



**Construction Environmental Management Plan
(CEMP)
WORK PLAN
Tower Arctic LTD.**

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1. INTRODUCTION

1.1 Project background

The Government of Nunavut (GN), through Economic Development and Transportation (EDT) is developing a new small craft harbour (SCH) in the Hamlet of Pond Inlet (the Hamlet) on the north shore of Baffin Island (the Project). The construction of the Project will be managed by Community and Government Services (CGS) on behalf of EDT.

The Hamlet is the northernmost community located on Baffin Island. The community does not currently have an established harbour. The Project will improve marine access for boats and the overall safety of marine activities in the community by providing a protected harbour for recreational users, hunters, fishers and cruise ship tender boats.

At this time, there is a small breakwater that has in-filled with sediment, and a steel boat ramp to facilitate launching and retrieval of boats. A small open area near the boat ramp is currently used as a sealift laydown area. This area becomes congested for several days following the sealift activities, restricting public access to the boat launch ramp and beach. This area is also exposed to high waves and winds and has little protection from storms. The Salmon River, located 4.5 km south west of the Hamlet, is used as a local safe harbour during storm events.

The proposed SCH will include a 2.5 ha inner harbour for the moorage of small local vessels (including three float strings), a fixed wharf for larger vessels, and sealift laydown area and ramp. The facility will be formed by an east and a west breakwater to provide a protected harbour. Construction will require significant amounts of aggregate, which is to be sourced from a new quarry located approximately 5 to 6 km from the construction site via existing and/or new roads.

1.2 Purpose Of The Plan

The primary purpose of the Construction Environmental Management Plan (CEMP) is to outline measures to be implemented to avoid, manage or mitigate potential environmental and social effects associated with construction activities. Associated monitoring requirements are also outlined.

This CEMP defines the requirements of the construction contractor(s) (Tower Arctic Ltd.) for the Project and guides the development of Construction Work Plans (CWPs) for specified construction activities.

The CEMP is a live document and will be updated, as required by additional permit conditions and any additional consultation commitments. Revisions will also be made if there are changes to design or construction methods and procedures. Once the CEMP is updated and Issued for Construction by the Contractor it must be submitted to NIRB prior to start of construction as per the Monitoring and Reporting Requirements within the Screening approvals, as defined in Section 1.3.

1.3 Project Overview

The Project will include three primary components (refer to Figure 1-1):

- SCH (see Figure 1-2)
- Quarry to supply aggregate
- Haul road between the quarry and the SCH. Two options are currently under consideration: one route primarily using existing road infrastructure and one that will require a new road to be constructed for most of its route (the alternate haul route)

The Project has undergone Screening by the Nunavut Impact Review Board (NIRB). The Project Specific Information Requirements (PSIR) application and NIRB Screening Decision Report support this CEMP. The NIRB Screening was approved on October 2, 2017 (NIRB File No: 17XN030: <http://www.nirb.ca/application?strP=r>).

Table 1 contains a summary description of the components of the Project and proposed construction approach. The anticipated construction methods are presented below.

The Project will require the following site services/activities to be executed at the start of construction:

- Mobilization (import) of marine construction and quarry equipment, construction material and supplies.
- Preparation of the Contractor laydown area; erection of fencing and other security measures as required; establishment of a fueling, storage and maintenance area.
- Use of temporary construction site offices.
- Use of pre-fabricated accommodation modules for lodging
- Site services, which are likely to include: chemical and hazardous materials management; waste management; spill prevention and response; vehicle/equipment maintenance; refueling and fuel storage; dust control; traffic control; site access and security.

The following services are expected to be provided through the Hamlet: potable water, sanitary waste disposal and fuel supply.

The Project is anticipated to be constructed over two open-water seasons, with demobilization in the third season. The first season will be scheduled based on the availability of sealift operations to mobilize the equipment, temporary offices and accommodations. On average, ice break-up starts mid-July and Pond Inlet is usually ice-free from the second week of August. Freeze-up typically starts in the second or third week of October and is usually complete in November. The first sealift of the season will be around the end of July. Because the main construction equipment will be prepared for over-wintering (not demobilized), the second season may be able to commence in late May/early June with ice removal and management, with substantial completion at the end of season two.

