Baffinland Iron Mines Corporation
Mary River Project

2012 Work Plan

2011-12-15	A	Approved for Use	J. Keech	A. Grzegorczyk	J. Binns	
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Annex

1. Executive Summary

1.1 Context for the Request for Licenses and Permits for the 2012 Work Plan

On September 15, 2011, Baffinland submitted an Application for Review and Approval of the 2012 Work Plan for the Mary River Project (September 15, 2012 Work Plan Application). The intent of this application was to obtain approval from the NIRB and the NWB for early site capture and undertake construction of essential infrastructure that would enable Baffinland to proceed with construction activities immediately following the delivery of the Project Certificate expected in Q3 2012. The undertaking of the 2012 Work Plan would require an exemption under article 12.10.2(b) of the Nunavut Land Claim Agreement.

Baffinland's September 15, 2012 Work Plan Application was submitted for comments and review by communities, the QIA, responsible federal agencies (AANDC, Environment Canada, DFO, Transport Canada, Parks Canada), and the Government of Nunavut. Feedback from these stakeholders was received on November 4, 2011, and at subsequent Pre-Hearing Conferences held in Igloolik (November 6 and 7, 2011) and Pond Inlet (November 9 and 10, 2011). The general consensus amongst stakeholders was that Baffinland's proposed 2012 Work Plan as submitted in its September 15, 2012 Work Plan Application was too ambitious, and, that due to community and regulatory concerns, the scope of 2012 Work Plan should be scaled back.

In view of stakeholders' comments, on November 24, 2011, Baffinland indicated to the NIRB that it would scale back the 2012 Work Plan program and submit an addendum to its September 15, 2012 Work Plan Application by December 15, 2011. The decision to scale back the 2012 Work Plan led a complete review and reassessment of the need and the scope of the proposed 2012 Work Plan. Baffinland also assessed the impacts that not undertaking the complete scope of the September 15, 2012 Work Plan Application would have on the overall Project Execution schedule. In light of this review, community and regulatory concerns, Baffinland has decided to withdraw its Application for Review and Approval of 2012 Work Plan for the Mary River Project, as submitted on September 15, 2011.

Baffinland's scope of activities for the 2012 Work Plan will be considerably scaled back compared to the original application dated September 15, 2011. The proposed 2012 Work Plan will focus on the installation of facilities already permitted, and, the construction of a limited number of additional facilities required to support ongoing exploration and geotechnical investigation activities for the advancement of the Mary River Project. Within this 2012 Work Plan, staging of a limited amount of equipment and material is proposed for the Steensby site. This approach will provide Baffinland with the flexibility to proceed with limited pioneer development work at Steensby should the Minister of AANDC render a favourable decision on the Project Certificate in Q3 2012. Execution of this 2012 Work Plan requires authorization and permits from the QIA, the NWB and, AANDC as outlined in Section 2.

1.2 2012 Work Plan

Most of the activities planned for 2012 have already been screened and approved by the NIRB in 2011 (refer to Appendix A.1 of September 15, 2012 Work Plan Application). However, some of the additional activities/facilities proposed by Baffinland for its 2012 Work Plan require permits and licenses from authorizing agencies. Baffinland expects that the authorizing agencies will defer to the NIRB for a determination pursuant to article 12.10.2(b) of the NCLA.

The 2012 Work Plan at each of the Project sites is presented in:

- Section 2 for Milne Inlet;
- Section 3 for the Mine Site; and
- Section 4 for Steensby Site.

For each site, the activities or facilities requiring a NIRB screening decision are clearly identified.

1.3 Licenses and Permits Required for the 2012 Work Plan

Most of the 2012 Work Plan is already permitted:

- The current Commercial Lease for IOL (Q10C3001) covers Milne, Mary River, and most of the Milne Inlet Tote Road. Under the Permitted Activities it authorizes "pre-construction staging activities" approved by NIRB and subject to submitting an amended Work Plan for approval by the QIA as landlord. The Commercial Lease also addresses quarries under the Quarry Concession Agreement, water rights and associated compensation for limited water use, required Security deposit, and provisions for socio-economic benefits to the Inuit;
- Baffinland currently holds land permits for Crown Land along a 10 km length of the Tote Road (LUP #N2007F004), and for the existing Steensby and Midrail Camps (N2006C0030);
- Baffinland currently holds a quarry permit on Crown Land adjacent to the Tote Road (2011QP0079); and
- Baffinland holds quarry concession agreements under the Commercial Lease for a quarry/borrow pit at Milne Inlet, a quarry/borrow pit at the Mary River Mine Site, and along the Tote Road.

As indicated in Table 1- 1, much of the work planned for 2012 has been approved under a modification to Baffinland's existing Type B water license (2BB-MRY-1114). Baffinland proposes to execute the construction of the new facilities listed in the 2012 Work Plan concurrently with the activities already permitted under the existing Type B Water License (2BB-MRY-1114).

Table 1- 1: Summary of Activities for the 2012 Work Plan

	Activities	Activities permitted under Existing Water License 2BB-MRY1114 TYPE "B"	Activities requiring New Type B Water License
Milne Inlet	Construction and use of 1.5 ML Jet A fuel tank and 5 ML diesel fuel tank (already constructed)	Yes	
	Operation of existing Milne Inlet person camp and associated sewage treatment facilities and incinerator	Yes	
	Water supply from Phillip's Creek or 32 km Lake	Yes	
	Construction and use of landfarm (required for decommissioning of fuel bladders)		Yes
Mine Site	Operation of existing Mary River Camp and associated sewage treatment facilities and incinerator	Yes	
	Upgrading and use of discharge line to Sheardown Lake for treated sewage treatment plant effluent	Yes	
	Operation of existing landfill site	Yes	
	Construction and use of new 5 ML diesel fuel tank and 1.5 ML Jet fuel tank		Yes
Steensby	Operation of existing 40 person tent camp and incinerator	Yes	
	Storage of 2500 barrels of fuel	Yes	
	Construction and use of new 46 person hardwall camp with associated water supply from 3 km lake and sewage treatment plant		Yes
	Installation and use of a "wash trailer" at existing camp		Yes
	Installation and use of 7 x 100,000L ISO-containers for onshore fuel storage (fuel dispensing facilities will be contained)		Yes
	Temporary solid waste storage	Yes	

In addition to the new Type B Water License, Baffinland has identified the need to obtain the permits or authorizations identified in Table 1- 2 for its 2012 Work Plan.

Table 1- 2: Permits Required for 2012 Work Plan

Project Site	Responsible Agency	Permit
Milne Inlet	QIA	Submit 2012 Work Plan (Q10C3001 S. 4.)
	NWB	New Type B water license
	Transport Canada	OPEP for Milne Port
Mine Site	QIA	Submit 2012 Work Plan
	NRCan	Storage and Use of Explosives
	NWB	New Type B water license
Steensby Site	AANDC	Crown Land Lease for Steensby Site
	Transport Canada	OPEP for Steensby Port
	NRCan	Storage of Explosives
	NWB	New Type B water license

Note that the OPEPs for both Steensby and Milne are presented in draft form and will be finalised once a favourable screening decision is rendered by NIRB. These OPEPs are presented as attachments to Baffinland's new Type B Water License Application.

1.4 Abandonment and Reclamation

An addendum to the current Abandonment and Reclamation Plan is attached in support of the new Type B water license application. At closure, all physical buildings, material and equipment are removed from the site – these activities are thus completely reversible. At closure, re-contouring of areas may be required to facilitate or improve natural drainage patterns; erosion and sediment control structures are left in place. Where secondary containment berms have been constructed, these berms are to be removed/flattened and the sites are re-profiled and contoured to ensure adequate drainage and prevent erosion. All hydrocarbon contaminated areas will be identified, assessed, and remediated as appropriate.

