by circles, most of which can be interpreted to represent tent rings. Many of them have associated hearths or windbreaks, both inside and outside, further indicating camp sites. The styles of the tent rings suggest a range of time periods. A significant number of the rings that are closely associated with the creek terraces and are partly covered by sediments and vegetation likely pre-date the road and may be considerably older. Some rings are fairly open and appear recent, with an approximate square appearance, suggesting use of canvas tents; others have a larger outside ring of six or eight boulders indicating a modern tent ring, likely dating to the period following road construction in the 1960s.

Unfortunately, the inland sites that were excavated contain few artifacts that could assist in narrowing down the occupation period. In addition excavations revealed a lack of distinct layers of rock that would help identify the age in all sites investigated. Therefore, relative age based on the appearance of features appears to be the best possible age approximation. One site represents the only inland site found to contain a complete stone tool. However, it was an isolated surface find adjacent to the road making the meaning of that find equivocal. A flake found at another site on the same landform suggests that there may be some lithic artifact deposits at one or both of these sites. If so, these findings could provide an indication of inland use and travel patterns over several time periods through the Phillips Creek valley, up to and including the present.

Archaeological Survey Findings - Mine Site

Only two archaeological sites were found at the Mary River Mine Site and their importance is considered to be relatively low to moderate since they are of relatively recent origin. One of the sites has already been mitigated.

Archaeological Survey Findings - Railway

Nineteen sites were found that could have potential direct effects and 10 were identified with potential indirect effects. No sites have been mitigated along the proposed railway corridor to date.

The sites discovered along and in the general vicinity of the proposed Railway indicate that the area crossed by the rail line served as an important travel corridor between Steensby Port and the communities to the north from prehistoric times to the present. It was also a significant location for caribou and for trapping wolves and foxes.

A system of uninterrupted navigational markers was found stretching from the east shore of 10 km Lake towards the west shore and Ikpikitturjuaq Bay, delineating a well-traveled route 6.5 km long. One site has a double row of Inukshuit, possibly a caribou drive lane, and a single row of Inukshuit pointing towards the mouth of Ikpikitturjuaq Bay. Of these sites, only one is within the proposed railway alignment. At another site, outside the Project boundary, there is a small river that is a good location for Arctic char (Theo Ikumak, pers. comm. 2010). The abundance of structures and features such as kayak stands show that the area was popular for a good length of time.

Archaeological Survey Findings - Steensby Port

Forty sites with potential direct effects were identified and three with potential indirect effects. An additional 28 sites have previously been mitigated, and 27 are outside the footprint of Steensby Port and will be avoided through the establishment of an exclusion zone.

The area between Ikpikitturjuaq Bay and Steensby camp contains many archaeological sites (the exclusion zone). Steensby Port represents an area of convergence and concentration of resources. The investigations support the hypothesis that people congregated at Steensby Port and surrounding area for thousands of years. The breadth of types of sites in this area illustrates that there was important occupancy back to Paleo-Eskimo times.

One gravesite was identified during IQ study workshops at the Steensby Port (Figure 4-9.9). This gravesite was not located during the archaeological surveys at Steensby Port.

9.2 ISSUES SCOPING

A series of scoping studies were carried out to determine the importance to stakeholders of cultural resources in the assessment of the effect of the proposed Project on the natural and socio-economic environments. The scoping activities included:

- Literature review (regional baseline conditions) – Project archaeologists reviewed previously completed archaeological studies within and immediately surrounding the study area;
- Archaeological field surveys for the Project in 2006, 2007, 2008 and 2010;
- Participation by field assistants from Pond Inlet, Igloolik and Hall Beach in archaeological field surveys;
- Review of applicable legislation, policies and guidelines;
- Consultation with Government of Nunavut Territorial Archaeologist and Director of culture and heritage;
- Consultation with the Pisiksik Working Group in 2006, and the Hamlets and Hunter and Trapper Organizations in Pond Inlet and Igloolik in mid-2008;
- Inuit knowledge studies conducted in the five communities of interest, Arctic Bay, Clyde River, Hall Beach, Igloolik and Pond Inlet, as described in Volume 2, Section 1;
- A Project team scoping meeting held in November 2007;
- Discussion of archaeology during various public meetings held by Baffinland in various communities of interest;
- Feedback from radio call-in shows and printed media;
- Bimonthly meetings between Baffinland executives and community leaders from Pond Inlet and Igloolik;

- Focus sessions on land use including archaeology in the five communities of interest; and
- Technical comments on the DEIS from CLEY technical, and from discussions with CLEY staff in October 2011.

Key conclusions from these scoping activities are that:

- Without distinguishing between the age/source of an archaeological site, that archaeological sites are viewed by Inuit as important to their own heritage.
- Inuit continue to use many of the same areas as their ancestors and other groups who preceded them, and they view the following of their ancestor's footsteps as an important element of their cultural heritage.
- The archaeological survey findings contribute significantly to the body of knowledge about the use of North Baffin Island by human groups for many thousands of years, and are consistent with findings throughout the North Baffin Region.

9.3 SUBJECTS OF NOTE

9.3.1 Wolf Trap

Two areas of interest, including a unique thicket of willows and a wolf trap, were identified at the southern end of Cockburn Lake in close proximity to the railway embankment. A discussion of Richardson's willow is presented in Volume 6, Section 3.3. The wolf trap is an important archaeological feature in the area and has been described as a prime example of a stone wolf trap; other such traps have been noted in the Cockburn area and in Steensby Port (Appendix 4D).

To mitigate the effect on the wolf trap, Canarail considered three alternatives. Two of the alternatives called for a realignment of the railway in the vicinity of km 126. The areas for proposed realignment are made up of ice rich alluvials with thermokarst lakes, which provide a high risk foundation. The original alignment was designed to minimize exposure to these conditions. These alternatives are not viable mitigation measures.

The third alternative, and the intended mitigation method for the wolf trap, is to maintain the original alignment of the railway and to place a fence between the railway and the protected areas during the construction phase. The current design shows the distance between the wolf trap and the centerline of the railway is 22.9 meters at the closest point and 12.9 meters from the nearest embankment line. As a result, the space between the willow and the wolf trap is large enough to allow the safe manoeuvrability of equipment without disturbing the areas of concern. Additional mitigation will include accurate mapping of the wolf trap, as a contingency measure.

9.3.2 Heritage Value of Archaeological Sites

During the course of project related archaeological investigations carried out between 2006 and 2011, 197 sites of archaeological value have been identified over the approximate 260 km long Project study area. The investigations have found evidence of Pre-Dorset, Dorset and Thule occupations as well as evidence of historic and more recent Inuit use.

The Steensby and inland areas have been identified as being historically peripheral to core areas of occupation. Previous surveys in the region have tended to focus on areas within the core area. The geographical span of the project related archaeological surveys is vast and includes both inland and coastal areas, which is unique and has provided an important contribution to the understanding of the cultural resources of the region.

Through mitigation activities such as systematic data recovery (SDR) the informational value of the sites is collected and catalogued. Although the physical location of the site may be lost, all the information collected contributes to the body of knowledge on the heritage value of the area. For example, through the archaeological investigations it has been established that this general area has seen substantial degrees of use throughout the human past. Both Milne Port and Steensby Port have revealed archaeological remains indicating repeat use both over time. The presence of a large number of sites in the Phillips Creek Valley has confirmed its importance as a travel corridor to the interior for a considerable time. As a result, the five field seasons have identified a large number of new sites that contribute significantly to the body of knowledge about the use of North Baffin Island by human groups for many thousands of years.

As indicated in Section 9.3.1, Inuit in the communities place a heritage value on archaeological sites in the region, without distinguishing between the age/source of an archaeological site. While mitigation activities such as SDR provide valuable information, the mitigation of archaeological sites may be viewed as a `loss` by some residents. For this reason, it is essential that the communities be involved in the surveys as has been done, and that information on the archaeological field activities and findings be disseminated.

9.4 GENERIC IMPACTS TO CULTURAL RESOURCES

Construction activity and human presence can result in loss or alteration of archaeological resources. Effects on these resources may be either direct or indirect. A direct effect is defined as "an immediately demonstrable effect of a project on an historic resource which can be attributed to a particular land modifying action". An indirect effect is defined as "an effect on an historic resource which is the result of an activity other than actual development actions". Indirect effects could include, for example, loss or alteration as a result of vandalism or erosion resulting from the construction of site infrastructure.

The Department of Culture, Language, Elders and Youth (CLEY), the Nunavut Government agency which oversees the protection and management of cultural resources in Nunavut, has identified the kinds of disturbances that may affect archaeological sites (Guidelines for Applicants and Holders of Nunavut Territory Archaeology and Palaeontology Permits, 21 Appendix H Guidelines for Developers). The types of disturbances and their applicability to the Project are listed in Table 4-9.1.

9.5 GENERIC MITIGATION APPLICABLE TO CULTURAL RESOURCES

Mitigation refers to actions that will ameliorate adverse effects on archaeological sites. Mitigation measures can include avoidance through project redesign or relocation (of the entire development or specific components), protection through the erection of physical barriers, and scientific investigation and recovery of archaeological data, also known as systematic data recovery (SDR). Site avoidance is always preferred. SDR commonly consists of accurate mapping, surface collection, and subsurface excavation where warranted. Because these actions can be destructive in themselves, SDR is only recommended for sites definitely under threat of disturbance. Detailed archaeological analysis and reporting are an integral part of mitigation. Mitigation plans must be approved by CLEY, which in turn consults with the Inuit Heritage Trust Inc. (IHTI).

Table 4-9.1 Types of Disturbance Potentially Affecting Cultural Resources

Types of Disturbance	Applicability to Project
Linear disturbances: including the construction of highways, roads, winter roads, transmission lines, and pipelines	Yes
Extractive disturbances: including the mining, gravel removal, quarrying, and land filling	Yes
Impoundment disturbances: including dams, reservoirs, and tailings ponds	No dams, reservoirs or tailing ponds are required for the Project
Intensive land use disturbances: including industrial, residential, commercial, recreational, and land reclamation work, and use of cultural resources as tourist developments	Yes, land reclamation is planned during the Operating and Closure Phase of the Project
Mineral, oil and gas exploration: establishment of camps, temporary airstrips, access routes, well sites, or quarries	Yes

9.6 ARCHAEOLOGICAL SITES

9.6.1 Assessment Methods

Archaeological sites were selected as the key indicator for cultural resources. Archaeological sites and artifacts contain valuable information about past and contemporary life, cultural identity and relations and/or interactions within and between cultures and the cultural environment. Archaeological sites are non-renewable resources.

While cultural resource is a valued socio-economic component, effects to archaeological sites is of a biophysical nature. The impact rating criteria for biophysical effects, rather than socio-economic effects, has been used to assess significance.

This assessment has assumed that there are no to negligible residual effects to cultural resources if sites are adequately mitigated by SDR without prior accidental disturbance. This is consistent with methodology in other environmental assessments of cultural resources in northern regions (VBNC, 1997). Because the mitigated sites will have been disturbed during information retrieval, the direction of the effect has been rated as negative. One could also consider the direction of the effect as neutral or positive since the knowledge from each of the mitigated sites will be retained and documented. For the purposes of this assessment, the direction has been conservatively considered as negative.

9.6.2 Potential Effects and Proposed Mitigation

For the purposes of this assessment and in accordance with CLEY, a potentially direct effect has been predicted for all sites within 30 m of an area of physical disturbance due to the Project. Potentially indirect effects have been identified for all archaeological sites within Project boundaries greater than 30 m from an area of physical disturbance and for sites identified outside boundaries but within sight of a Project area. The potential interactions of the Project with cultural resources are summarized by location in Table 2-3.2 in Volume 2, and are discussed below. These resources are most likely to be directly or indirectly affected during the construction phase as a result of construction activities and human presence. During operation effects are most likely to be indirect resulting from human presence. Indirect effects also may occur during the closure phase as a result of on-going human activity by local people and individuals with long-term site monitoring responsibilities. Direct effects may occur during closure as a result of reclamation activities.

The two main cultural resource issues identified during the scoping studies were:

Issue 1 - Disturbance or Removal of Archaeological Sites

Without appropriate mitigation, previously identified archaeological sites can be accidentally disturbed or removed. If the Project cannot find a way to avoid an identified site and effectively protect it from being disturbed, then the site can be salvaged and the information accurately recorded and artifacts retrieved for preservation of the contained knowledge.

It is also possible that sites could be inadvertently disturbed if they have not been identified during archaeological investigations prior to the start of construction. A site not previously identified is considered to be a 'chance find'. An example of a chance find is the discovery of a buried site during earthmoving activities.

Issue 2 - Unauthorized Removal of Artifacts

If a site is partially or completely destroyed through vandalism, chance finds or accidental events, a permanent loss of some or all of the archaeological resources from that site may result. For chance finds that are identified and either not destroyed or partially destroyed, an archaeologist will inspect the site and determine the appropriate mitigation.

The proposed mitigation for each of these issues is summarized below:

Issue	Proposed Mitigation
Disturbance or removal of archaeological sites	Pre-development archaeological surveys; mitigation by SDR prior to construction; implementation of a chance finds procedure.
Unauthorized removal of artifacts	Training, flagging and exclusion zones, management plans, implementation of chance finds procedure.

Several project facilities have been relocated to avoid archaeological sites wherever possible and these relocations have been described in the project description (Volume 3). Where sites cannot be avoided or are located within 30 m of Project activity (within Potential Development Areas - PDAs), Baffinland proposes to mitigate by SDR including documenting their features, excavating the sites and recovering the artifacts so that the knowledge gained from these cultural resources can be retained leaving no or negligible residual effects. Appropriate permit applications will be submitted to CLEY for approval in advance of any SDR.

For sites further than 30 m from Project activity within the LSA, different protection measures will be put in place depending upon the proximity of the site to the Project infrastructure. Measures include flagging, staking and posting of individual sites, declaring certain areas as off-limits and regular inspection and monitoring as detailed in the Cultural and Heritage Resource Plan (Appendix 10F-2). Some sites within the LSA that are far from Project activities will not be identified. For sites outside the LSA generally no action is proposed as the sites are far enough away from Project activities.

The Cultural and Heritage Resource Plan (Appendix 10F-2) includes policies to prohibit employees from accessing sites, explains how to recognize chance finds and the processes to be followed when chance finds occur so that the sites can be appropriately mitigated. An archaeologist will be available during the construction phase to confirm chance finds and recommend mitigation in accordance with the Cultural and Heritage Resource Plan to be approved by CLEY.

The proposed mitigation for each identified site is provided in the Preliminary Archaeological Mitigation Plan (Appendix 4D) and summarized below by Project component:

- Milne Port – Two sites with potential direct effects have been identified, nine sites with potential indirect effects and four sites have already been mitigated. Both direct effects sites are proposed to be mitigated by SDR. The area east of the lease area (an east of the unnamed creek) is a proposed exclusion zone, to be off limit by Project staff (employees and contractors). No further action is proposed for the sites with potential indirect effects as they are considered to be far enough away from Project activity, in particular camps, to avoid human disturbance.
- Milne Inlet Tote Road - Fifty-seven sites were identified on the Milne Inlet Tote Road. Twenty-five sites were mitigated during the years of 2007, 2008 and 2011. Of the remaining 32 sites, 15 are located in an area less than 35m from the center of the road in a zone of potential direct effects, and are proposed to undergo SDR. The remaining 17 are in a zone further than 35m and fencing and periodic monitoring is recommended.
- Mine Site - Two sites were found in this area. One has already been mitigated. The remaining site could have a potentially indirect effect and has been proposed to undergo SDR.
- Railway - Twenty-one sites were found that could have potential direct effects and nine were identified with potential indirect effects. No sites have been mitigated along the proposed railway corridor to date. Seven of the sites with potential direct effects are proposed to undergo accurate mapping and 13 to undergo further SDR.
- Steensby Port - Ninety-seven sites have been identified in Steensby Port. Twenty-eight were mitigated in 2008, 2010 and 2011. Of the 69 remaining, 27 are outside the footprint of Steensby Port, mostly located along the south shore of the Ikpikitturjuaq Bay, and will be avoided through the establishment of an exclusion zone. Two sites are to be protected by fencing and periodic monitoring. Forty sites are subject to direct impact and are proposed to be mitigated in 2012.

The results of the impact assessment on archaeology are provided below. Licensed professional archaeologists have conducted the field studies and have prepared the impact assessment providing their analysis regarding the relative significance of Project impacts to cultural resources. The final determination of cultural significance of the proposed undertaking to the people of Nunavut rests with the Government of Nunavut through CLEY.

9.6.3 Assessment of Residual Effects

All previously identified archaeological sites within Project boundaries will either be mitigated through excavation with all information reported and artifacts sent to the Prince of Wales Northern Centre in Yellowknife for preservation, or will be staked, flagged and posted prior to commencement of construction. Sites at Milne Port and along the Railway that are far from Project activities including camps will not be identified, so as to not bring unnecessary human attention to the sites.

Procedures are in place for dealing with chance finds and for employees, contractors and visitors to stay away from flagged or posted areas. The main Project activities likely to interact with archaeological sites and their residual effects on archaeology after mitigation are summarized in Table 4-9.2. Operation activities at the Mine Site and along the Railway have not been considered to have a residual effect and these activities have not been assessed. At the Mine Site, the two archaeological sites will have been mitigated and the only ongoing ground disturbance will take place at the mine, which is under the surface

and where the topography has been determined to not be conducive for human activity. Trains are not scheduled to stop along the Railway between the Mine Site and Steensby Port and all sites within 30 m of the Railway, quarries and temporary camps will have been mitigated prior to construction.

9.6.3.1 Ground Disturbance Activities During construction

Ground disturbance will be limited to the Project Development Area (PDA) (Level 1). Archaeological investigations have been carried out over the LSA and the Regional Study Area (RSA). All identified archaeological sites with potentially direct effects are proposed to have been mitigated and/or staked and flagged in advance of construction. Therefore the frequency and probability of encountering sites will be low. Because the information from all the mitigated sites will have been retained and remaining sites marked as off limits, the magnitude of the effect has been rated as negligible. The duration of the ground disturbance activities during construction is limited to the construction phase and therefore the duration is short-term. For the sites that are excavated, the effect is irreversible. The residual effect from this activity is considered negligible. The prediction confidence is high because of the previous archaeological investigations and proposed mitigations.

9.6.3.2 Potential for Chance Finds During Construction and Closure

The archaeological investigations have identified existing sites over the LSA and the Regional Study Area (RSA). There remains a possibility that additional sites might be discovered as a result of ground disturbance activities during construction and closure (chance finds) within the LSA. As previously indicated, Baffinland has put in place a detailed procedure for recognizing and addressing chance finds. Nevertheless it is possible that some or all of the information from a chance find may be accidentally destroyed.

The effect of accidental partial or complete destruction of a chance find will be negative, the extent is limited to the LSA and the magnitude of the effect will range from negligible to high depending upon the degree of destruction of the site before it is noticed and work has been stopped. The discovery of a chance find is limited to the construction and closure phases and is therefore considered of short term duration. Because of the previous archaeological investigations, the frequency of discovering a chance find is considered low. If a site has been partially or accidentally destroyed without retrieval of information, the action is considered irreversible. The probability of a chance find varies with location and ranges from low to medium as noted below. The probability of losing all information from a chance find is considered low because of the procedures in place for dealing with them and the prediction certainty is considered high. The residual effect is considered negligible.

Table 4-9.2 Effects Summary for Archaeological Sites

Effect		Residual Effect Evaluation Criteria					Significance
Effect	**Direction & Nature of Effect**	**Magnitude / Complexity**	**Geographical Extent**	**Frequency**	**Duration**	**Reversibility**	**Rated Significance of Residual Effect**
Ground disturbance All sites - construction	Negative	**Level I**: mitigated sites retained remaining sites off limits	**Level I:** confined to the LSA	**Level I:** rarely occurring	**Level I:** short term	**Level III:** non-reversible after activity is complete	Not Significant
Chance finds due to ground disturbance Construction and closure	Negative	**Level I** to **Level III**: dependent on the degree of destruction of the site before it is noticed and work has been stopped	**Level I:** confined to the LSA	**Level I:** rarely occurring	**Level I:** short term	**Level III:** non-reversible after activity is complete	Not Significant
Human presence at Project Sites All project phases	Negative	**Level III**: if unauthorized removal of artifacts occurs	**Level I:** confined to the LSA	**Level I:** rarely occurring	**Level II:** medium term (life of the Project)	**Level III:** non-reversible after activity is complete	Not Significant
Operation of Milne Inlet Tote Road	Negative	**Level II**: dependent of the degree of destruction	**Level I:** confined to the LSA	**Level I:** rarely occurring	**Level II:** medium term (life of the Project)	**Level III:** non-reversible after activity is complete	Not Significant
Accidental events	Negative	**Level I**: hazardous materials would not reach sites	**Level I:** confined to the LSA	**Level I:** rarely occurring	**Level II:** medium term (life of the Project)	**Level III:** non-reversible after activity is complete	Not Significant
Unauthorized removal of artifacts	Negative	**Level III**: if removal occurs	**Level I**: confined to the LSA	**Level I**: rarely occurring	**Level II**: medium term (life of the Project)	**Level II**: partially reversible after activity is complete	Not Significant

Probability of Chance Finds by Project Location

The probability of chance finds occurring at specific Project locations is as follows:

- Milne Port: low;
- Milne Inlet Tote Road from km 75 to Milne Port: medium;
- Milne Inlet Tote Road from Km 75 to Mine Site: low;
- Mine Site: low;
- Railway from Mine Site to Cockburn Lake: low;
- Cockburn Lake to Steensby Port: medium; and
- Steensby Port: medium.

9.6.3.3 Human Presence at Project Sites During all Project Phases

During the life of the Project, contractors and employees will be working at all sites and occupying the accommodation camps at Milne Port, the Mine Site and/or Steensby Port. Visitors will be viewing some or all of the Project sites periodically and staying over or visiting the accommodation camps at these locations. During construction, workers will also be occupying the temporary accommodation camps along the Milne Inlet Tote Road and Railway. Human activity can be expected especially around the accommodation camps. People are curious and may go exploring in and around the camps. This exploration will be limited by weather during most of the year, and by the possibility of encountering dangerous wildlife (polar bears) and strict operating and monitoring procedures discouraging such exploration.

The Environmental Protection Plan (EPP) (Volume 3, Appendix 3B, Attachment 5) contains an operational standard for contractors, employees and visitors with explicit procedures for avoiding archaeological sites, dealing with chance finds, and for prohibiting the building of any new Inukshuit. The EPP also requires contractors, employees and visitors to be informed about these procedures before being allowed on site. The effect of any partial or complete destruction of a site is negative. The potential effects will be limited to sites that have been staked, flagged or posted off-limits and/or chance finds because all sites with potential direct effects will have been mitigated. The magnitude of this indirect effect on archaeological sites of human presence is high if unauthorized removal or artifacts occurs despite all the procedures in place. The duration of the effects will continue over the life of the Project and is therefore considered to be medium. The extent is limited to the LSA and will be infrequent. Should any sites be partially or completely destroyed the effect would be irreversible. Due to the precautions in place, the probability of sites being partially or completely destroyed by human activity is considered low and the prediction certainty is medium. The residual effect is considered negligible.

9.6.3.4 Operation of the Milne Inlet Tote Road

The Milne Inlet Tote Road will be operational over the life of the Project. The potential exists for archaeological sites to be affected during snow clearing or if vehicles go off the roadbed. All sites within 30 m of the road and/or borrow areas associated with its upgrading will have been excavated and/or accurately mapped in advance of construction. Vehicle operators traveling on the road Milne Inlet Tote Road will not be allowed to leave the road without permission to do so.

Operation and maintenance procedures during all Project phases are not expected to affect archaeological sites near the Tote Road because all sites within 30 m will have been mitigated. Snow removal and dust suppression equipment will not leave the road right of way except to deliver snow to storage areas or to create snow berms to prevent snowdrifts on the road. Snow will not be blown over a distance greater than 30 m and dust suppression spraying will not extend beyond the road right of way. The Roads Management

Plan (Appendix 10D-8) will include procedures for snow storage areas or snow berms to avoid any identified archaeological sites.

In the unlikely event of a site being partially or completely destroyed, the effect would be irreversible and the extent would be limited to LSA. The magnitude of the effect for that site would be moderate to high, depending upon the degree of destruction of the site. The duration of the potential effect extends over the life of the Project and is considered medium. The probability of such an event occurring is low and the frequency is low. Any residual effect due to railway operation is considered to be negligible. The prediction certainty is high.

9.6.3.5 Accidental Events

Potential accidental events and malfunctions resulting from Project activities have been identified and analyzed in Volume 9. Most of these events are considered unlikely or highly unlikely. The events, should they occur, that could potentially affect archaeological sites include vehicle accidents along the Milne Inlet Tote Road, train derailments, accidental detonation of explosives and accidental releases of hazardous materials.

If any archaeological sites are partially or completely destroyed as a result of accidental events, the magnitude would be moderate to high and the effect would be irreversible. Accidental events could occur over the life of the Project; therefore the duration is medium. The extent of any accidental events would be limited to the LSA and the frequency would be low. Because all sites within 30 m of Project activities will have been mitigated prior to construction, only accidental events that reach beyond 30 m could potentially partially or completely destroy an archaeological site.

Explosives will be stored in designated storage areas where any archaeological sites will have been mitigated. Only limited quantities will be removed for use at any time. Therefore the magnitude will be low because sites in explosives storage areas will have been mitigated.

Accidental releases of hazardous materials at Milne Port, the Mine Site and Steensby Port such as from the tank farm would not reach archaeological sites because the laydown areas and tank farms are all bermed to contain spills and because all sites within 30 m will have been mitigated. Therefore the magnitude of an accidental release is low and the probability of such releases reaching any archaeological sites is low.

Vehicle accidents along the Milne Inlet Tote Road could result in the release of hazardous materials and vehicle rollovers could potentially cause vehicles to leave the road. The probability of accidents occurring is high despite best efforts to avoid them. The magnitude of accidental destruction of an archaeological site would be high. The probability of such accidents extending beyond 30 m is low. Should such events occur, cleanup procedures could partially or completely salvage the sites.

Only a railway accident that resulted in railcars leaving the railway embankment or fuel tank cars being breached could potentially reach beyond the 30 m mitigation zone for archaeological sites. The probability of such an event is low. Should such an event occur, cleanup procedures could partially or completely salvage the sites.

The residual effect of accidental events on archaeological sites is considered negligible. The prediction certainty is high.

For all Project activities including direct and indirect potential effects, there will be no to negligible residual effects on the disturbance or removal of archaeological sites.

9.6.3.6 Unauthorized Removal of Artifacts

The unauthorized removal of artifacts will be limited to the LSA (level I). The frequency of the effect occurring is low (level I), however the magnitude of such an effect would be high (level III). The duration of the effect will last for the life of the project, as this is when individuals will be most common in the LSA. The reversibility of the effect is rated as level II because there is a potential of finding out the individual(s) responsible for the unauthorized removal resulting in the return of the artifact. The overall assessment significance for this effect is not significant.

9.6.4 Follow-up

While most of the railway alignment has been surveyed to date, additional detailed archaeological investigations will be required at railway construction camp locations, a portion of the quarries along the railway, and connecting access roads. These investigations will be undertaken prior to construction and any sites discovered within 30 m of the corridor will be mitigated. A more detailed update to the Preliminary Archaeological Mitigation Plan (Appendix 4D) will be developed as an outcome of the FEIS review and will be submitted to CLEY for approval before the work is undertaken.

In accordance with the Cultural and Heritage Resource Protection Plan (Appendix 10F-2), employees and contractors will be trained to recognize potential archaeological sites (chance finds), to immediately stop work when encountering a chance find and to follow procedures for contacting a designated archaeologist who will then follow the instructions in the Plan.

Staked sites will be routinely inspected by qualified staff to ensure the integrity of the sites is maintained in accordance with instructions in the Cultural and Heritage Resource Protection Plan.

9.7 IMPACT STATEMENT

The Project will involve the avoidance, protection and mitigation of archaeological sites in accordance with an Archaeological Mitigation Plan approved by CLEY, and a protection plan to reduce the potential for unintentional destruction of archaeological sites.

Impact Statement for Key Indicator 1 – Archaeological Sites

With the implementation of the mitigation and protection plans, the Project is expected to have negligible residual effect on the disturbance or removal of archaeological sites, and on the cultural resources VSEC.

Potential for Cumulative Effects

Because there are no residual effects on cultural resources anticipated from the Project, this VSEC is not carried over for evaluation of cumulative effects.

SECTION 10.0 - RESOURCES AND LAND-USE

10.1 BASELINE SUMMARY

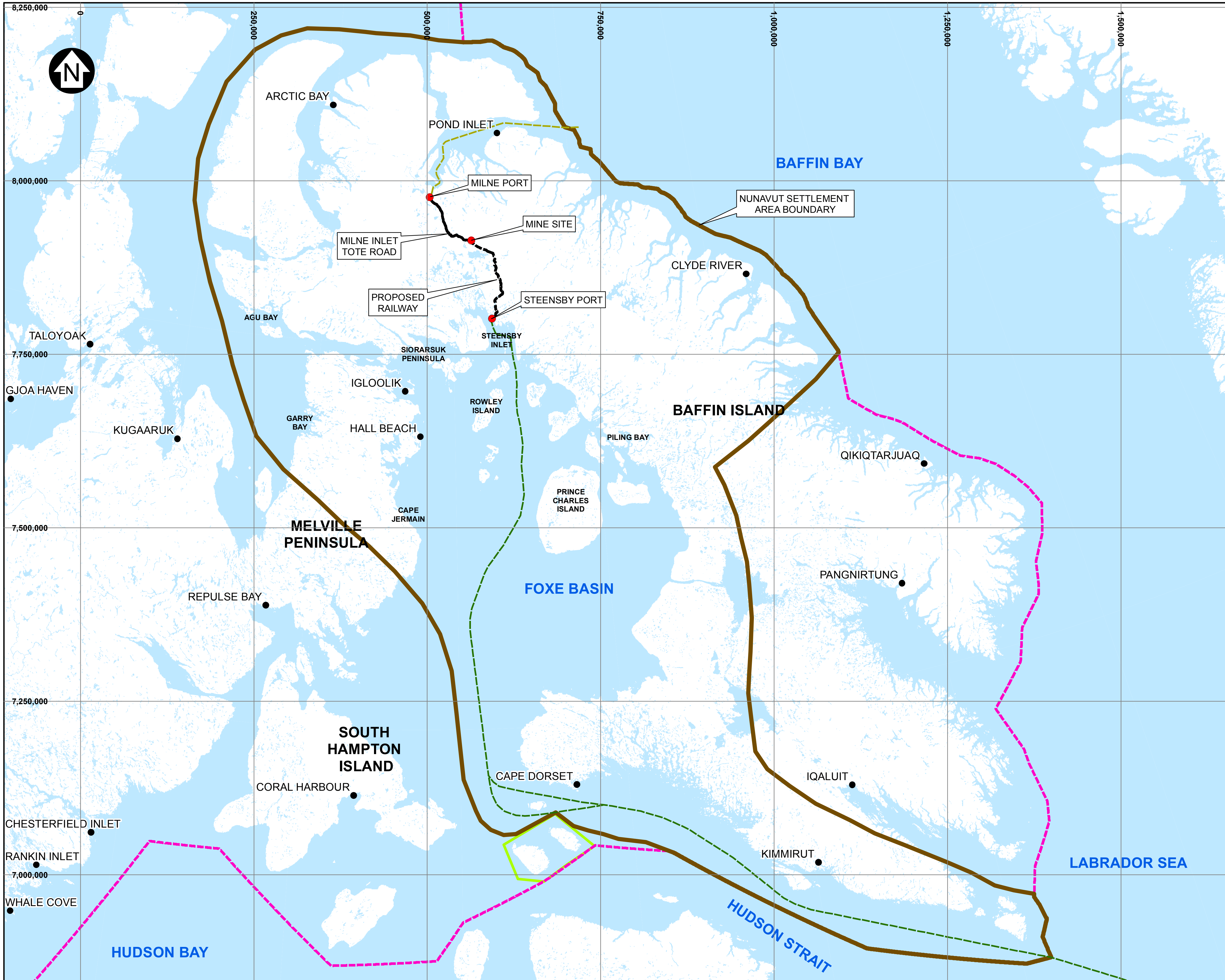
Information collected for the land-use baseline provides an overview of the history of the region, information on land-use during the contact-traditional period, and an overview of current land-use activities in the North Baffin and Foxe Basin areas. Based on guidelines from NIRB (2009), for the Mary River Project, the land-use study area depicted in Figure 4-10.1 encompasses both the LSA and the RSA. The study area was delineated based on historical land-use (Milton Freeman Research, 1976) and more contemporary land-use (Priest and Usher, 2004). Published sources, personal communications and the Project's Mary River Inuit Knowledge Study (MRIKS) were used to describe land-use in the Mary River Project and surrounding areas. The Nunavut Wildlife Harvest Study interviews and discussions with local communities (Priest and Usher, 2004) determined contemporary Inuit land-use. The complete Land-use Baseline Report is available in Appendix 4C.