Table 1: Project Components and Construction Approach

Component	Description	Construction Approach
West Breakwater	Approximately 360 m in length, commencing from the offshore edge of the sealift laydown area. The initial 100 m will include a 4 m wide driving surface to allow for one way traffic between the fixed wharf and sealift laydown area.	The west breakwater will be constructed first to provide protection to the beach from the prevailing westerly wind and waves and leave the existing ramp and sealift open to the public. Once the west breakwater and sealift laydown area and ramp are constructed, the ramp will be available for boat launching/storage, while the east breakwater is constructed.
East Breakwater	The main east breakwater will be approximately 240 m in length, with a secondary east breakwater extending approximately 65 m off the main breakwater to protect the harbour entrance. The east breakwater is not intended to be accessible to vehicle or pedestrian traffic.	Use quarry core material with various rip rap shoreline protection arrangements depending on wave exposure. Driving surface will be finished with a crushed granular road surfacing.
Inner Harbour & Float Strings	2.5 ha (at low water mark) of protected area, as bounded by the breakwaters and sealift laydown area. Vessels will either tie up to float strings, anchored or be pulled ashore onto the beach. The three float strings will be extended from the shoreline, and will be removed over winter.	Swept for rocks and boulders, but not dredged using marine equipment. Float strings will require installation of a mooring system, installation of floats and transition structures.
Shoreline	Used for vehicle access to the floating docks along the shoreline in the Inner Harbour.	Sandy beach will be topped with crushed gravel road surfacing, graded and compacted.
Sealift Laydown and Ramp	Laydown area will be approximately 1 ha, and located adjacent to the west breakwater. A vehicle access ramp will be provided between the laydown area and west breakwater to allow vehicle access between the two. The sealift ramp will be approximately 20 m wide, with a 15 m wide driving surface, sloped down to the seabed from the laydown area.	Laydown area requires a containment berm and fill. The fill will be primarily sourced from dredged sediments from the fixed wharf berth pocket and approach channel. Crushed granular road structure will be placed on top of the fill to provide a suitable working surface. Sealift ramp will use quarry core material, finished with a coarse granular rock.
Fixed Wharf	Approximately 40 m long, located on the inshore side of the west breakwater. Topsides will include a bull rail, mooring cleats and access ladders.	Wharf will be a sheet pile structure, backfilled with a coarse crushed quarry rock and finished with a granular road surface. Sheet piles will be driven from the breakwater fill using land-based equipment during the summer.
Harbour Entrance / Approach Channel	Used for vessel access to the fixed wharf, inner harbour and sealift ramp and laydown.	Dredged down to an elevation of -3.5 m CD using hydraulic dredging equipment (excavator).



	A 30 m wide dredged berth pocket and approach channel is required to provide suitable access to larger vessels.	Dredging will occur before the driving of sheet piles wharf (refer to Fixed Wharf).
Ancillary services / Electrical	Provide area lighting, navigation lights, maintenance and shore power plugs etc.	In conformance with the Canadian Electrical Code and the <i>Nunavut Electrical Protection Act</i>
Quarry	Provide fill material and rip rap for the construction of the breakwaters.	Drilling and blasting activities. Sorting and stockpiling blasted rock. Crushing, screening and stockpiling to produce various crushed granular products.
Haul Road	Route to transport the rock material for the construction of the SCH from the Quarry to the shoreline.	The final alignment of the route takes place in the alternate haul route corridor. Alternate route may require stripping of overburden, cut/fill on in-situ materials, water crossing culverts or bridges, ditching and safety berms.

1.4 Existing Site Conditions And Construction Effects

The Project Specific Information Requirements (PSIR) contains detailed information on the existing environmental setting based on the baseline investigations and desktop study, and assesses the potential environmental effects from construction activities.

1.5 Authorizations, Permits and Approvals

Tower Arctic Ltd. is required to comply with all Acts, Regulations, Bylaws and Codes. Section 3 references key Acts and Regulations.

A number of authorizations, permits, and approvals are required prior to commencing construction. The NIRB Screening process, the Navigation Protection Act approval, the Fisheries Act Authorization and the Nunavut Water Board permit have been issued. Land Use permit will not be necessary for this specific project. Any mitigation or monitoring measures related to these permits have been added within Section 3 of this CEMP.