1.5 Financial Security and Bonding Requirements

Baffinland recognizes that approval of the additional activities for the 2012 Work Plan does not constitute an approval for the overall Project and will not prejudice the NIRB or the Minister's decision on the Project Certificate.

Baffinland is willing to accept the risk and bonding required, and, to take the necessary steps to ensure this enhanced work plan can be authorized within the NIRB/NWB coordinated review process.

1.6 Benefits for Inuit

As was noted to all parties at the Pre-Hearing Conferences, Baffinland and the Qikigtani Inuit Association (QIA) are currently in the final stages of negotiating an Inuit Impact and Benefit Agreement (IIBA). The two sides have agreed on significant "incentive acceleration payments" (the amounts are confidential between the two parties) that would take effect upon an "Agreement in Principle" being signed.

There is agreement that once the "Agreement in Principle" has been signed, both parties will take action to commence implementation of the agreement as if and when the ultimate Project

Certificate is released for the project. Following the "agreement in principle", specific fulltime QIA positions will be hired (QIA IIBA Coordinator, Baffinland IIBA Coordinator, QIA Inuit Employment and Training Coordinator, and Baffinland Inuit Employment and Training Coordinator). These positions will be fully funded by Baffinland. Two committees management committees will be formed (an Executive and a Management committee) made up of QIA and Baffinland representatives. The Executive committee will meet quarterly while the management committee will meet monthly. The roles and responsibilities of each committee are specified in the IIBA.

Specific clauses of the IIBA deal with contracting and business opportunities for qualified Inuit firms throughout the construction, operations, and decommissioning phases of the Mary River Project. Baffinland and the QIA have outlined the types of contracts to be performed at the various phases of the Mary River Project and a list of the contracting opportunities is provided in the IIBA. Specific clauses of the IIBA also address business start-up and capacity building.

Total manpower requirements for the 2012 Work Plan are reduced both in number and duration and this will limit the number of positions available for Baffin residents. The total manpower requirement is 60 for Milne Inlet, 120 for Mine site and 80-90 for Steensby and the maximum duration is May-October or six months. This seasonal requirement is similar to the employment pattern at Mary River and Milne Inlet over the last two years. As part of the work – there will be onsite training opportunities associated with the jobs that residents will be hired for.

There will however still be opportunities for employment by north Baffin residents in the 2102 program but positions will be limited. The positions will be seasonal in nature - similar to what has been seen at Mary River and Milne inlet over the past two years. As part of the work – there will be onsite training opportunities associated with the jobs that residents will be hired for.

2. Milne Inlet – Work Plan for 2012

2.1 Activities Already Permitted

The following activities have already been screened by NIRB and are permitted under a modification to the existing 2BB-MRY-1114 Type B water license:

- Operation of the existing Milne Inlet camp with its associated water supply, sewage treatment plant, incinerator, and solid waste management;
- Operation of the oily water treatment pilot facility;
- Use of the 5 ML diesel fuel tank that will replace the fuel bladder farm;
- Installation of a 1.5 ML steel Jet A fuel tank; and
- Exploitation of the borrow pit at Milne Inlet.

2.2 Request for Screening for Additional Activities

The proposed additional scope of work for 2012 deals with the decommissioning of the bladder fuel farm with an area of new disturbance of up to 4 ha. The activities required are as follows:

- Construction and operation of a landfarm; and
- Decommissioning of the fuel bladders and containment.

Baffinland request the licenses and permits required to proceed with these two additional activities.

2.3 Schedule

The work plan for the Milne Inlet could commence as early as May 2012 and will be completed by October 2012.

3. Mine Site – Work Plan for 2012

3.1 Activities Already Permitted

The following activities have already been screened by NIRB and are permitted under the existing 2BB-MRY-1114 Type B water license:

- Operation of the existing Mary River camp with its associated water supply (from Camp Lake), sewage treatment plant, incinerator, and solid waste disposal;
- Installation and use of the treated effluent discharge line to Sheardown Lake;
- Operation of the fuel bladder farm;
- Ongoing geotechnical investigation program to advance the Mary River Project;
- Ongoing exploration activities to define the iron reserves; and
- Ongoing exploitation of the already permitted Mary River quarry.

3.2 Request for Screening for Additional Activities

The proposed additional scope of work for 2012 includes an area of new disturbance of up to 3 ha and deals with the following activities:

- Construction and use of a new 5.2 ML diesel fuel tank (steel for erection was staged at the Mine site in 2009); the intent of this tank is to replace the use of the fuel bladder farm; (possibility that this work may be delayed until 2013)
- Installation of two new 1.5 ML Jet A fuel tanks within the same secondary containment as the 5.2 ML tank; (possibility that this work will be delayed until 2013) and
- Advance the waste rock characterisation program as was discussed at the Technical Meetings in Iqaluit. It is expected that the 2012 characterisation program will consist of 3200 m of drilling.

Baffinland request the licenses and permits required to undertake the above activities.

3.3 Schedule

The 2012 Work Plan for the Mine site could commence as early as May 2012 and will be completed by October 2012.

4. Steensby Site – Work Plan for 2012

4.1 Activities Already Permitted

The following activities have already been screened by NIRB and are permitted under a modification to the existing 2BB-MRY-1114 Type B water license:

- Operation of the existing 40 person tent camp with its associated water supply (from 3 km Lake), incinerator, and solid waste management;
- Ongoing land and marine on-ice based geotechnical investigation program to advance the Mary River Project; and,
- Use of 2500 barrel fuel storage adjacent to the existing camp.

4.2 Request for Screening for Additional Activities

The proposed additional scope of work for 2012 includes an area of new disturbance of up to 20 ha and deals with the following activities:

- Installation and use of the 46 person hardwall camp that was staged at the Steensby site in 2009;
- Construction and operation of a potable water treatment facility to service both the existing camp and the new camp;
- Construction and operation of a new sewage treatment facility to service both the existing camp and the new 46 person camp;
- Installation of a treated effluent outfall to Steensby Inlet;
- Installation of a pre-fabricated "wash trailer" facility to service the existing 40 person camp (self contained showers, wash basins and toilets); the grey water and sewage from this facility will be trucked to the new sewage treatment facility installed for the 46 person camp;
- Installation and use of 7 x 100,000L ISO-containers at Steensby for diesel and Jet A fuel storage on shore; ISO containers do not require secondary containment but fuel dispensing areas will be contained.
- Expansion of the sea based geotechnical investigation program (at proposed dock locations, island causeway and in an area where dredging may be required), the geotechnical program may be conducted from a vessel from August-September;
- Staging of construction equipment and material that will provide Baffinland with the flexibility to begin construction of pioneer development work at Steensby, once the Project Certificate is granted. This material and equipment would consist of:
  - 4 crusher trains;
  - Mobile equipment (loaders, excavators, trucks – see Annexe 1);
  - One mobile explosive mixing unit;

- Four high explosives magazines and one detonator magazine; and
- Up to 3,000 tonnes of ammonium nitrate stored in 1 tonne tote bags placed within Seacan containers.

- Use of a 10 ML fuel barge or vessel, that will anchor and overwinter in Steensby Inlet, to provide the necessary diesel fuel to carry out the 2012 Work Plan, and, potentially, some pioneer development work once the Project Certificate is granted.

