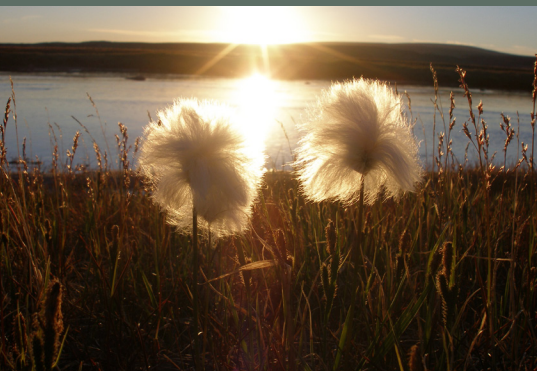


**Eqe Bay Exploration Program  
Type 'B' Water Licence Application**

**Attachment 7  
Project Proposal**





# EQE BAY EXPLORATION PROGRAM

## Project Proposal

April 2018



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## ABBREVIATIONS

Ege Bay Exploration Program.....	the project
AAQS .....	Ambient Air Quality Standards
AEMP .....	Aquatic Effects Monitoring Plan
ARD .....	acid rock drainage
Baffinland .....	Baffinland Iron Mines Corporation
CLARC .....	community lands and resources committee
CCME .....	Canadian Council of Ministers of the Environment
CO .....	carbon monoxide
CWS .....	Canada-wide Standard
DFO .....	Fisheries and Oceans Canada
ECCC .....	Environment and Climate Change Canada
EIS .....	environmental impact statement
EPP .....	Environmental Protection Plan
FEIS .....	Final Environmental Impact Statement
GN .....	Government of Nunavut
IIBA .....	Inuit Impact and Benefit Agreement
INAC .....	Indigenous and Northern Affairs Canada
IOL .....	Inuit-Owned Land
LOA .....	Letter of Advice
masl .....	metres above sea level
MUAR .....	mean annual unit runoff
ML .....	metal leaching
NO <sub>x</sub> .....	nitrogen oxides
NPC .....	Nunavut Planning Commission
NTI .....	Nunavut Tunngavik Inc.
NU .....	Nunavut
NWB .....	Nunavut Water Board
PGA .....	peak ground acceleration
PM .....	particulate matter
pXRF .....	Portable X-ray Fluorescence
QA/QC .....	Quality Assurance / Quality Control
QIA .....	Qikiqtani Inuit Association
SCP .....	Spill Contingency Plan
SO <sub>2</sub> .....	sulphur dioxide
TEMMP .....	Terrestrial Environment Mitigation and Monitoring Plan
TSP .....	total suspended particulate
TSS .....	total suspended solids
VEC .....	valued ecosystem component

## 1 – INTRODUCTION

### 1.1 OVERVIEW

Baffinland Iron Mines Corporation (Baffinland) plans to establish an exploration camp at its Ege Bay Prospect to carry out drilling and other exploration activities over the next five years (Figure 1). The name of the project is the Ege Bay Exploration Program.

Exploration will be undertaken within a portion of Inuit Owned Land (IOL) Parcel IG-03 for which Baffinland holds an Exploration Agreement with Nunavut Tunngavik Inc. (NTI), and on adjacent mining claims held by Baffinland on Crown Land (Figure 2).

Baffinland plans to conduct archaeological surveys of the proposed exploration area in the summer of 2018, prior to establishing an exploration camp and conducting any work. Equipment and materials will be delivered to Ege Bay by sealift and the camp will be established in the fall of 2018. No drilling is planned in 2018.

An initial drill program will begin in the late winter or spring of 2019. Other exploration activities to be undertaken in 2019 includes detailed geological mapping, till sampling, and a backpack drill program.

The initial drill program will be supported by an approximate 50-person trailer camp and other outbuildings. The camp will be equipped with an incinerator, a potable water treatment plant, and a sewage treatment plant. Helicopters will be used to move drills and to transport workers between the drill and camp. Diesel and Jet fuel will be stored in drums within lined secondary containment areas. Workers and supplies will be delivered to the camp from either Mary River, Hall Beach or Igloolik using Twin Otter or similar aircraft. The aircraft will land at the Ege Bay exploration area either on floats on a small lake within the exploration area, or on the tundra if equipped with tundra tires.

Based on the results of the initial drill program in 2019, Baffinland may seek to expand the scale of its exploration program at Ege Bay. Over the subsequent 5 years, the exploration program may be expanded as follows:

- Operate up to nine (9) drills
- Expand the initial camp to 100-persons
- Implement bulk fuel storage using double-walled tanks
- Source construction materials from one or two quarries
- Construct access trails to connect the camp to exploration areas to reduce helicopter use
- Construct a small airstrip to improve air access to the site

At the conclusion of the exploration program, a closure and reclamation plan will be followed to remove all equipment and materials from the site and restore the area to the extent practical.

### 1.2 REGULATORY CONTEXT

The Ege Bay Exploration Program is subject to the terms and conditions of Exploration Agreement PI17-001 between Baffinland and Nunavut Tunngavik Inc. (NTI), last amended on September 1, 2012 (NTI and Baffinland, 2012).

On April 17, the Nunavut Planning Commission (NPC) determined that the Ege Bay Exploration Program is located outside the area of an applicable regional land use plan, and that the project proposal requires screening by the Nunavut Impact Review Board (NIRB) because it does not belong to a class of exempt works or activities set out in Schedule 12-1 of the Nunavut Agreement (NPC File No. 148801; NPC, 2018).







Baffinland will apply to the Qikiqtani Inuit Association (QIA) for an Inuit Land Use Licence to secure surface land rights within the exploration area. Quarry Concession Agreements will be sought from the QIA when Baffinland plans to proceed with that activity.

Baffinland will also apply to the Nunavut Water Board (NWB) for a Type B Water Licence to address water use and waste disposal requirements associated with the exploration program. Baffinland currently holds Type A Water Licence 2AM-MRY1325 and Type B Water Licence 2BE-MRY1421 for its other exploration activities.

Finally, Baffinland will consult with Fisheries and Oceans Canada (DFO) regarding two culverts that are planned for installation within streams assumed to be fish habitat, as well as a proposed barge ramp; it is expected that formal approval will not be required and that DFO will issue a Letter of Advice (LOA) to Baffinland, or refer Baffinland to LOAs already issued to the company.

### 1.3 ALTERNATIVES TO AND ALTERNATIVE MEANS

Baffinland has conducted surface exploration of the Ege Bay area periodically since 2013. To advance the Company's knowledge of the mineral potential of this area, it is necessary to conduct exploration drilling. As the site is too distant from the Mary River Project camps, a local camp is necessary to support the exploration drilling.

The alternative to the Ege Bay Exploration Program is to abandon mineral exploration in this area. This does not fulfill the Company's objectives to continually generate opportunities for mineral exploration and development. Nor does it fulfill the mandates of a number of Inuit organizations (NTI and the QIA), the Government of Nunavut's Mineral Exploration and Mining Strategy (Government of Nunavut, no date), or Canada's Northern Strategy (INAC, 2009).

There are few alternative means to conduct mineral exploration at Ege Bay. Baffinland has considered various ways to access the site, and have proposed the construction of a gravel airstrip once initial drilling proves promising, to replace the initial plan to use Twin-Otter equipped with floats or tundra tires. The gravel airstrip will allow larger aircraft to access the site, reducing the number of flights required and hence fuel consumption and noise. Similarly, an access road will be constructed over time between the camp and the exploration area, which will reduce the amount of low level helicopter flying and associated fuel consumption and noise generation.

## 2 – EXPLORATION CAMP

### 2.1 CAMP LOCATION AND DESIGN

The temporary exploration camp will initially consist of 11 trailer units capable of accommodating up to 50 people. The trailers will include single and double occupancy rooms, a kitchen, dining area, storage and limited recreation facilities. The proposed camp will be located at the approximate location shown on Figure 3. Provided initial exploration drilling is promising, the camp will likely be expanded with an additional 11 trailer units, for accommodation for up to 100 people total. The camp will be capable of being operated year-round.