1.6 Contractor Construction Work Plans

Tower Arctic Ltd. was required to prepare task and site specific Construction Work Plans (CWP) that will include environmental management, mitigation and monitoring measures that comply with the requirements of this CEMP, approval and permit obligations and legal requirements.

At a minimum, Tower Arctic was required to prepare plans covering the following:

- Construction Health and Safety
- Quarry Development:
 - Quarry Operations (including blast and dust management)
 - Closure/Reclamation
- Traffic Management Plan
- Spill Response Plan
- Marine Safety Plan

The Construction Health and Safety Plan has been prepared in accordance with the *Safety Act*: Occupational Health and Safety Regulations as well as guidelines and Codes of Practice of the Workers' Safety and Compensation Commission. The Quarry Development Plan has been prepared in accordance with the Northern Land Use Guidelines, Pits and Quarries, Indigenous and Northern Affairs Canada (INAC), 2010 and the *Explosive Use Act* and Regulations. Once the Project is complete, the operation of the quarry will become the responsibility of the Hamlet.



Figure 1 : Location and Site Plan

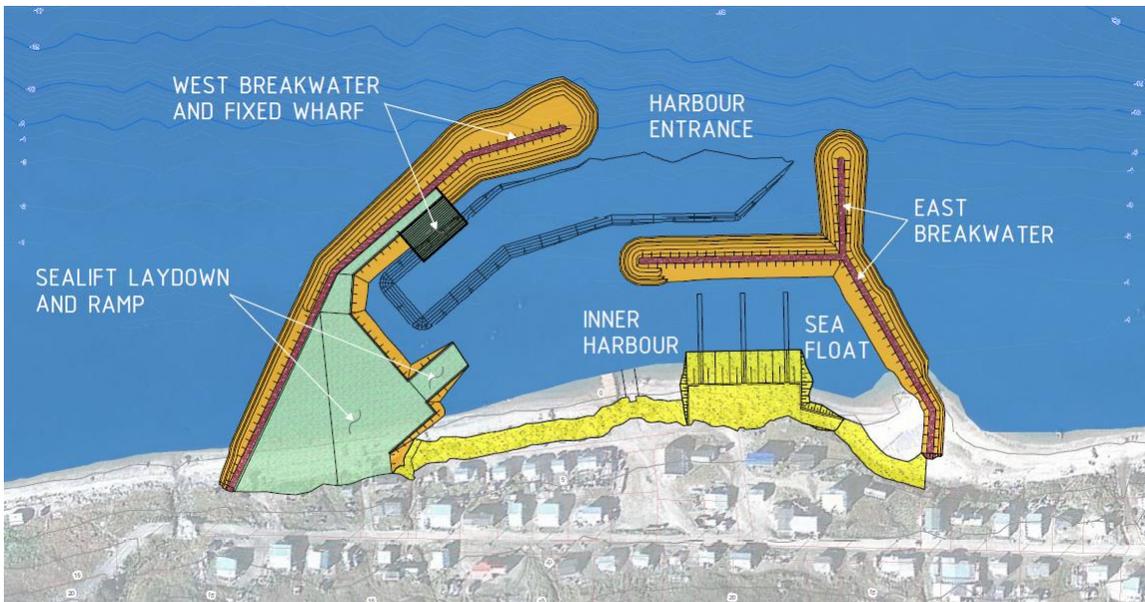


Figure 2 : SCH General Arrangement

2. ROLES & RESPONSIBILITIES

To successfully complete the Project, there are three primary organizations: the Government of Nunavut (GN), Construction Administration Team, and the Tower Arctic Ltd. Team. The roles and responsibilities for each team with respect to management of environmental performance on the Project are set out below. The responsibility for the application of this CEMP encompasses all Project personnel from management to workers.

2.1 Government Of Nunavut

As the owner of the Project, the GN has the obligation to ensure that their commitments to protect the environment are met, and that these relevant obligations are known to the Construction Administration Team. There are two departments in the GN that have a role in Project execution as described following.

2.1.1 Economic Development And Transportation

The Department of Economic Development and Transportation (EDT) is the owner of the Project and will be responsible for the facility once construction and commissioning have been completed.

2.1.2 Community And Government Services

The Community and Government Services (CGS) is managing the development of the Project through to the end of construction and commissioning on behalf of EDT.