Baffinland requests the licenses and permits required to proceed with the above activities.

Note that all personnel required to execute the 2012 Work Plan at Steensby will be flown in from the Mary River site. Hence there is a need to increase the Jet A fuel storage available at the Steensby site.

The specification and details on the 10 ML fuel barge or vessel are not available at this time. The fuel barge or vessel will be sourced once the 2012 Work Plan is approved by the authorizing agencies. However, Baffinland expects to charter this fuel barge or vessel from a licensed Canadian ship operator. The barge or vessel will be required to have a Transport Canada approved SOPEP.

Solid waste generated at Steensby will be stored temporarily at the Steensby site and transported off-site as required for disposal.

4.3 Schedule

The work plan for Steensby could commence as early as May 2012 and will be completed by October 2012.

5. Biophysical Environment Environmental Effects Assessment

The 2012 Work Plan will executed in a manner that meets all regulatory requirements and that will avoid, limit, and, minimize negative effects where possible and will enhance socio-economic benefits. Management plans have been developed to ensure that the commitments made by Baffinland will be respected.

Concerns have been expressed over the possibility of a diesel spill associated with refuelling at Milne and Steensby Inlets. In the unlikely event that it occurs, such a spill may have significant environmental effects. However, refuelling is a well mastered routine activity for all Arctic communities. Handling of fuel deliveries is regulated under the Canadian Shipping Act and subject to an Oil Pollution Emergency Plan (OPEP) which must be submitted and approved by Transport Canada prior to deliveries. For the 2012 Work Plan, shipments of fuel will be delivered at both Milne Inlet and Steensby Inlet by tankers between early August 2012 and late September 2012.

The specification and details on the 10 ML fuel barge or vessel are not available at this time. The fuel barge or vessel will be sourced once the 2012 Work Plan is approved by the authorizing agencies. However, Baffinland expects to charter this fuel barge or vessel from a licensed Canadian ship operator. The barge or vessel will be designed for the purpose of overwintering with fuel and is required to have a Transport Canada approved SOPEP. There is considerable experience with this kind of operation in Nunavut such that the risks can be managed successfully.

5.1 Identification of Valued Components (VCs)

VCs identify key species or topics to focus the effects assessment. NIRB (2007) distinguishes between valued ecosystem components (VECs) as the VCs of the biophysical environment, and "valued socio economic components" (VSECs) relating to the human, economic, and spiritual environment. VECs are defined by NIRB as follows:

- VECs include those aspects of the environment considered to be important to a particular region or community and might include:
  - Resources that are either legally, politically, publicly, or professionally recognized as important, such as parks, land selections, and historical sites;
  - Resources that have ecological importance, such as keystone species which, if affected, have a disproportionate effect on their surroundings relative to the types and numbers of other species in a community, and those species that are suitable ecological indicators; and
  - Resources identified for their importance to local communities because they are either harvested or of prominent spiritual importance.

This section examines the VECs or biophysical components, where interactions with activities related to the 2012 Work Plan may occur.

Table 5 - 1 summarizes the themes and VCs for the 2012 Work Plan.

Table 5 - 1: Summary of the Themes and VCs for the 2012 Work Plan

Themes	VECs	Key Indicators
Atmospheric Environment	Climate change	Greenhouse gases
		Climate change
	Air quality	Particulate matter, SO_2, NO_x
	Noise and vibration	Atmospheric noise levels, marine noise levels, vibration
Terrestrial Environment	Landforms, soil and permafrost	Sensitive landforms
	Vegetation	Plant abundance and diversity Plants important to Inuit Plant health
	Terrestrial wildlife and habitat	Caribou
	Migratory birds and habitat	Peregrine falcon, snow geese, eider ducks, red-throated loons
Freshwater Aquatic Environment	Surface water include freshwater quality and quantity	Water quantity Water and sediment quality
	Freshwater fish, fish habitat and other aquatic organisms	Arctic char
Marine Environment	Sea ice	Area of shore fast ice in Steensby Inlet
	Water and sediment quality	Water and sediment quality parameters with established guidelines
	Marine habitat and biota	Arctic char
	Sea birds	Eider ducks (shoreline nesting)
	Marine mammals	Ringed seals, bowhead whale, walrus, beluga whale, narwhal, polar bear You need to add in seabirds A whole new heading – Before marine mammals

5.2 Interactions

In terms of environmental protection and compliance, Baffinland has been operating the project for several years. in 2007 Baffinland established an Environmental Protection Plan (EPP) to provide guidance to on-site personnel regarding meeting legislative and permitting requirements. The Company submits various monthly and annual reports in accordance with permit requirements. The Company is in compliance with its permits and authorizations and has not experienced any major spills or other environmental emergencies at its operation, and no major accidents resulting in fatalities.

The 2012 Work Plan activities are primarily restricted to Milne Inlet, Mary River Mine Site and the Steensby site. The exception relates to shipping activities which have the potential to generate interactions along their entire travel route. The potential for interactions with VCs focuses on the following:

- Milne Inlet - One ship movement for delivery of fuel, one ship movement for delivery of Jet A Tanks, Construction of a Land farm for future decommissioning of the existing bladder tank farm;

- Mary River Mine Site – Construction of a fuel containment area and erection of a 5 million litre fuel storage tank (it should be noted that these activities may now be deferred until 2013; and
- Steensby Site – two ship movements for delivery of fuel, two ship movements for the delivery and staging of equipment and explosives for future operations, erect and occupy an existing 46 person hard wall camp, installation and operation of a 80 m3/day water intake source and installation and operation of a sewage treatment plant with ocean discharge. Note that the camps will utilise up to 30 m^3/day while the balance will be required for early project development work that will be undertaken once the Project Certificate is granted. In addition, a 10 million litre fuel barge will be anchored near the shore at Steensby.

Interactions between 2012 Work Plan components and the VECs are expected to be restricted in geographical scope, of short duration and fully reversible. This is primarily a result of the nature of the 2012 Work Plan components which are limited in scope. However, interactions between the activities of the 2012 Work Plan and the VECs may still cause effects. The effects assessments are organized according to resource component themes (e.g. atmospheric environment, terrestrial environment, freshwater aquatic environment, marine environment). VCs were identified within each of these themes based on the issues identified. Effects were then evaluated within the framework once mitigation measures were applied, leaving an assessment of any residual effects from the 2012 Work Plan. Table 5 - 2 below summarizes the effects as they apply to the VECs and predicts the significance of the residual effects following mitigation.

The VEC's were established in the DEIS, based on consultation with potentially affected communities during public meetings and independently confirmed by NIRB and identified in NIRB's EIS guidelines (NIRB, 2009).

5.3 Assessment Definitions

The assessment of effects of the interactions for the 2012 Work Plan with the VECs was done qualitatively based on criteria developed for the DEIS. These criteria are defined in Table 5 - 2 below.