Connection to the land through the pursuit of cultural land base activities such as harvesting, travel and camping continue to be of importance to Inuit. Harvesting in the land-use study area includes resources such as caribou, marine mammals, fish, soapstone, berries and sea resources. Harvesting of certain resources varies in importance between North Baffin and the two South Baffin communities in the land-use study area. For example, residents in Cape Dorset and Kimmirut indicated that they mainly rely on sea mammals and other sea resources such as mussels as a source of food. In North Baffin, by comparison, sea resources such as mussels and seaweed are less commonly harvested. Harvesting locations of marine mammals and sea resources are identified in Figures 4-10.2 and 4-10.3 for both North Baffin and South Baffin.

Caribou harvesting is commonly pursued by Inuit in the land-use study area. The Nunavut Wildlife Harvest Study (NWHS) (Priest and Usher, 2004) documented harvest locations for caribou. Caribou move around Baffin Island over the course of a number of years and during the NWHS were quite abundant in the North Baffin region. Recently, caribou abundance has declined, as referenced in the terrestrial mammal baseline report and the impact assessment (Volume 6, Appendix 6F and Volume 6, Section 5.0, respectively). Thus, Inuit must travel further to hunt caribou.

Inuit also harvest other resources, such as berries and soapstone. Berry picking is conducted as a secondary, opportunistic harvesting activity when individuals are already out on the land. A soapstone deposit at Mary River is an important resource commonly harvested by residents of North Baffin for carving purposes. Like all soapstone deposits, it's protected under the Nunavut Land Claims Agreement (NLCA), giving Inuit inherent harvesting rights. Figure 3-2.3 in Volume 3 demonstrates the location of the deposit.

Travel and camping are largely pursued in combination with harvesting and visiting other communities by following well established historical routes (in their ancestors' footsteps). An interpretation of the main routes identified by North Baffin and Cape Dorset and Kimmirut communities are illustrated in Figures 4-10.4 and 4-10.5 (the original travel route figures are Figures 3.13 and 3.15 in Appendix 4C), while camping locations are illustrated in Figures 4-10.6 and 4-10.7.



LEGEND:

- COMMUNITY
- NANISIVIK MINE
- MILNE INLET TOTE ROAD
- PROPOSED RAIL ALIGNMENT
- NUNAVUT SETTLEMENT AREA BOUNDARY
- NOMINAL SHIPPING ROUTE - ICE BREAKERS
- NOMINAL SHIPPING ROUTE - OPEN WATER SHIPPING ONLY
- AREA OF EQUAL USE AND OCCUPANCY NUNAVUT AND NUNAVIK
- LAND USE STUDY AREA
- WATER

ᖃᐅᔨᒪᔭᒃᓴᐃᑦ
NOTES:

1. ᓄᓇᖑᐊᓕᐅᐊᑕᐃᑦ: ᑯᐃᓐ ᑲᓇᑕᒧᑦ
BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA, DEPARTMENT OF NATURAL RESOURCES (2004). ALL RIGHTS RESERVED.
2. ᓄᓇᖑᐊᑦ ᑎᑎᕐᓯᒪᓂᖓ ᒪᓕᒃᑐᖅ UTM (NAD83) ZONE 17 AND IS IN METRES.
COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.

ᐊᖏᓂᖓ SCALE 50 25 0 50 100 150 200 250 ᑭᓛᒥᑕ km

BAFFINLAND IRON MINES CORPORATION

ᓄᓘᔾᓂ ᐅᔭᕋᒃᓯᐅᕐᑐᑦ MARY RIVER PROJECT

LAND-USE STUDY AREA

Baffinland Iron Mines Corporation

REF NO.	REV
BL_Vol4_GIS_006	0
ᑎᑎᕐᑖᔭᕐᓯᒪᔪᖅ FIGURE	4-10.1

Figure ID_ BL_Vol4_GIS_006 Land-Use Study Area Figure 4-10.1.mxd

400,000
500,000
600,000
700,000
800,000
900,000
8,200,000
8,100,000
8,000,000
7,900,000
7,800,000
7,700,000
7,600,000
7,500,000
N
ARCTIC BAY
POND INLET
CLYDE RIVER
IGLOOLIK
ROWLEY ISLAND
HALL BEACH
SPICER ISLANDS
PRINCE CHARLES ISLAND

LEGEND:

- COMMUNITY
- MILNE INLET TOTE ROAD
- PROPOSED RAILWAY ALIGNMENT
- NOMINAL SHIPPING ROUTE - YEAR-ROUND
- NOMINAL SHIPPING ROUTE - OPEN WATER SHIPPING ONLY

NWHS DATA (1996-2001)

- WHALE
- POLAR BEAR
- WALRUS
- ARCTIC BAY HARVEST LOCATION
- CLYDE RIVER HARVEST LOCATION
- HALL BEACH HARVEST LOCATION
- IGLOOLIK HARVEST LOCATION
- POND INLET HARVEST LOCATION

MRIKS DATA (2007-2010)

- FLOE EDGE
- NARWHAL MOVEMENTS
- NARWHAL AREA OF CONCENTRATION
- BEARDED SEAL MOVEMENT
- BEARDED SEAL AREA OF CONCENTRATION
- BEARDED SEAL HUNTING AREA
- BEARDED SEAL PUPPING AREA
- BELUGA WHALE MOVEMENT
- BELUGA WHALE AREA OF CONCENTRATION
- POLAR BEAR MOVEMENT
- POLAR BEAR AREA OF CONCENTRATION
- POLAR BEAR DENNING AREA
- POLAR BEAR HUNTING AREA
- RINGED SEAL MOVEMENT
- RINGED SEAL AREA OF CONCENTRATION
- RINGED SEAL HUNTING AREA
- RINGED SEAL PUPPING AREA

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. HARVEST DATA FROM THE NUNAVUT WILDLIFE HARVEST STUDY (2004), ISSUED BY THE NUNAVUT WILDLIFE MANAGEMENT BOARD (PRIEST AND USHER, 2004).
4. AN IDENTIFIED 'HUNTING AREA' SHOULD NOT BE CONSIDERED THE ONLY AREA WHERE HUNTING OCCURS. WHILE THESE AREAS WERE SPECIFICALLY POINTED OUT DURING THE WORKSHOPS, HUNTING CAN BE EXPECTED TO OCCUR ANYWHERE IN 'AREAS OF CONCENTRATION' FOR A GIVEN SPECIES.
5. THIS MAP WAS PRODUCED FROM INFORMATION COLLECTED DURING INUIT QAUJIMAJATUQANGIT WORKSHOPS IN THE COMMUNITIES OF ARCTIC BAY, CLYDE RIVER, HALL BEACH, IGLOOLIK AND POND INLET. THIS INFORMATION SHOWS PATTERNS OF LAND USE AND LOCAL KNOWLEDGE OF THE LAND. THE MAP IS NOT INTENDED TO BE A COMPLETE REPRESENTATION OF WHAT IS KNOWN.

SCALE 25 12.5 0 25 50 75 100 125 km

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PRJECT

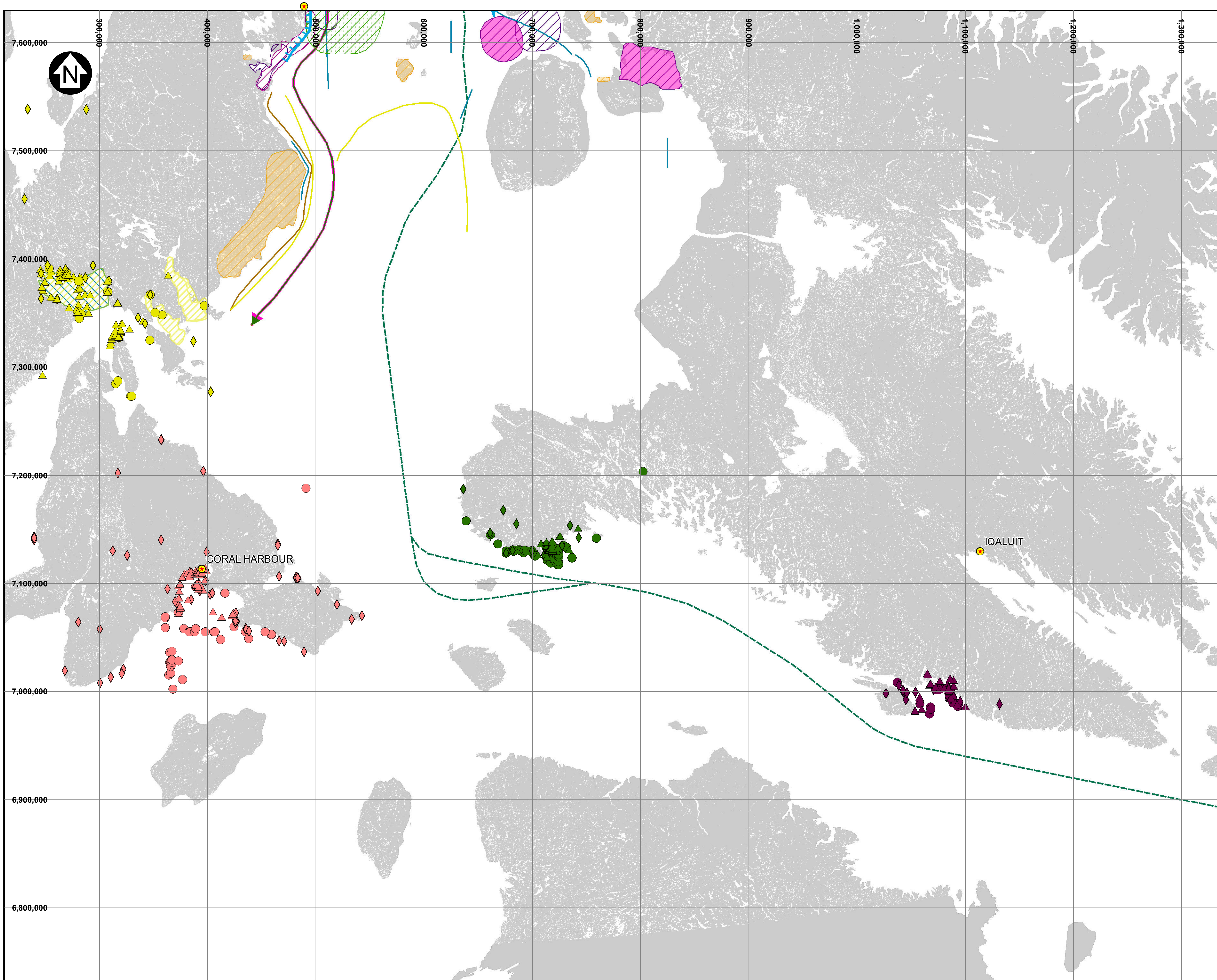
MARINE HARVESTING PATTERNS NORTH BAFFIN

Baffinland Iron Mines Corporation

REF NO. BL_Vol4_GIS_007

FIGURE 4-10.2

Figure ID: BL_Vol4_GIS_007 Marine Harvesting Patterns-North Baffin Figure 4-10.2.mxd



ᑐᑭᓯᒋᐊᕐᓂᖏᑦ LEGEND:

- COMMUNITY
- ᕿᖑᐊᓂ ᐊᖅᑯᑎ ᐅᓯᑲᖅᑕᖅᐱᒃ MILNE INLET TOTE ROAD
- ᓄᓇᓯᐅᑎᑯᑖᒃ ᐊᖅᑯᑎᒋᓂᐊᖅᑕᖓ PROPOSED RAILWAY ALIGNMENT
- ᐃᓚᖓᓂᑯᑦ ᐅᒥᐊᖅᔪᐊᖓᓂᑦ ᐊᖅᑯᑕᐅᖃᑦᑕᖅᓂᐊᖅᑐᖅ NOMINAL SHIPPING ROUTE

NWHS DATA (1996-2001)

- CAPE DORSET HARVEST LOCATION
- KIMMIRUT HARVEST LOCATION
- CORAL HARBOUR HARVEST LOCATION
- REPULSE BAY HARVEST LOCATION
- WHALE
- POLAR BEAR
- WALRUS

MRIKS DATA (2007-2010)

- FLOE EDGE
- NARWHAL MOVEMENT
- NARWHAL AREA OF CONCENTRATION
- BEARDED SEAL MOVEMENT
- BEARDED SEAL AREA OF CONCENTRATION
- BEARDED SEAL HUNTING AREA
- BEARDED SEAL PUPPING AREA
- BELUGA WHALE MOVEMENT
- BELUGA WHALE AREA OF CONCENTRATION
- POLAR BEAR MOVEMENT
- POLAR BEAR AREA OF CONCENTRATION
- POLAR BEAR DENNING AREA
- POLAR BEAR HUNTING AREA
- RINGED SEAL MOVEMENT
- RINGED SEAL AREA OF CONCENTRATION
- RINGED SEAL HUNTING AREA
- RINGED SEAL PUPPING AREA

ᖃᐅᔨᒪᔭᕐᓴᐃᑦ

NOTES:

1. ᓄᓇᖑᐊᖓᒍᐊᑕᐃᑦ: ᑯᐃᓐ ᑲᓇᑕᒧᑦ

2. ᓄᓇᖑᐊᖅ ᑎᑎᕐᓯᒪᓂᖓ ᒪᓕᒃᑐᖅ UTM (NAD83) ZONE 17 AND IS IN METRES.
   COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. HARVEST DATA FROM THE NUNAVUT WILDLIFE HARVEST STUDY (2004), ISSUED BY THE NUNAVUT WILDLIFE MANAGEMENT BOARD (PRIEST AND USHER, 2004).
4. AN IDENTIFIED 'HUNTING AREA' SHOULD NOT BE CONSIDERED THE ONLY AREA WHERE HUNTING OCCURS. WHILE THESE AREAS WERE SPECIFICALLY POINTED OUT DURING THE WORKSHOPS, HUNTING CAN BE EXPECTED TO OCCUR ANYWHERE IN 'AREAS OF CONCENTRATION' FOR A GIVEN SPECIES.
5. THIS MAP WAS PRODUCED FROM INFORMATION COLLECTED DURING INUIT QAUJIMAJATUQANGIT WORKSHOPS IN THE COMMUNITIES OF ARCTIC BAY, CLYDE RIVER, HALL BEACH, IGLOOLIK AND POND INLET. THIS INFORMATION SHOWS PATTERNS OF LAND USE AND LOCAL KNOWLEDGE OF THE LAND. THE MAP IS NOT INTENDED TO BE A COMPLETE REPRESENTATION OF WHAT IS KNOWN.

ᐊᖏᓂᖓ SCALE 35 17.5 0 35 70 105 140 175 km ᑭᓛᒥᑕ

BAFFINLAND IRON MINES CORPORATION

ᓅᔾᔪᓂ ᐅᔭᕿᓯᐅᕐᑐᑦ MARY RIVER PROJECT

MARINE HARVESTING PATTERNS SOUTH BAFFIN

Baffinland Iron Mines Corporation

REF NO. BL_Vol4_GIS_008 | REV 0

ᑎᑎᖅᐅᔭᕐᓯᒪᔪᖅ FIGURE 4-10.3

Figure ID: BL_Vol4_GIS_008 Marine Harvesting Patterns-South Baffin Figure 4-10-3.mxd

200,000
400,000
600,000
800,000
1,000,000
1,200,000
8,200,000
8,000,000
7,800,000
7,600,000
7,400,000
ARCTIC BAY
POND INLET
MILNE PORT
MINE SITE
STEENSBY PORT
CLYDE RIVER
IGLOOLIK
HALL BEACH

LEGEND:

- MILNE INLET TOTE ROAD
- PROPOSED RAILWAY ALIGNMENT
- NOMINAL SHIPPING ROUTE - YEAR-ROUND
- NOMINAL SHIPPING ROUTE - OPEN WATER SHIPPING ONLY
- ICE TRAVEL ROUTE
- LAND TRAVEL ROUTE
- WATER TRAVEL ROUTE

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. THIS MAP WAS PRODUCED FROM INFORMATION COLLECTED DURING INUIT QAUJIMAJATUQANGIT WORKSHOPS IN THE COMMUNITIES OF ARCTIC BAY (JULY 22-23, 2008), CLYDE RIVER (JULY 18-19, 2008), HALL BEACH (JULY 8-9, 2008), IGLOOLIK (JULY 10-12, 2008) AND POND INLET (JULY 15-17 AND SEPTEMBER 4, 2008). THIS INFORMATION SHOWS PATTERNS OF LAND USE AND LOCAL KNOWLEDGE OF THE LAND. THE MAP IS NOT INTENDED TO BE A COMPLETE REPRESENTATION OF WHAT IS KNOWN.

4. INTERPRETION OF FIGURE 3.13 IN LAND USE REPORT, APPENDIX 4C.

SCALE 40 20 0 40 80 120 160 200 km

BAFFINLAND IRON MINES CORPORATION

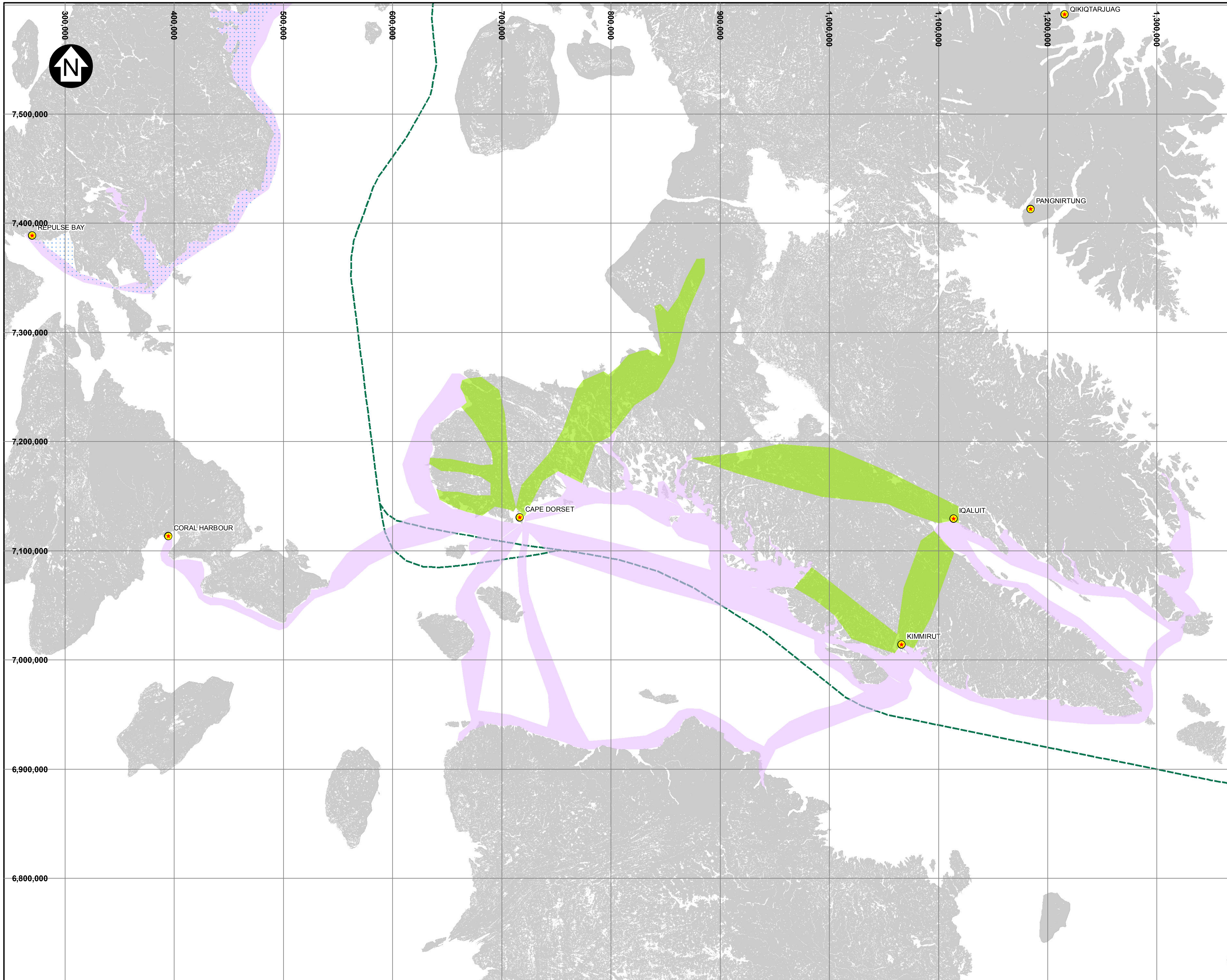
MARY RIVER PROJECT

TRAVEL ROUTES - NORTH BAFFIN REGION (WORKSHOP RESULTS)

Baffinland Iron Mines Corporation

REF NO.	REV
BL_Vol4_GIS_009	0
FIGURE	4-10.4

Figure ID: BL_Vol4_GIS_009 Travel Routes-North Baffin Region (Workshop Results) Figure 4-10.4.mxd



ᑐᑭᓯᔾᔪᑎᑦ
LEGEND:

ᐃᓚᖕᓂᑯᑦ ᐅᒥᐊᕐᔪᐊᓐᓂᑦ ᐊᖁᑕᐅᖃᑦᑕᕐᓂᐊᕐᑐᖅ
NOMINAL SHIPPING ROUTE

ᐅᑭᐅᑯᑦ ᓯᑯ ᐊᖁᑕᐅᑉᐳᑦ
ICE TRAVEL ROUTE

ᓄᓇᑯᕐᔪᖕᓂ ᐊᖁᑕᐅᑉᐳᑦ
LAND TRAVEL ROUTE

ᐅᒥᐊᕐᔪᕐᔪᖕᓂ ᐊᖁᑎᒋᔭᐅᑉᐳᖅ
WATER TRAVEL ROUTE

ᖃᐅᔨᒪᔭᒃᓴᐃᑦ
NOTES:

1. ᓄᓇᖑᐊᓕᐅᐊᑕᐃᑦ: ᑯᐃᓐ ᑲᓇᑕᒧᑦ
   BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA, DEPARTMENT OF NATURAL RESOURCES (2004). ALL RIGHTS RESERVED.

2. ᓄᓇᖑᐊᖅ ᑎᑎᕐᓯᒪᓂᖓ ᒪᓕᒃᑐᖅ UTM (NAD83) ZONE 17 AND IS IN METRES.
   COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.

3. THIS MAP WAS PRODUCED FROM INFORMATION COLLECTED DURING INUIT QAUJIMAJATUQANGIT WORKSHOPS IN THE COMMUNITIES OF KIMMIRUT (JUNE, 2010) AND CAPE DORSET (AUGUST, 2010). THIS INFORMATION SHOWS PATTERNS OF LAND USE AND LOCAL KNOWLEDGE OF THE LAND. THE MAP IS NOT INTENDED TO BE A COMPLETE REPRESENTATION OF WHAT IS KNOWN.

4. INTERPRETION OF FIGURE 6.1 (NB10-00446).

ᐊᖏᓂᖓ
SCALE
35 17.5 0 35 70 105 140 175 km
ᑭᓛᒥᑕ

BAFFINLAND IRON MINES CORPORATION

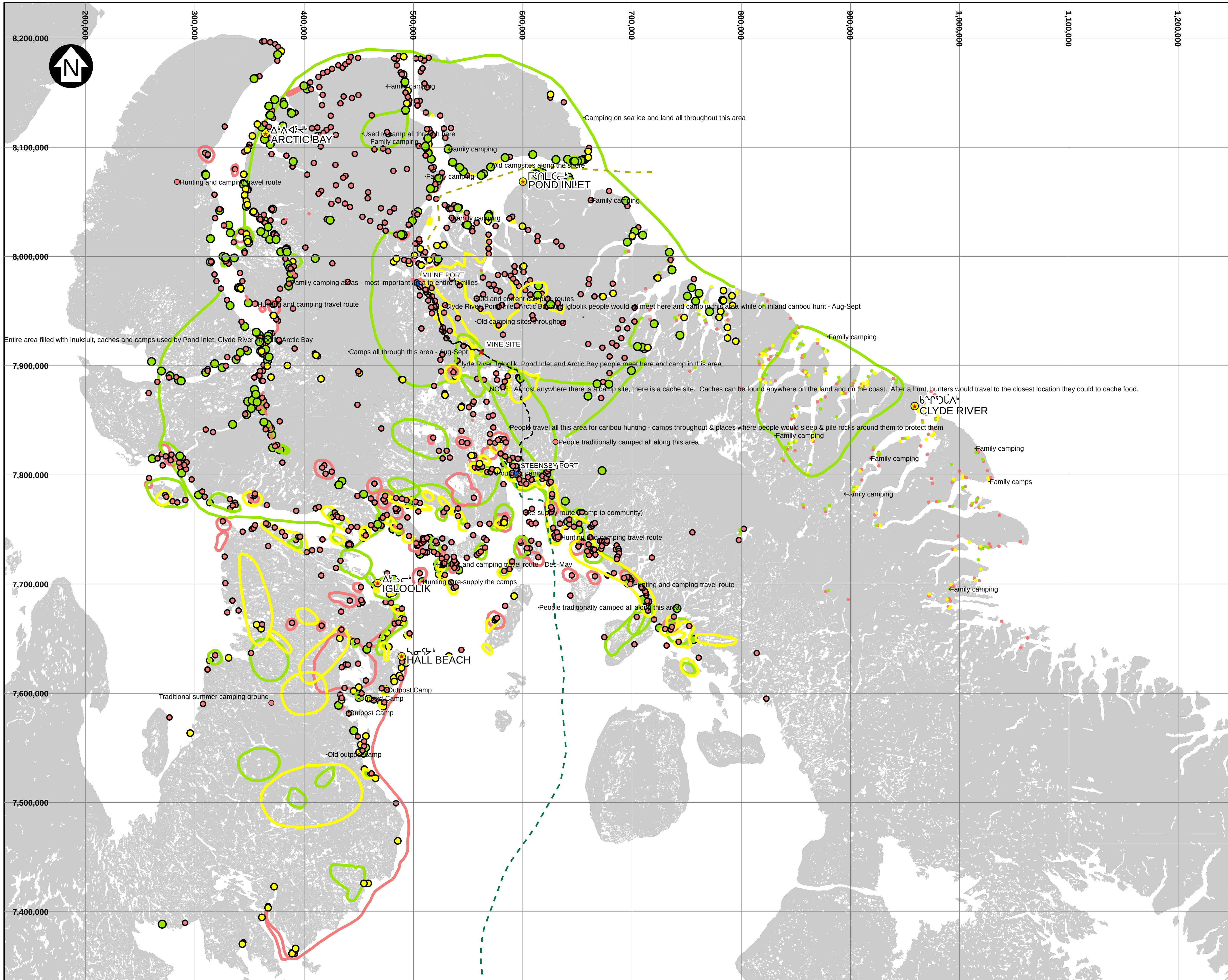
ᓄᓘᔾᔭᓂ ᐅᔭᕋᒃᓯᐅᕐᑐᑦ MARY RIVER PROJECT

TRAVEL ROUTES - SOUTH BAFFIN REGION (WORKSHOP RESULTS)

Baffinland Iron Mines Corporation

REF NO.	REV
BL_Vol4_GIS_010	0
ᑎᑎᖅᐅᔭᕐᓯᒪᔪᖅ FIGURE	4-10.5

Figure ID: BL_Vol4_GIS_0010 Travel Routes-South Baffin Region (Workshop Results) Figure 4-10-5.mxd



ARCTIC BAY
POND INLET
CLYDE RIVER
IGLOOLIK
HALL BEACH
MILNE PORT
MINE SITE
STEENSBY PORT
Family camping
Camping on sea ice and land all throughout this area
Used to camp all through here
Hunting and camping travel route
Old campsites along the shore
Family camping areas - most important area to entire families
Old and current camping routes
Clyde River, Pond Inlet, Arctic Bay and Igloolik people would all meet here and camp in this area while on inland caribou hunt - Aug-Sept
Old camping sites throughout
Entire area filled with Inuksuit, caches and camps used by Pond Inlet, Clyde River, Igloolik, Arctic Bay
Camps all through this area - Aug-Sept
Clyde River, Igloolik, Pond Inlet and Arctic Bay people meet here and camp in this area
NOTE: Almost anywhere there is a camp site, there is a cache site. Caches can be found anywhere on the land and on the coast. After a hunt, hunters would travel to the closest location they could to cache food.
People travel all this area for caribou hunting - camps throughout & places where people would sleep & pile rocks around them to protect them
People traditionally camped all along this area
Family camps
Re-supply route (camp to community)
Hunting and camping travel route - Dec-May
Hunting re-supply the camps
People traditionally camped all along this area
Traditional summer camping ground
Outpost Camp
Old outpost camp
8,200,000
8,100,000
8,000,000
7,900,000
7,800,000
7,700,000
7,600,000
7,500,000
7,400,000
200,000
300,000
400,000
500,000
600,000
700,000
800,000
900,000
1,000,000
1,100,000
1,200,000

LEGEND:

- PLACES THAT YOU HAVE CAMPED IN YOUR LIFETIME
- PLACES THAT YOU KNOW YOUR FAMILY AND FRIENDS HAVE CAMPED IN THE PAST
- CAMPS THAT WERE OCCUPIED SO LONG AGO THAT YOU DON'T KNOW WHO CAMPED THERE
- MILNE INLET TOTE ROAD
- PROPOSED RAILWAY ALIGNMENT
- NOMINAL SHIPPING ROUTE - YEAR-ROUND
- NOMINAL SHIPPING ROUTE - OPEN WATER SHIPPING ONLY

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. THIS MAP WAS PRODUCED FROM INFORMATION COLLECTED DURING INUIT QAUJIMAJATUQANGIT WORKSHOPS IN THE COMMUNITIES OF ARCTIC BAY (JULY 22-23, 2008), CLYDE RIVER (JULY 18-19, 2008), HALL BEACH (JULY 8-9, 2008), IGLOOLIK (JULY 10-12, 2008) AND POND INLET (JULY 15-17 AND SEPTEMBER 4, 2008). THIS INFORMATION SHOWS PATTERNS OF LAND USE AND LOCAL KNOWLEDGE OF THE LAND. THE MAP IS NOT INTENDED TO BE A COMPLETE REPRESENTATION OF WHAT IS KNOWN.