CGS will have the following responsibilities under this CEMP during construction and commissioning:

- Advising the Tower Arctic Ltd. and clarifying information with respect to CGS environmental principles, standards and expectations.
- Communicating with regulators on matters related to permitting and regulatory compliance.
- Maintaining communication and information with the community and Hamlet administration with support from the Contractor.
- Reviewing and approving the CEMP, and any changes that may be required.
- Reviewing and approving Tower Arctic Ltd. CWPs in conjunction with Construction Administration Team.
- Reviewing monitoring reports and providing comments as required.
- Reviewing the final construction report, as required under NIRB Screening Decision Reports, and providing comments as required.
- Transmitting monitoring and construction reports and incident notices to regulators and community members and groups as necessary.

2.2 Construction Administration Team

The Construction Administration Team will act on behalf of, and report to CGS.

2.2.1 Contract Administrator

The Contract Administrator (CA) acts as the CGS Representative and is responsible for verifying that the Tower Arctic Ltd.'s activities are in compliance with contractual requirements and the approved design, including environmental requirements, regulations and relevant permits and approvals. All reporting by Tower Arctic Ltd. shall be provided to the CA, or their designate, who will communicate information on environmental compliance activities with GN. With regard to environmental matters, responsibilities of the CA include:

- Participating in hazard identification associated with planned critical work activities.
- Liaising with Tower Arctic Ltd. and the Environmental Inspector (EI) to resolve non-compliance issues.
- Maintaining effective and timely communication with CGS in the event of any non-compliance.

2.2.2 Environmental Inspector

Reporting to the CA, the Environmental Inspector (EI) will be on site as required to verify that monitoring activities associated with the CEMP and CWPs are implemented appropriately, assess environmental performance and verify the effectiveness of mitigation methods.

The EI's responsibilities will include, but are not necessarily limited to:

- Reviewing Contractor CWPs and monitoring reports providing recommendations for improvements as needed.
- Approving Contractor CWPs in conjunction with CGS.
- Conducting periodic site inspections and environment compliance evaluations and audits.
- Acting as a primary point of contact as directed by the CA, for the Contractors regarding environment queries or complaints.
- Coordinating with the Contractors and the CA to resolve non-compliance issues.
- Liaise with Contractors and regulators, as directed by CGS and/or CA, for environmental compliance issues.

2.3 Contractor And Environmental Monitor

Tower Arctic is responsible for the management of construction activities and the preparation of task specific CWPs (refer to Section 1.6) for approval by GN/Construction Administration Team.

The Contractor will retain an Environmental Monitor (EM), to provide the following services:

- Support the preparation of CWPs and the environmental monitoring of construction, as required.
- Conducting field inspections, taking necessary environmental samples to confirm compliance with the CWPs and this CEMP for all Tower Arctic Ltd. works.
- Recording monitoring results, environmental compliance and corrective actions.
- Routine and incident reporting to Construction Administration Team/EI.
- Consulting on and resolving environmental issues including, leading incident investigations, etc.
- Suspending construction activities that do not accord with standards included in this CEMP or associated Tower Arctic Ltd. CWPs or following an Environmental Incident.
- Communicating with all Tower Arctic Ltd. personnel and providing training on environmental compliance requirements.
- Coordinating with the Contractor's staff, including all sub-contractors, to drive compliance with the CEMP and CWPs; all government regulatory, approval and permit conditions; procedures; and field instructions from the Construction Administration Team.
- Training and awareness: promotion of environmental protection by Contractor's staff, including the implementation of best management practices and procedures.
- Assist with and participate in inspections conducted by the Construction Administration Team.
- Preparing a final construction report, as required under NIRB Screening Decision Reports, for review by CGS, including but not limited to:
 - A summary of activities undertaken during the construction phase and primary mitigations measures implemented
 - A log of wildlife observed in or near the project site, especially marine mammals
 - Description of any fuel spills, or other environmental incidents, and response measures undertaken to contain or clean up the spill

3. MANAGEMENT, MITIGATION & MONITORING MEASURES

This section outlines the management, mitigations and monitoring measures to be incorporated into the Construction Work Plan and implemented before and/or during construction. Categories have been adopted based on either a construction activity that needs to be managed to mitigate a direct effect on the environment (e.g. traffic management) or an environmental component that will need to be managed (e.g. wildlife).