Table 5 - 2: Criteria for Assessment Definitions

Criteria	Rating Term	Definition
Magnitude	Level 1	The changes will not be distinguishable from natural variation and within regulated thresholds or values
	Level 2	The changes will be distinguishable from natural variation, but within regulated thresholds or values
	Level 3	The change is distinguishable from natural variation and exceeds regulated thresholds or values
Geographic Extent	Level 1	The expected measurable changes are confined to the PDA (Project Development Area)
	Level 2	The expected measurable changes extend beyond the PDA
Duration	Level 1	The predicted effect persists briefly - no longer than several hours or several days for the duration of the 2012 Work Plan.
	Level 2	The predicted effect persists continuously for the duration of the 2012 Work Plan
	Level 3	The predicted effect persists beyond the duration of the 2012 Work Plan.
Frequency	Level 1	Predicted effects occur only a few hours per day for the duration of the 2012 Work Plan.
	Level 2	The predicted effect occurs continuously for the duration of the 2012 Work Plan.
Reversibility	Level 1	The predicted effect is reversible after the activity ceases
	Level 2	The predicted effect is reversible with cost/effort when the activity ceases
	Level 3	The effect cannot be reversed
Qualifiers		
Certainty	High	Baseline data is comprehensive; predictions are based on quantitative data; effect relationship is well understood
	Medium	Intermediate degree of confidence between high and low
	Low	Baseline data are limited; predictions are based on qualitative data; effect relationship is not well understood
Probability	Unlikely	Less than 20% likelihood of occurrence
	Moderate	Between 20 and 60% likelihood of occurrence
	Likely	Over 60% likelihood of occurrence

It should be noted that for the 2012 Work Plan, due to the limited scope of activities, Magnitude is expected to be at Level 1 for all activities, and reversibility is also expected to be at Level 1 for all activities. The extent of effects for all land based activities will be well within the PDA, to within a few meters of the actual work activities, with the exception of the operation of the sea lift, which will occur outside of the PDA. This is based on the limited scope of the activities proposed in the 2012 Work Plan, and the anticipated interactions. These are further discussed below.

5.3.1 Atmospheric Environment

The Project is in a remote location with no existing local sources of air pollutants, noise and vibration or climate change other than exploration facilities at the Mine Site area. Contaminants present in the air are primarily due to long-range transport from the more southerly industrial and urban areas located in North America and Eurasia. Potential effects associated with the 2012 Work Plan were evaluated qualitatively on the basis of previous experience gained from the Bulk Sampling Campaign carried out in 2008.

On a limited basis, the 2012 Work Plan activities will introduce new, local sources of air contaminants such as particulate matter (TSP), nitrogen dioxide (NO2), sulphur dioxide (SO2), and carbon monoxide (CO) to the Project area. A reduction in air quality due to these emissions may, in the extreme, result in potential effects to vegetation or wildlife species; an ecosystem's structure or processes; or human health. These potential effects can either result from exposure to ambient air concentrations or from accumulation in (i.e., deposition to) the environment.

The Interactions of the 2012 Work Plan with the Atmospheric Environment are listed below:

5.3.1.1 Milne Inlet

The 2012 Work Plan activities and resulting interactions at Milne Inlet that have the potential to affect the local atmospheric environment include:

- Sealift activities – Interactions include emissions, noise, potential Green House Gases (GHGs);
- Earthworks associated with the construction of and the landfarm – Interactions include emissions, noise, potential GHGs;
- Operation of mobile equipment and generators for electricity - Interactions include emissions, noise, potential GHGs; and
- Incineration of domestic waste- Interactions include emissions, potential GHGs.

5.3.1.2 Mary River Mine Site

The 2012 Work Plan activities and resulting interactions at the Mary River Mine Site that have the potential to affect local air quality include:

- Earthwork activities associated with construction of fuel containment - Interactions include emissions, noise, potential GHGs;
- Quarry operation (existing) for aggregate sources - Interactions include emissions, noise, potential GHGs, vibration associated with crushing and quarry operation, vibration associated with blasting;
- Operation of mobile equipment and generators for electricity - Interactions include emissions, noise, potential GHGs; and
- Incineration of domestic waste - Interactions include emissions, potential GHGs.

5.3.1.3 *Steensby Port*

The 2012 Work Plan activities and resulting interactions at Steensby Port that have the potential to affect local air quality include:

- Sealift activities associated with delivery of Equipment - Interactions include emissions, noise, potential GHGs;
- Operation of mobile equipment and generators for electricity - Interactions include emissions, noise, potential GHGs; and
- Incineration of domestic waste - Interactions include emissions, potential GHGs.

The expected effects to the Atmospheric Environment are shown below in Table 5 - 3.

Table 5 - 3: Environmental Effects Assessment for the Atmospheric Environment for 2012 Work Plan

2012 Work Plan Activity	ATMOSPHERIC ENVIRONMENT EFFECTS ASSESSMENT					
	Potential Effect	Magnitude	Duration	Extent	Frequency	Reversibility
Arrival of 2 ships at Milne Inlet, and up to 4 ships at Steensby Site	Source of increased emissions to the atmosphere from operation of large ships. Has the potential to increase GHG, and impact the ambient air quality	Level 1 - limited number of ships	Level 1- operation only during open water season	Level 2 – extends outside PDA during travel	Level 1 –limited number of ships	Level 1 –effects are entirely reversible when ships leave
	Arrival and unloading of ships will increase the noise levels in the port area, and may disturb wildlife and avian communities (sensory impacts)	Level 1 - limited number of ships	Level 1- operation only during open water season	Level 1 - Limited to local area	Level 1 –limited number of ships	Level 1 –effects are entirely reversible when ships leave
Operation of Construction Equipment, Generators for Camps and vehicle movements	Increased emissions as a result of vehicle operation could increase GHG, and have a negative impact on ambient air quality	Level 1 – few vehicles operating	Level 2- operation will be for the duration of work plan	Level 1 - Limited to local area of construction	Level 2 –will be continuous for generators when camps occupied	Level 1 –effects are entirely reversible work plan ends
	Increased noise from operations may disturb wildlife and avian communities (sensory impacts).	Level 1 –may be high locally at times	Level 2 - operation will be for the duration of work plan	Level 1 - Limited to PDA. Occasionally heard outside PDA	Level 2- continuous for generators when camps occupied	Level 1 –effects are entirely reversible when work plan ends
Aircraft Movements	Noise disturbances to birds and mammals such as falcons, polar bear and caribou as a result of increased operations	Level 1 –may be high locally at times	Level 2 - operation will be for the duration of work plan	Level 1 - Occasionally heard outside PDA	Level 1- infrequent operations	Level 1 –effects are entirely reversible when work plan ends
	Potential for increased collisions with birds such as peregrine falcons	Level 1 –rare occurrence	Level 2 - operation will be for the duration of work plan	Level 1 -. Occasionally heard outside PDA	Level 1- infrequent operations	Level 1 –effects are entirely reversible when work plan ends
Burning of Waste Materials	Burning of Waste materials at campsites can increase atmospheric emissions and increase GHGs and have a negative impact on air quality	Level 1 – expected to be minimal burning	Level 2 – will occur occasionally	Level 1 - Limited to PDA.	Level 2- limited hours	Level 1 –effects are entirely reversible when work plan ends

The residual effects (see Section 5.4) to the Atmospheric Environment as a result of 2012 Work Plan are predicted to be NOT SIGNIFICANT. 2012 Work Plan activities at Milne Inlet, the Mine Site, and at Steensby Port are predicted to have a low magnitude, short duration, limited geographical extent, low frequency and are reversible. On the basis of repeated observations for similar activities, the level of confidence in this assessment is high and the certainty is high.

5.3.2 Terrestrial Environment

The project site is a relatively undeveloped area and any new activities have the potential to disrupt the local terrestrial environment. The effects assessment for terrestrial Valued Ecosystem Components (VECs) focuses on 2012 Work Plan activities of Milne Inlet, the Mine Site, and Steensby site.