### 2.2 WATER SUPPLY AND TREATMENT FACILITIES

Water will be pumped from unnamed lake EB-1 to the water treatment facility through a temporary intake which will need to be adjusted between open water and ice over. During ice cover, the intake will be positioned from the ice surface and during open water, the intake will be positioned from shore. The intake will be equipped with a fish screen in accordance with DFO's Freshwater Intake End-of-Pipe Fish Screen Guideline (DFO, 1995). A containerized water treatment facility will be commissioned to supply the initial 50-person camp with potable water. The water treatment facility will be a containerized ultrafiltration treatment facility with a chemical dosing system. Ultrafiltration is a pressure driven membrane separation process that removes suspended or particulate matter from water. It also efficiently removes bacteria and most viruses. The water treatment facility will treat up to 19 m<sup>3</sup> of water per day. An additional containerized water treatment facility will be added to the camp site upon expansion to the 100-person camp.

Water from the water treatment facility will be either trucked or piped to the camp. Up to 29 m<sup>3</sup> of water will be consumed by the 100-person camp.

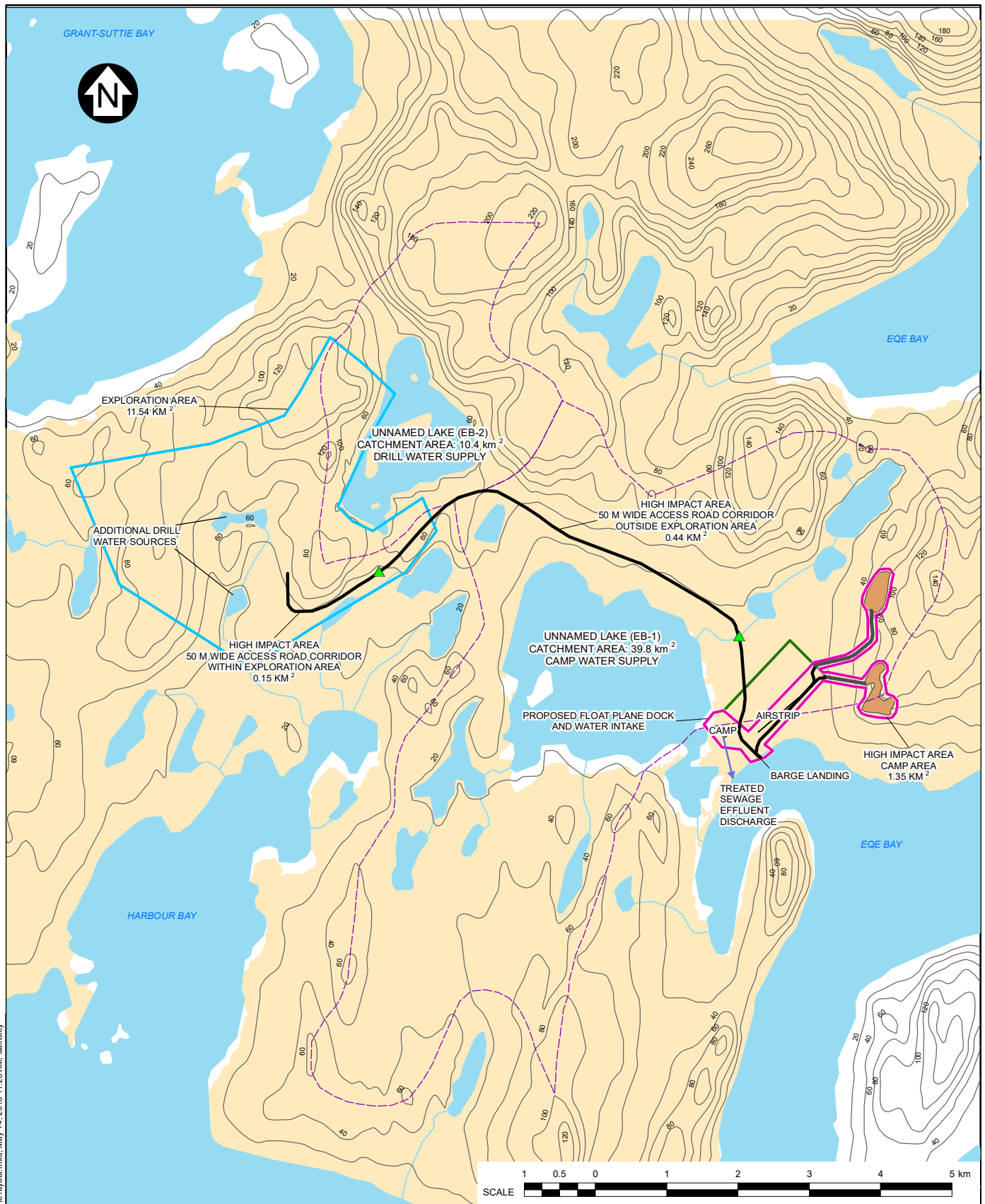
### 2.3 SEWAGE AND GREY WATER DISPOSAL

Camp sewage will be treated using a package sewage treatment plant prior to effluent being discharged to land for runoff into Ege Bay. The package sewage treatment plant consists of a four-part treatment process. The first stage includes two settling tanks, the second stage includes a reactor unit for extended aeration and a clarifier, the third stage includes a reactor with fixed film media and clarification, and the final fourth stage include a pump chamber to discharge the treated effluent. Raw wastewater will be pumped from a collection tank into the first and second settling tanks. Wastewater is then hydrologically displaced into the first reactor unit for further setting and aeration, after which gravity transports the waste water to the second reactor unit for processing using the fixed film growth media. A sludge return air lift will circulate activated sludge from the bottom of the reactor chamber to the fixed media. Wastewater will then flow through a quiescent zone at the outlet of the reactor into the pump chamber. In the pump chamber the effluent will pass through two sets of UV lights before final discharge.

The sewage treatment plant is designed to treat 11.4 m<sup>3</sup> of raw sewage daily. A second unit will be brought online when the camp is expanded to 100 persons. The effluent will be discharged to land at a location where the effluent will run off into the ocean (Figure 3).

Biological sewage treatment plants have the potential for upset conditions to occur, particularly from a sudden increase in camp population or if influent contains hazardous substances such as toxic cleaners or a high proportion of detergents. Baffinland gained experience with such systems during the exploration phase of the Mary River Project. Non-toxic cleaners will be used, and greywater can be re-directed away from the sewage treatment plant if needed, and as described further below.





LEGEND				
<span style="color: green;">▲</span>	PROPOSED CULVERT IN FISH BEARING WATERS	<span style="border: 1px dashed purple;"> </span>	CATCHMENT BOUNDARY	
<span style="color: black;">—</span>	CONTOURS	<span style="background-color: yellow;"> </span>	NTI EXPLORATION AGREEMENT SUB-AREA	
<span style="color: black;">—</span>	PROPOSED ACCESS ROAD/TRAIL			
<span style="color: black;">—</span>	QUARRY ACCESS ROAD			
<span style="color: blue;"> </span>	WATER			
<span style="background-color: brown;"> </span>	POTENTIAL QUARRY AREA			
<span style="background-color: green;"> </span>	POTENTIAL DEVELOPMENT AREA			
<span style="border: 1px solid blue;"> </span>	EXPLORATION AREA			
<span style="border: 1px solid pink;"> </span>	HIGH IMPACT AREA - CAMP AREA			

#### NOTES:

1. COORDINATE GRID IS IN METRES.  
COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N.
2. CONTOUR INTERVAL IS 20 METRES.
3. LOCATIONS AND SIZING OF PROJECT FACILITIES IS APPROXIMATE ONLY.