Each measure has been allocated a specific reference number to facilitate commitment tracking through the Project. Mitigation measures may apply to various environment categories; however it will only have one reference number assigned to avoid duplication.

3.1 Waste Management Plan

The following section contains management, mitigation, monitoring and reporting requirements associated with hazardous materials, solid and liquid waste (hazardous and non-hazardous) generated by the Project.

All use, handling, storage and transportation of hazardous and non-hazardous wastes are to be undertaken in compliance with statutes, regulations, standards, guidelines and local by-laws, which includes (but is not limited to):

- International:
 - International Maritime Dangerous Goods Code, International Maritime Organization, 2016
- Federal:
 - Arctic Waters Pollution Prevention Act; Part 4(1) states that: “Except as authorized by regulations made under this section, no person or ship shall deposit or permit the deposit of waste of any type in the arctic waters or in any place on the mainland or islands of the Canadian arctic under any conditions where the waste or any other waste that results from the deposit of the waste may enter the arctic waters”
 - Arctic Shipping Pollution Prevention Regulations (ASPPR), under the *Arctic Waters Pollution Prevention Act (AWPPA)*: to be referenced in relation to fuelling in the marine environment
 - Arctic Waters Pollution Prevention Regulations (AWPPR), under the AWPPA. This covers the ship owner’s liability provisions regarding spillage of waste
 - Canadian Environmental Protection Act: Interprovincial Movement of Hazardous Waste Regulations; Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations
 - Explosives Act
 - Fisheries Act: Section 36 states that: “Subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water”
 - Transportation of Dangerous Goods Act
 - Oil Pollution Prevention Regulations (OPPR), under the Canada Shipping Act (CSA)

- Territorial:
 - Environmental Protection Act: Part 5 states that: “Subject to subsection (3), no person shall discharge or permit the discharge of a contaminant into the environment...Unless the discharge is authorized by this Act or the regulations or by an order issued under this Act or the regulations”
 - Explosives Use Act
 - Fire Prevention Act
 - Nunavut Lands Claim Agreement Act: Article 13 Part 7 states that: “With the exception of domestic or emergency use of waters as set out in Section 5 of the Northern Inland Waters Act RSC 1985, c. N-25, no person may use water or dispose of waste into water without the approval of the Nunavut Water Board”
 - Public Health Act
 - Safety Act
 - Transportation of Dangerous Goods Act
 - Wildlife Act

Relevant Best Practice (BMPs) for waste management includes the following:

- A Best Practices Guide to Solid Waste Reduction, Canadian Construction Association, 2001.
- Environmental Guideline for the General Management of Hazardous Waste, Government of Nunavut, Department of Environment, 2010.
- Environmental Guideline for Industrial Waste Discharges into Municipal Solid Waste and Sewage Treatment Facilities, Department of Environment, Government of Nunavut, 2011.

3.1.1 Hazardous Materials Handling, Storage And Disposal

Hazardous materials may be used and/or generated in construction activities such as quarrying, maintenance of mobile equipment, welding and cutting of steel, painting wharf hardware and other miscellaneous components.

The mitigation and monitoring measures associated with transport, storage, use and disposal of hazardous materials are provided in Table 2. A complement of information is available in the Tower Arctic Ltd.’s Spill Response Plan (See Appendix A).

Note that fuel trucks will be under the responsibility of the hamlet of Pond Inlet and under the Hamlets Water License. Tower’s Portable tank is only in the case of the Hamlet can’t have time to come filling our equipment.