On a limited basis, the 2012 Work Plan activities will introduce new, local activities that could cause interactions with landforms and soil, vegetation, wildlife and their habitat, and birds and their habitat. These interactions may, in the extreme, result in potential effects to an ecosystem's structure or processes. The sources of interaction are listed below:

5.3.2.1 Milne Inlet

The 2012 Work Plan activities and resulting interactions at Milne Inlet that have the potential to affect the local terrestrial environment. The total area affected will be an area of 200m x 100 m for the land farm, plus ancillary structures for a total of < 4ha. Activities include:

- Earthworks associated with the construction of the landfarm – Interactions include permafrost alteration, loss of vegetation, disruption of birds and wildlife due to activity, loss of habitat; and
- Operation of mobile equipment and generators for electricity - Interactions include disruption of birds and wildlife due to activity.

5.3.2.2 Mary River Mine Site

The 2012 Work Plan activities and resulting interactions at Mine Site that have the potential to affect the local terrestrial environment. The total area for the construction of the secondary containment and ancillary facilities is < 3 ha. Activities include:

- Earthwork activities associated with construction of fuel farm secondary containment - Interactions include permafrost alteration, loss of vegetation, disruption of birds and wildlife due to activity, loss of habitat;
- Quarry operation (existing) for aggregate sources, disruption of birds and wildlife due to activity; and
- Operation of mobile equipment and generators for electricity - Interactions include disruption of birds and wildlife due to activity.

5.3.2.3 *Steensby Site*

The 2012 Work Plan activities and resulting interactions at Steensby site that have the potential to affect the local terrestrial environment. The land use permit for Steensby indicates a total area of up to 20 ha. Activities include:

- Operation of mobile equipment and generators for electricity - Interactions include disruption of birds and wildlife due to activity; the risk of collision with wildlife or wildlife habituation is minimal.
- Receive and staging of material and equipment – Interactions include landscape change that may disrupt birds and wildlife; the area of 20 ha is a small portion of the total PDA and does not represent a large loss of habitat; and
- Erect hard-wall camp - Interactions include landscape change that may disrupt birds and wildlife.
- The environmental effects to the Terrestrial Environment are shown below in Table 5 - 4.

Table 5 - 4: Terrestrial Environmental Effects Assessment for 2012 Work Plan

2012 Work Plan Activity	TERRESTRIAL ENVIRONMENT EFFECTS ASSESSMENT					
	Potential Effect	**Magnitude**	**Duration**	**Extent**	**Frequency**	**Reversibility**
Construction of fuel containment at Mary River, land farm at Milne Inlet and hard wall camp at Steensby site	Minimal footprint of projects will remove a small portion of landscape. Footings may cause some subsidence of permafrost. Presence of structure may reduce habitat for sensitive avian species.	Level 1 – small areas involved	Level 2- for life of project	Level 1- local effect only	Level 1 – infrequent	Level 1 –effects are entirely reversible with closure plan
Operation of Construction Equipment, and vehicle movements	Potential for increased collisions with animals	Level 1 – small numbers of animals within project site	Level 2- for life of project	Level 1- local effect only	Level 1 – infrequent and only during operations	Level 1 –effects are entirely reversible
Fuelling and maintenance of equipment	Potential for accidents and spills to contaminate local soils.	Level 1 –low potential	Level 2 – during 2012 work plan	Level 1 - Limited to local areas with proper spill containment	Level 1- only during select operations	Level 2 –effects possible to reverse if spills occur

The residual effects (see Section 5.4) to the Terrestrial Environment as a result of 2012 Work Plan are predicted to be NOT SIGNIFICANT. 2012 work activities at Milne Inlet, the Mine Site, and at Steensby Port are predicted to have a low magnitude, short duration (less than 6 months), limited geographical extent (less than 20 ha at Steensby, less than 3 ha at Milne for the landfarm, and less that 1.5 ha at the Mine site), low frequency and are reversible. On the basis of repeated observations for similar activities, the level of confidence in this assessment is high and the certainty is high.

5.3.3 *Freshwater Aquatic Environment*

The 2012 Work Plan will largely include the delivery and staging of materials and equipment at the Steenby site, construction of a fuel containment system at Mary River and construction of a landfarm at Milne Inlet. None of these facilities are close to fresh water streams. New demands will be placed on existing sources for domestic water supply at Steensby site, and a new water license for 80 m3/day from 3 km Lake is being requested . Changes to local drainage patterns will be limited to the immediate footprint of facilities.

Activities that could cause interactions with water quality, water quantity, freshwater biota including arctic char, and their habitat are listed below:

5.3.3.1 *Milne Inlet*

The 2012 Work Plan activities and resulting interactions at Milne Port that have the potential to affect the local freshwater environment are limited to < 4 ha of new disturbance and include:

- Earthworks associated with the construction of the landfarm – Interactions include possible sedimentation increase;
- Operation of local camps – Interactions include water usage for domestic and industrial use, sewage disposal system operation; these facilities are already permitted and monitoring results to date have shown no significant effects.
- Vehicle and Equipment operation – Interactions include increased erosion/sediment.

5.3.3.2 *Mary River Mine Site*

The 2012 Work Plan activities and resulting interactions at the Mine Site that have the potential to affect the local the freshwater environment are limited to < 3 ha of new disturbance include:

- Earthwork activities associated with construction of fuel containment and pads for infrastructure - Interactions include possible sedimentation increase;
- Operation of local camps – Interactions include increased water usage for domestic and industrial use, sewage disposal system operation; this facility is already permitted and monitoring to date indicates no significant effects.
- Vehicle and Equipment operation – Interactions include increased erosion/sediment.

5.3.3.3 *Steensby Site*

The 2012 Work Plan activities and resulting interactions at Steensby Site that have the potential to affect the local freshwater environment are limited to up to 20 ha of new disturbance and include:

- Construction and operation of an 80 m3/day domestic water supply intake – Interactions will be increased demand on 3 km lake, reduction in volume, possible loss of fish habitat; and
- Vehicle and Equipment operation – Interactions include increased erosion/sediment

The effects to the Freshwater Aquatic Environment are shown below in Table 5 - 5.

Table 5 - 5: Freshwater Aquatic Effects Assessment for 2012 Work Plan

2012 Work Plan Activity	FRESHWATER AQUATIC ENVIRONMENT EFFECTS ASSESSMENT					
	Potential Effect	**Magnitude**	**Duration**	**Extent**	**Frequency**	**Reversibility**
Construction and operation of water intake at 3 km Lake to Draw up to 80 m^3/day as per new water license application. Withdrawals from Phillips Creek and Camp Lake as per existing licenses	Drawdown of water from lakes can reduce overall lake volume.	Level 1 – small compared to lake volume	Level 2- operation during camp occupation	Level 1 – does not extend outside PDA	Level 2 –daily operation	Level 1 –effects are entirely reversible
	Drawdown can reduce available habitat for fish, and increase fish mortality from impingement on intake	Level 1 - small compared to lake volume	Level 2- operation during camp occupation	Level 1 - Limited to local area	Level 1 –daily operation	Level 1 –effects are entirely reversible
Construction of fuel containment at Mary River, land farm at Milne Inlet	Changes to local drainage patterns may occur and alter water regime	Level 1 – unlikely to occur at a detectable level	Level 2 – would be for life of project	Level 1 - Limited to local area	Level 2 –will be continuous	Level 1 –effects are entirely reversible with removal or mitigation
	Operation of equipment and transport of material may cause increased erosion and resulting sedimentation could impact water quality and fish habitat	Level 1 –low erosion potential	Level 2 - will be for the duration of work plan	Level 1 - Limited to local areas	Level 2- during all construction activity	Level 1 –effects are entirely reversible when work plan ends
Operation of Equipment, Staging of Equipment, fuelling operations at Milne Inlet, Mary River and Steensby Site	Potential for accidents and spills to occur and enter local surface water bodies. Could cause degradation of water quality, loss of fish habitat	Level 1 –low potential	Level 2 - will be for the duration of work plan	Level 1 - Limited to local areas	Level 2- during all construction activity	Level 2 –effects are difficult to reverse if spills occur

The residual effects (see Section 5.4) to the Freshwater Aquatic Environment as a result of 2012 Work Plan are predicted to be NOT SIGNIFICANT. Work Plan activities at Milne Port, the Mine Site, and at Steensby Port are predicted to have a low magnitude, short duration (less than 6 months),limited geographical extent (less than 20 ha at Steensby, less than 3 ha at Milne for the landfarm and less than 1.5 ha at Mary River), low frequency and are reversibility. Extensive baseline studies and experience with 3 km lake means the level of confidence in this assessment is high and the certainty is high.