#### EQE BAY EXPLORATION PROGRAM

#### PROPOSED EXPLORATION AREA LAYOUT

**Knight Piésold**  
CONSULTING

PIA NO. NB102-181/46 REF NO. NB18-00244

#### FIGURE 3

REV 0

REV	DATE	DESCRIPTION	RAC DESIGNED	RF DRAWN	RAC REVIEWED
0	11MAY'18	ISSUED WITH TRANSMITTAL			

There is the option that greywater will be directed to an excavated sump rather than to the sewage treatment plant. This option will be considered as a means of improving the quality of the sewage influent into the sewage treatment plant, to optimize treatment performance. The sump will be located more than 31 m from the high water mark of Ege Bay.

Baffinland expects to maintain a small care and maintenance staff year-round during most years, and continuing to operate the plant continuously will help avoid upset conditions. The influent holding tank provides some excess storage capacity. However, discharge of partially treated effluent to the environment may be required. There are several additional contingency measures available. The sewage treatment plant is designed to treat to a much higher standard than the sewage discharge criteria normally specified by the NWB for marine discharges. Additionally, treated sewage effluent will be discharged to land. In winter, additional treatment is provided when the effluent freezes and thaws in the spring. In the summer, land discharge provides additional polishing. Finally, the receiving environment of Ege Bay is expected to be tolerant to occasional exceedances, should this occur.

## 2.4 WASTE MANAGEMENT

The camp will generate an estimated 2 kg per person per day of solid waste. Waste generated as a result of exploration activities will be dealt with in various ways depending on the type of waste. Efforts will be made to minimize packaging when shipping consumables to site. Similarly, efforts will also be made to reuse materials.

Non-hazardous combustible waste will be burned in an onsite incinerator. The incinerator will use a two stage process. The primary burner burns waste and produces an inert ash and combustible gases, the secondary chamber combusts off-gases to eliminate smoke and minimize contaminants. The incinerator will run 2 cycles per day with each burn cycle lasting between 2 to 6 hours depending on waste type and density.

Non-hazardous waste that is non-combustible, such as scrap metal, will be stored and then backhauled to a southern disposal or recycling facility.

It is estimated that 2,000 L of hazardous waste (mainly waste oil and waste antifreeze) will be generated annually, along with lead-acid batteries and a small volume of oily rags. Liquid hazardous waste will be stored in a lined containment facility and backhauled by sealift to a southern disposal or recycling facility.

## 2.5 FUEL AND CHEMICAL STORAGE

Initially, fuel will be delivered to site by sealift. During the initial drilling program in 2019, approximately 369,000 L of fuel (diesel and Jet A fuel) will be stored in fuel barrels within a containment area boarded by a fuel berm made up of vinyl sling bag liners. Drums will be slung to drill sites by helicopter. Empty fuel barrels will be backhauled to the south by sealift for final disposal.

Upon expansion to the 100-person camp fuel will be stored in approximately 63 – 24,000L capacity ISO containers. The total amount of fuel stored will be in the order of 1,500,000 L.

Engine oil, antifreeze and calcium chloride will also be stored at the exploration site. Engine oil and antifreeze will be stored in 205 L drums within line containment areas. Calcium chloride powder will be stored in 50 large totes and will be used to generate brine for drilling the deepest holes. Most drillholes will be sufficiently shallow as to not require brine.

Baffinland's Exploration Spill Contingency Plan (SCP; under preparation) details the procedures that will be undertaken in the event of a spill of fuel or other hazardous materials during exploration activities at Ege Bay. This Exploration SCP identifies potential spills on land, ice, or fresh water that could arise during exploration at Ege Bay. Credible spill scenarios are identified and protocols for preventing, responding to, and recovering from releases to the environment involving regulated hazardous substances are provided.

## 2.6 QUARRIES

Baffinland intends to develop one or two rock quarries to aid in the development of the camp and laydown areas, access road between the camp and the exploration area, and a small airstrip. Pre-packaged explosives will be used. Preliminary locations of potential quarries are shown on Figure 3. It is expected that the quarries will only be developed if the exploration activities expand as described in this Project Proposal.

The rock in the quarries will be assessed for acid rock drainage (ARD) and metal leaching (ML) potential prior to being exploited, in accordance with the Protocol for the Assessment for the Potential for Acid Rock Drainage located in Appendix B of the Borrow Pits and Quarry Management Plan (Baffinland, 2014a). Once the potential quarries have been assessed for ARD/ML potential, Baffinland will develop and file a quarry-specific management plan with the NWB and QIA.



### 3 – EXPLORATION ACTIVITIES

#### 3.1 DESCRIPTION OF DEPOSIT

The objective of the exploration program is to advance the deposit scale mineral potential of the Ege Bay area. The Ege Bay Prospect contains high grade iron oxides. Exploration will evaluate the ferrous (iron oxides) as well as the non-ferrous mineral potential of the bedrock within the Ege Bay Exploration Area.

#### 3.2 EXPLORATION ACTIVITIES

Exploration activities planned for the Ege Bay exploration area include the following:

- **Detailed Lithological Mapping** - will be completed to define mineralization zones for sampling. Detailed structural mapping will be completed to understand the structural control on the prospects and aid in planning of the initial drill program to increase the chances of interesting mineralization at depth.
- **Soil Sampling Program** - Approximately 500 soil samples will be collected spread across the exploration area. Sampling will be conducted using shovels and sample grab bags.
- **Backpack Drill Program** - A man-portable “backpack drill” will be used to drill at least 50 targets in the exploration area.
- **Till Sampling Program** – Till sampling will be conducted in the Cheesecake/Cake Hill area looking for anomalies in portable X-ray Fluorescence (pXRF) readings. The pXRF readings will be taken in-situ. A duplicate sample will be sent to an assay lab.
- **Drill Program** – Conventional diamond core drilling will be carried out within the exploration area.

Drill core will be cut onsite with a saw, but no assay work will be conducted onsite.

Baffinland plans to conduct an initial exploration drilling program in 2019 with two diamond core drills. The initial program includes a yet to be defined number of holes with planned depths of 100 to 300 m, totaling 10,000 m total depth. The initial exploration area is shown on Figure 3.

If the initial drilling program is positive, Baffinland will look to significantly scale up its drilling program. Ultimately the exploration program could grow to up to nine (9) diamond core drills operating year-round. The amount of drill holes and depths will be determined following the results of the initial drill program. The expanded drilling program may extend the length of a mineralized zone across the entire IG-03 Exploration Agreement Area as well as the mining claims on Crown Land that extend north of the IG-03 Exploration Area (Figure 2).

#### 3.3 WATER USE FOR EXPLORATION

For the exploration work, 270 m<sup>3</sup> of water will be pumped daily from Unnamed Lake #1. The estimated water volume is to operate nine (9) exploration drills. The water consumption is based on withdrawal rates and does not consider recycling of drill water. Opportunities to recycle drill water will be investigated and utilized as the scale of the drilling program increases over time.

## 4 – SITE ACCESS

### 4.1 AIR ACCESS

Ege Bay will be initially accessed by air using twin otter or similar aircraft equipped with tundra tires or floats. A helicopter will be used to move drills and drilling personnel within the Project site.

An airstrip may be constructed at the approximate location shown on Figure 3. It will be necessary to quarry additional aggregate to construct the airstrip.

### 4.2 SEALIFTS

Equipment will be transported to Ege Bay by sealift in late August or early September 2018. Sealift deliveries of equipment and materials will be scheduled in subsequent years as required when expanding the camp or to replenish fuel and other consumables.