Table 2: Mitigation and Monitoring Measures for Hazardous Materials

Reference #	Requirement
Hazardous Materials Measures	
HM01.	Ensure staff are trained and qualified to safely handle the hazardous waste and materials.
HM02.	Hazardous waste and materials shall be stored a minimum 31 m distance from high water mark of any waterbody or identified sensitive environmental area (as identified through permitting, during pre-construction surveys [if required] or by the EI or EM).
HM03.	A suitable container, based on the properties of the waste or materials to be stored, shall be selected: hazardous materials shall be stored in their original containers, where possible, or in containers specially manufactured for the purpose of storing a specific hazardous waste or materials.
HM04.	Containers used for hazardous waste and materials shall not be used for non-hazardous waste types.
HM05.	All hazardous waste and materials shall be stored on a firm working surface that is impervious to leaks.
HM06.	All hazardous waste and materials shall be stored within a container which has at least 10% more capacity than the total volume of substances to be stored, and is inaccessible to wildlife.
HM07.	Drainage into and from the storage area shall be controlled, and/or suitable secondary containment implemented, to prevent spills or leaks from leaving the site and to prevent run-off from entering the site.
HM08.	Containers shall be sound, sealable and not damaged or leaking.
HM09.	Containers shall be closed and sealed at all times, except while materials are being added or removed.
HM10.	All hazardous waste and materials shall be classified and labelled – containers must be clearly labelled to identify their contents according to requirements of the WHMIS and the relevant Transport Authority.
HM11.	All hazardous waste and materials containers shall be accompanied by the Material Safety Data Sheet (MSDS) or have the MSDS on file available.
HM12.	Incompatible waste and materials shall be stored in a manner that contact, in the event of a spill or accidental release, is not possible (i.e. corrosive materials must be kept away from flammable materials).
HM13.	Containers shall be placed so that each can readily and easily be inspected for signs of leakage, corrosion or deterioration. Leaking, corroded or deteriorated containers shall immediately be removed and their contents transferred to a sound container.
HM14.	Inspections of the hazardous waste and materials management shall be performed and recorded at least weekly.
HM15.	A registered hazardous waste carrier shall be used to transport the waste to a registered receiver or hazardous waste management facility if disposal is required.
HM16.	Shipping of all dangerous goods shall be registered with Government of Nunavut as detailed in Table 4-1 and appropriate shipping documents shall accompany all movements of dangerous goods.
HM17.	Records are to be maintained indicating the type and quantity of waste being stored along with the date, type and quantity of hazardous waste brought into or removed from the facility.



Reference #	Requirement
HM18.	Any open source of ignition, open flame, hot works and smoking is prohibited in the hazardous waste and materials storage area. All designated smoking areas shall have appropriate fire proof containers for waste.
HM19.	Engines will be shut off and smoking shall be prohibited during fueling.
HM20.	During transfer of petroleum products, a trained person must be in attendance for the entire duration of the operation. Refueling of all equipment must occur a minimum of 31 m away from the high water mark of any water body, unless otherwise authorized by the Nunavut Water Board. Reasonable precautions shall be taken to avoid the discharge of petroleum products onto land or into water (i.e. Fuel transfers must be stopped prior to overflowing to leave room for expansion).
HM21.	Hydrocarbon contaminated soils shall be removed and treated on site or transported to an approved disposal site for treatment.
HM22.	The Contractor shall not deposit, nor permit the deposit of any fuel, chemicals, or wastes (including waste water) into any marine waters.
Other Applicable Environmental Measures	
WW01.	Staff shall be trained on sorting and storage requirements of specific wastes or materials that will be reused; or are prohibited from disposal in the non-hazardous waste system.
WW012.	All garbage, fuel and equipment shall be removed upon abandonment and completion of the construction activities.
WW013.	All clean-up and restoration of the lands used shall be completed prior to the end of each field season and/or completion of site construction.
SP02.	Spill kits shall be readily available, and will be appropriate to the type and amount of hazardous and waste materials anticipated for the Project. Standard spill kits typically contain absorbent booms, socks, pads, waste bags and ties, and personal protective equipment (PPE) such as gloves and goggles. Further details on the contents of the spill kits will be provided in the SPRP by the successful Contractor.

3.1.2 Non-Hazardous Waste And Wastewater

Non-hazardous solid waste generated may include food waste, wood packaging, cardboard, paper, plastics, scrap steel, glass etc. The majority of non-hazardous waste is to be disposed of in the Hamlet's landfill and overburden from the quarry activities will be stockpiled at the quarry. The Contractor shall obtain an authorization or letter of conformation of disposal from the operator of the Hamlet's landfill for waste disposal.

Wastewater production for the Project is expected to include both sewage (human waste) from on-site sanitary facilities and grey water. Wastewater will be transported by the Contractor's or Hamlet's sewage truck and disposed of in the existing sewage lagoon.