SCALE 35 17.5 0 35 70 105 140 175 km

BAFFINLAND IRON MINES CORPORATION

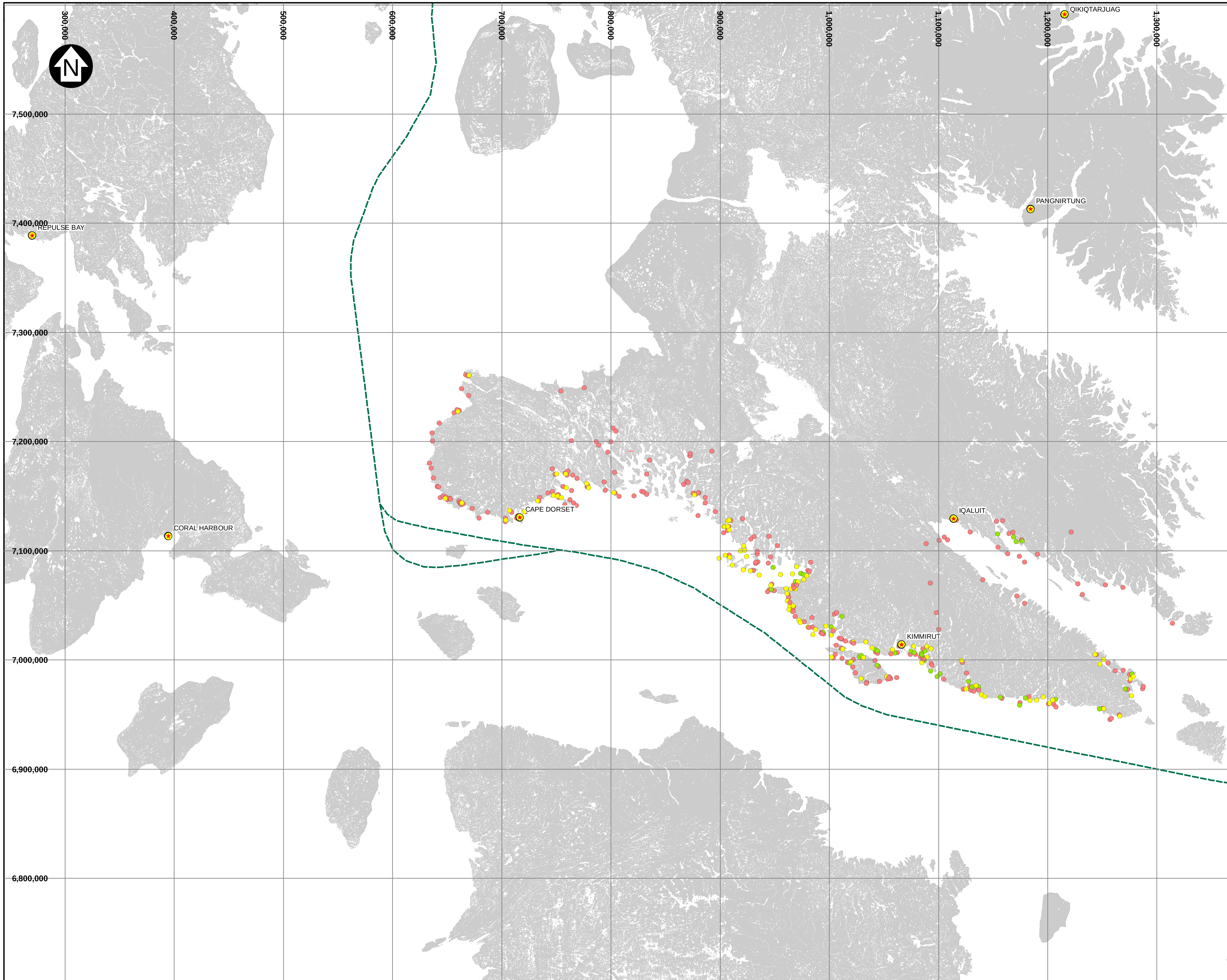
MARY RIVER PROJECT

CAMPING LOCATIONS - NORTH BAFFIN REGION (WORKSHOP RESULTS)

Baffinland Iron Mines Corporation

REF NO.	REV
BL_Vol4_GIS_011	0
FIGURE	4-10.6

Figure ID: BL_Vol4_GIS_011 Camping Locations-North Baffin Reion (Workshop Results) Figure 4-10-6.mxd



ᑐᑭᓯᔾᖓᑦ
LEGEND:

PLACE WHERE WORKSHOP PARTICIPANTS HAVE CAMPED

PLACES WHERE WORKSHOP PARTICIPANTS KNOW THEIR FAMILIES AND FRIENDS HAVE CAMPED

PLACES THAT WERE OCCUPIED SO LONG AGO THAT WORKSHOP PARTICIPANTS DO NOT KNOW WHO CAMPED THERE

ᐃᓚᖏᓐᑯᑦ ᐅᒥᐊᕐᔪᐊᓐᓂᑦ ᐊᖁᑕᐅᖃᑦᑕᕐᓂᐊᕐᑐᖅ
NOMINAL SHIPPING ROUTE

ᖃᐅᔨᒪᔭᒃᓴᐃᑦ
NOTES:

1. ᓄᓇᖑᐊᖅᑐᐊᑕᐃᑦ: ᑯᐃᓐ ᑲᓇᑕᒧᑦ
BASE MAP: © HER MAJESTY THE QUEEN IN RIGHTS OF CANADA, DEPARTMENT OF NATURAL RESOURCES (2004). ALL RIGHTS RESERVED.

2. ᓄᓇᖑᐊᑦ ᑎᑎᕐᓯᒪᓂᖓ ᒪᓕᒃᑐᖅ UTM (NAD83) ZONE 17 AND IS IN METRES.
COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.

3. THIS MAP WAS PRODUCED FROM INFORMATION COLLECTED DURING INUIT QAUJIMAJATUQANGIT WORKSHOPS IN THE COMMUNITIES OF KIMMIRUT (JUNE, 2010) AND CAPE DORSET (AUGUST, 2010). THIS INFORMATION SHOWS PATTERNS OF LAND USE AND LOCAL KNOWLEDGE OF THE LAND. THE MAP IS NOT INTENDED TO BE A COMPLETE REPRESENTATION OF WHAT IS KNOWN.

ᐊᖏᓂᖓ
SCALE
35 17.5 0 35 70 105 140 175 km
ᑭᓛᒥᑕ

BAFFINLAND IRON MINES CORPORATION

ᓄᓘᔭᓂ ᐅᔭᕋᖕᓯᐅᕐᑐᑦ MARY RIVER PROJECT

CAMPING LOCATIONS - SOUTH BAFFIN REGION (WORKSHOP RESULTS)

Baffinland Iron Mines Corporation

REF NO.	REV
BL_Vol4_GIS_012	0
ᑎᑎᕋᐅᔭᕐᓯᒪᔪᖅ FIGURE	4-10.7

Figure ID: BL_Vol4_GIS_012 Camping Locations-South Baffin Region (Workshop Results) Figure 4-10-7.mxd

Travel routes exist on ice, in water, and over land. Ice travel is limited to the landfast ice, which in South Baffin extends only a few kilometres from the coast. North Baffin has important travel routes:

- A route across Steensby Inlet, used by residents from Igloolik and Hall Beach to access inland harvesting locations and by Clyde River residents travelling to Igloolik and Hall Beach;
- A travel route from Pond Inlet through Eclipse Sound into Milne Inlet and through Navy Board Inlet; and
- The Phillips Creek valley, which is used as a guide for inland travel from Milne Inlet.

Although these travel routes have the greatest interaction with the Project, many other travel routes exist within North Baffin, as demonstrated in Figure 3.13 in Appendix 4C. In addition, hunters travel across the land, beyond the main travel routes, in search of caribou.

10.2 ISSUES SCOPING

Baffinland conducted a number of workshops and interviews, and the Mary River Inuit Knowledge Study (MRIKS), to collect baseline information and determine public perceptions and concerns regarding the Project's interaction with land-use activities. Key conclusions from these scoping activities are that:

- Harvesting and hunting are important components of Inuit life in the land-use study area and it is necessary to maintain access for the purpose of hunting;
- Country foods are primary dietary staples for some residents, and adequate access to and maintaining the quality of country foods is considered important; and
- Access to travel routes is also important for maintaining relationships among communities.

On this basis, the Key Indicators for the assessment are wildlife harvesting, travel and camps (which encompasses public safety) in relation to land-use activities. Quotes from residents, which support the identified Key Indicators, are provided below.

> *"We are worried about the effect on the fish and marine animals from contaminants. This will affect Inuit by making our traditional food supplies scarce."*
>
> Participant – Public Meeting Pond Inlet

> *"Our communities are growing. The more people you have, the more people will be hunting. This will affect animal activity; animals tend to move away from areas with lots of activity and hunting. We might have to start hunting in areas further away from town."*
>
> Participant – Hall Beach Marine Mammals Workshop

> *"Our food source comes from country food. The land and the sea is where we get our food from. I am unemployed right now, but I am a hunter. Because I am a hunter, I know I can survive; I can find enough food. The country food from the Arctic is some of the best, healthy food you can have for your body. This is why we want the eastern shipping route. Most people from Hall Beach don't hunt in this area. No matter how careful you are though, the animals will still be affected."*
>
> Participant – Hall Beach Marine Mammals Workshop

> *"Our communities are growing. The more people you have, the more people will be hunting. This will affect animal activity; animals tend to move away from areas with lots of activity and hunting. We might have to start hunting in areas further away from town."*
>
> Participant – Hall Beach Marine Mammals Workshop

"I just don't want to lose our traditional food from the explorations that are carried out in the Arctic. I am also grateful that these explorations are going to bring employment. But it's scary to think that the mining and oil explorations might have an impact on the wildlife that we as Inuit depend on for food."

Participant – Public Meeting Arctic Bay

"Right now we are trying to import caribou meat from other communities because there is no caribou in that area anymore. We people who live in the Arctic need fresh country food, especially raw mammal meat, helps us stay warm. Southern food doesn't do this for you. We tend to be cold when we eat store-bought food."

Participant – Pond Inlet Land-use Workshop

"Because the shipping route area is so well used by hunters, if the shipping is to proceed though Steensby Inlet I recommend that you use the route that goes east of Rowley Island. If you use this route, the area the hunters use will not be affected. From what I know, the animals will never disappear completely."

Participant – Public Meeting Igloolik

"Baffinland needs to understand how important meat sharing is between the communities. If they affect Igloolik waters, it will affect the ability of Igloolik hunters to share meat (especially walrus meat) with us."

Participant – Clyde River Land-use Workshop

"The ship tracks will cause traditional hunting trails to change, as there will be open water where there used to be a dog team/snow machine trail. Baffinland will have to keep in mind that these are areas that hunters use when they design their project."

Participant – Igloolik Marine Mammals Workshop

"The land around Steensby is very hard to travel on, so we have no choice but to go on the ice. When you area pulling a qamutiq you can't travel on the land around those areas. We have to travel on the sea ice. Where the icebreakers are going to disturb the ice, our travel routes will be disturbed."

Participant – Clyde River Land-use Workshop

10.3 SUBJECTS OF NOTE

Harvesting

Harvesting, in this EIS, is mainly focused on wildlife because of the greater amount of concern raised by community residents, and its importance to a large number of Inuit. Other harvesting activities, such as berry-picking, soapstone, and skins are addressed as subjects of note.

Berry Picking

Berry picking, an opportunistic harvesting activity, is conducted in various locations throughout the LSA as defined by the MRIKS. Prominent areas close to Project sites include locations southeast of Steensby Port, southwest of Pond Inlet, and west of the railway (MRIKS). Berry picking is deemed an opportunistic pursuit that is not sought out as the sole harvesting activity and therefore it is not identified as a Key Indicator. The

vegetation impact assessment (Volume 6, Section 3.0) addresses the effect of the Project on berry picking locations. The potential for berries to uptake contaminants from ore dust, causing subsequent human health concerns, was evaluated to be low (Volume 6, Appendix 6G-1 and 6G-2).

Mary River Soapstone

South of the proposed Mine Site is the Mary River soapstone outcrop, protected for Inuit use by the NLCA. During all of the Project phases, Inuit will be able to harvest soapstone. The mining of Deposit #1 concurrent with Inuit excavation of the Mary River soapstone outcrop is a potential interaction. Working in the same area poses a safety concern to both parties. (Public Safety is addressed in section 10.5 of this report). Since 2004, Baffinland has cooperated with Pond Inlet by assisting in the transportation of soapstone rock to the community. Collaboration between Inuit and Baffinland will continue throughout the life of the operations. This issue is will be formally addressed in the IIBA.

Traditional Clothing

Traditional clothing of seal pelts and caribou skins continue to be used by residents in the land-use study area. The harvesting of caribou and sea mammals is addressed in Section 10.4, which is related to Inuit ability to obtain and make traditional clothing.

The current low caribou population in the land-use study area are reflected by the lower production of traditional clothing. This matter was noted at by Pond Inlet Land-use Workshop participants:

> *"I noticed that people aren't travelling as much in the deep winter because people aren't getting caribou to make clothing that would allow them to spend more time out in the winter."*
>
> *"You can't stand out by a seal hole in the winter if you don't have warm clothing, so the lack of caribou affects our ability to hunt other animals in the winter as well."*

This comment demonstrates a potential shift in the use of traditional clothing that is occurring prior to Project development. Results from the impact assessment indicate that Project development is not anticipated to affect the abundance and distribution of caribou in the land-use study area.

Travel and Camps

Travel and Camps is mainly focused on the potential impacts in North Baffin due to the high level of project interaction with land-use activities. Travel and Camps in the South Baffin communities of Cape Dorset and Kimmirut is addressed as a subject of note due to the limited project interaction.

Travel and Camps in Cape Dorset and Kimmirut

The nominal shipping route to and from Steensby Port will pass through Foxe Basin and Hudson Strait, past the South Baffin communities of Cape Dorset and Kimmirut. The frequency of travel equates to one ship roughly every 1.8 days or 43 hours; the frequency will increase during open-water season. In relation to the South Baffin communities of Cape Dorset and Kimmirut the nominal shipping route is located approximately 35 km offshore, as illustrated in Figure 4-10.4. Shipping passage can occur across daytime and night hours. Based on calculations, people can see 11.5 to 13 miles (10 to 12 nautical miles) off shore. Ships should not be visible from the communities of Cape Dorset and Kimmirut.

Hudson Strait is an established shipping route used by other ships and sea-lifts travelling to and from the Port of Churchill. Because of the close proximity of South Baffin travel routes to the coastline, an effect on travel routes is not anticipated.

The current baseline travel conditions indicate that most Inuit travel in Cape Dorset and Kimmirut occurs close to the shore. In winter, snowmobile travel across the landfast ice extends only several kilometres from shore, well removed from shipping activities. Limited travel occurs across Hudson Strait, when individuals travel to South Hampton Island, Nunavik, Mill Island, Salisbury Island, and Nottingham Island. Interaction with ships will be minimal and would occur in Hudson Strait, when ore carriers are en route in the same waters. During the open-water season there is a greater chance of interaction because of increased frequency of travel. Existing levels of ship traffic in Nunavut and Nunavik waters of Hudson Strait between 2002 and 2010 was noted as an average of 108 - 187 vessels each year (Volume 9, Section 1.0).

Camps in South Baffin identified by Cape Dorset and Kimmirut residents are primarily located along the coastline, and no camps were identified at the large islands within Hudson Strait and south of Cape Dorset. The interaction with land-use in South Baffin will be limited to marine-based rather than land-based interactions during the open-water period when hunters infrequently travel beyond the immediate coastline.

Lighting

At Mine Site and Steensby Port lighting will be used as the Company conducts its operations. Lighting will be used at Milne Port primarily during the construction phase and once every couple of years during the open-water sea-lift season during the Operations Phase, when mine staff are present at the Port site. Lighting from the operation will be seen some distance, particularly across Steensby Inlet; lighting from the mine site will be somewhat abated by the undulating terrain. Coupled with the noise, and other sensory insults, this could deter wildlife from feeding in the operational area, until familiarities (habituation) occur.

The combined effects of certain project interactions (noise, dusting, lighting, visual change to the landscape, etc.) could cause some Inuit to avoid the Project area to continue their traditional activities in non-affected areas. Others may find the project effects non-intrusive and prefer interactions with the sites (i.e., lighting as a beacon, and knowledge that the site could provide emergency assistance). During the bulk sample program, Baffinland participated in search and rescue operations in the area and will continue to undertake this into construction and operations.

Lancaster Sound National Marine Conservation Area

The Lancaster Sound National Marine Conservation Area was proposed as a candidate National Marine Conservation Area (NMCA) in 1987, with a feasibility study beginning in late 2010. The feasibility study area extends to the head of Milne Inlet; however the boundary of the NMCA has not yet been determined. National Marine Conservation Areas (NMCA) are marine areas managed for sustainable use and for the protection of the marine environment and species (Parks Canada, 2010a). The NMCAs are governed under the authority of the Canada National Marine Conservation Areas Act (the Act) and regulations specific to each NMCA (Canadian National Marine Conservation Areas Act, 2002). Figure 4-10.8 shows the study area for the feasibility study.

The disposal of any substance in the waters of a NMCA is not permitted except under authorization of an applicable permit pursuant under the authority of the Act or the Canadian Environmental Protection Act (1999). There will be no discharge related to Project operations into the waters of Milne Inlet so additional permits will not be required should a Lancaster Sound NMCA be declared and extend to the head of Milne

Inlet. Discharges arising from the construction camp will occur during construction so permits would be required if the NMCA is declared during that phase.

Use of aircraft and speed of vessels are regulated under the Act in subsection 16(1)(j) and subsection 19, respectively. Aircraft will not arrive at the Milne airstrip under normal operations, and shipping in and out of the Port and around Milne Inlet and Eclipse Sound will be limited to infrequent sea-lifts once every couple of years (refer to Project Description Volume 3).

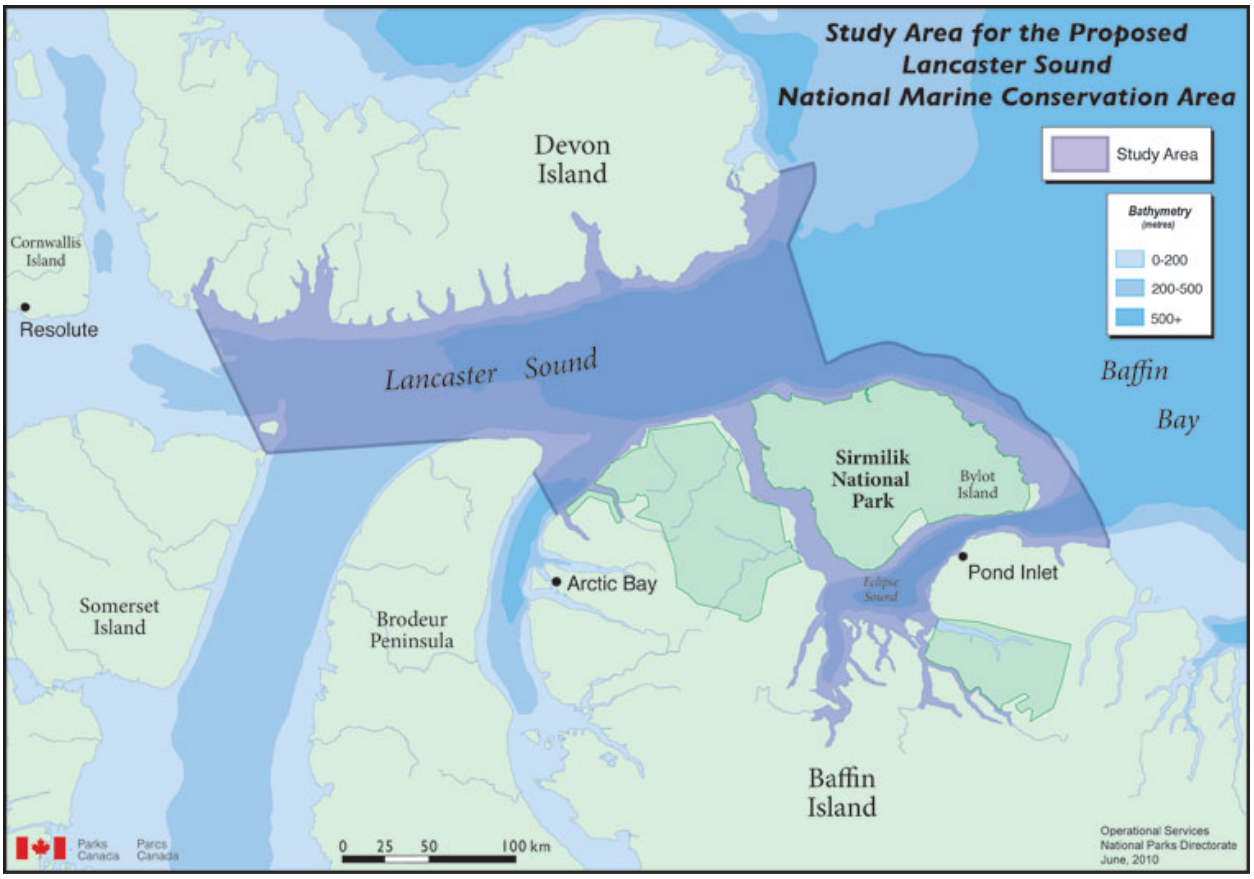


Figure 4-10.8 Study Area for the Proposed Lancaster Sound National Marine Conservation Area (from Parks Canada, 2010b)

Several sections of the *Act* have been identified as potentially relevant to Baffinland's proposal and the implication of project activities for the proposed establishment of the Lancaster Sound NMCA. These include:

> *Subsection 8(3) The Minister may maintain and operate facilities and carry out operations and activities to achieve the purposes of this Act, and may conduct scientific research and monitoring and carry out studies based on traditional ecological knowledge, including traditional aboriginal ecological knowledge, in relation to marine conservation areas.*

In preparing the baseline studies and the impact assessments for their proposal, Baffinland has undertaken various studies including traditional aboriginal knowledge and scientific research. These studies and any

future Project-related monitoring that overlap the candidate Lancaster Sound NMCA study area will likely contribute positively to the existing body of knowledge.

> *Subsection 9(1) The Minister shall, within five years after a marine conservation area is established, in consultation with relevant federal and provincial ministers and agencies, with affected coastal communities, aboriginal organizations, aboriginal governments and bodies established under the land claims agreements, and with other persons and bodies that the Minister considers appropriate, prepare a management plan for the marine conservation area that includes a long-term ecological vision for the marine conservation area and provision for ecosystem protection, human use, zoning, public awareness and performance evaluation, which shall be tabled in each House of Parliament.*
>
> *Subsection 10(1) The Minister shall consult with relevant federal and provincial ministers and agencies, with affected coastal communities, aboriginal organizations, aboriginal governments and bodies established under land claims agreements, and with other persons and bodies that the Minister considers appropriate in the development of marine conservation area policy and regulations, the establishment of any proposed marine conservation area and the modification of any marine conservation area, and any other matters that the Minister considers appropriate.*

The management plan prescribed the proposed establishment of the Lancaster Sound NMCA may include Project-related uses, and Baffinland may be identified as an appropriate body for consultation in the preparation of the management plan, as well as policies and regulations, as a potentially affected stakeholder.

> *Subsection 14(1) No person shall dispose of any substance in waters within a marine conservation area except as authorized by a permit issued by a superintendent pursuant to this Act or, in the case of waters to which subsection 125(1) of the Canadian Environmental Protection Act, 1999 applies, authorized by section 130 of that Act or by a permit issued by the Minister of the Environment pursuant to section 127 or 128 of that Act.*

The Project will involve the discharge of treated sewage effluent from vessels and treated stormwater and run off from ore stockpiles in accordance with the terms of a future water licence that will be required from the Nunavut Water Board. In addition, discharge of ballast water will occur. Ballast water discharge will be carried out in accordance with applicable regulations that will be set out by Transport Canada. If the Lancaster Sound NMCA extends to the head of Milne Inlet it is possible that additional permits might be required to discharge ballast water or treated effluent into the waters of Milne Inlet.

> *Subsection 16(1)(j) for the control of the flight of aircraft to prevent danger or disturbances to wildlife and wildlife habitat, and respecting the takeoff, landing and taxiing of aircraft.*

The establishment of the Lancaster Sound NMCA and subsequently the *Act* and associated regulations may potentially limit aircraft use at the Milne airstrip.

> *Subsection 16(1)(k) for the control of scientific research activities.*

The *Act* and associated regulations that would come into effect following the potential establishment of the Lancaster Sound NMCA may limit or impede proposed monitoring of the marine environment under the Shipping and Marine Mammals Management Plan (Volume 10, Appendix 10D-10).

Regulations under the *Act* are developed separately for each NMCA. As an example of potential implications of the development of the Lancaster Sound National Marine Conservation Area, the *Marine Activities in the Saguenay-St. Lawrence Marine Park Regulations* were reviewed. Section 3(c) of these regulations indicates that only sections 14 and 19 apply to cargo ships.

> *Subsection 14(1) No person shall engage in behaviour in the park that may kill or injure a marine mammal or cause the disturbance of a marine mammal.*
>
> *Subsection 14(2) The operator of a vessel that is involved in an accident in which a marine mammal is killed or injured or that collides with a marine mammal shall report the incident immediately to a park warden or an enforcement officer.*

The marine impact assessment (Volume 8) indicated that no mortality or injury of marine mammals is expected to occur as a result of the Project in the candidate Lancaster Sound NMCA study area. Although the assessment noted potential disturbances to marine mammals from Project-related activities, the disturbances fall within acceptable thresholds and are deemed as not significant.

Baffinland will report the mortality or injury of marine mammals in accordance to the Shipping and Marine Mammals Management Plan (Volume 10, Appendix 10D-10) and any laws to which Baffinland is required to adhere.

> *Subsection 19 Subject to section 20, no person shall operate a vessel in the park at a speed greater than 25 knots.*

The maximum speed of vessels used in the operation of the mine will be 18.5 knots, which is below the mandated maximum speed. Tugs will be located at Milne Port.

10.4 WILDLIFE HARVESTING BY INUIT

10.4.1 Assessment Methods

Harvesting is assessed based on the following question:

- Will the Project affect the ability of hunters to obtain/harvest country food in the LSA?

Change in Harvest Quantity per Level of Effort

The theoretically measurable parameter used to assess the magnitude of change (either positive or negative) to the amount of country food harvested by local communities is:

- Harvest quantity per level of effort - measured by number of harvests by species, or total quantity (i.e., weight) of country food obtained, in relation to an estimated level of effort (amount of time spent hunting).

Magnitude - Change in Harvest Quantity per Level of Effort (kg country food/day hunting)

Low	≤1 % change in harvest quantity per level of effort
Moderate	>1 % <10 % change in harvest quantity per level of effort
High	≥10 % change in harvest quantity per level of effort

Baseline data regarding harvest quantity per level of effort is unavailable. In order to measure the effect of the project a percentage change will be used.

Theoretically applied, at the proposed levels, changes of 5 % (moderate) is thought would be noticeable by the community, and potentially affecting the Human Health and Well-being VSEC (Section 6.0) (including food security). Changes equal to and greater than 10 % (high) would be noticeable to the community and affecting the Human Health and Well-being VSEC (Section 6.0).

Using the "per level of effort" component in the measureable parameter eliminates issues relating to an individual's ability to hunt due to other commitments such as holding a full-time job at Mary River. Because the level of effort is included in calculating the quantity of harvests, a full-time hunter can be equally compared to a weekend or an off-shift hunter.

10.4.2 Potential Effects and Proposed Mitigation

Important Harvesting Areas in the Study Area

Various harvesting areas in the Study area are of importance to Inuit residents of northern and southern Baffin Island for a number of reasons. Assigning relative importance of harvesting areas is difficult, however the following analysis can be provided:

- One important marine harvest area for Pond Inlet is at the floe edge at the entrance to Pond Inlet during the period of mainly April through June each year. As noted in Section 10.4.2, ships will not be sailing to Milne Port during this period.
- Harvesting of narwhal during open-water occurs throughout Pond Inlet, Eclipse Sound and Milne Inlet.
- Koluktoo Bay in Milne Inlet is recognized as an important summer habitat for narwhal, but harvesting does not appear to be concentrated in this location, and it is expected this is due to the large distance from the community.
- Harvesting close to the community is important because the cost increases with. Potential to affect these important harvesting areas is discussed in Section 10.4.

Changes to the Amount of Country Food Harvested

There are a number of potential effects of the Project that could result in a change (beneficial or adverse) to the amount of country food harvested:

- Effect 1 - Potential effects on harvesting caribou;
- Effect 2 - Potential effects on harvesting marine mammals; and
- Effect 3 - Potential effects on harvesting Arctic char.

Effect 1: Caribou Harvesting

Three Project effects on caribou have been identified (Volume 6, Section 5.0). These include a reduced habitat effectiveness zone in the Zone of Influence (ZOI) due to sensory disturbances, factors affecting caribou movement, and collisions leading to caribou mortality.