5.3.4 Marine Environment

The 2012 Work Plan as proposed will occur during the open water season in 2012, and will avoid issues associated with sea ice. Total ship movements will include two fuel deliveries to Steensby site as well as marine based geotechnical drilling and sampling, plus two sealifts for the delivery and staging of equipment. Milne Inlet will receive one fuel delivery, and an additional sealift for the Jet A fuel tanks.

In addition to the ship movements, land based activities such as discharge of sewage or increased erosion can also affect the marine environment. The2012 Work Plan activities will introduce new, local activities that could cause limited interactions with Marine Environment VECs, , water and sediment quality, marine habitat and biota, and marine mammals. The activities and sources of interaction are listed below:

5.3.4.1 Milne Site

The 2012 Work Plan activities and resulting interactions at Milne Inlet that have the potential to affect the Marine environment include:

- Sealift and fuel delivery– Interactions include changes in sediment due to propwash that could result in a loss of habitat, collisions with marine mammals, disruption to marine mammals due to increased activity;
- Operation of local camps – Interactions include treated effluent discharge to Milne Inlet, increases to runoff, disruption to marine mammals due to increased activity; and
- Vehicle and Equipment operation – Interactions include increased erosion/sediment to ocean.

5.3.4.2 Steensby Port

The 2012 Work Plan activities and resulting interactions at Steensby Port that have the potential to affect the Marine environment include:

- Sealift and fuel delivery– Interactions include changes in sediment due to propwash and possible habitat loss, collisions with marine mammals resulting in mortality, disruption to marine mammals due to increased activity resulting in behaviour changes and disturbance of nesting sea birds by wake waves;
- Geotechnical drilling and sampling from a vessel in Steensby Bay—interactions include disturbance of sediments and disruption to marine mammals due to increased activity resulting in behaviour changes
- Discharge of treated effluent from sewage treatment plant to Steensby Inlet - –Interactions will include minor changes to sediment and water quality; and
- Vehicle and Equipment operation – Interactions include increased erosion/sediment processes that result in increased ocean deposition

The environmental effects assessment for the Marine Environment is shown below in Table 5 - 6.

Table 5 - 6: Marine Aquatic Environment Effects Assessment for 2012 Work Plan

2012 Work Plan Activity	MARINE AQUATIC ENVIRONMENT EFFECTS ASSESSMENT					
	Potential Effect	**Magnitude**	**Duration**	**Extent**	**Frequency**	**Reversibility**
Sealift and refuelling ship activities. Arrival of 2 ships at Milne Inlet, and up to 4 ships at Steensby Site	Ship arrival and passage may disturb marine mammals and shorebirds. Behavioural changes could result	Level 1 – few ships involved	Level 1- only during open water season outside of breeding seasons	Level 2 –could extend outside PDA	Level 1 – infrequent arrivals of only 6 ships total	Level 1 –effects are entirely reversible when ships leave area
	Collisions with marine mammals could cause increases in mortality	Level 1 - small number of movements	Level 1- only during open water season, few mammals present	Level 2 –could extend outside PDA	Level 1 – infrequent arrivals of only 6 ships total	Level 1 –effects are entirely reversible
	Propwash from ship could disrupt aquatic sediments and alter habitat	Level 1 - small number of movements	Level 1- only during open water season,	Level 1 –only shallow water locally	Level 1 – infrequent arrivals of only 6 ships total	Level 1 –effects are entirely reversible
	Wake effects from vessels may disturb nesting sea birds	Level 1 - small number of movements	Level 1- only during open water season	Level 2 –could extend outside PDA	Level 1 – infrequent arrivals of only 6 ships total	Level 2 –effects are difficult to reverse if damage to nest occurs
	Anchorages could impact benthic habitat	Level 1 - small number of movements	Level 1- short time for mooring	Level 2 –local effects only	Level 1 – infrequent arrivals of only 6 ships total	Level 1 –effects are entirely reversible
Operation of Equipment, to transfer fuel from ships to shore facilities	Potential for accidents and spills to occur and enter local marine environment. Could cause degradation of water quality, loss of fish habitat, impacts to marine wildlife	Level 1 –low potential	Level 2 – only during fuel transfer operations	Level 1 - Limited to local areas with proper spill containment	Level 1- only during fuel transfer operation	Level 2 –effects are difficult to reverse if spills occur

The residual effects to the Marine Environment as a result of 2012 Work Plan are predicted to be NOT SIGNIFICANT. The 2012 Work Plan activities at Milne Inlet and at the Steensby site are predicted to have a Level 1 for magnitude, frequency and reversibility , and Level 2 for extent and duration.. On the basis of repeated observations for similar activities, the level of confidence in this assessment is high and the certainty is high.

5.4 Residual Effects

The potential effects associated with the 2012 Work Plan on the various VECs are summarized in Table 5 - 7. In all cases, the residual effect from the activities are expected to be not significant. This is a result of the reversibility of all effects, and the limited magnitude of the anticipated impacts.

Interactions will primarily be restricted to the immediate footprint of the activities, with the exception of the effects due to shipping activities, which will introduce effects through a much broader area along their proposed travel routes. However, the volume of shipping (expected to be 4 vessels to Steensby Inlet and 2 vessels to Milne Inlet) is small in relation to the other activity in the arctic, and is not expected to produce significant impacts.