The mitigation and monitoring measures associated with transport, storage, and disposal of non-hazardous waste material are provided in Table 3.

Table 3: Mitigation and Monitoring for Non-Hazardous Waste and Wastewater

Reference #	Requirement
Non-Hazardous Waste and Wastewater Measures	
WW01.	Staff shall be trained on sorting and storage requirements of specific wastes or materials that are to be reused; or are prohibited from disposal in the non-hazardous waste system.
WW02.	Where possible, materials shall be re-used, reduced and/or recycled to minimize waste generated.
WW03.	Install barriers to prevent vehicle interaction at waste storage areas.
WW04.	Waste shall be segregated in clearly marked waste containers applicable to the end use (e.g. landfill waste categories used by the Hamlet; i.e. wood waste).
WW05.	Domestic waste containers shall be kept closed (e.g. equipped with lids, covers / tarps over skips) at all times except when bins are being emptied or filled, to prevent scavenging by wildlife and domestic animals, as well as to control odour.
WW06.	Containers and tanks are to be in good condition (no rusting or apparent structural defects).
WW07.	Tanks or vessels must be able to withstand the pressure expected by the stored waste, taking into account factors such as temperature fluctuations.
WW08.	All waste shall be stored in plastic bags while conducting marine work to prevent waste being released into the water.
WW09.	Waste shall not be deposited in, or placed on land or ice, under any conditions where the waste may enter Arctic waters.
WW010.	Daily site cleaning (housekeeping practices) and routine inspections shall be completed to ensure materials are correctly sorted and placed in the proper bins.
WW011.	Vehicle washing areas for haul trucks, if required, shall be contained separately and shall be provided with an oil water separator sized to expected flows and conditions.
WW012.	All garbage, fuel and equipment shall be removed upon abandonment and completion of the construction activities.
WW013.	All clean-up and restoration of the lands used shall be completed prior to the end of each field season and/or completion of site construction.
Other Applicable Environmental Measures	
HM04.	Containers used for hazardous waste shall not be used for non-hazardous waste types.
HM22.	The Contractor shall not deposit, nor permit the deposit of any fuel, chemicals, or wastes (including waste water) into any marine waters.
WL07.	Food, food waste, and other attractants shall be handled, stored and disposed of safely to avoid attracting and habituating animals.

3.2 Spill Prevention And Emergency Response

Spill Prevention and Response Plan is addressed in two sections:

- Spill Prevention and Response
- Emergency Organizational Chart

The acts, regulations and BMPs noted in Section 3.1 also apply to spills and emergency response. Additional acts and BMPs include:

- Environmental Protection Act, Spill Contingency Planning and Reporting Regulations (R-068-93)
- Northern Land Use Guidelines, INAC, 2003
- National Fire Code of Canada, National Research Council Canada, 2015
- Workplace Hazardous Materials Information System (WHMIS), Health Canada, 2015
- Guidelines for Spill Contingency Planning, INAC, 2007
- Guidelines for the Preparation of Hazardous Material Spill Contingency Plans, Environment Canada, 1990
- Emergency and continuity management program, Canadian Standards Association (CSA) Z1600-14, 2014
- National Oil Spill Preparedness and Response Regime, Transport Canada, 2012

3.2.1 Spill Prevention And Response Plan

A site specific Spill Response Plan (15255-00331-07-TA-GN-CWP-0003-2) and a Fueling Method (15255-00331-07-TA-GN-CWP-0005-0) have been developed prior to construction.

These work plans are provided in Appendix A. The SRP includes the mitigation and monitoring measures for spill prevention and response that have been defined prior to construction. The SRP follows INAC's Guidelines for Spill Contingency Planning (2007).

3.2.2 Emergency Response Plan

An Emergency Response Plan has been jointly developed with the Spill Response Plan that outlines the protection of the environment, personnel and the public in the event of an emergency scenario during construction.

The Emergency Response Plan that is included in the Spill Response Plan has been developed in conformance with the "Environmental Guideline for the General Management of Hazardous Waste", Government of Nunavut, 2010.