Residual effects relating to habitat reduction, movement, and potential mortality are identified. Habitat within the PDA of the project is a residual effect, as Baffinland does not expect habitat to be reclaimed within a generation of caribou. Sensory disturbances have also been identified as residual effects of project activities and are expected to last the life of the Project or until caribou become accustomed to them. Caribou may experience a barrier to movement on five known trails (Volume 6, Section 5.0).

Although the assessment concluded that the Project will have residual effects on the habitat, movement and mortality of caribou, the effects are deemed to be not significant (Volume 6, Section 5.0).

The caribou assessment noted that there will not be a detectable change to the abundance and distribution of caribou as a result of the Project. Therefore, Inuit harvesting of caribou is not expected to be affected by changes in the abundance and distribution of caribou.

Mortality from collisions is possible, but thought to be unlikely and restricted to individuals, particularly over the time horizon of the Project when caribou are expected to remain in low numbers. However, mortality from collisions has the potential of a low magnitude adverse effect on the harvesting of caribou.

Mitigation measures identified to limit the effect on Inuit caribou harvesting include the company policy prohibiting non-Inuit and Inuit workers from harvesting while on Project sites.

Effect 2: Marine Mammal Harvesting

The marine mammal impact assessment in Volume 8, Section 5.0, predicted residual effects to marine mammals including ringed seal, walrus, beluga whale, narwhal, bowhead whale, and polar bear. The effects are predicted to be not significant (Volume 8, Section 5.0).

To focus the assessment of Inuit harvesting of marine mammals four key issues have been identified:

- Harvesting of narwhal by Pond Inlet;
- Harvesting of beluga and walrus in Foxe Basin by Igloolik and Hall Beach;
- Harvesting of narwhal and beluga in Hudson Strait by Cape Dorset and Kimmirut; and
- Harvesting of ringed seal in Steensby Inlet on landfast ice.

Project employees will not be permitted to harvest marine mammals while on Project sites as per company policy to limit the Project's effects on Inuit harvesting of marine mammals.

Harvesting of Narwhal by Pond Inlet Residents

Narwhal are commonly harvested by Pond Inlet residents. Harvest data (Priest and Usher, 2004) suggests that narwhal harvesting is carried out within Milne Inlet, and throughout Eclipse Sound and Pond Inlet, including the floe edge at Pond Inlet (Figure 4-10.2). The marine mammal impact assessment (Volume 8) focuses mainly on the movement of ships in and out of Milne Inlet during summer, when narwhal are present in large numbers. Vessel movements through Eclipse Sound into Milne Inlet will be most frequent during the construction phase, with only occasional sea-lifts during operations.

Mortality of narwhal as a result of the Project is not expected, and minimal effects on habitat are predicted. Changes to distribution of narwhal are not expected because of the minimal shipping activities at Milne Port. Population level effects are not anticipated. Aerial surveys carried out during shipping of the bulk sample documented the movements of large groups of narwhal between various areas of Eclipse Sound and surrounding fjords, and could not detect a change in movement patterns that could be attributed to the ship presence. Since disturbance effects at Milne Inlet are expected to be modest, harvesting of narwhal is not expected to be meaningfully affected.

Harvesting of Beluga and Walrus in Foxe Basin by Igloolik and Hall Beach Residents

Beluga and walrus are the main larger marine mammal species hunted in Northern Foxe Basin. Beluga and walrus mortalities as a result of Project related activities are not expected. Habitat change of both species is predicted to be of low magnitude and confined to the local study area (Volume 8, Section 5.0).

Changes to the distribution of walrus as a result of disturbances related to Project activities are not anticipated; these harvesting of walrus in Foxe Basin is not anticipated to be affected.

Changes to the distribution of beluga in Foxe Basin are variable in that belugas' response to shipping varies from avoidance of the area or ignoring the disturbance. The assessment predicted that belugas would avoid ore carriers during the open-water season along nominal shipping route by 6 to 7 km, depending on the vessel location and speed. Belugas have been noted to respond differently to vessels during the ice-cover period. As identified in the marine mammal impact assessment, residents have noted belugas tend to stay near shore when large ships arrive.

As most harvesting activities, according to harvest data and IQ, occurs close to the community and to the west of Rowley Island (Figure 4-10.2) the ships zone of disturbance is distant from these areas. Therefore, the harvesting of beluga and walrus in Foxe Basin by Igloolik and Hall Beach residents is not expected to be significantly affected.

Harvesting of Narwhal and Beluga in Hudson Strait by Cape Dorset and Kimmirut Residents

No mortality of narwhal or beluga is expected as a result of Project activities. Habitat change for both species will be minimally affected in Hudson Strait and the pack ice will quickly move with water currents and wind conditions.

Disturbance of narwhal and beluga in Hudson Strait will occur during ship passage. Disturbance effects are predicted to be of low to medium magnitude (as assessed in the marine mammal impact assessment). Disturbance may result in possible changes in distribution; avoidance of the area around the passing ship may. Based on aerial surveys conducted during April in Hudson Strait, a 15 to 20 km avoidance zone (or 30-40 km swath along the ship track depending on ice conditions) is predicted. Hunting of marine mammals in the communities of Cape Dorset and Kimmirut is concentrated in areas along the shore and the floe edge (Figure 4-10.3). The distance of main harvesting locations from the nominal shipping route indicates that harvesting is not expected to be affected.

Harvesting of Ringed Seal in Steensby Inlet on Landfast Ice

Ringed seal are ubiquitous through the region, and are hunted from landfast ice as well as open-water. Most harvesting occurs near the communities, although it is expected to occur on the landfast ice at Steensby Inlet as an opportunistic activity engaged in while Inuit are out on the land.

Ringed seal mortalities in the area are possible from collisions with icebreaking vessels. Mortality will be limited because seals will likely avoid broken ice, since it will not be provide suitable conditions for developing breathing holes and, more important, lairs for birthing (Volume 8, Section 5.0). Seal pups are more vulnerable to mortality due to collision particularly while out of the lairs. It is expected that mortalities will occur; however, it will have a negligible and non-measureable effect on the population.

Habitat in Steensby Inlet will be slightly altered by port traffic. The level of habitat change is not deemed significant and the decrease of suitable pupping habitat is below the 10 % threshold (Volume 8, Section 5.6).

Some temporary avoidance of locations with increases in project specific activities will occur. However, it is predicted not to have a long term negative effect on ringed seals. Monitoring will occur to accurately measure changes.

Effects to ringed seals in Steensby Inlet are limited and since Steensby Inlet is not the main location for harvesting, the effect on harvesting is considered to be negligible.

Conclusion on Marine Mammal Harvesting in the Land-use Study Area

Considering the results of marine mammal impact assessment (Volume 8, Section 5.0), it is predicted that the Project will have a negligible effect on marine mammal harvesting. Residual effects on harvesting are not anticipated, and therefore there is no residual effect carried forth to the significance evaluation.

As a precautionary measure, Baffinland will undertake a monitoring program and an adaptive management plan as described in the Shipping and Marine Mammals Management Plan (Volume 10, Appendix 10D-10). Where effects to marine mammals result in limitations to harvesting, compensation agreed upon within the IIBA will be provided.

Effect 3: Fish Harvesting

Sea run or anadromous Arctic char are targeted for harvesting by Inuit, mostly around the communities. Harvesting of fish appears to be a secondary activity when hunters are out on the land hunting or travelling. Near the Project, sea-run Arctic char are present in Cockburn Lake adjacent to the railway, the lower lakes of the Ipikitturjuaq system adjacent to Steensby Port, and in coastal waters of Steensby and Milne Inlets. Landlocked char are found throughout the Mary River area, along the northern part of the Railway, and within the Phillips Creek watershed next to the road.

The freshwater and marine biota and habitat impact assessments (Volume 7, Section 4.0 and Volume 8, Section 4.0, respectively) have predicted that the Project will have no significant residual adverse effects on arctic char or their habitat. Some activities will require compensation pursuant to sections 35(1) and 35(2) of the *Fisheries Act*. The Project may result in the mortality of juvenile char (landlocked population) in the Mine Site LSA due to stream diversions. There is low certainty that this effect will occur, and is not expected to have a detectable change in the landlocked char population in the Mine Site LSA (Volume 7, Section 4.0). Additionally, fishing by workers (non-Inuit and Inuit) is prohibited by Baffinland policy.

The Project will have a negligible effect on fish harvesting therefore there is no residual effect.

10.4.3 Assessment of Residual Effects

The residual effects of the quantity of caribou and marine mammals harvested per level of effort are provided in the table 4-10.1 below. Residual effects on caribou harvesting will occur due to potential mortality from collisions, and therefore has been evaluated for significance. Effects on all other harvesting were predicted to be negligible.

Table 4-10.1 Effects Assessment Summary for Harvesting

Key Indicator: Harvesting	
VSEC: Land-use	
Effect	**Quantity of Caribou Harvested per Level of Effort**
Direction	Negative
Geographical Extent	Smaller Communities
Social Extent	Hunters; Family
Equity	Bystanders
Magnitude	Low
Frequency	Infrequent
Duration	Medium Term

Table 4-10.1 Effects Assessment Summary for Harvesting (Cont'd)

Key Indicator: Harvesting	
VSEC: Land-use	
Effect	**Quantity of Caribou Harvested per Level of Effort**
Reversibility	Irreversible
Significance of Adverse Effect	Not Significant
Probability of Effect Occurring	Low

Inuit caribou hunters frequenting the Mary River area would have travelled hundreds of kilometres to reach the area (Volume 6, Appendix 6F). The potential habitat reduction is 1.9 % of the entire range area; if caribou avoid the immediate zone of influence, they will still be located in the habitat area known and frequented by Inuit. The amount of effect required to find caribou will be similar to existing hunting patterns.

As noted in Volume 6, Section 5.0, collision mortality of caribou may occur but is expected to have an undetectable effect. Therefore, effects on caribou harvesting was rated low magnitude, and is not significant.

The effect of loss of hunting opportunity as a result of animal collisions and habitat reduction is rated not significant because the area where collisions may occur in relation to caribou range area is small. The number of animal collisions is expected to be low enough not to affect the caribou population. Therefore, a not significant effect of less than 1 % magnitude change in the quantity of caribou harvested per level of effort is anticipated.

Significance Determination

Based on the low magnitude and infrequent frequency of collision mortality of caribou resulting from the Project, the effect on quantity of caribou harvested per level of effect is assessed to be not significant.

10.4.4 Prediction Confidence and Risk Analysis

The prediction confidence of the assessments from the caribou impact assessment and the marine mammal impact assessment is moderate. In the assessment of the change of quantity of country food harvested per level of effort the prediction confidence based on available information is high.

10.4.5 Follow-up

Follow-up will include reporting to local HTOs and responsible government authorities any caribou and marine wildlife mortality as a result of the Project. The Shipping and Marine Mammals Management Plan (Volume 10, Appendix 10D-10) outlines the Company's plans to monitor marine wildlife and its Terrestrial Environment Management Plan (Volume 10, Appendix 10D-11) outlines plans to monitor caribou and other terrestrial wildlife. A monitoring plan will be established to monitor the effects of ship traffic noise on marine mammals. Salvageable animal carcasses will be retrieved for consumption or provided to Inuit for traditional activities, if permitted.

10.5 TRAVEL AND CAMPS

10.5.1 Assessment Methods

Land-use activities such as travel and camps are variable and difficult to quantify and therefore changes are difficult to measure. Thus the assessment of the effects of the Project on land-use activities is qualitative. The rating for the magnitude of the effect on land-use activities focuses on descriptive ratings as follows:

Low	Project results in changes but does not meaningfully impair land-use
Moderate	Project impairs but does not remove land-use activity opportunities
High	Project results in the complete removal of a land-use activity, with no reasonable alternatives

10.5.2 Potential Effects and Proposed Mitigation

North Baffin

Milne Port, Eclipse Sound and Pond Inlet

Milne Port will be used during the construction phase to provide construction material and approximately once every few years during the Operation Phase to supply the Mine Site with required equipment. The shipping route will be through Eclipse Sound and Pond Inlet, passing the community of Pond Inlet.

Eclipse Sound and Pond Inlet are used for hunting and for travel in the open-water season, when shipping by ore carriers will occur at the Milne Port. The ships could interact with other boats travelling in the area. No shipping will occur out of Milne Port during the ice season, thus there will be no interactions with travellers.

Project-related shipping through Pond Inlet to Milne Inlet is not expected to meaningfully affect use of the open water by hunters in boats, although vessel sightings will occur. Vessels will generally stay within the middle of Pond Inlet and Eclipse Sound, staying away from the coastline. It is expected that hunters in boats will remain closer to the coast in most instances. This is particularly expected to be the case during bad weather. Although the ships will not affect people's ability to travel, public safety interactions will exist, but will be mitigated by community public safety awareness campaigns, informing the community of vessel movements, tracking the route and timing of passage, and by periodic public meetings and information sessions. These information sessions will provide opportunities to discuss issues related to travel safety.

Milne Inlet, including the port area, is accessible by snowmobile on the landfast ice and by water, and is both a camping destination and part of the inland route connecting North Baffin Island communities. For example, the Milne Port area is used by residents of Pond Inlet and Arctic Bay when travelling inland or visiting other communities.

Milne Port will remain an industrial site that will be off limits to land-users during the construction phase and during times of notable mine related activity, including during the arrival of mine materials in the Operation Phase. To ensure the safety of land-users the boundary will be clearly marked with appropriate signage. All Project sites are considered industrial sites where the safety of individuals will be the utmost priority; travelers passing through Milne Port en route to Milne Inlet Tote Road during the construction phase will be encouraged to check in at the main office to indicate their presence and inform staff of future travel plans.

They will be welcomed to the site and invited for a meal prior to continuing on their journey. There will be no restrictions on travel outside the designated industrial area.

Authorized visitors will be required to check in and sign in at the main office and will undergo introductory safety training; following safety procedures, they will be escorted when entering the site.

Some camp locations have been identified along the coast of Milne Inlet. Generally, the beach area at the head of the inlet, the location of the current camp and the proposed port, is used for camping. The main area is at the eastern edge of the beach, which is not part of the port facility. Camping will still be possible. Noise modeling contour plots in Volume 5 Figures 5-3.7 and 5-3.8 indicate that noise levels at the main camping area will be above 40.0 dBA but below 45.0 dBA in summer and below 40 dBA in winter. This falls below the established thresholds and is typical to the background noise level in a library (at 40.0 dBA) or in an office with HVAC (at 45.0 dBA).

Air quality modelling predicted that particulate matter ($PM_{2.5}$ and PM_{10}) would be below indicator thresholds several hundred meters beyond of the construction activities and sea-lift operation (Volume 5, Section 2.0).

While the use of the camping area will be impaired somewhat by the presence of the port, the area can continue to be used by Inuit during the life of the Project

Milne Inlet Tote Road

The Milne Inlet Tote Road between the Mine Site and Milne Port will be used during the construction, operation and closure phases of the Project. The road will be used as a transportation link providing supplies to the Mine Site and transporting ore to Milne Port. During the construction phase, approximately 10 trucks will travel Milne Inlet Tote Road each day, year-round. During the Operation Phase road traffic will be reduced to multiple truck loads over a period of several weeks, occurring once every few years, when material shipments arrive at Milne Port.

The Phillips Creek valley is a main travel route for Inuit heading inland from Milne Port. The Tugaat River valley, located to the northeast of the Phillips Creek valley, is also used as a guided route for travelers. Travel in the area around Milne Inlet Tote Road is mainly by snowmobile, and to a lesser degree all-terrain vehicles (ATVs). Pisiksik (pers. comm., 2006) suggests travelers follow the road alignment occasionally because of easier travel; however, snowmobile traffic will also follow parallel routes inland, in part seeking better snow conditions. Inuit travelling on or near the Milne Inlet Tote Road will be mindful of Company traffic and aware of safety guards, and maintenance structures will be placed along the road. The road may pose a public safety concern due to the interaction of mine trucks and land-users. To mitigate these effects and ensure the safety of all users, Baffinland has developed a Roads Management Plan (Volume Appendix 10D-8).

The key components of the plan in relation to the safety of land-users include:

- Speed control and signage;
- Speed limited to 60 km/hr on all project roads;
- Signs warning of hazards and blind road curves or intersections;
- Kilometre markers used to radio in wildlife and non-project individual sightings;
- Vigilance of truck operators for non-project individuals; and
- Reporting of non-project individuals to other drivers and the Superintendent of Sustainable Development.

Mine Site

The Mine Site area, including ancillary facilities (described in Volume 3), is categorized as an industrial site and therefore access with be restricted. The site consists of an open pit, mine haulage roads, run of mine (ROM) ore storage, waste rock stockpiles, crushing and screening units, airstrip, truck and rail loading areas, maintenance shops warehouses and other facilities. Several travel routes pass through the Mine Site; a main travel artery runs approximately 40 km to the south. A cabin located within the Mine Site area was left behind after exploration activities in the 1960s and has since been used by hunters.

Travel through the mine area will be restricted and the cabin will no longer be available. Alternate accommodations are expected to be included in the signed IIBA. Signs will be posted and in some cases fencing will be used to alert individuals to the boundary and inform them of the potential dangers of accessing the Mine Site.

The safety of visitors will be the utmost priority. Harvesters will be encouraged to check in at the main office to indicate their presence and inform staff of future travel plans. They will be welcomed to the site and invited for a meal prior to continuing on their journey. There will be no restrictions on travel outside the designated industrial area.

Public safety of travelers and hunters will continue to be important during post closure. A Preliminary Closure Plan is available in Volume 3, Appendix 3B, Attachment 10. Upon Project commencement an approved Mine Closure Plan will be in place.

The Mine Closure Plan identifies measures Baffinland will take to ensure the Project sites will remain physically stable, chemically stable, safe to the public, and safe for travelling and camping. At the Mine Site, this includes:

- Providing a physical barrier around the open pit;
- Leaving stockpiles at stable slopes;
- Re-grading the Mine Site;
- Taking away buildings and equipment; and
- Re-establishing natural drainage patterns.

Railway

The 149 km railway will connect the Mine Site to Steensby Port. Three trains will each make two round trips for a total of 5 to 6 round trips per day. Each train will consist of two locomotives and 110 to 130 ore cars. Additionally, a train carrying fuel will travel once a week. General freight trains will operate approximately once a week and a passenger train may travel as needed.

Several travel routes cross the proposed railway based on MRIKS (Appendix 4C, Figures 3.13 and 3.14). Most of these routes are used by snowmobiles, but some all-terrain vehicle (ATV) use occurs as well. Workshop participants did not identify any permanent camps along the railway. Pingimajuq Ridge, a reported a historical meeting spot of Inuit from Clyde River, Pond Inlet and Igloolik, is located immediately east of the railway and south of Ravn River (Pisiksik, pers. comm., 2006).

Snowmobile crossings will be possible at most but not all locations during snow cover. The embankment at its lowest will be about 1.5 m (4 feet) above the grade with side slopes at 3 horizontal to one vertical (3H:1V). Representative railway embankment cross-sections are provided in Volume 3, Appendix 3E. The highest embankment is 5 m above grade, but the slopes at these locations are 5H:1V, a very gentle grade.

The embankment slopes along most of the alignment will be blasted rock, which will be large diameter and angular material. While this material is not dissimilar to the local terrain, and with snow cover, will likely be passable with a snowmobile, ATVs may experience difficulties in some locations.

The railway corridor could cause hunters to detour to find a suitable crossing. There is also a safety hazard and the potential for damage when crossing the rail line. To ensure safe crossing several mitigation measures have been identified in the Railway Maintenance Management Plan (Volume 10, Appendix 10D-9.1). These measures include:

- Public education based upon the "Operation Lifesaver" program that will be adapted to Nunavut's specific needs.
- Six locations for safe crossing, in addition to the Ravn River, which can be used in the winter as a safe crossing.

To ensure safety the proposed "snowmobile crossings" at six strategic locations will consist of signage, a surface treatment of finer filled material over the embankments, and wooden timbers next to the steel rails, to prevent ATVs and snowmobiles from getting caught. The location of these crossings will be finalized after consultation with the communities. Discussions of safety aspects in relation to the railway, crossing it, and travel in inclement weather will be included in these consultations. A typical cross-section drawing is presented in Volume 3, Appendix 3E, and a photo is presented as Figure 4-10.9.

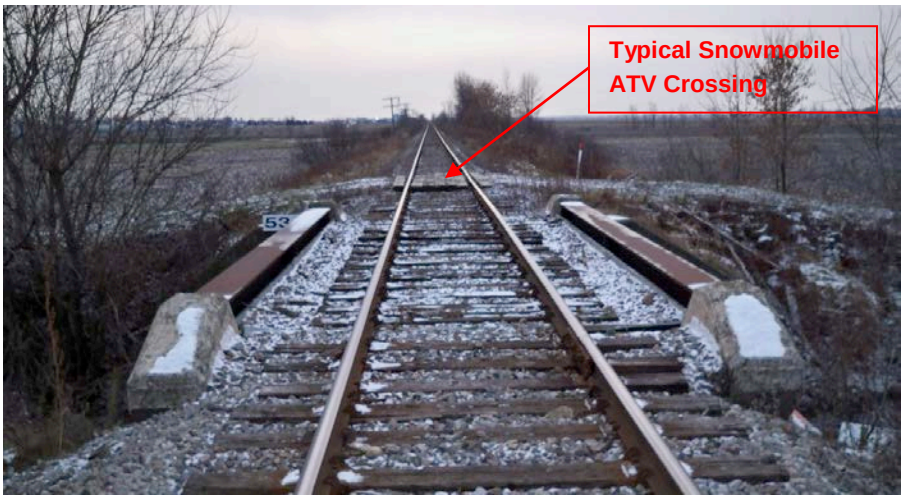


Figure 4-10.9 Cross Section of Snowmobile/ATV Railway

The safety and ease of travel will remain an important aspect post closure. The steel rails, culverts and bridges will be removed, and the railway embankments will be breached to re-establish natural drainage.

Steensby Port and Northern Foxe Basin

Steensby Port is the year-round port for will service the railway operation. Ore carriers will operate out of Steensby Port year-round, with supply ships arriving during the open-water season. The port will receive an average of 12 ore carriers per month during the ice season and up to 17 during the open-water season. Port facilities will be built along the coast of Steensby Inlet as detailed in Volume 3.

Steensby Port is an area actively used for travel across the Inlet by water and landfast ice. The inlet is a part of a main travel route for residents from Clyde River travelling to Igloolik and for residents from Igloolik and Hall Beach who travel inland.

As a result of Project development, direct travel on landfast ice across Steensby Inlet will no longer be possible unless future mitigation measures are developed. Land-use activities will still be possible; however, a detour around the ship's track will be required. To address safe travel across the Steensby Inlet, one mitigation measure proposed is set reflective markers in the ice to identify the ships track and mark out the safest route. The detour is expected to impair travel across Steensby Inlet; however, it will not remove land-use activity opportunities (Figure 4-10.10). Baffinland will explore with the QIA and communities the best measures to ensure safe travel in the vicinity of the ship track. These discussions will include the identification of issues that may be specifically related to traveling in inclement weather.

Compensation for Ship Track Travel Disruption

Baffinland acknowledges that shipping, port activities and rail line operations related to the Project may cause socio-economic effects, for example by potentially affecting Inuit travel. Mitigation measures to offset the inconvenience or hardship created by such changes include:

- Providing fuel to offset the additional costs for traveling around the Steensby Port site and associated shipping route.
- Providing food and shelter at Project facilities.

The potential for additional mitigation response, agreed to through processes that may be defined through the signed IIBA negotiated with QIA, is also acknowledged.

Camp areas are located along the coast of Steensby, Inlet including near the proposed Port area. The camp sites at Steensby Port have been identified as places that workshop participants have stayed in during their lifetime. While the immediate area of the potential development area will be restricted, camping will be allowed at areas beyond. All visitors will be welcomed at the Port site, which will provide a "safe harbour" for Inuit travelling in the area. Baffinland will be able to assist travelers in the immediate area in the event of an emergency.

10.5.3 Assessment of Residual Effects

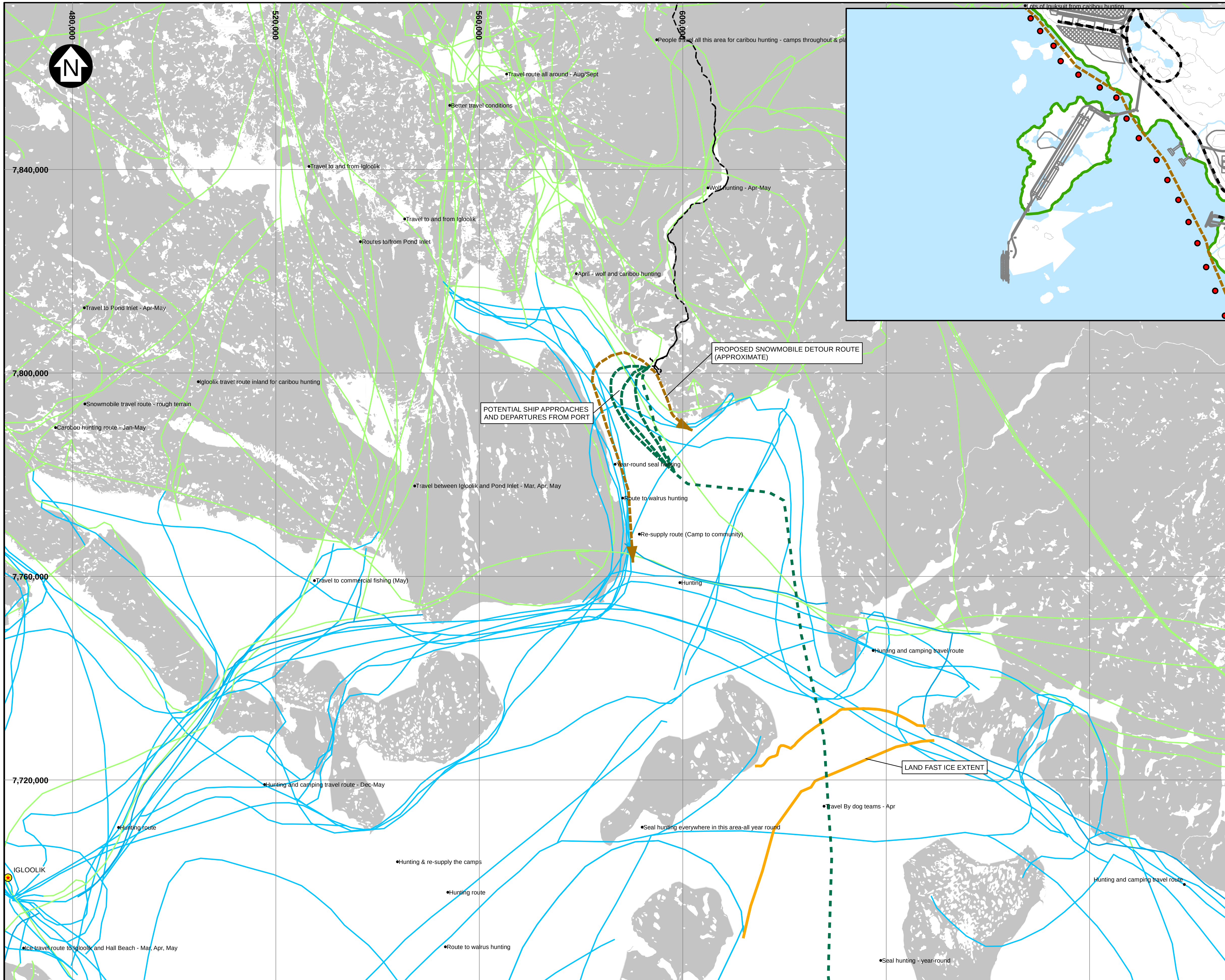
The residual effects of the Project on travel and camping are assessed in the following section and in Table 4-10.2.

Component Assessment: Safe Travel around Eclipse Sound and Pond Inlet

Travellers through and around Eclipse Sound and Pond Inlet could be negatively affected when boaters share the water with shipping to and from Milne Inlet. The boater/vessel effect is determined to be of low magnitude and infrequent, as ore carriers will only ship out of Milne Port during the open-water season. As a result of mitigation measures identified in Section 10.5.2 and based on low magnitude and infrequent frequency ratings, the Project's effect on safe travel around Eclipse Sound and Pond Inlet is assessed to be not significant.

Component Assessment: Safe Travel through Milne Port

The development of facilities at Milne Port affects the ability of Inuit travellers and hunters to freely and safely travel inland. The effect has been assessed to be negative, on baseline conditions. The residual effect is assessed to be low in magnitude and not significant due to mitigation measures.



ᑐᑭᒥᔭᕐᑦ
LEGEND:

- ᓄᓇᑯᕐᓘᓂ ᐊᕐᑯᑕᐅᕙᒃᑐᑦ LAND TRAVEL ROUTE
- ᐅᑭᐅᑯᑦ ᓯᑯ ᐊᕐᑯᑕᐅᕙᒃᑐ ICE TRAVE ROUTE
- ᕿᖑᐊᓂ ᐊᖅᑯᑎ ᐅᓯᒃᑲᑦᕕᒃ MILNE INLET TOTE ROAD
- ᓄᓇᓯᐅᑎᑯᑕᒃ ᐊᕐᑯᑎᒋᓂᐊᕐᑕᖓ PROPOSED RAILWAY ALIGNMENT
- ᐃᓚᖓᓂᑯᑦ ᐅᒥᐊᕐᔪᐊᓐᓂᑦ ᐊᕐᑯᑕᐅᖃᑦᑕᕐᓂᐊᕐᑐᖅ NOMINAL SHIPPING ROUTE
- INFRASTRUCTURE
- LAND FAST ICE EXTENT
- PROPOSED SNOWMOBILE DETOUR ROUTE
- TRAIL MARKERS

ᖃᐅᔨᒪᔭᒃᓴᐃᑦ
NOTES:

1. ᓄᓇᖑᐊᓕᐅᕐᑕᐃᑦ: ᑯᐃᓐ ᑲᓇᑕᒥᑦ

2. ᓄᓇᖑᐊᕐ ᑎᑎᕐᓯᒪᓂᖓ ᒪᓕUTM (NAD83) ZONE 17 AND IS IN METRES.
COORDINATE GRID IS SHOWN IN UTM (NAD83) ZONE 17 AND IS IN METRES.
3. ᐅᓇ ᓄᓇᖑᐊᖅ ᐊᕿᕐᑕᐅᓚᐅᕐᓯᒪᔪᖅ ᐃᓄᐃᑦ ᖃᐅᔨᒪᔾᔪᑎᖏᓐᓂᒃ ᑲᑎᒪᔪᑎᖃᕐᓗᑎᒃ ᖃᐅᔨᔭᐅᓂᑯᖏᓐᓂᒃ ᑲᑎᒪᑎᓗᒋᑦ ᐃᒃᐱᐊᕐᔪᖕᒥ (ᔪᓚᐃ 22-23, 2008), ᑲᖏᕐᓗᒐᐱᒃ (ᔪᓚᐃ 18-19,2008), ᓴᓂᕋᔭᖕᒥ 9ᔪᓚᐃ ᓐ%ᓪ, ᐢᔾᔾᓐ0, ᐃᒡᓗᓕᖕᒥ (ᔪᓚᐃ 10-12, 2008), ᐊᒻᒪ ᒥᑎᒪᑕᓕᒃ (ᔪᓚᐃ 15-17 ᐊᒻᒪ ᓯᑎᐱᕆ 4, 2008). ᒪᓇ ᖃᐅᔨᔭᐅᓂᑯ ᖃᐅᔨᑲᐅᑕᐅᔪᓇᕐᑐᖅ ᓄᓇ ᖃᓄᑎᒋ ᐊᑐᕐᑕᐅᕙᖕᓂᖓᓐᓂᒃ ᐊᒻᒪ ᐃᓄᐃᑦ ᖃᓄᑎᒋ ᖃᐅᔨᒪᓂᕐᖏᓐᓂᒃ ᓇᓗᓇᐃᕐᓯᔪᑕᐅᓗᓐᓂ. ᒪᓇ ᓄᓇᒍᐊᖅ ᑕᒪᐃᓂᒃ ᖃᐅᔨᑲᐅᑕᔪᓇᕐᑐᖅ ᑭᓯᐊᓂᓕ ᖃᐅᔨᒪᔭᐅᔪᓂᒃ ᓇᓗᓇᐃᕐᓯᔪᑕᐅᔪᖅ.
THIS MAP WAS PRODUCED FROM INFORMATION COLLECTED DURING INUIT QAUJIMAJATUQANGIT WORKSHOPS IN THE COMMUNITIES OF ARCTIC BAY (JULY 22-23, 2008), CLYDE RIVER (JULY 18-19, 2008), HALL BEACH (JULY 8-9, 2008), IGLOOLIK (JULY 10-12, 2008) AND POND INLET (JULY 15-17 AND SEPTEMBER 4, 2008). THIS INFORMATION SHOWS PATTERNS OF LAND USE AND LOCAL KNOWLEDGE OF THE LAND. THE MAP IS NOT INTENDED TO BE A COMPLETE REPRESENTATION OF WHAT IS KNOWN.