### 4.3 ACCESS ROAD BETWEEN CAMP AND EXPLORATION AREA

Following the initial exploration program, Baffinland will prepare a 4 km access road connecting the camp to the exploration area to the north (Figure 3). The access road may further finger out to specific drill sites. The construction of the travel way will reduce the need for helicopter use to transport personnel, thereby reducing fuel consumption and noise generated by the helicopter. The access road will be constructed by placing a sub-base and/or surfacing layer as required using aggregate from the proposed quarries (Section 2.6). Cuts in overburden will be avoided.

Culverts will need to be installed at two locations along the access road, shown on Figure 3. Based upon a desktop review of the two crossing locations, both are expected to be fish habitat. Baffinland will engage Fisheries and Oceans Canada (DFO) in regard to these culvert installations, and will comply with existing DFO Letters of Advice issued to Baffinland, or other guidance as directed by the DFO. The culverts will be removed as part of closure and reclamation of the exploration program.

It is possible that Baffinland may establish a winter trail along the access road alignment prior to constructing the access road.

## 5 – ENVIRONMENTAL SETTING

### 5.1 SITE DESCRIPTION

The Ege Bay Exploration Area is located along the west coast of Baffin Island, approximately 190 km east from both the communities of Hall Beach and Igloolik (Figures 1 and 2). Relative to the Mary River Project, the Ege Bay Exploration Area is located approximately 200 km from the Mine Site at Mary River, and approximately 90 km from the proposed Steensby Port.

The exploration area is shown in more detail on Figure 3, identifying the following proposed features:

- Initial exploration area where exploration drilling will be initially focused
- Exploration camp and associated development area
- Access road and quarry locations
- Airstrip

The Ege Bay Exploration Area is located in Water Management Area 22, as identified in Schedule 4 of the Nunavut Waters Regulations (Minister of Justice, 2018).

### 5.2 SITE HISTORY

The Ege Bay exploration area was first explored for iron ore in 1969 by Patino Mining Corp. Ltd., who established mining claims, a camp with a winter airstrip. A limited drilling program was carried out at that time. Nanisivik Mines Ltd. conducted additional exploration in 1991.

The area was selected as Inuit Owned Land with surface and subsurface mineral rights by the community of Igloolik (IOL Parcel IG-03) during the land selection process leading up to the Nunavut Agreement (INAC and NTI, 2010).

From review of historical records that describe Inuit occupancy and use of northern Foxe Basin, it is clear that the area was a traditional settlement area for Inuit, referred to as the Piling Bay settlement area (Crowe, 1969 in Knight Piésold, 2010a). In consultation with Igloolik and Hall Beach on the Ege Bay Exploration Program, participants indicated that there are cultural heritage resources in the area, including two participants who indicated that their parents or grandparents historically occupied the area.

### 5.3 PHYSICAL SETTING

#### **Topography**

The Ege Bay Exploration Area consists of undulating bedrock outcrops with waterbodies filling local topographic lows. Glacio-fluvial or marine deposits are also present in the area.

#### **Geologic Conditions**

The North Baffin Region lies within the Committee Belt, a granite-greenstone terrain mixed with sedimentary and volcanic rock. Occasional outcrops of granitic and sedimentary rock formations occur.

Near surface bedrock is dominant in the Ege Bay Exploration Area. Limited overburden is in the form of marine sediments and localized deposits of till. The majority of the overburden is located in depressions between the numerous bedrock outcrops and is typically overlain by a layer of vegetation and boulders.



### Climatic Conditions and Trends

Northern Baffin Island has a semi-arid climate with relatively little precipitation. The region experiences near 24-hour darkness with less than two hours of twilight from approximately November 12 to January 29. Conversely, continuous sunshine is experienced from approximately May 5 to August 7. During September to November, temperature and the number of daylight hours start to decrease, and by mid-October the mean daily temperature is well below 0°C. The highest amount of snowfall typically occurs during this period.

Monthly mean temperatures at the long-term Environment Canada stations range from about -34°C in February at Pond Inlet to about 7°C in July at Igloolik (RWDI AIR Inc., 2010). Over the period of 2006 to 2015, monthly mean temperatures at Mary River ranged from -34.7°C in February to 11.1°C in July (Knight Piesold, 2016a). Annual mean temperatures generally increased over the measurement period at all locations, although there is considerable year-to-year variability. RWDI AIR Inc. (2010) noted that the annual mean temperature at Pond Inlet had increased by about 2.1°C between 1975 and 2009.

The mean annual precipitation at Pond Inlet is 190.8 mm, with 144.5 cm of snowfall (equivalent to 105.4 mm of rain) and 85.4 mm falling as rain (RWDI AIR Inc., 2010).

### Hydrologic Characteristics

Streamflow in the North Baffin Region typically commences in early to mid-June as temperatures climb above 0°C, and ends in late September to late October, depending upon watershed characteristics (Knight Piesold, 2012). The annual hydrograph is dominated by a nival (snowmelt) freshet, which occurs between late June and the end of July, followed by a period of low baseflows driven by permafrost melt and shallow subsurface flow. Baseflows are punctuated by precipitation events through July to early September. Precipitation runoff events are usually quite large and flows increase rapidly as interception, infiltration, and evapotranspiration are minimal due to shallow permafrost, cool temperatures and lack of vegetative cover.

The timing and magnitude of runoff was first estimated from regional analyses and then reassessed with the addition of onsite measurements. Regional data indicated that mean annual unit runoff (MAUR) in the vicinity of Mary River should be slightly less than 10 L/s/km<sup>2</sup>. Mean annual peak daily unit runoff values range from less than 100 L/s/km<sup>2</sup> for watersheds with significant lake volumes, to over 400 L/s/km<sup>2</sup> for smaller watersheds without lakes.

### Seismicity

Regional bedrock structures include a northwest-trending fault set system and the Central Borden Fault, a crustal-scale structure which extends more than 200 km northwest from Angajurjualak Lake to Milne Inlet. This forms the southern boundary of the Mary River iron deposits. These fault systems typically show very large displacements both vertically and horizontally. The majority of recorded earthquakes in the Baffin Island region are concentrated along the east and northeast coastline and within the northwestern area of Baffin Bay. Most of these events are small earthquakes with magnitudes of less than 5.0, though some moderate to large earthquakes have been recorded in the region, the largest being a magnitude 7.3 earthquake in 1933, located over 150 km off shore in Baffin Bay. This is the largest earthquake to be recorded north of the Arctic Circle.

A seismic review was performed in support of the south railway embankment design (Knight Piesold, 2008) using information from the seismic hazard database of Natural Resources Canada. Information obtained included determination of seismic coefficients and horizontal Peak Ground Acceleration (PGA) value. Based on the findings of the seismicity assessment, an appropriate design earthquake for foundations and structures at Mary River is the 1 in 2,500-year earthquake, with an estimated PGA of approximately 0.25g. At Steensby Port, the estimated PGA for the design earthquake is approximately 0.12g. The peak ground acceleration for the Steensby Port is significantly lower due to a rapid decrease in the apparent seismic hazard along the western side of Baffin Island.

### Permafrost Conditions

The Ege Bay Exploration Area is located within the zone of continuous permafrost with low ground ice content and mean annual ground temperatures between -10°C and -15°C (Natural Resources Canada, 1995). The active layer in the region typically ranges from approximately 1 to 2 m, but may be greater in areas where there is loose, sandy soil at the edges of lakes or ponds and less in areas with a substantial surface layer of wet organics. Unfrozen taliks can exist within areas of continuous permafrost below lakes, under large rivers or near the coast.

Permafrost thickness in and around the region is considered to be deep, typically in the 400–700 m depth range (Knight Piésold, 2010b). In 2007, a 400 m thermistor installed into Deposit No. 1 showed that the depth to permafrost is predicted to extend to 610 m at this location. This is consistent with regional measurements at the former Nanisivik Mine, where permafrost was measured at depths greater than 430 m (Gartner Lee, 2003), and at drillholes located 450 km west and 450 km south of Pond Inlet, with measured permafrost depths of 500 m and 400 m, respectively (Geological Survey of Canada, 2006).