Table 5 - 7: Residual Effects of 2012 Work Plan on Biophysical Environment

Landforms, Permafrost and Atmospheric Environment			
VC	**Potential Effect**	**Mitigation Measure**	**Residual Effect**
Landforms and soil	Increased erosion	Ensure adequate drainage and prevent pooling of water	Not Significant
Permafrost	Local subsidence	Drainage and foundation design	Not Significant
Climate Change	GHG emissions	Arctic grade diesel fuel	Not Significant
Air Quality	Degradation of ambient air quality	Apply best management practices for limiting air emissions; where possible, use of granular material for road construction; regular maintenance of road bed, equipment and vehicles; use of low sulphur arctic grade diesel fuel; Trained personnel running Incinerators for design incinerator performance.	Not Significant
Noise and Vibration	Sensory impact on wildlife	Procurement policy for noise for equipment and vehicles; Use of mufflers – regular maintenance of engines and equipment;	Not Significant
Water Quantity			
Philips Creek km 32 Lake	Reduction in volume	Measurement of withdrawal quantities as per Water License	Not Significant
Camp Lake	Changes in lake volume	Measurement of withdrawal quantities as per Water License	Not Significant
Steensby 3 km Lake		Measurement of withdrawal quantities as per Water License	Not Significant
Water Quality			
Surface water freshwater quality	Deterioration of surface runoff - negative effects on receiving water quality	Surface water Management Plan – use of Best Management Practice; (i.e. Use of silt fencing) Routine inspection and maintenance of water crossing; ice and freshet management	Not Significant
Treated Effluent Quality	Untreated effluent discharge to lakes or river	Sewage treatment plant operation. Wastewater Management Plan)	Not Significant
	Spills	Fuel tank farm and large storage tanks placed in secondary containment structures (lined and impermeable); smaller fuel tanks consist of double wall iso-containers; Refuelling on impermeable surfaces and runoff contained; Emergency and Spill Response Plan and OPEP in place. Regular scheduled inspections of facilities.	Not Significant
Aquatic ecosystems , fish and fish habitat			
Freshwater fish, fish habitat and other aquatic organisms	Loss of Habitat (Steensby)	no stream crossing work during 2012 Work Plan – therefore no effects	Not Significant
	Movement (all areas of 2012 Work Plan)	no stream crossing work during 2012 Work Plan – therefore no effects	Not Significant
	Mortality (all areas of 2012 Work Plan)	no work near or in stream crossing work during 2012 Work Plan – therefore no effects	Not Significant
	Health (all areas of 2012 Work Plan)	Fuel tank farm and large storage tanks placed in secondary containment structures (lined and impermeable); smaller fuel tanks consist of double wall iso-containers; Refuelling on impermeable surfaces and runoff contained; Emergency and Spill Response Plan and OPEP in place.	Not Significant

Terrestrial Environment – Vegetation and Wildlife			
VEC	**Potential Effect**	**Mitigation Measure**	**Residual Effect**
Vegetation		Limit physical footprint of facilities;	Not Significant
Caribou	Loss of Habitat	Use of dust suppressant on Tote Road during growing season;	Not Significant
	Mortality	Speed limits for trucks Baffinland has a no hunting policy for all personnel while working on site. Use of polar bear monitors around site	Not Significant
	Movement	Limited traffic outside the 2012 Work Plan areas	Not Significant
	Health	Support monitoring of health by support for Hunter-harvest study conducted in coordination with local HTOs and the GNDoE	Not Significant
Terrestrial Environment – Migratory Birds			
Peregrine falcons	Direct Habitat Loss	Employee awareness / environmental induction program; Minimize footprint of facilities and conduct nest search prior to start of activities;	Not Significant
Snow geese	Indirect Habitat Loss	No hunting policy; avoidance of areas of large concentrations of foraging or moulting birds;	Not Significant
Common eiders	Indirect Habitat Loss	Avoidance of known nests or nesting areas;	Not Significant
King eiders	Indirect Habitat Loss	To the extent possible, develop appropriate aircraft approach and departure flight paths;	Not Significant
Red-throated loons	Health & Mortality	Mitigation measures outlines in Appendix B.8 Terrestrial Environment Management Plan	Not Significant
Marine Environment			
VEC	**Potential Effect**	**Mitigation Measure**	**Residual Effect**
Marine water and sediment quality	Discharge of runoff	Sediment control measures for runoff; application of best management practices (Appendix B.4 - Surface water management plan)	Not Significant
	Discharge of treated effluent	Sewage treatment plant; (Appendix B5 Wastewater Management Plan)	Not Significant
	Ship-to-shore spills	Emergency and Spill Response Plan; Milne Port OPEP and Steensby Port OPEP	Not Significant
Sea seabed sediments quality	Discharges from Ships	On-board waste management for ships; No discharge at sea; SOPEP	Not Significant
Marine and coastal physical habitat	HADD	no HADD for 2012 Work Plan as no dock are constructed	Not Significant
Marine mammals and polar bears	Habitat	Shipping Management Plan – shipping only during 2012 open water season	Not Significant
	Movement	Shipping Management Plan – shipping only during 2012 open water season	Not Significant
	Mortality	Shipping Management Plan – shipping only during 2012 open water season Use of Polar Bear monitors around the sites.	Not Significant
	Health	No discharge from ships at sea	Not Significant

5.5 Accidents and Malfunctions

Baffinland has an obligation to identify any foreseeable hazards that may arise from the Mary River Project and to assess the risk of harm arising from the identified hazards. The reasons for this process:

1. Out of concern for the health and safety of employees, contractors and visitors;

2. Out of concerns for environmental protection;
3. So that Baffinland's duty of care for its employees and contractors can be undertaken, and so that health, safety and environmental legal requirements can be met.
4. It makes good business sense and is cost effective; and

Knowledge of hazards and the evaluation of associated risks for the 2012 Work Plan are necessary requirements for establishing health, safety and environmental objectives and targets, and for setting priorities to control the identified risks to employees and others on an ongoing basis. Hazard Identification, risk assessment and control is an on-going process undertaken periodically throughout the Project life cycle. Despite this on-going effort, major accidents and malfunctions can occur due to natural events, breakdown of mitigation measures or human error. Although the likelihood or probability of occurrence of such events is low, accidental events could have severe environmental, health or safety repercussions.

Baffinland has updated its Emergency Response and Spill Contingency Plan. This plan presents an overview of credible accidents and spill scenarios likely to occur during the 2012 Work Plan. The draft Emergency Response and Spill Contingency Plan has been submitted to the NWB in support of the new Type B Water License application.

Since Baffinland will also be receiving fuel shipment during 2012, draft versions of Oil Pollution Emergency Plans (OPEPs) have been prepared for Milne Inlet fuel farm and the Steensby Inlet fuel transfer. These draft OPEP are submitted to the NWB in support of the new Type B Water License application.

In addition to the Emergency Response Plan and the OPEPs, the 10 ML fuel vessel anchored and overwintering in Steensby Inlet will be licensed to operated in Canadian waters. It is a requirement of the Canada Shipping Acts that vessels operating in Canadian waters have a Transport Canada approved SOPEP (Ship Oil Pollution Emergency plan). This SOPEP will only be available once a vessel has been retained.

5.6 Cumulative Effects Assessment (CEA)

The Nunavut Impact Review Board (NIRB) defines a cumulative effect as:

"…the impact on the environment that results from the incremental effects of a development when added to other past, present and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (NIRB, 2009)

The CEA for the Draft Environmental Impact Study (DEIS) concluded that although cumulative effects had been identified as a possibility for several VCs, particularly caribou and marine mammals, no significant cumulative effects were anticipated to result from the Project. The 2012 Work Plan described above involves activities that are proposed to occur in potential development areas already assessed under the DEIS, many of which have been screened by the NIRB and carried out in compliance with regulations and various land use permits, water licenses and other approvals. Previous exploration and bulk sampling activities carried out at

Milne Port and the Mine Site have not resulted in significant residual effects. Therefore, it is not expected that previous activities at Milne Port, the Mine Site or limited activity at Steensby Port are likely to adversely interact with the 2012 Work Plan Future activities at Milne Port and the Mine Site as a result of the 2012 Work Plan are considered to be within the level of activity previously executed within the potential development area and works to be considered at Steensby Port are not likely to interact with activities at the Mine Site or Milne Port as these locations are in excess of 145 kilometers away.