SCALE 10 5 0 10 20 30 40 km

BAFFINLAND IRON MINES CORPORATION

MARY RIVER PROJECT

POTENTIAL DETOUR AROUND SHIP TRACKS IN STEENSBY INLET

Baffinland Iron Mines Corporation

REF NO. BL_Vol4_GIS_012

FIGURE 4-10.10 REV 0

Figure ID: BL_Vol4_GIS_013 Potencial Detour Around Ship Tracks in Steensby Inlet Figure 4-10-10.mxd

Table 4-10.2 Effects Assessment Summary for Travel and Camps

Key Indicator: Travel and Camps									
VSEC: Resources and Land-use									
Effect	**Safe Travel around Eclipse Sound and Pond Inlet**	**Safe Travel through Milne Port**	**Emissions and Noise Disruption at Camps**	**Sensory Disturbances and Safety along Milne Inlet Tote Road**	**Detour around Mine Site for Safety and Travel**	**HTO Cabin Closure**	**Difficulty and Safety relating to Railway Crossing**	**Detour around Steensby Port**	**Restriction of Camping Locations around Steensby Port**
Direction	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative	Negative
Geographical Extent	Smaller Communities	Smaller Communities	Smaller Communities	Smaller Communities	Smaller Communities	Smaller Communities	Smaller Communities	Smaller Communities	Smaller Communities
Social Extent	Hunters; Family	Hunters; Family	Hunters; Family	Hunters; Family	Hunters; Family	Hunters; Family	Hunters; Family	Hunters; Family	Hunters; Family
Equity	Bystanders	Bystanders	Bystanders	Bystanders	Bystanders	Bystanders	Bystanders	Bystanders	Bystanders
Magnitude	Low	Low	Low	Low	Moderate	Low	Low	High	Moderate
Frequency	Infrequent	Infrequent	Infrequent	Infrequent	Continuous	Continuous	Continuous	Infrequent	Continuous
Duration	Short Term	Short Term	Short Term	Short Term	Long Term	Long Term	Medium Term	Medium Term	Medium Term
Reversibility	Management Required	Management Required	Reversible	Management Required	Irreversible	Management required	Management Required	Management Required	Management Required
Significance of Adverse Effect	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
Probability of Effect Occurring	Low	Low	Low	Low	High	High	High	High	High

Component Assessment: Emission and Noise Disruption at Camps

Although the main camping site at Milne Port will not be affected as a result of Project development, potential noise disruptions will infrequently occur and could be periodically audible at the camp. The noise and air emissions, however, will be within normal thresholds as defined in the noise impact assessment and the air quality impact assessment (Volume 5, Section 3.0, and Volume 5, Section 2.0, respectively). As a result, the residual effect is assessed to be not significant. Based on the low magnitude and infrequent frequency, the effect of the Project is assessed to be not significant.

Component Assessment: Sensory Disturbances and Safety along Milne Inlet Tote Road

There will a visual change to the Milne Inlet Tote Road. The increased use of the road during the construction phase will alter other senses (auditory and olfactory) and heightened safety concerns along the road will have a potential negative effect. The magnitude of the adverse effect is assessed to be low, in that it will not meaningfully impair land-use.

Mitigation measures identified by Baffinland to ensure public safety are referenced in Volume 10. The IIBA will include mechanisms to address any concerns that may arise during each phase of the Project. Taking into account the mitigation measures, the low magnitude and low frequency of effect on sensory disturbances, the residual effect is assessed to be not significant.

Component Assessment: Detour around Mine Site for Safety and Travel

When Inuit are harvesting or travelling, development will result in a detour around the Mine Site. The detour will disrupt current travel routes toward Steensby Inlet and is deemed as a negative effect. Upon cessation of operations, the perimeter of the open pit will be barricaded and remain restricted, however, most of the Industrial site area will be re-opened for access. Prior to finalizing the Reclamation and Closure Plan, the communities will be consulted. The Mine Site is located on Inuit Owned Lands and therefore the final Reclamation and Closure plan will need the approval of the QIA, the leaseholder. Mitigation measures will ensure safe travel around the Mine Site. Based on moderate magnitude and continuous frequency, of the residual effect is assessed to be not significant.

Component Assessment: HTO cabin closure

A 1960s exploration cabin used by hunters will no longer to be accessible. While this is deemed a negative effect, it is assessed as low, because hunters and travellers in the area will be able to sign in at the Mine Site office and have some food and shelter. A new cabin will be constructed at an agreed upon location in discussions with the local community. Based on the low magnitude and continuous frequency the residual effect is deemed to be not significant.

Component Assessment: Difficulty and Safety Relating to Railway Crossing

The development of a railway will adversely affect easterly and westerly travel routes. The railway is assessed as having a low magnitude effect on the difficulty and safety of travel. Although it is a newly-constructed feature on the landscape, the embankments will be passable with a snowmobile at most locations. Crossings will be added at six locations to ensure safe passage.

Based on the low magnitude and continuous frequency, the adverse effect is deemed not significant and the residual effect is assessed to be not significant.

Component Assessment: Detour around Steensby Port

The detour around Steensby Inlet is an adverse effect to travel because individuals will not be able to use traditional travel routes as a result of ice breakage. The effect is high in magnitude in that the detour will be relatively long; however, safe detour routes around the ship's track in the area of the Port and along part of the landfast ice will be marked for safety purposes. A detour route will be provided so that travelers can cross from north to south without having to cross the track. For travel parties using the detour route, food and fuel will be available along the detour route at the Steensby port site to offset the extra distance they have to travel. Other arrangements are yet to be worked out through an adaptive process with the affected communities. These measures will enable individuals to continue their land-use activities.

The effect is assessed to be infrequent because the detour through Steensby Inlet will occur only during the winter and by a small number of people. Through planned and further adaptive mitigation, combined with the potential for further negotiated measures and/or compensation measures ensuring the ability to safely travel, and based on the high magnitude and low frequency of the Project's effect on the detour around Steensby Port, the residual effect is assessed to be not significant.

Component Assessment: Restriction of Camp Sites around Steensby Port

A number of current camping locations along the coast of Steensby Inlet have been identified by MRIKS participants (see Figure 4-10.6). Several camp areas at Steensby Port will no longer be available; however, camping locations outside of the PDA will still be available. The effect of the restriction of these camps is assessed to be negative. Mitigation measures, outlined by Baffinland, allow travellers to access shelter and food at the port site. Baffinland agrees that there is an opportunity for the cultural history of the Steensby port area to be recognized through mitigation and collection of artifacts that could be put on display at a local community. Further discussion is required to move this initiative forward between Baffinland, local communities, and agencies including the GN Department of Culture, Language, Elders and Youth (CLEY).

Based on moderate magnitude and continuous frequency, the residual effect is assessed to be not significant.

10.5.4 Prediction Confidence and Risk Analysis

The prediction confidence of the above assessment is high because the Project will interact with land-users in the manners identified in the assessment: by water, ice and land travel and at camps. The mitigation measures are well suited to address the safety issues resultant from Project interactions with land-users while ensuring their ability to continually use the land for their cultural pursuits.

10.5.5 Follow-up

Follow-up will consist of a variety of components including:

- Maintaining a log of travelers passing through Project sites as they check into main offices;
- Monitoring the use of Milne Inlet Tote Road by non-Project related individuals as described in the Roads Management Plan (Volume 10, Appendix 10 D-8); and
- Through public meetings relating to safety of land-users and their interactions with the Project.

10.6 IMPACT STATEMENT

The Project will interact with current land-use activities such as harvesting, travel and camping. Direct adverse residual effects on these activities are acknowledged. With planned mitigation described in the Key Indicator assessments, these effects are predicted to be not significant. Concerns that Project effects on

these Key Indicators along with other residual effects on relevant VECs and VSECs might combine to lead to adverse effects on Resources and Land-Use and on harvesting livelihoods were raised during the DEIS technical review. These concerns are addressed in detail in this Volume, Section 4.3. The integrated analysis of the combined effects of the Project does not lead to an assessment of adverse effects on harvesting. The interactions are expected to be complex and highly inter-twinned with other factors affecting harvesting in the LSA. The potential for beneficial outcomes is equally or more highly anticipated than the potential for negative effects. An analytical framework developed for this assessment is carried forward into the monitoring framework of this Volume, Section 15.0.

Impact Statement for Key Indicator 1: Wildlife Harvesting By Inuit

The Project is assessed to not have a significant effect on harvesting within the land use study area as a result of Project development. Although potential exists for wildlife to avoid areas of intensive Project interaction, the amount of country food harvested per level of effort is not anticipated to change meaningfully.

Impact Statement for Key Indicator 2: Travel and Camps

Baffinland acknowledges that shipping, port activities and rail line operations may potentially affect Inuit travel. However, this will not result in significant adverse effects on travel and camps. Individuals' ability to travel and camp throughout the land use study area will not be meaningfully altered—the negative effects are only evident at points of project interaction including Milne Inlet, Milne Inlet Tote Road, Mine Site, Railway, and Steensby Port.

Potential for Cumulative Effects

Residual effects of the Project on the Resources and Land Use VSEC include effects on caribou harvesting, expected to be minor, but relate to the potential for caribou mortality due to collisions. Additional residual effects to land use include disturbance of camping areas at Milne Port, general disturbance and safety concerns related to Project-related traffic and Inuit hunters along the Milne Tote Road, potential crossing issues along the Railway, and a detour on the Steensby Inlet fast ice. These residual effects are carried over for consideration in the cumulative effects assessment.

SECTION 11.0 - CULTURAL WELL-BEING

11.1 BASELINE SUMMARY

Cultural well-being may be defined as the ability of an individual or community to enjoy creative and cultural activities, with the freedom to express and retain their traditions (Government of New Zealand, 2008). A component of Inuit culture is IQ, "the Inuit way of doing things: the past, present and future knowledge, experience and values of Inuit Society" (Inuit Qaujimajatuqanginnut Task Force, 2002). Baffinland has worked with the communities in the LSA and the QIA to collect IQ through the Mary River Inuit Knowledge Study (MRIKS), and through various workshops and public meetings.

Cultural well-being is the purview of the Inuit and is taken into consideration in the Nunavut Land Claims Agreement (NLCA), Government of Nunavut and other organizations such as CLEY/DIA. The QIA is the steward and custodian of IQ and cultural well-being for the Inuit in the study area (Qikiqtani Inuit Association, 2007). The QIA ensures that Inuit needs are being met by the Government of Nunavut and the Government of Canada.

As a feature of the NLCA, Baffinland is in negotiations with the QIA for an Inuit Impact and Benefits Agreement (IIBA). Cultural well-being is addressed in the IIBA as follows:

- Inuktitut-speaking work groups within sub-activities of the Project;
- Baffinland recognizes the importance of maintaining social and cultural well-being to ensure a productive workforce, and will provide support in addressing potential impacts on cultural well-being as a result of the Project;
- Workplace conditions will be respectful of Inuit culture and will provide cultural recognition programs to employees;
- A senior Executive Committee will oversee the implementation of the economic, social/cultural and environmental provisions of the IIBA; and
- Development of the *Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat* (INPK) fund to support various social and cultural community activities, as outline in Section 10.2 of the IIBA.

Baffinland recognizes that the cultural well-being of the Inuit is an Inuit activity and responsibility. Baffinland will not become paternalistic nor will it assume a central role in preserving Inuit cultural well-being – rather, Baffinland will be supportive in Inuit and QIA activities.

Traditionally, IQ consists of six basic guiding principles (Inuit Qaujimajatuqanginnut Task Force, 2002):

1. **Pijitsirnjiq** - The concept of serving (a purpose or community) and providing for (family and/or community);
2. **Aajiiqatigiingni** - The Inuit way of decision-making, comparing views or taking counsel;
3. **Pilnimmaksarniq** - The passing on of knowledge and skills through observation and practice;
4. **Piliriqatigiingniq** - The concept of collaborative working relationships or working together for a common purpose;

5. **Avatittinnik Kamattiarniq** - The concept of environmental stewardship; and

6. **Qanuqtuurniq** - The concept of being resourceful to solve problems.

Therefore, cultural well-being is considered in context of these principles being realized.

Baseline conditions relating to cultural well-being are addressed in various sections of the socio-economic baseline report (Appendix 4A, Section 2.4 Language and Culture).

Inuit beliefs, stories, special places, and knowledge of the land and wildlife are rooted in IQ (Inuit traditional knowledge). Traditional values continue to be of importance to residents of Baffin Island, as made evident through the MRIKS. Special places valued by ancestors are still accessed and valued by individuals. Other cultural activities such as going out on the land and harvesting are central to most Baffin Island residents.

11.2 ISSUES SCOPING

In order to assess concerns related to the effects on cultural well-being in the study area, a variety of issues scoping activities were undertaken, including:

- Archaeological surveys and background studies;
- Mary River Inuit Knowledge Study (MRIKS);
- Public meetings; and
- Interviews with government service providers, demographic groups and youth during socio-economic baseline studies.

Through these venues, Inuit have consistently indicated the importance of preserving cultural integrity. Elders in particular commented on the changes underway in Inuit culture, preferences and practices, particularly among youth.

11.3 CULTURAL WELL-BEING

As not all effects or issues are equally significant, interactions that are less likely to be of notable importance and are common to projects of this nature will be addressed through the application of standard and proven mitigation measures. Cultural well-being, although considered an important quality by both Baffinland and Inuit, is considered a subject of note for the purposes of this assessment. The cultural well-being indicators will be defined by the Inuit. Baffinland will provide a supportive role – in the areas where Project effects on cultural well-being can be mitigated. Systemic cultural changes are the accountability of others such as the QIA and the Government of Nunavut.

As one means of evaluating the potential of the Project to influence cultural well-being, Baffinland reviewed its Project in relation to the IQ guiding principles (see Table 4-11.1).

Baffinland has evaluated cultural well-being considering other aspects, as identified in the Guidelines.

> *The potential to affect cultural well-being, religious and spiritual activities through disruption to cultural and historic, sacred and spiritual sites (Guideline Section 8.2.8.2, bullet 4)*

Table 4-11.1 The Project in the Context of IQ Guiding Principles

Guiding Principle	Effect
Pijitsirnjiq - The concept of serving and providing for	The Project will provide employment and economic development opportunities that will allow Nunavummiut to provide for themselves and their families. Royalties and taxes will provide Government and Inuit organizations with increased means of serving their constituents through the provision of services. These discussions will be made at the community/regional level
Aajiiqatigiingni - The Inuit way of decision-making	Inuit make decisions through consensus. While the nature of industrial workplaces does not allow for consensus decision-making by necessity, through the IIBA committees will be established to allow for decision making by seeking counsel from other committee members and community members.
Pilnimmaksarniq - The passing on of knowledge and skills through observation, doing and practice	Training and mentorship opportunities will be provided to employees, which elders have asked for their youth. Baffinland has supported "back to the land" programs to facilitate the transfer of Inuit land skills within the communities. The Company has developed a comprehensive Human Resource Management Plan (Appendix 10F-3) which outlines but is not limited to hiring policies, education and training opportunities, employee relations, and workplace preparedness.
Piliriqatigiingniq - The concept of collaborative working relationships or working together for a common purpose	Community representatives have repeatedly stated the desire to work together for a common understanding and common goals with Baffinland. This is something Baffinland has embraced, through partnership initiatives in education, training, back to the land, and elder-in-residence programs. Further, Baffinland and the QIA agree that communities must be engaged in the development and implementation of strategies to build the capacity necessary to enable communities to deal with existing and potential impacts and to maximize benefits from the Project and to sustain those benefits beyond the life of the Project.
Avatittinnik Kamattiarniq - The concept of environmental stewardship	An Environmental Section will be included in the IIBA, once further discussions are held with the QIA. Baffinland's exploration operations have been undertaken in accordance with its Environmental Protection Plan. For mine development, the Company has developed a comprehensive Environmental, Health and Safety (EHS) program (Volume 10). Inuit comments received have been taken into consideration in the development of Project design. The Environmental Management System completed for the Project is an internal continuous improvement process that includes consideration for cultural well-being.
Qanuqtuurniq - The concept of being resourceful to solve problems	Environmental assessment is a planning tool used to identify and address problems. The process of developing the EIS has allowed Baffinland to carefully consider its proposed Project, including alternatives, and has identified both standard and innovative ways of reducing potential effects of its future operations.

Source: Inuit Qaujimajatuqanginnut Task Force, 2002

Residents in the study area continue to use camping sites and travel routes historically used by their ancestors, and have noted a continued desire to follow in their footsteps. Additionally, special places continue to be important to Inuit cultural history.

> *"It's not only us today who are camping in those places or travelling in those places, we are following in the footsteps of our ancestor who also camped and traveled in those places. We want to be able to do the same things that our ancestors did."*
>
> - Participant, Clyde River Land-use Workshop

> *"As well, I am aware of the place where people died of hunger. I am not sure of exact location on the land. Those Inuit who died of hunger were travelling to Igloolik. Our grandmother Ataguttaaluk was the only survivor… I do not want to see that area where Inuit died of hunger to be destroyed."*
>
> - Bertha Tatatuapik – Arctic Bay

The potential to affect cultural well-being, religious and spiritual activities through disruption to cultural and historic, sacred and spiritual sites was evaluated. Based on the data obtained, a number of special places or spiritual sites were identified, including the location of the story of Ataguttaaluk at Inuktorfik Lake, which is approximately 25 km southwest of the Mine Site and downstream/west of Angajurjualuk Lake (see special places shown on Figure 4-9.2). The locations of Tuniit archaeological sites and graves, or where small/shadow people have been seen, were identified.

Camping areas where people from the various communities (or before communities, camps) would meet were identified. The location of earth eggs has also been identified. Project infrastructure does not interfere with any of these identified features. Potential effects on cultural well-being, religious and spiritual activities in relation to cultural and historic, sacred and spiritual sites are not anticipated.

The cultural resources impact assessment (Section 9) identifies archaeological sites within the LSA and addresses Project effects on those sites. The assessment concluded that after mitigation, no significant residual effects are expected on archaeological sites as a result of project development. Inuit participation in archaeological surveys is important.

> *Potential impacts 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 (Guideline Section 8.2.8.2, bullet 8)*
>
> *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 (Guideline Section 8.2.8.2, bullet 9)*

Community representatives, in public meetings and the MRIKS working group meetings, have repeatedly acknowledged a desire to preserve Inuit traditional lifestyles and land-use activities, and the need for economic development. Often the two goals are presented as opposing forces that are potentially mutually exclusive, and the need for balance between the two to be met. Some Inuit have recognized the need to reconcile the balance between environmental effects and economic development and have considered environmental stewardship practices.

Elders have also commented on the changing habits of youth, that they are less interested in traditional pursuits and the consumption of country food, with a greater preference for store-bought foods, modern technology and media (i.e., fashion, TV, internet, and MP3 players). The shift in consumption habits is supported by an increase in per capita shipments of southern food through the Food Mail Program. From 1999 to 2009 the total per capita shipments, presumably equal to per capita consumption of these store-bought foods, has increased by 52 % (INAC, 2010).

Elders consistently indicated a strong desire for economic development, including the Mary River Project, as the future for their youth, to provide them with opportunities that are more aligned with their preferences. Many traditional land-use activities require equipment that is expensive to obtain and maintain. Elias (1995) found that households with high cash incomes are often the most productive domestic producers in a community, where domestic production includes hunting, fishing and gathering. This finding points to the positive association between wage labour resulting from economic development and traditional land-use activities such as harvesting, as assessed in Section 4 of this report.

> *"I have the same point of view. I'm in support of the mine. The money we get for seal pelts will now go down [because of a European ban] and there isn't much money in carvings. When you are on welfare you can't afford anything (e.g., boat, skidoo). There will be an impact from the mine, but the trade-off will be benefits for the younger people."*
>
> Timothy – Tikkuu Working Group (Hall Beach)

Employment opportunities resulting from the Project may help enable individuals to become self-sufficient and independent in their lives. The life skills gained from employment will enable them to take greater pride and control in their lives. The self-determination gained from employment can be translated to greater personal confidence and increased opportunities to pursue cultural activities.

Positions in Baffinland will enable individuals to develop leadership skills and enhance their work skills. Promotions to higher level positions recognizing good work will further enhance self-confidence and promote self-determination.

To help maintain Inuit culture at the workplace Baffinland will provide country food, which will have to be inspected for public health requirements of a workplace. The primary language at the Mine will be English; however, employees will be able to explain something in Inuktitut to each other to help them understand – this will have to be repeated in English so the rest of the crew understands as well.

Pre-existing forces of cultural change including the dilution of Inuit culture and language are already present in the five communities of North Baffin. This is demonstrated through youth's increased interest in modern technology and media and their associated decreasing preference in participating in cultural activities. These changes are also evident through the increasing consumption of store-bought foods.

Cultural change in Inuit culture in a historical context began with the settlement of scattered families into communities, which now make up the five communities in the LSA. This led to further traditional cultural changes, resulting in a shift in community dynamics and need for government support through housing and social programs. Education has shifted toward the need of academic knowledge rather than cultural or traditional knowledge for a self-determinant lifestyle. Project development is not expected to make significant contributions to the dilution of Inuit culture and language.

In consideration of the pre-existing forces of cultural change, it is expected that the Mary River Project will fit in with the changing needs of the community, most notably by providing employment to younger

generations. Inuit who wish to experience the wage economy will have the opportunity to work at the Project as an employee, as a short-term or a temporary contractor. Indirect employment opportunities will also be created. Due to the distance of the Project from the communities in the LSA, the Project will not directly affect the Inuit in their daily, routine activities and local cultural pursuits. Indirect effects such as those of introducing economic stimulus are considered to be negligible in relation to the economic transitions that have occurred across the RSA over the past three generations.

11.4 IMPACT STATEMENT

The Project will affect Inuit culture and cultural development through its interactions with Inuit cultural values. To a large degree, these interactions will be positive. The opportunities for productive livelihoods based on self-reliance and sharing of resources, learning and sharing experience through supervisory and role-model functions, and for monitoring the environment are all relevant and supportive of these values. This conclusion, that productive employment is aligned with Inuit culture in the contemporary context, has also been expressed by Elders during community consultations.

It is acknowledged, however, that culture has many facets. Different perspectives on industrial development and its effects on culture have been heard during community engagement. Some individuals have deep concerns about the effect of on-going economic development and expansion of the wage economy on Inuit culture. What may be a positive cultural effect for some—access to a job that enables one to provide for family and relatives—may be a negative cultural effect for someone else. For these reasons, Project effects on culture are considered to be diverse in their direction — neither positive nor negative. No significant impact is assessed.

Potential for Cumulative Effects

No adverse residual effects are assessed with regard to the Cultural Well-Being VSEC. Therefore, no residual effects are carried over to the cumulative effects assessment.

SECTION 12.0 - BENEFITS, ROYALTY, AND TAXATION

The Benefits, Royalty, and Taxation VSEC addresses indicators related to the monetary flows and savings associated with the Project.

12.1 BASELINE SUMMARY

12.1.1 Baseline Conditions

The 2010-11 territorial budget was $1.2 billion (Government of Nunavut, 2010a). With a population of just over 32,000 territorial government services total over $37,000 per capita. The largest single expenditure, $265 million (over $8,100 per capita) is made for health and social services.

Federal transfers to the territorial government total roughly $36,000 per capita, or $1.2 billion, for the 2010-11 fiscal year (Finance Canada, 2010). The territorial government expects to raise $89 million from taxes and other own-source revenues. Personal taxes are estimated at $12 million and corporate taxes at $6 million. Payroll taxes and tobacco taxes are larger revenue-providers at $17 million and $12 million, respectively. Fuel tax generates an additional $5.4 million.

As of the start of the 2010-11 fiscal year, the consolidated debt of the territory was less than $150 million. Less than $5 million of this is directly attributable to the territorial government, with most related to outstanding debts of the Qulliq Energy Corporation, the Nunavut Housing Corporation, and the Nunavut Development Corporation. Under the *Nunavut Act*, the GN may borrow a maximum of $200 million. The GN has borrowed only modest amounts, generally under $5 million per year, over the past five years (Government of Nunavut, 2010a).

12.1.2 Expected Future Conditions

In its recent economic forecast for the territories, the Conference Board of Canada (2010) noted that the fiscal health of the Government of Nunavut is good and that the outlook for the coming decade is even better. This forecast includes revenues anticipated to flow from Agnico-Eagle's Meadowbank mine in the Kivalliq Region, but does not include advancement of the Mary River Project.

In spite of this healthy fiscal position, the Conference Board suggests that much of the focus of government spending will need to be placed on keeping up with entitlement spending in areas of public health and social services, rather than being available for productive investments in areas such as education.

12.2 ISSUES SCOPING

Scepticism about Benefits to North Baffin Communities

A degree of scepticism was expressed during public meetings in the North Baffin about the benefits that increased tax revenues from the Mary River Project might have for the North Baffin community. For example, one hamlet leader made the following comment:

> *"…the benefit directly to the community will be limited to training and employment. The community has been trying to get a breakwater without success. We didn't get any money from government for the breakwater. Baffinland is interested in helping out the community and since there is no breakwater this is a way you can help us."*

As set out below, the Mary River Project is expected to generate considerable future tax revenue for the Federal and Territorial governments and the Inuit. The Company does not take responsibility for community or government matters but is open to providing input if requested and if appropriate.

12.3 TERRITORIAL GOVERNMENT OWN-SOURCE REVENUES

12.3.1 Project Effects

The Mary River Project will generate streams of taxation revenue to the federal and territorial governments. These payments include taxes on inputs of labour (such as payroll taxes) and materials (such as sales taxes) and taxes on corporate profits. In addition, Baffinland will pay for the mineral and for the aggregate that it extracts from the land. Payments for aggregate (sand, gravel, and rock) extracted from quarries will be paid to either the federal government or to QIA, depending on ownership of the particular land where the quarry is located. In addition, mining taxes or "resource royalties" will be paid to the federal government for the extracted ore. Under the negotiated terms of the Nunavut Land Claims Agreement (NLCA), Inuit own the subsurface mineral rights of relevance to this Project. As a consequence, these payments made by Baffinland will be transferred by the federal government to NTI, as set out in the NLCA. This is discussed further in Section 12.4.1, below. Table 4-12.1 provides a summary of these various payments.

Table 4-12.1 Baffinland Required Payments of Benefits, Royalty And Taxes

Type of Payment	*Federal Government*	*Territorial Government*	*Other Governments*	*Inuit*
Negotiated Benefits				
IIBA				✓
Taxes and Royalty Payments				
Nunavut mining tax (royalty)	✓	→ transferred to NTI →		✓
Aggregate royalty	✓			✓
Corporate Income Tax	✓	✓	✓	
Employee payroll tax		✓		
Fuel tax		✓		
Property tax		✓		
Other taxes and payments (CPP, WSCC, EI)	✓	✓	✓	

Notes:

1. The employee payroll tax is a 2 % tax on wages paid that is deducted from workers' paycheques. Nunavut residents get this deduction rebated while southern employees do not. Since Baffinland and its contractors need to establish competitive wage scales to attract the workforce this is essentially a tax that Baffinland needs to pay.
2. Other taxes include the employer's contribution to the Canada Pension Plan (CPP), contributions to the Workplace Safety and Compensation Commission (WSCC), and to Employment Insurance (EI).

Corporate Income Tax

Baffinland Iron Mines Corporation will carry out substantially all of its business activities in Nunavut. Such activities include the mining of iron ore, product transportation to port, loading onto ships and transport to export markets. The Income Tax Act (Canada) addresses how taxable income earned by a corporation is allocated across the provinces and territories. If a corporation has a permanent establishment in more than one province or territory, taxable income is allocated based on the salary and wages and gross revenue that

is reasonably attributed to that province or territory. As a general rule, where a corporation makes a sale of merchandise to a customer in a foreign jurisdiction, and the corporation does not have a permanent establishment in that foreign jurisdiction, the gross revenue from the sale is attributed to the province or territory where the goods were produced or manufactured. Baffinland will comply with all laws governing the allocation of taxable income to the appropriate jurisdiction.

Corporate taxable income allocated to Nunavut is taxed at a territorial rate of 12 %. In addition federal corporate income tax will also be paid. This rate has declined over recent years and is, as of January 1, 2012, set at 15 %.

Baffinland will likely not generate taxable income until it advances to the Operations Phase of the Project. Furthermore, once the company enters into commercial production, the company will be able to deduct accelerated tax depreciation from taxable income and deduct investment tax credits from gross taxes payable, both of which will accumulate during the exploration and construction phases of the Project, in order to reduce net federal and provincial taxes payable. Consequently, it is reasonable to expect that corporate federal and territorial income taxes will be lower for several years following the commencement of commercial production.