### Surface Water Regime and Drainage Area

There are two unnamed lakes in the vicinity of the Ege Bay Exploration Area, referred to herein as Lakes EB-1 and EB-2. These lakes and their respective catchment areas are shown on Figure 3. Smaller ponds also exist within the Ege Bay Exploration Area; these ponds may be used as a source of drilling water during the open water period only. Each of these waterbodies are sufficiently separated from the ocean and are therefore expected to be freshwater, however, water quality sampling has not been conducted in the Ege Bay Exploration Area as yet. Bathymetric surveys have not been conducted at these waterbodies. Break-up and freeze-up periods are unknown but are not expected to vary significantly from lakes in the vicinity of the Mary River Project, which experience break-up in the first half of July and freeze-up in the month of October.

## 5.4 BIOLOGICAL SETTING

### Vegetation

Plant life is relatively sparse in much of the Project area and is generally consistent with the plants that usually occur in arctic regions. Vegetation surveys have not been conducted in the Ege Bay Exploration Area; however, no plant species considered to be “rare” in Canada were found to occur during baseline surveys for the Mary River Project (Baffinland, 2012).

### Terrestrial Mammals

Terrestrial mammals in the region include barren-ground caribou of the North Baffin herd, wolf, arctic and red fox, ermine, arctic hare, and lemmings. Marine mammals are found in abundance in the region, including polar bears, narwhals, beluga whales, bowhead whales, several species of seals, and walrus. Killer whales and northern bottlenose whales were found in small numbers. North Baffin caribou are currently present at low densities and their numbers seem to vary in accordance with a 60- to 70-year cycle. The last period of caribou abundance in the area was 1980 to 2000, and the previous period of low abundance was in the 1940s. Caribou are expected to remain at low numbers for the next couple of decades. However, there is evidence that caribou do occur throughout the entire region. While some populations of caribou migrate between preferred habitats in summer and winter, North Baffin caribou appear to be non-migratory and are likely to be found relatively equally in many locations throughout the Project area.

### Migratory Birds

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

and many types of gulls. According to the Nunavut Coastal Resource Inventory (Government of Nunavut, 2008), a number of waterfowl species harvested by Inuit occur within the adjacent Grant-Suttie Bay as well as the offshore islands nearby (Bray, Rowley and Prince Charles).

### **Freshwater Biota**

There are two fish species in the freshwater environment: Arctic char and ninespine stickleback. Many inland waters on northern Baffin Island contain a landlocked variety of Arctic char. Lakes connected to the marine environment that do not have natural barriers to fish contain anadromous or sea-run variety of char. Fish in the marine waters include Arctic char, sculpins, and Atlantic lumpfish at Steensby Inlet (Baffinland, 2012).

Lake EB-1 (to be used for the camp water supply) is situated just above sea level and very likely supports Arctic char and ninespine stickleback and possibly sculpins. The accessible portions of the lake inlet tributaries would be used by juvenile Arctic char in the summer months as rearing habitat. This lake will be used as the water source for the exploration camp. A culvert will be installed in an unnamed stream at the east side of Lake EB-1; the stream likely supports juvenile Arctic char. Detailed habitat mapping has not been conducted to describe the streambed and streambank material, streambank vegetation and meander characteristics.

Lake EB-2 (to be used to supply water to drills) will be the main water source for initial exploration drilling. The lake discharges to a stream with several ponds that ultimately reports to Harbour Bay (the marine environment). Lake EB-2 is at elevation 50 metres above sea level (masl) and its outlet is approximately 3 km by stream distance from tidewater. It is unlikely that Lake EB-2 is accessible by sea-run Arctic char due to insufficient flows and habitat connectivity to support upstream and downstream fish passage. Lake EB-2 may support land-locked Arctic char and ninespine stickleback. The second proposed stream crossing is on the same stream that discharges directly to Harbour Bay in the marine environment. The upper portion of this stream may support juvenile rearing by land-locked Arctic char during the open water period although fish use is expected to be low at the proposed crossing since it is 2.5 km by stream distance upstream from tidewater and 0.5 km below the Lake EB-2 outlet. It is unlikely that the proposed crossing is accessible by sea-run Arctic char due to insufficient flows and habitat connectivity to support fish passage.

Both culvert crossings are assumed to be fish-bearing, although each has fish habitat limitations due to the relatively small catchment areas and low flows in mid to late summer.

### **Marine Environment**

The Ege Bay Exploration Area is bordered on the east by Ege Bay, a long finger-like inlet; Grant-Suttie Bay to the west; and Harbour Bay / Foxe Basin to the south. Marine mammals are found in abundance in the region, including polar bears, narwhals, beluga whales, bowhead whales, several species of seals, and walrus. Killer whales and northern bottlenose whales were found in small numbers. Fish in the marine waters include arctic char, sculpin, and Atlantic lumpfish at Steensby Inlet, and Arctic char, sculpin and Greenland cod at Milne Inlet.

## **5.5 SOCIO-ECONOMIC SETTING**

The Baffin Region of Nunavut has a rich and visible archaeological heritage dating many thousands of years. Within the North Baffin Region broadly, there are many archeological sites both small and more significant, particularly along the coast but also inland. Though an archaeological survey of the Ege Bay Exploration Area will be conducted only in 2018, the coastal location as well as the sheltered nature of Ege Bay means that there is likely to be a comparatively high density of archaeological sites in the area.

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

The five communities of northern Baffin Island, listed by proximity to Ege Bay, include Hall Beach (190 km), Igloolik (190 km), Clyde River (325 km), Pond Inlet (345 km) and Arctic Bay (480 km). Based on the results of the Mary River Inuit Knowledge Study (Baffinland, 2014b), Igloolik and Hall Beach and to a lesser extent Pond Inlet and Clyde River have ties to the Ege Bay area.

For many of these North Baffin households, harvest of country food provides an important contribution to their overall well-being, both physical and cultural. In all five communities, caribou, ringed seal, and arctic char are of major importance. In addition, walrus is a significant species in Hall Beach and Igloolik, while narwhal is a key component of the harvest among households in Arctic Bay, Pond Inlet, and to a lesser degree, Clyde River. The land-based economy is a major part of the livelihoods of many residents of the North Baffin. Harvesting from the land and sea is estimated to produce food worth between \$12 million and \$20 million per year in this region (Baffinland, 2012). The amount of work to harvest this food is estimated to be 350 full-time jobs.

Residents of the region earn money through sales of arts and crafts, through employment, and from various government social programs such as income support. The Mary River Project has provided employment to these same communities since exploration was resumed in 2004, and particularly since construction of that project began in 2013. The Mary River Project provided approximately 155 full-time equivalents of employment in 2017 (Jason Prno Consulting Services Ltd., 2018). Approximately \$387.2 million was spent on procurement with Inuit-owned businesses and joint ventures in 2017.

## 5.6 HISTORICAL AND TRADITIONAL USES OF WATERS IN THE PROJECT AREA

Historic land use information collected for the Mary River Project suggest that Inuit occupied traditional settlements in the general area (Crowe, 1969 in Knight Piésold, 2010a), and this was confirmed during consultation with Igloolik and Hall Beach (Section 8).

Baffinland undertook an extensive traditional knowledge study in the five North Baffin communities referenced above in support of the Mary River Project (Baffinland, 2014b). Although the focus of the study was the Mary River Project, the study included all of northern Baffin Island including the Ege Bay Exploration Area. A number of historic camping areas were identified by elders who participated in the study. These camping locations have been recorded along the coast of Foxe Basin, and along the shores of Ege Bay. It is likely that Lake EB-2 was used as a water source for a camp and for drilling by previous mineral exploration activities.