In terms of duration for the 2012 Work Plan, activities are proposed to occur during between May 2012 until October 2012 which is a vastly reduced duration compared with the 4 year construction and 21 year operation assessed in the DEIS for the overall Mary River Project. As a result, it is not expected that the 2012 Work Plan will not interact with future development scenarios such future development of Deposits 2 through 9. Additionally, due to the short duration of the 2012 Work Plan, activities are not likely to interact in any significant way with reasonably foreseeable projects such as the Roche Point Iron Ore Project or the Madrid and Boston Properties, acquired by Newmont Mining. Due to the limited shipping activity and short duration associated with the 2012 Work Plan it is not expected that cumulative interactions will occur with operating Mines such as Raglan Mine at Deception Bay and Meadowbank Mine.

The conclusion reached by Baffinland is that the scope and boundaries (spatial and temporal) for a CEA for the 2012 Work Plan would be the same, but far less in scope, than that completed in the CEA for the main mining Project contemplated in the DEIS. Therefore, based on the scale of activities for the 2012 Work Plan it is not expected that residual significant effects will occur based on the approach and scope of cumulative effects examined for the DEIS.

5.7 Transboundary Effects

5.7.1 Introduction

Over the past decade and beyond, a variety of international, bilateral and national laws, guidelines and institutions have adopted requirements that a transboundary impact assessment be conducted prior to making decisions on Projects or activities with transboundary implications (Bruch et al., 2007). In Nunavut, consideration of transboundary effects is required by NIRB and the Board provides general direction to proponents regarding transboundary impacts in its minimum EIS Requirements for a Part 5 Review, including Item 10 which states:

Where relevant, an EIS must include an assessment of all significant adverse ecosystemic or socio-economic trans-boundary effects. Transboundary effects are defined by NIRB in its Guide 2 – Guide to Terminology and Definitions (NIRB, 2007) as: *Environmental effects/ impacts which occur across provincial, territorial, or international boundaries*.

5.7.2 Boundaries

The transboundary effects assessment is intended to consider the extent of effects which may occur outside of the Nunavut Settlement Area There are two jurisdictional boundaries that border the Qikiqtani region of Nunavut. To the south of Baffin Island and across Hudson Strait is

the Nunavik Inuit Settlement Area, which forms part of northern Quebec. To the east of Baffin Island and across Davis Strait is Greenland.

5.7.3 Assessment

Table 5 - 8 below summarizes the transboundary relevance of the potential effects from the 2012 Work Plan. The project location is such that there are few potential transboundary issues. In the case of migratory birds, where transboundary effects are considered of relevance, the effects assessment was made using indicator species and used to draw a conclusion on the whole population of migratory birds and the term "subsumed" has been used to refer to the assessment approach within Table 5 - 8.

Table 5 - 8: Summary of the Transboundary relevance of the potential effects from the 2012 Work Plan

VEC	Potential Effect	Transboundary Relevance	Type of Effect	Assessment Approach
Water Quality				
Surface water freshwater quality	Deterioration of surface runoff - negative effects on receiving water quality	No	n/a	n/a
Treated Effluent Quality	Un treated effluent discharge to freshwater lakes or river	No	n/a	n/a
	Contaminated Runoff, Elevated TSS	No	n/a	n/a
	Spills	No	n/a	n/a
Fish & Fish Habitat				
Freshwater fish, fish habitat and other aquatic organisms	Loss of Habitat (all areas within LSA)	No	n/a	n/a
	Movement (all areas within LSA)			
	Mortality (all areas within LSA)			
	Health (all areas within LSA)			
Vegetation		No	n/a	n/a
Caribou	Loss of Habitat	No	n/a	n/a
	Mortality			
	Movement			
	Health			
Migratory Birds				
Peregrine falcons	Direct Habitat Loss	Yes	Cumulative	Subsumed
Snow geese	Indirect Habitat Loss			
Common eiders	Indirect Habitat Loss			
King eiders	Indirect Habitat Loss			
Red-throated loons	Health & Mortality			

6. Biophysical Baseline Integrity Work Plan for 2012

Baffinland will continue to engage the QIA, DFO and Environment Canada throughout 2012 to define and undertake additional baseline data collection programs related to:

- Marine mammal monitoring; and
- Wildlife and bird monitoring.

Workshops have already been held and additional workshops are planned for January 2012. Baffinland will seek community input in the definition of these monitoring programs.

During the 2012 field season, a number of programs are planned that will contribute to baseline integrity and future monitoring initiatives. Broadly, these programs can be grouped as a geochemistry characterization program, freshwater, terrestrial and marine environment programs and a cultural resources program.

It is anticipated that waste rock geochemistry characterisation will continue in 2012 from June until September. This program is aimed at gathering additional geochemistry information that will inform Baffinland's overall waste rock and waste water management plans into the future.

Common to all studies conducted in 2012 and in future years will be the collection of data and information that can inform future monitoring programs that will have the aim of observing if Project activities are having an effect and if so, what mitigation can be implemented to prevent or minimize any potential impacts.

6.1 Freshwater and Terrestrial Environment

In the freshwater environment, Baffinland will continue hydrology studies to augment existing knowledge of hydrological regimes particularly in the mine site project area. Surface water and sediment quality baseline work will be continued to further baseline information and to inform on future aquatic effects monitoring design. Fish habitat work will also continue in 2012 to better characterize potential Hazardous Alteration Disruption or Destruction (HADD) as part of fisheries authorizations relevant to the Project.

A lichen sampling program has been proposed for the 2012 field season which would provide more extensive data on background levels of metals in lichen tissue which is an important food source for caribou in the local study area. Collecting this information will inform future monitoring results as they relate to Project activities. Additional data on raptor and songbird species will also be collected in 2012 with the primary objective of gathering additional baseline data in the Study Area. As part of the raptor database, small mammal data will also be collected to provide additional context to potential changes in numbers of raptors as a result of food source.

6.2 Marine Mammals

As part of ongoing consultation with the DFO and QIA and commitments made at technical meetings, Baffinland has also agreed to several potential candidate studies in the marine environment. These studies are contingent on future consultation and workshops. The primary candidate studies will involve marine mammal surveys by way of aerial flights of Hudson Straight during the winter months. Aerial flights of Foxe Basin during the summer months are also proposed. Walrus response to shipping activities has also been raised as an important topic and as a result a candidate study understanding behavioural response to shipping is being considered in future years. Finally, in 2012, additional benthic data collection is proposed in Steensby Inlet.

6.3 Cultural Heritage Resources

Baffinland will continue an archaeological program to further delineate and mitigate cultural resources under the direction of Culture Language Elders and Youth (CLEY). Baffinland will continue to work with CLEY to ensure that applications are submitted for mitigation of archaeological site impacted by the work. Baffinland will undertake best effort to involve local Inuit in collection of artefacts in the area of Project work, if required.

Annex 1

Detailed Construction Equipment List

Detailed Construction Equipment List

MARY RIVER PROJECT - 2012 WORK EQUIPMENT FLEET				
Quantity	**Type**	**Purpose**	**Department**	**Location**
Mobile Equipment Steensby				
9	Excavator	Earth Works	Construction	Steensby
5	Loader	Earth Works	Construction	Steensby
17	Haul Trucks	Earth Works	Construction	Steensby
8	Bull dozer	Earth Works	Construction	Steensby
9	Rock Drills	Earth Works	Construction	Steensby
2	Rock Crusher	Earth Works	Construction	Steensby
2	Vac Truck(Water Sewer)	Support Equipment	Construction	Steensby
2	Mechanics Service Trucks	Support Equipment	Construction	Steensby
2	Skid-steer loaders	Support Equipment	Construction	Steensby
16	Light Towers 8KW	Support Equipment	Construction	Steensby
20	Diesel Heaters	Support Equipment	Construction	Steensby
4	12 KW Gen Sets	Support Equipment	Construction	Steensby