Taxable income earned by Baffinland will be influenced by global economic factors such as foreign currency exchange rates, interest rates, commodity prices and labour costs. It will also be contingent on Baffinland's corporate strategy and bargaining power related to Project financing, marketing, transportation, and input costs. Given these variables, no estimation of corporate income tax is provided.

Fuel Taxes

Nunavut charges a fuel tax on the import of certain types of fuels and fuel for certain purposes. Motive diesel is taxed at a rate of $0.091 per litre, while non-motive diesel and aviation fuel is taxed at $0.031 per litre. Fuel used for heating is not taxed.

The Project is expected to import 125 ML of motive diesel fuel for during each year of operations, 80 ML of non-motive fuel for power generation, and 1 ML of aviation fuel per year. During the four year construction phase, an estimated total of 255 ML motive, 222 ML non-motive, and 2 ML aviation fuel will be utilized. Additional fuel will be imported for the purpose of heating. Most of the power demand of the Project is expected to be for ore crushing and operation of port facilities.

Based on these rates of fuel import, the Project is expected to pay a total of some $30 million during the four-year construction phase (roughly $7.5 million per year), and just under $14 million per year during operations. Over the life of the Project, an estimated total of roughly $320 million will be paid in fuel taxes. These payments are contingent on the on-going operations of the Project but are not reliant on other factors affecting Project profitability.

Baffinland Property Taxes

Properties in Nunavut are assessed by an independent assessment agency. For mining properties a mill rate of $9.76 per $1,000 of assessed value is applied. Baffinland's Nunavut properties will not be assessed until they are built. As an interim estimate, the Meadowbank mine was assessed somewhat under $1 million in 2010 property taxes.[85] Given the higher costs of the Baffinland Project a property tax assessment greater than $1 million is reasonable to expect.

[85] Larry Connell, personal communication, December 2011.

Personal taxes — income and payroll tax

The Nunavut Government assesses a 2 % payroll tax. Residents of Nunavut effectively do not pay this deduction but they will remit personal income taxes to the territory. During the construction phase personal tax payments, including income and payroll taxes, to the territory are expected to average roughly $4 million per year. During operations, personal taxes to Nunavut are estimated to be roughly $2 million per year.

Summary of revenues flowing to the territorial government

During the construction phase Project tax payments are estimated to total roughly $12.5 million per year. This represents approximately 1 % total territorial revenue from all sources. It is noted, though, that this early revenue stream will account for over 10 % or more of the territorial government's "own-source" revenues of $89 million.

During operations, approximately $17 million per year will flow to the territorial government through property tax and taxes on inputs such as fuel and labour. Taxes on net corporate income ("profits") earned in Nunavut will also be paid to the territory. This is currently taxed at a rate of 12 %.

Significance Determination

The beneficial effect of Project revenues flowing to the territorial government is assessed to be significant over the life of the Project. During operations, taxes paid on property and on inputs of fuel and labour are expected to total nearly 20 % of the territory's "own-source" revenues. Taxes paid on corporate profits will contribute further revenues to the government. The magnitude of this corporate profits tax is not estimated given the uncertainty and variability caused by factors outside the control of Baffinland, such as iron ore prices, fuel costs, exchange rates and interest rates.

12.3.2 Prediction Confidence

Confidence in the assessment of significant revenues flowing to the territorial government is high due to the magnitude of taxes on inputs relative to territorial "own-source" revenues.

12.3.3 Follow-up

No follow-up.

12.4 SUBJECTS OF NOTE

12.4.1 Resource Revenues to Inuit

Owners of the sub-surface mineral rights will be paid for these minerals by Baffinland. The sub-surface rights to Deposit No. 1 are owned by Inuit, through NTI. However, Deposit No. 1 is grandfathered under the NLCA and is a crown lease that will be subject to the Nunavut mining royalty as set out in the Northwest Territories and Nunavut Mining Regulations (Minister of Justice, 2008). The Nunavut mining royalty is a graduated payment based on the value of the output of the mine during the fiscal year, ranging from 5 % to 14 % of pre-tax cash flow with a maximum aggregate rate of 13 %. It is similar to income tax with two exceptions—it allows for accelerated depreciation on all capital expenditures, and it does not allow interest payments to be deducted in the calculation of pre-tax cash flow.

As with corporate profits tax payments, this amount is expected to vary according to Project profitability which in turn will be influenced by variables such as currency exchange rates, iron ore prices, and fuel costs. Table 4-12.2 outlines the application of the Nunavut mining royalty.

Table 4-12.2 Nunavut Mining Royalty

Net Cash Flow Before Taxes and Interest ($)	Royalty payable on that portion of the value
10,000 or less	0 %
in excess of 10,000 but not exceeding 5 million	5 %
in excess of 5 million but not exceeding 10 million	6 %
in excess of 10 million but not exceeding 15 million	7 %
in excess of 15 million but not exceeding 20 million	8 %
in excess of 20 million but not exceeding 25 million	9 %
in excess of 25 million but not exceeding 30 million	10 %
in excess of 30 million but not exceeding 35 million	11 %
in excess of 35 million but not exceeding 40 million	12 %
in excess of 40 million but not exceeding 45 million	13 %
in excess of 45 million	14 %

Source: Northwest Territories and Nunavut Mining Regulations, Territorial Lands Act

The NTI Resource Revenue Policy sets out how resource revenues will be shared between an endowment fund and an operating fund. This latter fund will be distributed annually in accordance with the following formula: 30 % to NTI, 10 % to each RIA, and 40 % to the RIAs on a per capita basis. Eligible expenditures from the operating fund are described in the Policy under two sections:

7.3 Allocations and expenditures shall be for the purpose of providing both near-term and long-term sustainable benefits, and may be for economic, social, cultural, environmental or other purposes.

7.4 Except as approved by NTI's membership in exceptional circumstances, allocations and expenditures shall not be made by NTI or an RIA in areas where government has primary responsibility. Constraints or conditions shall be attached to such allocations and expenditures in order to ensure that Inuit benefit to the fullest extent possible, and that such allocations and expenditures augment rather than duplicate or replace government expenditures or programs.

Quarries at Milne Port and at the Mine Site are located on QIA-owned lands. QIA currently charges $2.50 per cubic metre for rock, sand or gravel. Based on aggregate demand estimates presented in Volume 3, Table 3-1.1, the payment to QIA for aggregate will total roughly $2 million over the construction phase of the Project. Payments for aggregate from Crown-owned lands will accrue to the federal government through AANDC. These are estimated to total somewhat under $1 million due to federal rates that are currently $1.25 per cubic metre for rock and $1.50 per cubic metre for sand and gravel.

In addition to the above revenues, the Project will include an IIBA negotiated with the QIA. This agreement may include cash payments in addition to the non-monetary terms.

12.4.2 Support to Communities

Baffinland's contributions to capacity building and long-term social development include its commitments to employment, training, contracting and subcontracting described in the HRMP (Appendix 10F-3). In addition, Baffinland will contribute to the *Ilagiiktunut Nunalinnullu Pivalliajutisait Kiinaujat* (INPK fund) that will be administered by QIA as described in the HRMP (Appendix 10F-3). The terms of Baffinland's participation in this fund will be established in the IIBA.

However, while these may lead to some tangible benefits, they do not represent new sources of revenue that community governments can manage and allocate according to their internal needs and priorities. In Nunavut, most municipalities receive their revenues from the territorial government. Within the LSA, only the City of Iqaluit also generates revenues from its own tax base. Baffinland recognises that, although the municipalities of the LSA are the levels of government most closely affected by the Project, these local governments will not receive tax revenues flowing directly from the Project.

Further under the terms of the land claims agreement, impact and benefits agreements related to major projects are negotiated with the Designated Inuit Organisations, not with local municipalities. In the case of the Project, and as noted previously, the IIBA will be with the QIA.

For these reasons, the financial benefits of the Project flow to Inuit organisations and to levels of government that do not include the municipalities. Whether or not revenues paid to the Government of Nunavut by Baffinland find their way to local communities will be determined by governments as mediated through the political process.

12.4.3 Government Social Expenditures and Development Partnership Opportunities

In addition to the direct revenues generated through personal and corporate tax payments, the Project will also affect the level of social expenditures payable by government. These payments will be highly dependent on variables such as the degree of local employment and patterns of this employment.

Some social expenditures such as income support and medical care are entitlements over which government has control only at a high level (by changing entitlement policy, for example).

Other expenditures, such as early childhood education, training programs, local infrastructure, and a range of social services, can be affected by adjusting budget envelopes. Some of the expenditure areas that will be affected by the Project are presented in Table 4-12.3, with an indication of the expected direction (increase or decrease) of the expenditure.

Table 4-12.3 Effect of the Project on Social Expenditure Trends

	Increase	Decrease	Neutral
Social Entitlement Expenditures			
Social Assistance (Income Support)		X	
Social Housing (per capita subsidy)		X	
Health Care and Medical Travel			X
Essential community infrastructure and services			X
Demand for Discretionary Social Expenditures			
Early childhood education and daycare	X		
Education and training programs	X		
Discretionary community infrastructure and services	X		

Income Support

Government transfers account for between 20 % and 25 % of total personal income of the LSA. Much of this is provided through the territorial income support (IS) program (Appendix 4A). Individuals who gain income from their work at the Project will come off the IS case load and reduce the level of social assistance payments made by the GN to these individuals. Further, should these individuals be laid off following a qualifying period of employment, they will be eligible for federal Employment Insurance benefits, further reducing pressure on the territorial social assistance budget.

The value of this benefit to the territorial budget can be modeled by considering a "credible scenario" of employment. For example, if 168 individuals moved from IS to full-time, full-year employment at the Project, and if these individuals previously collected $652/month from the IS program (estimated rate for a single adult with one dependent in several North Baffin communities), then the territory would save $1.3 million per year. If the employees were families of four, a monthly IS allowance estimated at $1,175 would be saved, for a total savings to government of some $2.4 million. Actual savings are expected to fall between these two numbers, and an estimate of $1.5 million is considered to be conservative.

Social Housing / Rent Subsidy

Individuals who are not working and who are living in social housing pay $60 per month for their housing. The remainder of the cost of housing is paid to the housing association by the Income Support Program. As household income increases, so does the level of rent. Householders earning $86,000 or more may pay up to roughly $1,600 per month, saving the government $1,540 per month per household formerly on Income Support. Thus, as individuals gain employment, the housing subsidy paid by government will be reduced. If 168 households moved from paying $60 to paying $1,540 per month in rent, this would save the government roughly $3 million in social housing subsidy per year. However, some households will already be paying higher rent levels and some may not be in social housing. An estimate of $1.5 million per year in reduced housing subsidy due to increased rental income from social housing tenants is considered a conservative estimate.

Health Care and Medical Travel

Over 15 % of GN expenditures are spent on health care and medical travel for Nunavummiut (Government of Nunavut, 2010b). Medical travel has increased by nearly 50 % over the four years between 2005-06 and 2009-10, and currently accounts for an annual expenditure of $48 million. The interactions between the Project and the health status of Nunavummiut will be complex, as discussed in Section 6. The net effect of the Project on human health is assessed in Section 6 to be positive—essentially arising from a reduction in poverty and its effects on health and well-being.

Some accidents are expected to occur at the Mine Site, and some of these will lead to a need for emergency medical care beyond that which can be supplied on-site by Company medical personnel. This will contribute to specific instances where the GN may be called on to provide emergency medical travel. On the other hand, the Project is expected to positively influence personal attitudes and behaviours related to risk and risk taking and these are expected to be transferred to the household and community setting.

The net outcome is for health care and medical travel costs to decline due to overall health benefits. However, given the complexity of these interactions and an absence of appropriate health and health care delivery cost data, a conservative assessment that the net effect will be neutral, is adopted.

Essential Community Infrastructure and Services

Some public community services are considered to be essential. These include water and sewage services, fire protection, and road maintenance, among others. Spending in these areas is, to a large degree, non-discretionary. For example, an increase in households will lead to an increased demand for water and sewage services which must be met.

The Project is not expected to lead to substantial net in-migration to North Baffin LSA communities. While some population movements may arise, this is anticipated to be modest and to include both in-migration as well as out-migration.

The possibility that service delivery might be affected by the Project has been addressed in this Volume, Section 7.0. As identified in that section, some individuals who have worked for hamlets as, for example, water truck or sewage truck drivers may be expected to take on employment at the Project. However, a medium and longer term increase in labour force capacity is also identified in Section 7.0. The net result should be a neutral effect on the cost of delivering these essential services.

Early Childhood Education and Daycare

Engagement of local residents in the Project is expected to lead to an increased demand for daycare and possibly also for early childhood education services. Support for daycares and for early childhood education arises from various federal and territorial programs. It is expected that the demand for increased funding for these services will increase.

Education and Training

It is anticipated that the Project will lead to a greater valuing of education amongst households and school-aged children and youth, over the medium to longer term (see Section 3). This is obviously a desirable outcome; however there may be costs to government associated with education success. Given the current high drop out rates, an improvement in attendance and school completion may lead to demands for expanded school infrastructure and more teachers to keep class sizes down. Government has some discretion in how it allocates resources to schooling. Nonetheless, it is expected that education expenditures will increase due to the Project.

A similar outcome may be seen in the area of training. The territorial government may be asked to contribute funds toward initiatives to support adult literacy and numeracy, as well as other essential skills. In addition, a general increase in people's interest in education arising from expanded economic opportunities may lead to a demand for increased investment in facility and trainer capacity.

Discretionary Community Infrastructure and Services

Demand for improved facilities and services in communities near to the Project may be expected to arise from several directions. First, political pressure for a return of some of the benefits flowing to the territory through taxes paid by the Company is expected to arise from the municipalities. Improved recreational facilities and programs may be requested, as one example. Second, increased household wealth may lead to an increase in vehicles for travel both in the community as well as on the land and sea. Demands for improved roads in town as well as more access roads for getting out of town may arise. This may also include demands for safe harbours and docks for boats. The Project is thus expected to lead to an increased expenditure in these discretionary areas.

Summary

The anticipated outcome of the Project on these social expenditures is that there will be a decline in the cost to government of entitlement expenditures and an increase in the demand for discretionary social expenditures.

Savings from entitlement spending, combined with the increased government revenues arising from Project-related taxation, are expected to provide capacity to address some discretionary spending demand. However, the actual allocation of these savings and revenues will be determined through the political process.

In addition to government-driven social spending, some areas of anticipated increased demand for services are to be addressed through partnerships in the LSA between government and private third parties, including Baffinland. For example, some of the orientation and training programs described in the HRMP (Appendix 10F-3) will have beneficial effects on overall education and training opportunities.

12.5 IMPACT STATEMENT

Through its contributions made under the IIBA, as well as payments of royalty, rents, and taxes, the Project will have a significant beneficial effect on the Benefits, Royalties, and Taxation VSEC. It is also expected to reduce social entitlement program expenditures while modestly increasing demands for discretionary social spending.

Impact Statement for Key Indicator 1 - Territorial Government Own-source Revenues

The beneficial effect of Project revenues flowing to the territorial government is assessed to be significant.

Potential for Cumulative Effects

No adverse residual effects are assessed with regard to the Benefits, Royalty, and Taxation VSEC. Therefore no residual effects are carried over to the cumulative effects assessment.

SECTION 13.0 - GOVERNMENT AND LEADERSHIP

The Government and Leadership VSEC addresses indicators related to the interaction between the Project and the various strategic priorities and initiatives of Nunavut's leadership. These are addressed as subjects of note.

13.1 STRATEGIC VALUE OF THE PROJECT

"Fit" with Territorial Strategic Plans

The Project fits well with the Nunavut Economic Development Strategy and the Mineral Exploration and Mining Strategy, "*Parnautit.*" In addition to its contribution to development of Nunavut's mining sector—a strategic sector as identified in these documents—the Project is assessed as having significant beneficial effects on the development of Nunavut's labour force or "human capital", particularly among youth. This is another major strategic area addressed in the territorial strategic plan for economic development.

"Fit" with Local CED Strategic Plans

Development of opportunities related to the mining sector is identified as a strategic priority in local community economic development plans. These plans particularly identify the need to build local capacity to participate in near-by mining projects, through both direct employment relationships and the direct and indirect business opportunities that may arise from these projects.

The Project fits well with these local strategic objectives. The mitigation measures identified to build labour force capacity, hire local labour, and build business capacity to deliver goods and services to the Project fall well within the local strategic plans.

13.2 PROJECT AGREEMENT GOVERNANCE REGIME

IIBA Governance

As provided for under Article 26 of the NLCA, agreement with respect to an IIBA for the Project will be concluded between Baffinland and the Qikiqtani Inuit Association. The QIA provided letter to NIRB on November 24, 2011, describing progress toward IIBA finalization. The recently re-elected President of the QIA has publicly stated that one of her first priorities is to finalize the IIBA with Baffinland. Therefore, there is optimism that an Agreement in Principle on the IIBA can be reached in the first quarter of 2012. Unless otherwise stipulated, as set out under Part 11, provisions of Article 26, the IIBA agreement will be signed prior to commencement of the Project. The governance of the IIBA agreement, as well as processes for conflict mediation, will be set out in the agreement itself. The March 2009 MOU between the QIA and Baffinland was provided to NIRB for the public registry in late 2011, and is considered to address terms related to IIBA implementation, contracting, employment, training, workplace conditions, a community capacity fund, and a dispute resolution process.

Baffinland and QIA have agreed to the creation of a management structure that can best ensure that the goals and objectives of the IIBA and environmental protection are attained. This management structure will consist of:

- A senior Executive Committee composed of three Baffinland and three QIA executives. The role of this committee will be to oversee the implementation of economic, social/cultural and environmental provisions of the IIBA; and

- A joint Management Committee consisting of four representatives of the Company and four representatives of the QIA. The role of this committee will be to monitor the Project on a continuous basis and review progress of the Project as it relates to the goals and objectives established. This committee will report to the Executive Committee.

Baffinland has agreed to fund the operation of these two committees as well as to fund a position for a QIA representative as an IIBA Coordinator. Baffinland has agreed to fund Training Officers and a QIA-appointed IIBA Coordinator. In consultation with QIA, Baffinland will also establish a position of Inuit Employment and Training Coordinator and will fund QIA to hire an Inuk for a second position as Inuit Employment and Training Coordinator.

DPA Governance

Similar to other already operating companies in Nunavut, Baffinland will consider the value, both pros and cons, that a Development Partnership Agreement (DPA), negotiated with the Government of Nunavut, may have in assisting the Company to achieve its corporate social responsibility goals in an efficient and cost effective manner. Such an agreement may provide an effective framework to govern the partnerships that Baffinland anticipates may support achievement of community-level development objectives. Existing arrangements, such as the MOU signed between Baffinland and the Government of Nunavut, related to training, may fit well within a DPA.

13.3 CONTRIBUTION TO SOCIO-ECONOMIC MONITORING

Baffinland has participated in the past to regional socio-economic monitoring initiatives such as the Qikiqtani Socio-Economic Monitoring Committee (Q-SEMC) and intends to continue to do so into the future. Most recently, the Company actively participated at the November 21 to 22, 2011 Q-SEMC meeting held in Iqaluit.

In this capacity the Company intends to work with these initiatives to identify indicators of relevance to regional monitoring programs, share data generated by activities related to the Project, and discuss the interpretation of this data with others involved in these initiatives. This monitoring is addressed in further detail in this Volume, Section 15, below.

13.4 IMPACT STATEMENT

The Project is considered to fit well with the strategic priorities identified for the RSA and for the communities of the North Baffin LSA. An effective governance regime will be in place with the signing of an IIBA and, through partnership with the Q-SEMC, Baffinland will contribute to socio-economic monitoring of importance to the region's leadership. Therefore, the Project is considered to have a positive and significant effect on the Government and Leadership VSEC.

Potential for Cumulative Effects

No adverse residual effects are assessed with regard to the Government and Leadership VSEC. Therefore no residual effects are carried over to the cumulative effects assessment.

SECTION 14.0 - SOCIO-ECONOMIC IMPACT SUMMARY AND CONCLUSIONS

14.1 IMPACT STATEMENTS

14.1.1 Summary of Impact Statements for VSECs

Impact Statement for the Population and Demographics VSEC

The Project will have multiple residual effects on the Population Demographics VSEC (Section 2.0) for some of the communities in the North Baffin LSA. These will affect individuals, families and communities, and may include positive as well as negative directions. The dynamic nature of human and community interactions makes it difficult to predict the overall direction (positive or negative) and magnitude of such changes. Mitigation measures implemented by Baffinland aim to enhance the positive residual effects of the Project on this VSEC. Based on the best available understanding of the dynamics involved in these decisions, there is moderate confidence that negative residual effects will have no significant effect on Population Demographics.

Impact Statement for the Education and Training VSEC

The assessment of the Project's residual effects on life skills and on education and skills, combined with a consideration of the subjects of note, concludes that the Project will have a significant positive effect on education and training. This effect is expected to be confined to the LSA and should have sustained benefits that will be felt beyond the termination of the Project. Given the mitigation measures committed to, as described in the HRMP (Appendix 10F-3), confidence in this assessment is high.

Impact Statement for the Livelihood and Employment VSEC

The Project is assessed to have no significant adverse residual effects on the Livelihood and Employment VSEC (Section 4.0). With successful implementation of planned mitigation, it is assessed to have significant beneficial effects on this valued component.

Impact Statement for the Economic Development and Self-Reliance VSEC

The overall direction of the effects of the Project on the Economic Development and Self-Reliance VSEC are assessed, with a high level of confidence, to be positive. Direct and indirect economic expansion associated with the Project will create new opportunities for employment and business across the RSA, and particularly within the LSA. The Project will enhance labour force capacity and may increase Inuit business capacity. The assessment of Project interactions on land and land use dimensions of this VSEC suggest that these effects will be multi-dimensional. No significant adverse effects on the underlying VECs are assessed. The integrated analysis of the combined effects of the Project does not lead to an assessment of adverse effects on harvesting. Considering the Project's interactions with these multiple dimensions related to Economic Development and Self-Reliance, the residual effects of the Project are assessed to be positive and significant.

Impact Statement for the Human Health and Well-Being VSEC

The positive residual effects of the Project on the Human Health and Well-being VSEC (Section 6.0) are assessed to be significant. Improved income is a major factor in this assessment, as it will improve the well-being of most children whose parents work at the mine. Some negative residual effects are expected to occur in relation to the well-being of some children arising from absence of workers from the community. These effects are not expected to reach levels that would cause significant adverse impacts on the VSEC,

however. The Project will have positive and negative residual effects on substance abuse, but these are not assessed to be significant.

Impact Statement for the Community Infrastructure and Public Services VSEC

The assessment of the Project's residual effects on the Community Infrastructure and Public Services VSEC (Section 7.0), combined with a consideration of the subjects of note, leads to a conclusion that the Project will have a significant positive impact this valued component.

This conclusion is based on an assessment of no significant adverse residual effects on community infrastructure and services arising from competition for skilled workers, and on an assessment of significant labour force capacity development.

Impact Statement for the Contracting and Business Opportunities VSEC

The direction of the effects of the Project on the Contracting and Business Opportunities VSEC are assessed, with a high level of confidence, to be positive. Baffinland, through the IIBA, is committed to work closely with the QIA and will fund an initiative for capacity building that will be administered by the QIA. The company is also committed to an Inuit contracting policy adapted to the capacity of Inuit firms.

The successful implementation of these mitigation measures, and the active participation of individuals in these programs, will largely determine the significance of the Project's residual effects on contracting and business opportunities. In light of the mitigation measures adopted by Baffinland, the residual effects are assessed to be positive and significant.

Impact Statement for the Cultural Resources VSEC

The Project will involve the avoidance, protection and mitigation of archaeological sites in accordance with an Archaeological Mitigation Plan approved by CLEY, and a protection plan to reduce the potential for unintentional destruction of archaeological sites. With the implementation of both the mitigation and protection plans, the Project is expected to have negligible residual effect on the disturbance or removal of archaeological sites, and on the cultural resources VSEC.

Impact Statement for the Resources and Land-use VSEC

The Project will interact with current land-use activities such as harvesting, travel and camping. Direct adverse residual effects on these activities are acknowledged. With planned mitigation described in the Key Indicator assessments these effects are predicted to be not significant. Concerns that Project effects on these Key Indicators along with other residual effects on relevant VECs and VSECs might combine to lead to adverse effects on Resources and Land-Use and on harvesting livelihoods were raised during the DEIS technical review. These concerns are addressed in detail in this Volume, Section 4.3. The integrated analysis of the combined effects of the Project does not lead to an assessment of adverse effects on harvesting. The interactions are expected to be complex and highly inter-twinned with other factors affecting harvesting in the LSA. The potential for beneficial outcomes is equally or more highly anticipated than the potential for negative effects. An analytical framework developed for this assessment is carried forward into the monitoring framework of this Volume, Section 15.0.

Impact Statement for the Cultural Well-being VSEC

The Project will affect Inuit culture and its development through interactions with Inuit cultural values. To a large degree, these interactions will be positive. The opportunities for productive livelihoods based on self-reliance and sharing of resources, learning and sharing experience through supervisory and role-model

functions, and for monitoring the environment are all relevant and supportive of these values. This conclusion that productive employment is aligned with Inuit culture in the contemporary context is something that has also been expressed by Elders during community consultations.

It is acknowledged, however, that culture has many facets. Different perspectives on industrial development and its effects on culture have been heard during community engagement. Some individuals have deep concerns about the effect of on-going economic development and expansion of the wage economy on Inuit culture. What may be a positive cultural effect for some—access to a job that enables one to provide for family and relatives—may be a negative cultural effect for someone else. For these reasons, Project effects on culture are considered to be diverse in their directions—neither positive nor negative. No significant impact is assessed.

Impact Statement for the Benefits, Royalty, and Taxation VSEC

Through its contributions made under the IIBA, as well as payments of royalty, rents, and taxes, the Project will have a significant beneficial effect on the Benefits, Royalties, and Taxation VSEC (Section 12.0). The Project is also expected to reduce social entitlement program expenditures while modestly increasing demands for discretionary social spending.

Impact Statement for the Government and Leadership VSEC

The Project is considered to fit well with the strategic priorities identified for both the RSA and the communities of the North Baffin LSA. An effective governance regime will be in place with the signing of an IIBA and, through partnership with the Q-SEMC, Baffinland will contribute to socio-economic monitoring important to the region's leadership. Therefore, the Project is considered to have a positive and significant effect on the Government and Leadership VSEC (Section 13.0).

14.1.2 Summary of Project Effects on Key Indicators

Table 4-14.1 presents a summary of the impact statements for each of the key indicators associated with the socio-economic VSECs.

Table 4-14.1 Summary of Project Effects on the Key Indicators

VSEC	Key Indicator	Impact Statement
Population Demographics	Demographic stability (KI)	Residual effects arising from in-migration and out-migration are expected to arise due to the Project. At the anticipated levels, however, these effects are not expected to be sufficient to cause adverse effects on demographic stability of the affected communities. Therefore these residual effects are assessed to be not significant.
Education and Training	Lifeskills (KI)	Positive residual effects on lifeskills amongst youth adults are anticipated to arise from the Project through access to industrial work in a context that is supported through pre-employment preparation and on-the-job training.
	Education and Skills (KI)	The Project will have significant beneficial residual effects on education and skills across the LSA. Some potential that individuals may drop out of school or forego further education in order to pursue work at the Project is recognized. However, the overall effect of the Project will be to increase the value of education and thereby the "opportunity cost" of dropping out of school.
Livelihood and Employment	Wage Employment (KI)	The Project will have a positive effect on wage employment in the North Baffin by introducing new job opportunities and actively assisting local residents to access these jobs.
	Job progression and career advancement (KI)	The Project will have a positive effect on the ability of local residents to progress in their jobs and career choices. This effect will arise as a result of the new career paths that will be introduced to the region, from entry-level through step-by-step advancement to higher level jobs.
Economic Development and Self-reliance	Consolidated effects on Land, People, Community, Territorial Economy (KI)	The overall direction of the effects of the Project on the Economic Development and Self-Reliance VSEC are assessed, with a high level of confidence, to be positive. Direct and indirect economic expansion associated with the Project will create new opportunities for employment and business across the RSA, and particularly within the LSA. The Project will enhance labour force capacity and may increase Inuit business capacity. The assessment of Project interactions on land and land use dimensions of this VSEC suggest that these effects will be multi-dimensional. No significant adverse effects on the underlying VECs are assessed. The integrated analysis of the combined effects of the Project does not lead to an assessment of adverse effects on harvesting. Considering the Project's interactions with these multiple dimensions related to Economic Development and Self-Reliance, the residual effects of the Project are assessed to be positive and significant.
Human Health and Well-being	Well-being of children (KI)	Positive residual effects of the Project on human health and well-being are anticipated to significantly improve the well-being of most children of parents working at the Project. The potential that some children may experience an overall decline in well-being is acknowledged, and is assessed to be not significant, based on low magnitude and infrequent occurrence.

Table 4-14.1 Summary of Project Effects on the Key Indicators (Cont'd)

VSEC	Key Indicator	Impact Statement
Human Health and Well-being (cont'd)	Substance abuse (KI)	During an early period of transition, the potential for negative residual effects on substance abuse to be experienced is acknowledged but assessed to be not significant due to its short duration and moderate magnitude. Over the medium term and extending beyond Project termination, an overall positive residual effect on substance abuse is anticipated. This is assessed to be not significant based on the moderate magnitude and a moderate level of uncertainty related to its occurrence.
	Community social stability (KI)	Negative residual effects arising from the absence of workers from the community are recognized to occur, although not at a high enough magnitude for significant effects on community social stability and are therefore assessed to be not significant.
Community Infrastructure and Public Services	Recruitment and retention of hamlet workers (KI)	The Project may lead to some residual adverse effects on the ability of hamlets to recruit and retain workers as the level of competition for these workers increases through Project hiring. However, these effects are not considered to be significant, based on their short-term duration as Project-initiated training leads to improved levels of skill and experience in the labour force. As training and experience increases, this labour force capacity development effect will lead to significant positive outcomes on hamlet abilities to recruit workers.
Contracting and Business Opportunities	Opportunities for business (KI)	The Project will have a significant positive effect on the level of opportunities available for local businesses to pursue. These opportunities will be available over the relatively long time horizon of the Project, and many will be available on a continuous basis. These are considered to be important attributes of the Project's impact on business opportunities as they should support the developmental context seen in the LSA.
Cultural Resources	Archaeological Sites (KI)	The Project will not result in significant adverse effects on archaeological sites. Appropriate procedures including excavation and flagging will be undertaken prior to development to limit the effect of the Project on cultural resources in the area.
Resources and Land Use	Inuit harvesting of wildlife (KI)	The Project will not have a significant effect on harvesting within the land use study area as a result of Project development. Although potential exists for wildlife to avoid areas of intensive Project interaction, the amount of country food harvested per level of effort is not anticipated to change meaningfully.
	Travel and camps (KI)	Baffinland acknowledges that shipping, port activities and rail line operations related to the Project may potentially affect Inuit travel. However, these effects of the Project will not result in significant adverse effects on travel and camps. Individuals' ability to travel and camp throughout the land use study area will not be meaningfully altered—the negative effects are only evident at points of Project interaction including Milne Inlet, Milne Inlet Tote Road, Mine Site, Railway, and Steensby Port.