One of the rivers entering the adjacent Grant-Suttie Bay was identified as an area of high abundance of Arctic char in the fall or early winter in the Nunavut Coastal Resource Inventory (Government of Nunavut, 2008). The shoreline of Ege Bay facing the proposed camp was identified as an area for clam digging by one elder participating in the Nunavut Coastal Resource Inventory. The adjacent Grant-Suttie Bay was identified more prominently by multiple elders as a location for clam digging, mussels, and an area of concentration of birds. Due to the proximity of Ege Bay from Igloolik and Hall Beach, contemporary use of the area is relatively limited. Baffinland (2014b) recorded that the Ege Bay shoreline is a blueberry picking area, as is a large area to the



north and west of Ege Bay. With respect to wildlife presence, caribou movements have been recorded in the vicinity of the area. A walrus haul-out exists on a small island in the adjacent Grant-Suttie Bay and on offshore islands (Bray Island and Rowley Island), while further out on toward Foxe Basin larger marine mammals such as narwhal are present.

## 5.7 PROPOSED BASELINE STUDIES

In 2018, Baffinland expects to conduct bathymetric surveys on the two lakes (Lake EB-1 and Lake EB-2) that will be used to supply water for the camp and exploration activities, as well as collect water quality samples from these waterbodies. Archaeological surveys will be conducted in June or July 2018, prior to sealift delivery of equipment and materials. Additional baseline studies are not planned at this time.

## 6 – EFFECTS ASSESSMENT

### 6.1 EFFECTS ASSESSMENT METHODOLOGY

Effects of the Ege Bay Exploration Program have been assessed at a screening level, considering the effects assessment criteria of magnitude, extent, duration and sensitivity of the resource or valued ecosystem component (VEC).

Relative to the scale of a mining development (which can have the potential for significant effects), most effects of exploration activities, with appropriate mitigation applied, are low to moderate magnitude, localized in extent, and short- to medium-term in duration.

This screening level assessment does not discuss the significance criteria listed above unless an effect has been deemed material, requiring a more detailed assessment.

### 6.2 AIR QUALITY AND NOISE

The exploration activities will generate emissions locally from the combustion of fuel while operating power generators, drills, and mobile equipment, and from camp heaters. Air contaminants released from fuel combustion include particulate matter less than 10 µm (PM<sub>10</sub>), particulate matter less than 2.5 µm (PM<sub>2.5</sub>), total suspended particulate (TSP), carbon monoxide (CO), Sulphur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>). The level of activity at the exploration camp is small compared with industrial operations, and concentrations of these air contaminants is expected to remain relatively low relative to applicable Ambient Air Quality Standards (AAQs).

The waste incinerator will release the same contaminants and may also release mercury as well as dioxins and furans. Baffinland has purchased an incinerator from Eco-Waste Solutions, a reputable incinerator manufacturer whose equipment is proven to meet Canada-wide Standards (CWS) for dioxins and furans (Canadian Council of Ministers of the Environment [CCME], 2001) for mercury (CCME, 2000). Incinerator feed stock (requiring effective sorting of wastes) as well as operation and maintenance are key to minimizing incinerator emissions. Baffinland will follow its Incinerator Operating Procedure found in its Waste Management Plan (Baffinland, 2018). Applying the proper operating procedures, Baffinland expects its incinerator will meet CWS standards under normal circumstances.

Stationary and mobile equipment will also generate noise. The main sources of noise at the exploration operation include the drills, helicopters and airplanes. Noise emissions may have localized impacts on wildlife. There is a walrus haul-out on an Imiliq Island, located near the entrance to Grant-Suttie Bay and approximately 15 km from the exploration area. Air traffic will avoid this area and will be mindful of the possible presence of other walrus haul-outs as well as caribou in the area. Other key mitigation measures to minimize noise emissions include adherence to minimum flight altitudes specified in land use licences. This will be possible outside of the exploration area but difficult to meet within the exploration area given the short distance between the camp and drilling activity, and the need to sling drills between drill sites. Provided initial exploration is promising, Baffinland intends to construct an access trail between the camp and exploration area. This will significantly reduce demand for helicopter use and will reduce noise emissions within the exploration area. Overall, noise emissions are expected to be low to moderate magnitude, localized in extent, and short to medium term in duration, and not significant.

### 6.3 SURFACE WATER AND GROUNDWATER

Baffinland plans to draw water from two lakes (Lake EB-1 and Lake EB-2), the withdrawal rates are not anticipated to change flow of water to or from the lakes. The volumes that will be withdrawn are well below the recharge volumes of the lake and are not anticipated to have an effect on the quantity of surface water. The main water withdrawals are assessed further below.

### Water Withdrawals from Lake EB-1 for Camp Water Supply

The exploration camp will extract up to 29 m<sup>3</sup>/day of water for domestic use from Lake EB-1. The camp may operate year-round, and based on the maximum daily water withdrawal, the water withdrawal over the 8-month ice cover period could be up to 7,200 m<sup>3</sup> and annually up to 11,000 m<sup>3</sup>.

Winter water withdrawals are normally assessed using the DFO Protocol for Winter Water Withdrawal from Ice-covered Waterbodies in the Northwest Territories and Nunavut (DFO, 2010). Excessive amounts of water withdrawn from ice-covered waterbodies can impact fish through oxygen depletion, loss of over-wintering habitat and/or reductions in littoral habitat (DFO, 2010). The DFO Protocol states that water withdrawals that are less than 10% of the under ice lake volume do not require further assessment. The volume of water in Lake EB-1 has not been determined as yet, though Baffinland aims to conduct a bathymetric survey during the 2018 open water season.

Based upon a lake surface area of 6.16 km<sup>2</sup>, a winter water withdrawal of 7,200 m<sup>3</sup> will result in a drawdown of approximately 1 mm over an 8-month period of ice cover. This drawdown is expected to be within the annual variation of winter water levels, and is not expected to have a material effect on fish habitat including any spawning areas that may be present.

The catchment area of Lake EB-1 measured at the lake outlet is approximately 39.8 km<sup>2</sup> (Figure 3). Based on a MAUR measured at seven seasonal hydrometric stations of 9.5 L/s/km<sup>2</sup> (Knight Piésold, 2012), the annual recharge to Lake EB-1 is in the order of 12 Mm<sup>3</sup>. The winter water withdrawal represents approximately 0.1% of the annual recharge to Lake EB-1. As such, the winter water withdrawal is not expected to meaningfully affect (i.e., delay) lake outflow in the spring.

### Water Withdrawals from Lake EB-2 (Cake Lake) for Drilling

Two drills will be operated in the initial year of drilling in 2019, with drilling beginning in late winter (March-April) and finishing by the end of October. Provided initial drilling demonstrates promise, Baffinland intends to ramp up the drilling program to have as many as nine (9) drills operating within the exploration area year-round.

Most water required for drilling, including all water withdrawn during the ice-covered period, will be drawn from Lake EB-2. Other smaller ponds in the area will be used as a source of drilling water during open water conditions only (Figure 3). Fisheries assessments have not yet been conducted on these waterbodies, but Baffinland has observed stickleback minnows in the upper pond identified on Figure 3. It is assumed that Lake EB-2 supports both Ninespine stickleback and Arctic char.

Under the fully scaled up drilling campaign, the daily water consumption of nine (9) drills will total 270 m<sup>3</sup>/day. The maximum total water consumption from Lake EB-2 under eight (8) months of ice cover (mid-October through mid-June) will be an estimated 64,800 m<sup>3</sup>.

Winter water withdrawals are normally assessed using the DFO Protocol for Winter Water Withdrawal from Ice-covered Waterbodies in the Northwest Territories and Nunavut (DFO, 2010). Excessive amounts of water withdrawn from ice-covered waterbodies can impact fish through oxygen depletion, loss of over-wintering habitat and/or reductions in littoral habitat (DFO, 2010). The DFO Protocol states that water withdrawals that are less than 10% of the under ice lake volume do not require further assessment. The volume of water in Lake EB-2 has not been determined as yet, though a bathymetric survey will be carried out during the 2018 open water season.