Table 4-14.1 Summary of Project Effects on the Key Indicators (Cont'd)

VSEC	Key Indicator	Impact Statement
Cultural Well-being	(Subject of note)	The Project will affect Inuit culture and cultural development through its interactions with Inuit cultural values. To a large degree, these interactions will be positive. The opportunities for productive livelihoods based on self-reliance and sharing of resources, learning and sharing experience through supervisory and role-model functions, and for monitoring the environment are all relevant and supportive of these values. This conclusion that productive employment is aligned with Inuit culture in the contemporary context is something that has also been expressed by Elders during community consultations. It is acknowledged, however, that culture has many facets. Different perspectives on industrial development and its effects on culture have been heard during community engagement. Some individuals have deep concerns about the effect of on-going economic development and expansion of the wage economy on Inuit culture. What may be a positive cultural effect for some—access to a job that enables one to provide for family and relatives—may be a negative cultural effect for someone else. For these reasons, Project effects on culture are considered to be diverse in their direction — neither positive nor negative. No significant impact is assessed.
Benefits, Royalty, and Taxation	Territorial own-source revenues (KI)	The flow of revenues generated by the Project to the Government of Nunavut is assessed to be significant relative to the GN's own-source revenues.
Governance and Leadership	(Subject of note)	The Project is considered to fit well with the strategic priorities identified for both the RSA as well as for the communities of the North Baffin LSA. An effective governance regime will be in place with the signing of an IIBA and, through partnership with the Q-SEMC, Baffinland will contribute to socio-economic monitoring of importance to the region's leadership. Therefore, the Project is considered to have a positive and significant impact on the Government and Leadership VSEC.

SECTION 15.0 - SOCIO-ECONOMIC MONITORING

This monitoring framework is designed to address how Baffinland's Mary River Project will be monitored to assess socio-economic effects and to support management decisions. The framework also addresses how Project monitoring will fit in with public monitoring activities and how it can contribute to advancing understanding of socio-economic processes in Nunavut.

The framework has been prepared through a collaborative process involving BIM, QIA, GN, and AANDC participants. This included two informal meetings with these agencies in Iqaluit during October and November, 2011, along with two working sessions with the QIA socio-economic advisor in Edmonton and Ottawa. This collaboration has been helpful in the development of this framework. Baffinland is, of course, solely responsible for the final product included in this FEIS.

Baffinland recognises that collaboration in monitoring is necessary given the multiple sources of influence over socio-economic changes taking place across the territory. The expectation is that a collaborative approach to socio-economic monitoring will continue as the Project proceeds.

15.1 PERFORMANCE SPECIFICATIONS

The overall perspective against which the monitoring program will be assessed and adapted is its ability to address two questions: "How are we doing in achievement of sustainable development objectives?" and "How could we do better?"

The Mary River project socio-economic monitoring plan is designed specifically to address the following monitoring functions arising from internal and external needs for data:

- Monitor Inuit participation and IIBA implementation
- Provide data on indicators that affect Project performance
- Support community, regional and territorial monitoring initiatives
- Support Baffinland's management system and adaptive processes
- Contribute to understanding of socio-economic processes
- Support compliance monitoring

Socio-economic monitoring is also designed to link the outcome of monitoring related to biophysical VECs (such as terrestrial and marine mammals, water and air quality, and so forth) in order to identify any impacts that changes in these areas may have on the social, cultural, or economic environment.

15.2 MONITORING INUIT PARTICIPATION & IIBA IMPLEMENTATION

The IIBA MOU (QIA / BIM 2009) provides some insight into monitoring and reporting that will be carried out under direction of the IIBA. The final signed IIBA will provide the actual requirements to be carried out. For the purpose of the present framework, the MOU is illustrative of what is anticipated. The MOU identifies several monitoring reports that will be produced on a regular basis. These include an annual IIBA Implementation Report and an Inuit Participation Report. These will provide data on Inuit involvement in the Project as well as workplace initiatives designed to enhance Inuit participation.

The Inuit Participation Report will include data related to Inuit training activities, successful completion of training, and the outcomes of these initiatives in terms of the number of these training graduates who are hired at the Project. The report will also indicate the funding provided for training by Baffinland as well as by other sources.

Indicators presented in the Inuit Participation Report will be included in the monitoring report provided to NIRB (and available to the public). These will include:

- Training and support for education
- Inuit employment by gender, and by representative occupational groups
- Wages paid to Inuit
- Procurement from Inuit business
- Workplace culture and support initiatives
- Identification of issues that require partnerships with other agencies to properly address

15.3 PROJECT PERFORMANCE MONITORING

Monitoring goal:

Performance monitoring will be carried out directly by Baffinland. The focus of this monitoring is to report on indicators that describe the Company's socio-economic outcomes. To be effective, a small number of indicators are envisioned. These performance indicators will be used to build a "performance dashboard" that will provide a meaningful snapshot of the Project at a glance.

Baffinland recognizes the integrated nature of socio-economic and biophysical components of its Project. For this reason, the following discussion addresses both VSEC as well as VEC monitoring, although VEC monitoring will be addressed in more detail under the VEC Volumes.

15.3.1 Direct Project-generated VSEC indicators

In addition to indicators integrated from the Annual IIBA Implementation and Inuit Participation Reports, Baffinland has an interest in monitoring important indicators that drive performance of the Project. These will include the following indicators:[86]

- Inuit employment (MIEG)87
- EHS Management Plan indicators – Lost Time Injury, Recordable Incident rates
- Absenteeism
- Turnover rates
- Reasons for termination
- Local procurement

These are critical indicators that affect mining productivity and profitability. They also relate to the ability of individuals to succeed in training, employment, and career advancement.

For example, worker turnover and worker absenteeism are both expected to be major cost drivers for the Project. Given the nature of the project (fly-in/fly-out rotation), employees who fail to turn up for their flights cause a production impact for the two-week rotation period. Absenteeism has the potential for significant negative impact on operational performance and productivity and will need to be closely monitored and measured.

[86] The IIBA reports will be focused on Inuit-specific statistics. However, data for non-beneficiary participation by LSA and RSA residents will also be available from the human resources information system. For the purpose of public reporting, this data is expected to be included in the reports.

[87] The MIEG is established under the IIBA and will be reported through the IIBA reports. However, Baffinland considers its success in Inuit employment as a performance measure, along with other measures and so this indicator is included here.

15.3.2 Direct Project-generated VEC indicators that influence VSECs

Baffinland recognizes the tremendous importance that land and marine-based harvesting has for Inuit within the LSA. This relationship with the land and sea leads to a tight connection between any Project environmental effects on wildlife and wildlife habitat and the socio-economic environment. For this reason, data from VEC monitoring will be fed into the socio-economic monitoring framework. Similarly, mitigation measures related to wildlife and habitat protection will be discussed with communities as part of the on-going monitoring and improvement of these measures.

Table 4-15.1 Project Socio-economic Performance Indicators

Baffinland Performance Indicators	Indicator Rationale
Characteristics of the Project labour force	A description of the number and categories of positions created by the Project may be useful for the purposes of individual career planning as well as for broader development of and training plans.
MIEG acheivement	Reporting on the achievement of the minimum Inuit employment goal, as established by the IIBA Executive Committee provides a high-level perspective on progress being made to develop capacity within the Inuit labour force. In addition to an overall Inuit employment percentage, additional Project labour force characteristics will be presented. This will include data related to age, gender, and community of residency of Inuit workers.
Harvester interactions	A description of interactions with Inuit harvesters. This will include instances where compensation is provided for disruption of travel, death of wildlife, or other reasons. It may also include information on the utilization of site hospitality by Inuit traveling through Project areas.
Inuktitut in the workplace	Monitoring and annual report related to the "Inuktitut in the workplace" policy, as described in the IIBA. This is expected to include both qualitative and quantitative information and data.
Inuit employment by Representative Occupational Groups (ROG)	A description of the categories of job that Inuit are engaged in at the Project will provide insight into the effectiveness of measures intended to support local employment benefits. It will also provide insight into the contribution of the Project to enhancing labour force capacity in areas of strategic importance to local communities.
Absenteeism	Absenteeism generates costs for the Company through increased overtime and reduced productivity. It creates lost opportunity for individuals by reducing career success. Many underlying determinants affect absenteeism. Developing appropriate responses to absenteeism will therefore require broad engagement with community and other agencies.
Turnover rate	Turnover affects productivity. If it is too high, workers will be constantly on a learning curve. Investments in training made by public and private sector funders may be lost. Opportunities for individual advancement may be curtailed. If turnover is too low, opportunities for new entrants to the Project may be limited.

Table 4-15.1 Project Socio-economic Performance Indicators (Cont'd)

Baffinland Performance Indicators	Indicator Rationale
Reasons for termination	Understanding why individuals leave employment at the Project will assist in the assessment of measures intended to bring turnover rates within a desireable range. It may assist in focusing some mitigation / EFAP initiatives as well as to support effective focusing of the applicant selection process.
Environmental performance (VEC monitoring)	Monitoring activities related to terrestrial and marine wildlife and habitats may be relevant to understanding of changes in Inuit harvesting. Key environmental performance indicators will therefore be included in Baffinland's socio-economic performance reporting.
Local procurement expenditures	Reporting of procurement expenditures provides insight into the Project's contribution to the local economy.
Workplace injuries	Reports to the WSCC on workplace injuries will provide insight into the performance and effectiveness of the EHS management plan. Trends in this indicator over time may relate to changes in labour force capacity.
Archaeological protocol compliance	Reports on archaeological compliance provides insight into the level of interaction between the Project and the region's heritage resources.

15.4 COLLABORATIVE MONITORING — COMMUNITY, REGIONAL, TERRITORIAL

Monitoring goal:

The performance monitoring carried out directly by Baffinland is likely to be useful for purposes beyond project-specific monitoring. Likewise, understanding about socio-economic trends in Nunavut, particularly in the North Baffin region and its communities, may be relevant to understanding how performance can be improved through adaptation of the mitigation measures identified in the HRMP.

The purpose of this component of the monitoring framework will be to better understand the root causes or "drivers" of issues that are identified by Baffinland's performance monitoring activities. This understanding will contribute to adaptive management, particularly related to the HRMP.

This area of the monitoring framework will also provide an avenue for Baffinland to participate in public monitoring activities where the Company may have data that can contribute to indicator development, or "indicator clusters," in areas of importance to communities, government, or other agencies. This may include priority areas identified by the Q-SEMC.

Approach to monitoring:

Baffinland will participate with community, regional, and territorial monitoring processes where such collaboration is welcome by these third parties and is considered by Baffinland to be productive as a means to achieve mutually shared objectives.

The settings for this collaboration are expected to be diverse. For example, some individual communities may choose to engage in community-level monitoring initiatives. Where Baffinland has substantial interactions with these communities, the Company would be willing to share information. At the regional level, Baffinland has participated in the Q-SEMC forum. This group is seen to be an effective way to

engage with a regional level of monitoring with leadership from communities across the Qikiqtani Region. Baffinland is also aware of the Nunavut General Monitoring Program (NGMP) and will again be prepared to engage at this territorial level to the extent this is seen to be useful.

Collaboration with government agencies is seen as a further way to share information and gain access to relevant insights related to socio-economic developments at territorial, regional, and community levels. In some instances, these collaborative relationships may lead to specific data-sharing relationships in order to support adaptive management decisions. These relationships will need to take into account issues of data confidentiality. A partnership with the Nunavut Bureau of Statistics, as a portal into the various GN Departments, is envisioned.

15.4.1 Issues where collaborative monitoring is anticipated

Many potential socio-economic issues may be addressed through these collaborative processes. The priorities will be determined by the relevant agencies that generate and maintain the relevant data. Baffinland hopes to participate in forums where issues related to its workforce and the communities it is engaged with can be brought forward. Areas that have been specifically identified where this more complex monitoring may be useful include the following.

Health and well-being

Project-specific health and safety monitoring will be carried out directly by Baffinland. This will include reporting on "Positive Performance Measures" related to risk assessment, work procedures, workplace inspections, employee work safety, reporting timeliness, training completion, safety awareness talks, and safety culture.

The health of individuals and family members can also have a direct effect on things like absenteeism as well as on work performance. This includes understanding physical health and mental health, as well as the range of things that contribute to good health and well-being, such as housing or lifestyle choices. Substance abuse and crime, including family violence, are additional areas of importance to health and well-being.

Monitoring of population health and lifestyle characteristics is expected to involve a partnership between the territorial government (GN) as well as others such as front-line hamlet workers and employers such as Baffinland. Baffinland does not see a leading role for the Company in this area of monitoring but recognizes it may be able to contribute to collaborative monitoring. For example, Baffinland supervisors may have perspectives on worker well-being that may help to interpret health data or identify areas for productive social research.

Education, Life skills, Training

Baffinland seeks to engage local residents as much as possible in its labour force. In addition, Baffinland will implement programs designed to directly improve labour force capacity, as described in Section 3. The company therefore has a clear interest in the performance of Nunavut's education system and other initiatives that aim to improve labour force capacity. Baffinland shares a common interest with others engaged in labour force development to understand trends and identify effective practices in these areas.

The Company also has expressed a commitment to contributing to long-term, sustainable development in the LSA. Part of this commitment includes supporting individuals in gaining skills that are important not only to the Project, but which will also be strategically important to the local economy. Baffinland recognizes that the Project will present a wide diversity of positions that can potentially be filled by local residents. While

individuals will have choice in the positions they seek, the Company is interested in working with Community Economic Development Officers to learn what skills are locally identified to be of importance for the sustainable development of LSA communities. This may be expected to lead to collaborative monitoring of the level of these skill sets in the local labour force.

Employment

The local, regional, and territorial significance of the employment opportunities provided by the Project can best be understood in the context of the broader labour market and trends in this market. Many of the indicators of importance to understanding these trends have been presented in the socio-economic baseline report (Appendix 4A). The Q-SEMC has identified employment—and understanding how and why individuals make the decisions they do in relation to work—as a priority area for on-going monitoring. As a major employer in the region, Baffinland will be in a position to contribute to this broader monitoring effort. This contribution will include reporting the performance indicator data identified earlier (MIEG, absenteeism, turnover, etc.), as well as, potentially, other insights that may be identified by others engaged in public monitoring activities.

Demographics

Population shifts in LSA communities may arise for many reasons, as identified in Section 2, above. This includes in-migration to gain employment, out-migration to seek new opportunities, better services, or to gain education. Population growth can also influence demographic patterns. Given the long-term nature of the Project, Baffinland has some interest in understanding changes taking place in the local populations. This interest may be shared with other agencies.

Baffinland's employment data will not provide clear insight into the nature of migration or demographic changes taking place in the region. However, there may be areas where the Company could collaborate with others to try to understand what trends are taking place, and to help to interpret Baffin Region migration data available from sources such as the Canadian Revenue Agency's T1 Family File (tax forms). To the extent that demographics are identified as a priority issue, and where other data-generating agencies are prepared to share information that sheds light on population demographics, Baffinland may also be able to contribute.

Land use, culture, food security

Understanding traditional land use and the transfer of Inuit culture and skills related to land use, harvesting, food security, and sharing of resources within and amongst households is a priority area for public monitoring identified by the Q-SEMC. Baffinland shares an interest in understanding trends in these areas, recognizing that they are important foundations for building a physically and mentally capable workforce.

The Company anticipates that it may generate data from several sources that could contribute to the initiatives of other agencies in generating understanding in this area. For example, monitoring of Project effects in the biophysical area (i.e., "VEC monitoring") may provide some insight into changes taking place amongst wildlife populations. In addition, the Project will generate some insight into land use through the level of utilization of hospitality i.e., hunters dropping in at Project sites. Engagement of Inuit in the monitoring of VECs such as marine mammals and caribou will also provide a source of knowledge of relevance to understanding Inuit land use, culture, and food security issues.

15.4.2 Summary of Collaborative Monitoring Approach

Table 4-15.2 illustrates how Baffinland data may be combined with data from other agencies to provide insight into various socio-economic processes that may be of interest to Inuit communities, government departments, as well as to the company. The focus of this monitoring, along with the specific indicators and supporting data will need to be developed through an on-going process of collaboration. The Q-SEMC is one forum where this can take place.

Not all of these areas are necessarily expected to attract the level of resources or attention required to gain insight into the processes and their trends. Rather, the table is intended to illustrate the kind of collaboration that may be needed in order to explore areas that are identified by these groups to be priorities for monitoring.

Monitoring of specific indicators that relate to Inuit harvesting—such as effects on caribou, marine mammals, and employment, among others—will be carried out as described elsewhere in the FEIS (Volumes 6, 8 and 4, respectively). However, these narrowly focused monitoring initiatives are not expected to generate an integrated understanding of how Inuit harvesting may be affected from the combination and accumulation of these individual interactions. The following table provides a framework for considering the many dimensions that may influence Inuit harvesting. Given the complex and indirect nature of many of these interactions—along with the concurrent influence of many other trends and interactions unrelated to the Project—analysis of changes in harvesting activity will involve collaboration between many groups.

Table 4-15.2 Indicators and Indicator Clusters

Collaborative monitoring	Possible focus	Sources of Data to Support Development of Indicator Clusters		
		Baffinland	Agency / Government	Community
Health & Well-Being	How is fly-in/fly-out employment influencing the health and well-being of workers, their children, their partners? How is the health of workers and family members affecting job success?	EFAP, SEP, BIM security reports, WSCC safety and incident reports, emergency response data, termination reasons	CRA Taxfiler T1FF data, Nutrition North, NBS - GN Department data (HSS, Education, Finance, Liquor Commission, Justice / RCMP, Nunavut Housing Corporation, etc.), Special Studies.	Schools, front-line social services workers, food bank, breakfast program output; HTO, Local Housing Association, Alcohol Education Committees, local retailers, RCMP
	How is worker absence affecting communities?	SEP	Special studies	Hamlet and social organisation studies.
Education, Lifeskills, Training	Is the local labour force gaining durable capacity that is relevant to the livelihoods people seek to live and to future opportunities?	BIM HR Information System: Absenteeism, reasons for termination, EFAP summary data, training output data, apprentices hosted; SEP issues identification.	GN HR Information System (absenteeism, reasons for termination, EFAP summary data); HSS, Education, GN and Hamlet level (MTO) training output data, other agencies to get at underlying issues	Hamlet HR system (absenteeism, reasons for termination), local employers, front-line educators insight, special studies with youth, students, employers.

Table 4-15.2 Indicators and Indicator Clusters (Cont'd)

Collaborative monitoring	Possible focus	Sources of Data to Support Development of Indicator Clusters		
Employment	What are the things that influence people's decisions and success related to employment?	BIM HR Information System—Absenteeism, reasons for termination, EFAP summary data.	GN HR Information System (absenteeism, reasons for termination, EFAP summary data); HSS, Education, GN and Hamlet level (MTO) training output data, other agencies to get at underlying issues	Hamlet HR system (absenteeism, reasons for termination), local businesses, front-line worker insight (e.g., principles), special studies with youth, students, employers.
Demographic changes & mobility	Are there demographic changes occurring and if so, what are the roots of this change?	BIM HR Information system.	Statistics Canada / Nunavut Bureau of Statistics / GN Finance (net migration to Baffin Region based on CRA - Tax File T1FF, Census data - Percentage Inuit in population by community); GN HR Information System.	Effects of in-migration and out-migration on community - anecdotal reports, housing data, school enrollment, special studies/local surveys.
Land use, culture, food security	How is Inuit harvesting changing? Is food security amongst local households improving? What are the factors that are leading to these changes?	In addition to VEC monitoring and Project-specific land-use and travel data, Baffinland may have additional insight or data of value to those seeking to monitor harvesting, culture, and food security issues.	Harvester support program data, special studiies, Nutrition North data, GN HSS nutritional studies, NBS, IPGs, NGMP.	Special studies, IQ workshops, local surveys, HTO knowledge.

Table 4-15.3 Conceptual Analysis of Project – Harvesting Interactions

Dimension of Harvesting	BIM	Agencies	Communities
Decline in target wildlife population numbers or health attributable to biophysical Project interactions	VEC monitoring	QIA, GN, NWMB	HTOs, hunters, IQ studies
Decline in target wildlife population numbers due to local socio-economic change or other factors	VEC monitoring	QIA, GN, NWMB, Arctic Council, etc.	HTOs, hunters, IQ studies
Change in Inuit sharing traditions		QIA	HTOs, hunters, IQ studies
Increase in the sale of country food	Procurement	QIA, HSS	HTOs, hunters, IQ studies
Socio-economic or demographic shift in who engages in harvest activities		QIA, NBS, Statistics Canada	HTOs, hunters, IQ studies
Change in harvesting knowledge and skills		QIA	HTOs, hunters, IQ studies

Table 4-15.3 Conceptual Analysis of Project – Harvesting Interactions

Dimension of Harvesting	BIM	Agencies	Communities
Change in interest in harvesting		QIA	HTOs, hunters, IQ studies
Change in timing of harvest activities		QIA	HTOs, hunters, IQ studies
Change in preferred harvest locations		QIA	HTOs, hunters, IQ studies

15.5 MONITORING TO SUPPORT MANAGEMENT SYSTEM AND ADAPTIVE PROCESSES

Monitoring goal:
Baffinland's direct performance monitoring as well as the collaborative monitoring carried out with other agencies will be useful in supporting the process of adaptive management of the various measures that will be implemented to minimize adverse effects and maximize benefits from the Project. The goal will be to analyse the monitoring data in order to assess the effectiveness of current practices; obtain early warning should mitigation measures not be achieving their intended outcome; and provide timely detection of unanticipated outcomes. The outcome of this adaptive process will be on-going learning and improvement of the Project.

Approach:
Baffinland's EHS system defines the sequence of "Policy – Planning – Implementation and Operation – Checking and Corrective Actions – Management Review Process" that must be in place to ensure that the Mary River Project is executed in an environmentally and socially acceptable manner and in a spirit of continuous improvement and employs adaptive management principles.

The EHS system and its associated management plans are Life of Project Management Plans. They apply from the onset of the exploration phase, through pre-development activities, construction, operation and closure phases of the Project. The application of the continuous improvement principle, also known as adaptive management (Policy – Planning - Checking and Corrective Actions – Management Review Process) ensures that the various environmental management plans are appropriate for the level of activities on site at all times. Adaptive management is the application of mitigation measures when management review processes identifies potential adverse direct effects caused by the project.

Monitoring to support adaptive management decisions involves analysis and information flow. The multiple sources of quantitative and qualitative "output" and "outcome" data derived from Project-specific as well as community/regional/territorial monitoring activities will be useful in checking the effectiveness of activities related to supporting socio-economic objectives, as well as the joint QIA / Baffinland initiatives such as the INPK Fund, Business Capacity Fund, and the engagement of Inuit Employment and Training Coordinators that will be implemented through the IIBA.

Information from Project-specific monitoring may also serve to support adaptation of government and hamlet-level services. The value of Project monitoring for this purpose will depend on the extent to which Baffinland and these agencies share mutual interests and relevant data.

Information from collaborative monitoring will help to check the effectiveness of mitigation initiatives. For example, are public education efforts to improve literacy and numeracy succeeding in providing individuals with the skills they require to succeed in Company-delivered skills training programs? This area of monitoring and analysis may also include the gathering of knowledge or participation in third-party initiatives

to gather knowledge from Northern mines in order to support the development and application of best practices.

Link into Corrective Actions and Management Decisions

Appropriate links between monitoring and management needs to be in place both at the Company level as well as in hamlet and territorial government agencies. Communications to support the flow of monitoring information into decision-making is therefore an important function of the monitoring program.

Within the context of the IIBA, information will flow from monitoring activities to the decision-making process through the joint Baffinland – QIA Executive Committee and Management Committee. The flow of appropriate and timely information to other agencies such as GN Departments will be enhanced by efforts to build collaborative relationships with these groups.

Socio-economic monitoring data will assist in on-going assessment of the focus and effectiveness of planned mitigation activities. Consideration of the outcomes of work readiness training may be expected to lead to modifications in these programs to continually improve their effectiveness.

An example of where turnover or absenteeism rates may drive decision-making and program improvement would be if the Company were to notice higher turnover from one particular community compared to others. Baffinland could then investigate what actions or inactions were taking place in that community compared to others in order to focus efforts aimed at improving those rates.

Baffinland would also look closely at reasons for termination/departures. If, for example, home life challenges were arising, the Company could make clearer during the recruitment and interview period the challenges of the work and also strengthen the work-ready program in these respects. Extra support could also be provided through the Employee and Family Assistance Program (EFAP), Elders-On-Site and community-based mechanisms delivered through the Baffinland Liaison Officers.

Monitoring will also link into on-going assessment of the effectiveness of mitigation measures that are implemented in order to achieve benefits and to reduce adverse impacts that have been considered in the FEIS.

Surveillance to provide early warning of emerging issues can also be implemented. This early warning monitoring is intended to provide early detection of problems that may be emerging so that appropriate response can be put in place. For example, on-going relationships with local educators may provide early insight into how children are responding to their home situations. In some instances this sort of early detection may lead to efforts to activate available support measures; in others it may identify gaps in available services. In some cases, surveillance monitoring may identify issues that were not foreseen and for which new mitigation measures or service responses are called for.

Adaptation of the Monitoring Program

The socio-economic monitoring program itself is designed to adapt to changing information needs of the Company and other stakeholders. Some indicators that are of priority concern early on in the Project may become less important, while others may emerge as more important. Continual improvement of socio-economic monitoring is needed through on-going and periodic detailed reviews to ensure that the right information flows to the right individuals and agencies in a timely manner to support decision making. Best practices from other relevant projects may help in this process of improvement.

15.6 MONITORING TO UNDERSTAND SOCIO-ECONOMIC PROCESSES

Monitoring goal:
To contribute to the on-going expansion of knowledge related to interactions between communities and resource projects in Nunavut.

Approach:
The impact assessment presented in the FEIS is based on the best information that is available to support understanding of how the Project will interact with the people and economy of the LSA. However, knowledge is recognized to be incomplete in many areas raising a level of uncertainty. For example, the effect that new opportunities for employment will have on successful completion of school has not yet been documented in the context of Nunavut.

EIS prediction validation is a longer-term effort to expand the knowledge base of mining – community interactions that should improve the focus of future NIRB processes. Efforts to explore impact prediction may also help to focus monitoring by identifying unanticipated effects or outcomes that are not in-line with predicted trends.

The FEIS includes predictions and assumptions related to socio-economic interactions with the Project and, more generally, with wage employment, increased household income. The following list outlines a few of these socio-economic relationships that may merit further investigation:

- Availability of accessible employment opportunities will lead to increased valuing of education;
- Locally available fly-in/fly-out jobs will have complex interactions with migration decisions;
- Increased household income will be generally beneficial to children in these households through various interactions including improved food security;
- The effects of fly-in/fly-out employment on substance abuse are complex but generally beneficial over time; and
- Effects of fly-in/fly-out job opportunities on traditional harvesting activities will be multi-faceted.

It is well understood that these underlying socioeconomic relationships and conditions will respond to a wide range of influencing factors. In some instances, agencies or groups may seek to identify cause-and-effect relationships. In other instances, the goal may be to improve understanding of Nunavut society and its economy in order to improve policy or to design services.

As with its participation in collaborative monitoring activities, Baffinland may participate in activities intended to better understand socio-economic relationships when the Company has relevant data and to the extent that the initiative is seen to be useful to achievement of enhanced benefits for residents of the LSA.

15.7 COMPLIANCE MONITORING

Project monitoring will include monitoring for compliance with several socio-economic requirements. The IIBA, for example, will include a MIEG that the Company will be expected to use best efforts to achieve. Monitoring Inuit employment will address compliance with this goal. The monitoring will address whether the MIEG is being met, should it change, what are the factors related to achievement or lack of achievement? Are some groups more successful in gaining access to employment than are others?

Another compliance issue that will be monitored includes the protection of cultural and archaeological artifacts. Archaeological protocols will be monitored as required to determine whether they being met and effective in achieving goals related to protection of artifacts.

The possibility that a Development Partnership Agreement may be negotiated with the GN in return for a fuel tax rebate is also acknowledged. Should such an agreement be negotiated and agreed to by Baffinland, some level of monitoring may be required to ensure compliance with the terms of agreement.

15.8 IMPLEMENTATION CONSIDERATIONS

15.8.1 Community & Inuit Engagement In Monitoring and Mitigation Planning

Inuit and other community members will be involved in the on-going implementation, review and adaptation of monitoring initiatives and mitigation design. The following mechanisms will provide opportunities for participation:

- Engagement of Baffinland Liaison Officers and Inuit Employment Coordinator and other company managers/supervisors to provide insight and improve communications between the company and communities;
- Baffinland Stakeholder Engagement Plan activities, and Inuit involvement in VEC monitoring programs;
- Participation in the Q-SEMC which is structured to support community input and direction into socio-economic monitoring through its primary composition of hamlet mayors and other officials;
- Participation in the joint QIA / Baffinland IIBA Executive and Management Committees which will make decisions related to initiatives designed to improve access of Inuit to opportunities and to mitigate impacts at community level;
- QIA Mary River Project Review Committees; and
- Communication and collaboration with Inuit front-line service providers in communities.

Inuit involvement will help to identify underlying drivers of the performance indicators, such as causes of absenteeism, and appropriate management responses. Inuit involvement will also help to identify areas where indicators may need to be developed in order to better understand emerging issues related to the Project. This function will be to ensure that monitoring can address “What Inuit want to know.”

Access to Inuit participation is a key component of the monitoring framework. Inuit involvement is built into the structure of the IIBA, with IIBA reports being delivered to the joint QIA – BIM Executive Committee. Additional forums to provide information flow between Inuit and the Project may be included under the IIBA agreement. Additional avenues for Inuit participation are provided through Baffinland’s Northern Affairs office in Iqaluit, and the Baffinland Liaison Officers that will be located in the North Baffin LSA communities. On-going community engagement will be carried out throughout the Project, as described in the Stakeholders Engagement Plan (SEP) (Volume 10, Appendix 10F-1). Participation in the Q-SEMC will provide a further forum for Inuit involvement, as many of the elected municipal representatives on this committee are Inuit.

15.8.2 Process for Indicator Development and Analysis

Baffinland will develop the specific measures and methods to present the performance indicators identified earlier. Reporting on these indicators may raise new questions within the Company or amongst other stakeholders which may require new indicators or modification of the methodology.

Baffinland will manage its human and procurement data using an electronic information system. Analysts hired by the Company will be able to extract data from this system in order to generate key performance

indicators. Additional data will be drawn from training course records, Inuit Employment and Training Coordinators' reports, and other sources.

Development of indicators arising from collaborative processes will involve both the party that is interested in gaining insight into a particular question, as well as the party that generates the data. Specific roles and practical considerations related to indicator development, methodology, data extraction & analysis, and reporting will be determined within this context.

Baffinland recognizes that some of these relationships may require clear agreements with the appropriate Departments in order to set out parameters for sharing of data and information so that confidentiality and privacy is not breached. In some instances formal agreements may be useful to facilitate this process.

Three main tasks are understood to be of importance in this process:

- Data collection (may involve one or more parties)
- Analysis and interpretation (may involve the same or different parties as collection)
- Mitigation or management response (depends on who has the role/responsibility)

In the analysis and interpretation of indicators, Baffinland recognises that community perceptions are an important source of insight and a good lens through which to consider issues. For example, community consultation identified local perceptions that the employment numbers reported for the bulk sample activities did not reflect the actual numbers that were hired. Opportunities to talk about perceptions and ways of observing will be available through entities such as the Q-SEMC.

15.9 REPORTING

The indicators and mitigation adaptations arising from the monitoring processes described above will be presented in the appropriate quarterly and annual reports to NIRB, to the IIBA Executive Committee, and to other audiences such as in presentations to the Q-SEMC.

The following sections provide an outline of this reporting as it is presently conceived. Reporting requirements identified in the final IIBA may lead to modifications in IIBA – mandated reporting.

15.9.1 Annual Socio-economic Report to NIRB

Baffinland will prepare an annual socio-economic report presenting Baffinland performance data. This report will also provide relevant public data related to IIBA monitoring, as detailed below.

These annual reports will describe the Company's participation in collaborative monitoring processes and any activities related to understanding socio-economic processes. The results of these multi-party monitoring and socio-economic research initiatives will be reported as appropriate by the lead agencies involved.

15.9.2 Presentations to Collaborative Partners Such as Q-SEMC, Communities, Departments

From time-to-time Baffinland expects to participate with agencies such as the Q-SEMC and with various Departments or communities that may be engaged in specific socio-economic monitoring efforts. In these instances, the Company will prepare presentations, drawing data from existing reports and from other internal data as available.

15.9.3 IIBA - Periodic Reports from Baffinland – Economic Provisions

Baffinland will supply quarterly reports that will include:

- A list of all positions active in all phases of the Project over the previous three months with Baffinland directly or with contracts or subcontracts;
- A list of Inuit employed in the positions listed in Section 10.1.1;
- The extent to which the MIEG has been achieved on all active contracts;
- A list of training activities underway in all aspects of the Project and Inuit participation in those activities;
- A description of training activities pending in the next six months;
- A list of current Project contracts and extent of participation of Inuit firms in those contracts;
- A list of current Project subcontracts and extent of participation of Inuit firms in those subcontracts;
- An account of any enforcement issues;
- An account of any arbitration underway or pending; and
- Education or promotion of education initiatives.

All reports will contain relevant age and gender-based data. Distinction between Inuit and non-Inuit data will also be included where appropriate.

15.9.4 Periodic Reports from Baffinland – IIBA Environmental Provisions

As per the terms of its Water Licence, Baffinland will report on a number of environmental issues. These environmental report requirements are detailed in each of Baffinland`s Environmental Mitigation and Management Plans.

15.9.5 IIBA - Annual Implementation Report

Baffinland will prepare an Annual IIBA Implementation Report each year, for submission to the IIBA Executive Committee. This report will include:

- An Inuit Participation Report containing information on Inuit training and employment, contracts and economic benefits
- A report describing annual achievement of workplace initiatives, including social and cultural objectives
- An annual implementation budget report
- Additional reports as directed by the Executive Committee

15.9.6 IIBA - Inuit Participation Report

Baffinland will prepare an annual Inuit Participation Report containing information on Inuit training and employment, contracts, and economic benefits. This report will include:

- A joint report from Baffinland and QIA Inuit Employment and Training Coordinators outlining progress of training programs, number of Inuit trained as well and success rate of training programs, including:
    - a list of training programs provided under the Inuit Human Resources Strategy
    - number of hours of training received by Inuit in these programs
    - percentage of Inuit who successfully completed the training
    - number of graduates who were subsequently hired by contractors and subcontractors
- Details of all training and education initiatives, including but not limited to:
    - activities of the employment and training fund and any additional funding from outside sources
    - achievement awards and scholarship
    - use of Inuktitut and Inuit instructors
    - pre-employment preparation
    - adult education

- construction phase training program
- Operation Phase training program
- training programs for contract and subcontract activities
- management and advanced skills training
- company education initiatives
- any other measures for optimizing Inuit employment and training
- description of Baffinland's success in achieving the MIEG during the previous calendar year, including, where possible and without limitation:
- total number of person days worked by all employees including training positions, by Representative Occupational Grouping
- total number of person days worked by Inuit, by Representative Occupational Grouping
- percentage of total person days worked by Inuit, by Representative Occupational Grouping
- total dollar value of Inuit payroll in the preceding year
- additional steps Baffinland will take to recruit potential Inuit employees
- any measures Baffinland has taken or proposes to take to increase Inuit employment, including details of any Inuit recruitment programs, training or apprenticeship programs, and equivalencies for formal qualifications
- where the MIEG is lower than the projection provided under Section 7.14, a description of how Baffinland could achieve the projection for Inuit employment

- Other details regarding Inuit employment initiatives, including:

  - Inuit Recruitment and Selection Program
  - retention, advancement and career development
  - Inuit women's access to employment
  - student employment
  - description of how Baffinland intends to maximize Inuit contracting and subcontracting opportunities, including, where possible and without limitation, names, address, and particulars of any actual or proposed Inuit contractors and subcontractors; and specifics of any actual or proposed contracting arrangements
  - analysis of Inuit participation in contracting and subcontracting covering annual and cumulative results by contract type

15.9.7 IIBA - Workplace Initiatives

As part of the annual implementation report, Baffinland will prepare a progress report on workplace initiatives, including:

- Cultural recognition;
- Inuit preparedness for the workplace;
- Affirmative steps for attracting female employees;
- Counselling and support services;
- Availability of country food;
- Code of Conduct and Anti-Harassment/Discrimination Policy;
- NLCA Rights of Inuit, including Employees to Pursue Traditional Activities;
- Wildlife harvesting and firearms; and
- Communications.

Baffinland will prepare an annual report specifically on progress with the "Inuktitut in the Workplace" policy.

15.9.8 Frequency of reporting

Table 4-15.4 Reporting Frequency

Report	Frequency	Responsibility	Recipient
Socio-economic Report to NIRB	Annual	Baffinland	NIRB, public distribution
Presentations to Collaborative Partners	Periodic	Baffinland	Partner groups e.g., Q-SEMC
IIBA - Economic Provisions Report	Periodic	Baffinland	IIBA Executive Committee
IIBA Implementation Report	Annual	Baffinland	IIBA Executive Committee
IIBA - Inuit Participation Report	Annual	Baffinland	IIBA Executive Committee
IIBA - Workplace Initiative Report	Annual	Baffinland	IIBA Executive Committee
IIBA - Current list of Nunavut Inuit and Inuit firms from Baffin region that appear to be capable of providing goods and services to the Project	Annual	Baffinland QIA	
IIBA - Reports that demonstrate the extent of compliance with Inuit content for work done by Baffinland, or for contracts and related subcontracts	Quarterly	Baffinland, all contractors and subcontractors	IIBA Management Committee
IIBA - Reports on workplace conditions	Quarterly	Inuit Employment and Training Coordinators IIBA Coordinator	IIBA Executive Committee

SECTION 16.0 - CONCLUSIONS

The Mary River Project represents important and significant socio-economic benefits to Nunavut. These benefits will apply at the level of North Baffin communities, the Baffin Region, and to the territory overall. These effects are expected to arise primarily from employment of local residents as well as the training and education benefits associated with these employment opportunities. Increased human health and well-being, associated with the benefits of meaningful employment, increased self-reliance, and a reduction in poverty levels is anticipated. Other beneficial effects will arise from the Project's tax payments to government and from resource royalty and IIBA payments to Inuit organizations. Beneficial effects are also expected to arise from procurement of goods and services from Inuit and northern businesses and from the associated capacity building within the business sector, both locally and on a regional level. These benefits represent value both in their short-term contribution of income to households, enterprises, and organizations as well as over the long term through their positive contribution to the capacity of individuals, businesses, and organisations.

An important consideration addressed in this Volume has been the question of the Project's interactions and overall effects on Inuit hunters. The outcome of the Project on harvesting and land-use activities will arise from the combined interactions of the Project on a wide range of factors that influence these activities. This includes effects on marine and terrestrial wildlife as well as effects on the human environment through interactions ranging from household income, rotational work, ability to travel across ice and land due to the Project's rail and shipping components. These effects have been considered throughout the FEIS and are summarized in this Volume. The potential for beneficial outcomes on harvesting activities overall is equally or more highly anticipated than the potential for overall negative outcomes. However, the range of interactions and the diversity of individual engagement in these activities mean that a wide diversity of responses will be experienced. Baffinland has heard the concerns raised by community residents and agencies, and acknowledges that some disruption will be caused by the Project. The detour around Steensby Inlet caused by the ship track is a specific example of the sort of disruption that is anticipated. The Company has committed to on-going Inuit engagement and collaborative monitoring around this issue.

The benefits represented by the Project will not come without a cost. In particular, the fly-in/fly-out lifestyle can be challenging for many families and children. Mitigation to support workers and their families will not remove the fact that workers will be away from their community for half the time. For families that succeed in adapting to this lifestyle the rewards may be considerable in a financial sense and from the increased mental well-being that often comes with economic self-reliance and meaningful work. Additionally, increases in income will allow individuals to purchase expensive equipment for the pursuit of traditional activities such as hunting. Having two weeks off the job to spend with family and in other pursuits such as going out on the land, may be an added benefit. For those for whom the fly-in/fly-out lifestyle does not work so well, the hope is that local economic development stimulated by the Project will generate employment opportunities in the community. The reality is that such effects will require considerable planning and coordination amongst community leaders and territorial partners.

Other potential costs of the Project may arise from the increased affordability of illegal substances, potentially leading to greater substance abuse and lost opportunities. The possibility that some young adults may choose work over school completion has also been noted as a potential negative outcome. In both these situations, the Project is expected to alter the playing field for individuals faced with these

decisions. With this Project in place, the rewards will be substantially increased (from what they are under baseline conditions) for many of those who overcome addictions or who gain education.

Simply introducing new opportunities for education, training and employment may have major beneficial effects on the outlook for the future for many young people. These cost-benefit effects, however, rely on a sufficient number of individuals succeeding and being seen to succeed, in these areas of opportunity. This includes success in gaining life skills and maintaining employment, success in job promotions and career advancement, and success in business development related to the Project. In all these areas, early, recognizable success will act as a catalyst to encourage others to succeed.

The importance of the successful implementation of mitigation measures is emphasized throughout the assessment. These measures are critical for the achievement of significant positive effects in areas of employment, career advancement, enhancement of labour force capacity, growth of the local business sector, and achievement of community development objectives. These positive outcomes will also rely on the choices and contributions made by individuals and institutions. The Project will create conditions for benefits to individual, household, community, and regional well-being and self-reliance. However, these outcomes will be realized only through concerted and to some degree, coordinated, efforts on many fronts.

Given the importance of on-going mitigation and partnership activities, monitoring of Project outcomes and changes generally taking place in the socio-economic environment will be critically important to support effective management response. Maintaining close communication with residents and local leaders through on-going stakeholder engagement will be key to detecting successes and failures so that they can be built upon or addressed, as appropriate. Gathering Project-generated data and participation in collaborative efforts to track broader socio-economic indicators will be useful in discussions with local leaders and others with community perspectives.

SECTION 17.0 - AUTHORS

Impact statements for population demographics; education and training; livelihood and employment; human health and well-being; economic development and self-reliance; contracting and business opportunities; community infrastructure and public services; benefits, royalty and taxation; and government and leadership were prepared by Doug Brubacher, of Brubacher Development Strategies Inc. (lead socio-economic specialist). The economic impact report was prepared by Eric Howe, B.A., Ph.D. The cultural resources impact assessment was prepared by the Project archaeologist Claude Pinard, M.Sc., with the assistance of Carole Burnham, Ph.D, P. Eng., B.C.E.E. Impact statements for resources and land-use and cultural well-being were prepared by Anna Potoczna and Richard Cook of Knight Piésold Ltd.

SECTION 18.0 - REFERENCES

1. Brubacher and Associates. 2002. *The Nanisivik Legacy In Arctic Bay – A Socio-Economic Impact Study*. Prepared for the Government of Nunavut, Department of Sustainable Development. 87 p.
2. Brubacher Development Strategies. 2009. *Jericho Diamond Mine: 2007 Socio-Economic Monitoring Report*. Prepared for the Kitikmeot Socio-Economic Monitoring Committee. 80 p.
3. *Canada National Marine Conservation Areas Act*, S.C. 2002, c. 18.
4. *Canadian Environmental Protection Act*, S.C. 1999, c. 33.
5. Canadian Mortgage and Housing Corporation (CMHC). 2011. Northern Housing Report. Available online at: www.cmhc.ca/housingmarketinformation.
6. Clifford, S.A. 2009. *The effects of fly-in/fly-out commute arrangements and extended working hours on the stress, lifestyle, relationships and health characteristics of Western Australian mining employees and their partners*. Ph.D. Thesis, University of Western Australia.
7. Clinton, G. and S. Vail. 2008. *2008 Nunavut Economic Outlook: Our Future to Choose*. Prepared for Nunavut Economic Forum. 92 p.
8. Conference Board of Canada. 2001. Nunavut Economic Outlook. Available at: http://www.nunavuteconomicforum.ca/public/files/library/REPORTSO/NUNAVU~1.PDF
9. Conference Board of Canada. 2010. *Northern Outlook January 2010 – Economic Forecast*. Ottawa, Ontario. 38 p. Available at: Nunavut Economic Forum: http://www.nunavuteconomicforum .ca/public/files/library/REPORTSO/Northern %20Outlook %20January %202010.pdf.
10. Crowe, K. 1970. A Cultural Geography of Northern Foxe Basin, N.W.T. Department of Indian Affairs and Northern Development, Ottawa.
11. Elias, P.D. 1995. *Northern economies*. In Northern Aboriginal Communities: Economies and Development.
12. Finance Canada. 2010. *Federal Support to Provinces and Territories*. Available online at: http://www.fin.gc.ca/fedprov/mtp-eng.asp.
13. Gallegos, D. 2006. *Aeroplanes always come back—Fly-in/fly-out employment: managing the parenting transitions.* Murdock University Centre for Social and Community Research with Ngala and Meerilinga. Perth, Western Australia. 115 pp.
14. Government of the Northwest Territories, 2008. *Communities and Diamonds, 2008 Annual Report.*
15. Government of Nunavut. 2010a. *Fiscal and Economic Outlook*. Department of Finance. 35 p.
16. Government of Nunavut. 2010b. *Capital Estimates 2010–2011*. Department of Finance.
17. Government of Nunavut. 2005. *Parnautit: A Foundation for the Future – Mineral Exploration and Mining Strategy*. Department of Economic Development and Transportation.
18. Government of Nunavut, Health and Social Services. 2004. *Nunavut Report on Comparable Health Indicators*. Department of healthand Social Services. 39 p.
19. Government of Nunavut and Nunavut Tungavik Incorporated. 2006. *Nunavut Adult Learning Strategy.*

20. Government of New Zealand. 2008. . *Cultural Well-being: What is it?* Ministry for Culture and Heritage. Available online at: www.culturalwellbeing.govt.nz/files/Cultural Wellbeing PDF 2008.pdf

21. GSGislason and Associates Ltd. 2005. *Benefits of SGH—Seven Communities in Nunavut*. Prepared for Small Craft Harbours, Fisheries and Oceans Canada. Winnipeg, Manitoba.

22. Hamlet of Arctic Bay. 2007. *Community Economic Development Plan – 2007*. Prepared by the Hamlet of Arctic Bay.

23. Hobart, C.W. 1976. Work Rotation in the Northwest Territories. Department of Economic Development. 738 p.

24. Hobart, C.W. Work aspirations and physical mobility interest of young Inuit in Gjoa Haven, Northwest Territories. Polar Gas Project. 116 p.

25. Human Resources and Skills Development Canada (HRSDC). 2006. *National Occupational Classification Matrix 2006*. Available online at: http://www5.hrsdc.gc.ca/noc/english/noc/2006/pdf/Matrix.pdf.

26. Indian and Northern Affairs Canada (INAC). 2010. *Food Mail A shipments based on Canada Post data provided by INAC*, July 2010.

27. InterGroup Consultants. 2005. *The Impact on Families and Communities of the FIFO Work Rotation System in Uranium Mines in Northern Saskatchewan*. Prepared for the Community Vitality Monitoring Partnership Program Steering Committee. 69 p.

28. Inuit Qaujumajatuqanginnut Task Force. 2002. *The First Annual Report of the Inuit Qaujimajatuqanginnut (IQ) Task Force*. Available online at: http://www.inukshukmanagement.ca/IQ%20Task %20Force %20Report1.pdf.

29. Kaczmarek, E.A. and A.M. Sibbel. 2008. The psychosocial well-being of children from Australian military and fly-in/fly-out (FIFO) mining families. *Community, Work, and Family* 11(3): 297-312.

30. LaForte, J. 1991. *Long distance commuting in the mining industry: a wife's point-of-view*. CIM Bulletin. September 1991.

31. Mary-Rousselière, G. 1968. Reconnaissance archéologique dans la region de Pond Inlet, Territoires du Nord-Ouest. Centre d'Études Nordiques, Université Laval, Québec, Travaux Divers No. 21.

32. Mary-Rousselière, G. 1969. Exploration archéologique de la côte ouest d'Eclipse Sound et de Milne Port. Report on file, Canadian Museum of Civilization, Ottawa.

33. Mary-Rousselière, G. 1976. The Paleo-Eskimo in Northern Baffinland. In Eastern Arctic Prehistory: Paleoeskimo Problems, edited by Moreau Maxwell, pp. 40-57. Memoirs of the Society for American Archaeology No. 31.

34. Mary-Rousselière, G. 2002. Nunguvik et Saatut. Sites paléoeskimaux de Navy Board Port, Île de Baffin. Mercury Series, Archaeology Paper162. Canadian Museum of Civilization. Ottawa.

35. Mathiassen, T. 1927. Archaeology of the Central Eskimos. Vol. 4 in Report of the Fifth Thule Expedition, 1921-24. Gyldendalske Boghandel, Nordish Forlag, Copenhagen.

36. Maxwell, M. S. 1985. Prehistory of the Eastern Arctic. Academic Press, Inc., Orlando.

37. Maxwell, M. S. 1976. Pre-Dorset and Dorset artifacts: The view from Lake Harbour. In M.S. Maxwell (Ed.) Eastern Arctic prehistory: Paleoeskimo problems, Society for American Archaeology, Memoir, 3138-78.

38. McGhee, R. 1996. Ancient People of the Arctic. UBC Press, Vancouver

39. Meldgaard, J. 1960. Prehistoric culture sequences in the Eastern Arctic as elucidated by stratified sites at Igloolik. Selected papers of the 5th International Congress of Anthropological and Ethnological Sciences, 1956. Philadelphia: University of Pennsylvania Press. 588–595.

40. Meldgaard, J. 1962. On the formative period of the Dorset culture. In: Campbell, J., ed. Prehistoric cultural relations between the Arctic and the temperate zones of North America. Technical Paper 1. Montreal: The Arctic Institute of North America. 92– 95.

41. Milton Freeman Research. 1976. Inuit Land Use and Occupancy Project. Prepared for Department of Indian Affairs and Northern Development.

42. Minister of Justice. 2008. "Northwest Territories and Nunavut Mining Regulations. C.R.C., c. 1516." http://laws.justice.gc.ca/PDF/C.R.C._c._1516.pdf.

43. North Sky Consulting Group. 2009. *Qanukkanniq? The GN Report Card: What We Heard Report*. Prepared for the Government of Nunavut. 57 p.

44. Northwest Alaska Native Association and Cominco. 1998. *Shared Values, Common Goals, Exceptional Results: The Red Dog Mine Story*. Kotzebue, AK.

45. Nunavut Arctic College. 2008. "Nunavut Arctic College Corporate Plan, 2008 to 2013." http://www.arcticcollege.ca/publications/corporate/CorporatePlan2008-final.pdf.

46. Nunavut Arctic College. 2010. Presentation at the 2010 Nunavut Mining Symposium, Iqaluit. http://www.nunavutminingsymposium.ca/wp-content/uploads/2010/05/Shouldice-NAC.pdf.

47. Nunavut Bureau of Statistics. 2011. Nunavut Housing Needs Survey – Fact Sheets.

48. Nunavut Impact Review Board (NIRB). 2009. *Guidelines for the Preparation of an Environmental Impact Statement for Baffinland Iron Mines Corporation's Mary River Project (NIRB File No. 08MN053)*. Dated November 16, 2009.

49. Odess, D. 2003. An Early Arctic Small Tool tradition structure from interior Northwestern Alaska. *Inuit Studies* 27(1): 13-27

50. Park, R.W. 1993. The Dorset–Thule Succession in Arctic North America: Assessing Claims for Culture Contact. American Antiquity 58:203–234.

51. Parks Canada. 2010a. *National Marine Conservation Areas of Canada*. Available online at: http://www.pc.gc.ca/eng/progs/amnc-nmca/index.aspx.

52. Parks Canada. 2010b. *Feasibility Assessment for the Proposed Lancaster Sound National Marine Conservation Area: The Study Area*. Available online at: http://www.pc.gc.ca/eng/progs/amnc-nmca/lancaster/carte-map.aspx.

53. Pauktuutit. 2006. *National Strategy to Prevent Abuse in Inuit Communities* and *Sharing Knowledge, Sharing Wisdom: Guide to the National Strategy*. Available at http://www.pauktuutit.ca/pdf/publications/abuse/InuitStrategy_e.pdf. Accessed 2010.

54. Pauktuutit. 2007. *National Aboriginal Women's Summit – Strong Women, Strong Communities*. June 20-22, 2007. Corner Brook, NL. Available online at: http://www.laa.gov.nl.ca/laa/naws/pdf/SexualHealth.pdf.
55. Priest, H. and P.J. Usher. 2004. *The Nunavut Wildlife Harvest Study*. Prepared for the Nunavut Wildlife Management Board.
56. Qikiqtani Inuit Association. 2007. *About Us*. Available online at: http://www.qia.ca/i18n/english/about.shtm.
57. Rowley, G., and S. Rowley 1997. Igloolik Island Before and After Jorgen Meldgaard. In Fifty Years of Arctic Research, edited by R. Gilberg and H. C. Gulløv, pp. 269-276. Publications of the National Museum Ethnographical Series, 18. Department of Ethnology, National Museum of Denmark, Copenhagen.
58. Rowley, G. 1940. The Dorset Culture of the Eastern Arctic. American Anthropologist 42:490-499.
59. Rowley, S. 2002 Inuit Participation in the Archaeology of Nunavut: A Historical Overview. In Honoring Our Eiders: A History of Eastern Arctic Archaeology, edited by W. W. Fitzhugh, S. Loring, and D. Odess, pp. 261-271. Contributions to Circumpolar Anthropology 2. National Museum of Natural History, Smithsonian Institution, Washington, D.C.
60. Savelle J.M., A.S. Dyke, and M. Poupart. 2009. The Northern World AD 900-1400 edited by Herbert Maschner, Owen Mason and Robert McGhee. The University of Utah Press, Salt Lake City. pp. 209-234.
61. Savelle, J. M. 2004. Preliminary Report of Archaeological Investigations in Foxe Basin Nunavut. Report on file, Canadian Museum of Civilization, Ottawa.
62. Sibbel, A.M. 2001. *The Psychosocial Well-Being of Children from FIFO Families*. BA (Psychology) Report. Edith Cowan University. 78 p.
63. Silburn S.R., S.R. Zubrick, J.A. De Maio, C. Shepherd, J.A. Griffin, F.G. Mitrou,R.B. Dalby, C. Hayward, and G. Pearson. 2006.. *The Western Australian Aboriginal Child Health Survey: Strengthening the capacity of Aboriginal children, families and communities.* Perth: Curtin University of Technology and Telethon Institute for Child Health Research.
64. Sivummut Economic Development Strategy Group. 2003. *Nunavut Economic Development Strategy: Building a Foundation for the Future.* 93 p. Available online at: http://www.nunavuteconomicforum.ca/public/files/strategy/NUNAVUTE.PDF
65. Statistics Canada. 2004. *Mortality, Summary List of Causes*. See Catalogue No. 84FR0209.
66. Statistics Canada. 2000. *Classification of Instructional Programs.* See Catalogue 12-590-XIE.
67. Story, Keith and Mark Shrimpton. 1988. *Long Distance Labour Commuting in the Canadian Mining Industry*. Queen's University Centre for Resource Studies, Working Paper No. 43.
68. United States Government Central Intelligence Agency (CIA). 2007. *CIA World Factbook.* Available online at: https://www.cia.gov/library/publications/the-world-factbook/geos/ca.html.
69. Vestey, J. G. 1974. Igloolik Eskimo Settlement and Mobility, 1900-1970. M. A. Thesis in Geography, McGill University.

70. Voisey's Bay Nickel Company (VBNC). 1997. Voisey's Bay Mine/Mill Project Environmental Impact Statement - Historic Resources.

SECTION 19.0 - DEFINITIONS AND ABBREVIATIONS

19.1 DEFINITIONS

Baseline	Environmental settings in the Project area as they exist naturally or pre development, against which changes in the environment from a project can be assessed.
Bulk sample	A large ore sample extracted as a test for the purpose of demonstrating the quality of an ore and/or the economic viability of mining the ore.
Cumulative effects	Refers to effects that result from incremental changes caused by interactions between the Project and other past, present, or reasonably foreseeable future projects or activities.
Demography	The statistical study of populations, with particular reference to births, deaths, migratory movements, age and sex.
Ecosystemic	Relating to the complex of a natural community of living organisms and its environment functioning as an ecological unit in nature.
Exploration	The act of searching a terrain for the purpose of discovering resources.
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).
Igloolingmiut	Residents of Igloolik.
Impact and benefit agreement	Contractual agreements under negotiation between the Proponent and Aboriginal groups. The intent of these agreements is to make it possible to develop the Project in a way that respects Aboriginal rights and culture, provides socioeconomic benefits to nearby Aboriginal communities and addresses negative environmental, economic, and social impacts.
Issues scoping	The process of focusing an environmental assessment on a concise list of those components of the biophysical and socio-economic environment that are valued (socially, economically, culturally or scientifically) and of interest when considering the potential environmental effects of a project.
Key Indicator	A VEC might have a have a KI, which focuses the assessment to a finer level of the environment; in the case of the terrestrial environment, the finer level is often a species; in the socio-economic environment, it is often a component, such as employment.

Local Study Area	The study area that describes areas within and directly adjacent to the Project footprint, and that may be subject to direct and indirect effects. See Regional Study Area.
Nunavummiut	The indigenous inhabitants of Nunavut.
Pack ice	Sea ice that is not landfast; it is mobile by virtue of not being attached to the shoreline or something else.
Regional Study Area	The study area that describes the Project's regional context that may be subject to indirect effects as well as areas that could function as control areas beyond the range of Project effects.
Royalty	Usage-based payments made by one party and another for ongoing use of an asset.
Significance determination	An evaluation of the "significance" of environmental effects.
Subject of Note	Interactions are those that are less likely to be of notable environmental importance or consequence.
Valued Socio-Economic Component (VSEC)	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)

19.2 ABBREVIATIONS

AANDC ..... Aboriginal Affairs and Northern Development Canada
AEC ..... Alcohol Education Committee
ASETS ..... Aboriginal Skills and Employment Training Strategy
ATV ..... All Terrain Vehicle
CED ..... Community Economic Development
CLEY ..... (Department of) Culture, Language, Elders and Youth
CRA ..... Canadian Revenue Agency
dBA ..... Decibel(s)
DOE ..... Department of Environment
DPA ..... Development Partnership Agreement
EDC ..... Economic Development Committee
EFAP ..... Employee and Family Assistance Program
EHS ..... Environmental, Health and Safety
EI ..... Employment Insurance
EIS ..... Environmental Impact Statement
EPP ..... Environmental Protection Plan
GDP ..... Gross Domestic Product
GN ..... Government of Nunavut

HSMP ..... Health and Safety Management Plan
HRMP ..... Human Resources Management Plan
HRSDC ..... Human Resources and Skills Development Canada
HTO ..... Hunters and Trappers' Organization
HVAC ..... Heating, Ventilation, and Air Conditioning
IHTI ..... Inuit Heritage Trust Inc.
IIBA ..... Inuit Impact and Benefits Agreement
IPG ..... Institution of Public Governance
IQ ..... Inuit Qaujimajatuqangit
KI ..... Key Indicator
km ..... Kilometre(s)
km/hr ..... Kilometer(s) per hour
LSA ..... local study area
MLA ..... Member of the Legislative Assembly
MOU ..... Memorandum of Understanding
MP3 ..... MPEG-1 or MPEG-2 audio layer 3 (III)
MR ..... Mary River
MRIKS ..... Mary River Inuit Knowledge Study
MTO ..... Municipal Training Organisation
Mt/yr ..... mega (million) tonne(s) per year
NBS ..... Nunavut Bureau of Statistics
NEDS ..... Nunavut Economic Development Strategy
NGMP ..... Nunavut General Monitoring Program
NIRB ..... Nunavut Impact Review Board
NLC ..... Nunavut Liquor Commission
NLCA ..... Nunavut Land Claims Agreement
NMCA ..... National Marine Conservation Area
NNI ..... Nunavummi Nangminiqaqtunik Ikajuuti
NOC ..... National Occupational Classification
NTI ..... Nunavut Tunngavik Inc.
NWHS ..... Nunavut Wildlife Harvest Study
NWT ..... Northwest Territories
PDA ..... Potential Development Area
$PM_{2.5}$ ..... Particulate Matter, 2.5 µm (microns)
PM_{10} ..... Particulate Matter, 10 µm (microns)
PYLL ..... potential years of life lost
QIA ..... Qikiqtani Inuit Association
Q-SEMC ..... Qikiqtani Socio-Economic Monitoring Committee
QC ..... Qikiqtaaluk Corporation
QL ..... Qikiqtaaluk Logistics
RCMP ..... Royal Canadian Mounted Police
ROM ..... Run Of Mine
RSA ..... Regional Study Area
SDR ..... Systematic Data Recovery
SEP ..... Stakeholder Engagement Plan

SoN ..... Subject of Note
TV ..... Television
VBNC ..... Voisey's Bay Nickel Company
VSEC ..... Valued Socio-Economic Component
WSCC ..... Workplace Safety and Compensation Commission
yr ..... year
ZOI ..... Zone of Influence