In the interim, the proposed water withdrawal has been evaluated by comparing the winter water withdrawal quantity to both the lake's wetted surface area (i.e., excluding islands) as well as the quantity of water reporting to the lake each year within its catchment area.

The surface area of the lake is 2.54 km<sup>2</sup>. A winter water withdrawal of 64,800 m<sup>3</sup> will result in a drawdown of approximately 25.5 mm (or 2.5 cm; one inch) over the 8-month ice cover period. This drawdown is likely within the annual variation of winter water levels, and is not expected to have a material effect on fish eggs.

The catchment area of Lake EB-2 measured at the lake outlet is approximately 10.4 km<sup>2</sup> (Figure 3). Based on a MAUR measured at seven seasonal hydrometric stations of 9.5 L/s/km<sup>2</sup> (Knight Piésold, 2012), the annual recharge to Lake EB-2 is in the order of 3.1 Mm<sup>3</sup>. The winter water withdrawal represents approximately 2.1% of the annual recharge to Lake EB-2. As such, the winter water withdrawal is not expected to meaningfully affect flow at the lake outlet in the spring.

The winter water withdrawal is not expected to meaningfully affect fish and fish habitat in Lake EB-2. Nonetheless, Baffinland will verify this once a bathymetric survey of the lake has been completed during the 2018 open water season. Baffinland will re-assess the winter water withdrawal in accordance with the DFO Protocol, and submit the results to the Nunavut Water Board.

### Effects to Water Quality

With respect to water quality, activities associated with the exploration are not anticipated to have an effect on water quality in the area. Hazardous waste will be stored in containers, negating any interaction with surface water. Treated effluent that will meet discharge criteria will be pumped into Ege Bay.

### Effects to Groundwater

No effects to groundwater are anticipated. Any water that may come in contact with the ground surface will seep into the active layer and ultimately report to a surface water body.

## 6.4 AQUATIC RESOURCES

The results of a desktop review of fish habitat near to exploration activities is described in Section 5.4. Aquatic resources may be affected by exploration activities as follows:

- Winter water withdrawals
- Potential impingement of fish during water withdrawals
- Culvert installations

The potential for winter water withdrawals to adversely affect fish habitat was established to be negligible in Section 6.3. All water intakes will be equipped with fish screens that meet DFO's Freshwater Intake End-of-Pipe Fish Screen Guideline (DFO, 1995).

Culverts will be installed in two small streams. Both culvert crossings are assumed to be fish-bearing, although each has fish habitat limitations due to the relatively small catchment areas and low flows in mid to late summer. Culverts will be sized and installed in accordance with Knight Piesold (2018), based upon peak flow estimates by Knight Piesold (2016b). When installing the culverts, Baffinland will follow the mitigation measures outlined in its Surface Water and Aquatic Ecosystems Management Plan (Baffinland, 2016a). Baffinland will also seek direction from DFO and will comply with the best practices outlined in an expected Letter of Advice (LOA) when installing culverts along the access road.

## 6.5 SOILS AND PERMAFROST

Exploration at Ege Bay is not expected to have a meaningful effect on the soil and permafrost of the area. The exploration activities proposed have a relatively small footprint. Quarrying will be conducted in accordance with Baffinland's Quarry and Borrow Pit Management Plan (Baffinland, 2014a) and a site-specific quarry management plan yet to be developed. The access



road and airstrip, when constructed, will not involve any cuts on unconsolidated materials, and instead will involve placement of fill over the existing ground. Ground disturbances will be undertaken in accordance with the ground disturbance operational standard contained in the Environmental Protection Plan (EPP; Baffinland, 2016b). Applying the appropriate mitigation measures outlined in the EPP, effects to soil and permafrost are not expected to be significant.

## 6.6 VEGETATION

Exploration activities including drilling, test pitting, water use, construction and waste disposal are expected to have a very minimal effect on vegetation. The construction of the camp and the future construction of the access road and airstrip will result on the localized removal of vegetation that is negligible in comparison to the area and the vegetation type in these locations is abundant throughout the area. As mentioned above, ground disturbances will be undertaken in accordance with the ground disturbance operational standard contained in the EPP (Baffinland, 2016b).

The potential for the introduction of non-native species will be minimized by delivering cleaned heavy equipment and drills to site and inspecting the equipment upon arrival, in accordance with the EPP. To reduce potential contamination of vegetation by hazardous materials and waste, these materials will be stored in the appropriate containers and within lined containment areas as appropriate, and any spills will be cleaned up in accordance with the Spill Contingency Plan.

## 6.7 TERRESTRIAL WILDLIFE AND BIRDS

Terrestrial wildlife and birds may be affected by exploration through direct and indirect habitat loss, mortality, or effects to wildlife health.

Direct habitat loss from exploration will be relatively limited given the small footprint of the exploration program. Indirect habitat loss will occur through sensory disturbance. Efforts to minimize noise emissions is described in Section 6.2.

Mortality may occur because animals through collisions with wildlife, which are unlikely but possible with birds, and through attraction and habituation of animals such as foxes. Baffinland will enforce its policy of not feeding the wildlife, and will properly contain food wastes that may serve as attractants.

Effects to wildlife health through the introduction of invasive species will be mitigated as described in Section 6.3. The nature of exploration is such that the introduction of contaminants that affect wildlife health is highly unlikely to occur.

Various measures to monitor and mitigate against adverse effects on terrestrial wildlife are included in the EPP (Baffinland, 2016b) and the Terrestrial Environment Mitigation and Monitoring Plan (TEMMP; Baffinland, 2016c). The effects to wildlife from the exploration program are predicted to be not significant.

## 6.8 MARINE ENVIRONMENT AND WILDLIFE

Marine resources in the vicinity of Ege Bay include marine mammals and in particular walrus. Baffinland is aware of a walrus haul out on a small island in the adjacent Grant-Suttie Bay and on offshore islands (Bray Island and Rowley Island). The same islands are important nesting areas for a number of bird species. Other coastal resources important to Inuit that have been identified in the area include clams (Section 5.6).

The activities that have the potential to interact with the marine environment include:

- Sealift deliveries of equipment and supplies which could occur up to once annually
- Construction of a barge ramp
- Aircraft (helicopter and small fixed wing) accessing and operating within the exploration area

- Discharge of treated sewage effluent to land, running off into Ege Bay

Sealifts will operate in accordance with standard protocols, and Ege Bay is sufficiently deep to accommodate barges. A barge ramp may be constructed at some time in the future to facilitate barge offloading, similar to what currently exists at Milne Port for the Mary River Project. That barge ramp was constructed in accordance with a Letter of Advice that the DFO issued to Baffinland (DFO, 2013). Baffinland will seek similar guidance from the DFO with respect to construction of a barge ramp at Ege Bay, if the company proceeds with this plan.

Low flying aircraft has the potential to generate noise that could affect marine wildlife, include walrus haul outs and bird colonies. Aircraft will adhere to minimum flight altitudes and avoid sensitive wildlife areas, as described elsewhere in Section 6.2.

Treated sewage effluent will be discharged to land, running off into the marine environment of Ege Bay. It is expected that the effects of this discharge will be minimal given that the effluent will meet discharge limits in a future Type B Water Licence.

Sealift vessels do not release ballast water into the local marine environment.

The effects to the marine environment including marine wildlife from the exploration program are predicted to be not significant.

## 6.9 CULTURAL HERITAGE RESOURCES

The potential for cultural heritage resources in the coastal environment of Ege Bay is high (Section 5.5). An archaeology field program will be carried out within the Ege Bay Exploration Area in the summer of 2018, prior to the camp and equipment being delivered by sealift. A permit application has been submitted by project archaeologist to Government of Nunavut's Department of Culture and Heritage. The planned archaeological program includes a helicopter fly-by of the area to determine areas of potential cultural heritage potential. An on the ground assessment will be conducted in areas with moderate to high cultural heritage potential. Areas assessed to be of moderate or high archaeological value will be mapped, photographed, documented and stacked or roped off (if potential for human interaction exists).

The archaeological site protection measures described in the Cultural Heritage Protection Plan (Baffinland, 2016d) will be adhered to. This includes:

- Relocating project activities and infrastructure away from known archaeological sites (avoidance)
- Implementing protection measures at known sites near exploration activities, including marking or fencing these areas
- Including cultural heritage awareness in site orientation training for workers
- Implementing the chance finds procedures contained in the plan, should a previously unidentified archaeological site be identified within a work area

Baffinland has committed to seek the participation of one or two elders from Igloolik when carrying out the archaeological surveys this summer.

With the effective implementation of the above mitigation measures, adverse effects to cultural heritage are not expected.

## 6.10 LAND USE

The Project area is not a high use area, based on the Mary River Inuit Knowledge Study (Baffinland, 2014b), the land use study completed for the same project, and consultation with Igloolik and Hall Beach (Section 8). Following meetings held in the communities of Igloolik and Hall Beach in April, Baffinland has learned the area holds some historical significance to the communities. The exploration program is not expected to adversely effect the use of the area by community members.

Baffinland will implement site access procedures similar to those at Mary River, to ensure the safety of all potential land users in the area.

#### 6.11 SOCIO-ECONOMIC EFFECTS

Potential socio-economic effects will be limited, based on the scope of the exploration program. Positive effects may be realized in the local communities through the employment of workers for the exploration program. Baffinland will look for opportunities to engage the communities of Hall Beach and Igloolik in employment, contracting and procurement activities, to help maximize potential socio-economic effects.

#### 6.12 CUMULATIVE EFFECTS ASSESSMENT

To Baffinland's knowledge there are no other previous, present or reasonable foreseeable project in the vicinity of Ege Bay that could potentially cause cumulative effects to the environmental components assessed above.

#### 6.13 ACCIDENTS AND MALFUNCTIONS

As with any planned activity, the potential for accidents and malfunctions exists. Baffinland intends to safe guard against any accidents and malfunctions to reduce any potential adverse effects that may result. Potential for accidents and malfunctions resulting from the exploration at Ege Bay are summarized below.

- **Accidental spill of fuel** – an accidental spill of fuel may occur during the transfer of fuel to their consumption source, while filling vehicles/drills, or while slinging fuel barrels by helicopter. Baffinland will implement measures identified in its Spill Contingency Plan (under preparation) to mitigate against potential accidental fuel spills. The potential effects resulting from fuel spill includes contamination of soil, vegetation, and water. A further effect may be realized if contaminated vegetation is consumed by animals. In the event of a spill in water, fish and fish habitat may be adversely effected.
- **Tank refueling from barge** – fuel tanks will be refilled from a barge by a floating hose. There is a potential for the hose to leak or accidentally disengage from the barge or fuel tank. This may result in adverse effects in the marine environment and on marine mammals.
- **Hazardous waste container leak** – containers used to store hazardous waste and/or materials may leak due to improper seals or manufacturing error. The leak could result in hazardous materials spilling onto the surrounding ground, there by seeping into the active layer and ultimately a surface water body and contaminating soil and vegetation in the vicinity of the leak.

## 7 – ENVIRONMENTAL MANAGEMENT

A number of environmental management plans developed by Baffinland for the Mary River Project will be applied as appropriate on the Ege Bay Exploration Program, including:

- Surface Water and Aquatic Ecosystems Management Plan (Baffinland, 2016a)
- Environmental Protection Plan (Baffinland, 2016b)
- Terrestrial Environment Mitigation and Monitoring Plan (Baffinland, 2016c)
- Cultural Resources Protection Plan (Baffinland, 2016d)
- Waste Management Plan (Baffinland, 2018)
- Borrow Pit and Quarry Management Plan (Baffinland, 2014a)
- Sampling Program – Quality Assurance and Quality Control Plan (Baffinland, 2016e)

In addition, three management plans are under development specific to the Ege Bay Exploration Program:

- Spill Contingency Plan
- Closure and Reclamation Plan
- Monitoring and Inspection Plan

These plans will be submitted to the NWB as part of the application for a Type B Water Licence.



## 8 – CONSULTATION

Baffinland conducted an initial community tour on April 5-6, 2018 to introduce the Ege Bay Exploration Program to the communities of Hall Beach and Igloolik. The meeting in Hall Beach was held on April 5, 2018 with the Mayor and Council and HTA representatives. The meeting in Igloolik was held on April 6, 2018 with the Mayor and Council, HTA representatives, and QIA representatives.

During the meeting, Baffinland provided a presentation on the Ege Bay exploration program and its current plans for the area. Following the presentation meeting participants raised questions or concerns they may have. Some key point raised are provided below.

- **Archaeology and traditional land use** – Baffinland was informed of the traditional use by Igloolik and Hall Beach community members of the area, noting that camping occurred there as well as the presence of burial sites in the general area. Baffinland’s project archaeologist will conduct archaeological surveys of the area this summer. Baffinland offered to involve one or two elders familiar with the area in the archaeological surveys.
- **Inuit employment** – A number of meeting attendees expressed approval of the upcoming exploration provided Baffinland prioritized hiring from Igloolik and Hall Beach.
- **Potential benefits** - Questions regarding potential benefits were also raised. Baffinland indicated that the exploration is at a very early phase and that there are a number of steps required to determine if there are minerals that are economic for development. Baffinland suggested that if the exploration is successful and mine development was proposed, that this would likely result in the negotiation of an Inuit Impact Benefit Agreement (IIBA) separate from that of Mary River.
- **Mineralization and grade** – meeting participants asked about the minerals that are being targeted and if they are the same grade as Mary River. Baffinland is currently in the very early stages of exploration and will be investigating the overall mineral potential of Ege Bay. Specific mineralization and grades will not be known until exploration begins.
- **Closure and reclamation** – Meeting attendees raised concerns about historical exploration in the area that left fuel barrels and waste behind. Baffinland reassured participants that mining and exploration requirements have changed since then, and Baffinland is required to post financial assurance to cover the reclamation of the site and is required to bring the site back to its natural environment following their activities.

On April 13, 2018 Baffinland met with the QIA in Iqaluit. During the meeting Baffinland indicated their plans with respect to permitting and exploration at Ege Bay. The QIA had asked Baffinland on the feedback provided in Hall Beach and Igloolik and indicated they will be conducting their own consultation with Community Lands and Resources Committees (CLARCs).

Meeting records are available under a separate cover.

## 9 – CLOSURE AND RECLAMATION

Exploration activities are temporary in nature. Camps are mobile and focused on areas of high prospectively. Camps may be moved during or after the drilling the season to minimise mobilisation and travel distances for more advanced exploration activities, primarily exploration drilling.

Final closure and reclamation consists of removing the exploration camp and their associated infrastructure (sewage treatment, fuel cache) and site materials (drums, barrels, buildings and contents, docks, water pumps and lines, material and other equipment at the exploration camp site). All disturbed surfaces will be prepared by ripping, grading, or scarifying the surface to conform to the natural topography. All material will be transported off-site by sealift to licensed disposal facilities in the south, or to other exploration programs where materials can be reused.

Final closure and reclamation activities are expected to last a year, or perhaps as much as two (2) years if insufficient window remains to complete closure work before a sealift arrives to remove all remaining equipment, materials and waste at the end of the upcoming open water season.

Details regarding closure and reclamation activities are provided in the Closure and Reclamation Plan.

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