This plan includes:

- A definition of the roles and responsibilities in the event of an environmental emergency.
- Include a pre-work hazard analysis which requires Contractors to identify spill hazards, pathways of exposure to environmental receptors, access for emergency/clean-up vehicles, and storage facilities for spill response gear.
- The identification of storage facilities for spill response gear.
- The communication protocols including a key contact list for emergency response.
- Incident reporting guidelines and necessary information such as: Date and time of call; estimated time of spill or release; Type of hazardous material spilled or released; Evacuation requirements; estimated quantity of hazardous material spoiled or released; Spill response completed prior to reporting; Assistance required for successfully containing and cleaning the spill or release.
- Post-incident reporting requirements.

3.3 Road/Marine Traffic Management

The key concern is to ensure safety of residents, to maintain normal road traffic flow and marine access and navigation in the community. Traffic management is addressed in three sub-sections:

- Road Traffic and Transportation: Includes road construction and operations (i.e. dust management and maintenance).
- Vehicle and Equipment Operators and Use: Includes driver requirements, and vehicle and equipment specifications, fueling and maintenance requirements.
- Marine Traffic and Transportation: Includes marine construction and vessel movements.

3.3.1 Road Traffic And Transportation

For the Road Traffic and Transportation, Tower Arctic Ltd. developed a Traffic Management Plan (See Appendix A) to minimize the risk of traffic accidents, maintain normal traffic flow in the community, maintain normal Hamlet service delivery to residents (refer Section 1.6) and manage dust.

The mitigation and monitoring measures for road traffic and transportation management are provided in Table 4.

Table 4: Mitigation and Monitoring for Road Traffic and Transport

Reference #	Requirement
Traffic Measures	
TF01.	Consult and coordinate with existing road service providers in the Hamlet. Road use shall not disrupt the delivery of community services and will be done in consultation with the Hamlet administration.
TF02.	A traffic awareness campaign concerning road safety, particularly for children and teens shall be implemented in the community.
TF03.	Project specific speed limits shall be set for the haul route, not greater than limits specified by the Hamlet <i>(to be agreed)</i> . Speed limits will be set such that community safety is maintained and for the control of dust mobilization.
TF04.	Road use timing restrictions shall be adhered to <i>(to be agreed with Hamlet administration)</i> .
TF05.	Traffic control measures shall be implemented at intersections along the haul road route, as required. This may include the use of a traffic monitor.
TF06.	Appropriate roadway construction materials, which will not require significant dust management efforts during use, shall be selected.
TF07.	Suitable dust suppressants (non-toxic and biodegradable) to reduce dust generation to acceptable levels shall be used. Dust suppressants will be in accordance with the Government of Nunavut, Department of Sustainable Development, Environmental Protection Service, and Environmental Guideline for Dust Suppression.
TF08.	Proactive maintenance shall be undertaken to address problem areas of the road which may produce significant dust.
TF09.	Haul road shall be maintained and repaired immediately if damaged. Undertaking regular grading and compacting to remove potholes.
TF10.	Regular inspection and maintenance of water control features (i.e. culverts) shall be undertaken during construction.
TF11.	Consultation with the sealift companies and Hamlet administration shall be undertaken to minimize obstructing access to the existing sealift during SCH construction.
Other Applicable Environmental Measures	
WL09.	Escape routes for wildlife on access roads shall be provided (where possible), particularly during winter (i.e. avoid creating continuous berms of snow adjacent to roads that restrict wildlife).
WL10.	Appropriate mitigation measures will be implemented in the event large congregations of wildlife and birds occur in the Project Area.
SE05.	Road surfaces shall be stabilized and controlled runoff channels created where required.

3.3.2 Vehicle And Equipment Operators And Use

The mitigation and monitoring measures for vehicle and equipment operators and use are provided in Table 5.

Table 5: Mitigation and Monitoring Measures for Vehicles and Equipment Operators

Reference #	Requirement
Vehicle and Equipment Use Measures	
VE01.	Drivers will be properly trained and licensed. Personnel shall be encouraged to drive defensively and courteously.
VE02.	All vehicles shall have adequate lighting so they can be easily seen.
VE03.	Combustion emissions sources (machinery) and staging areas for vehicles and heavy duty machinery shall be located away from sensitive receptors.
VE04.	Construction equipment shall be sized correctly for the task and in compliance with any Hamlet road restrictions.
VE05.	A regular maintenance program for Project vehicles and equipment shall be implemented to ensure construction equipment is in good working order.
VE06.	When existing local facilities are not available for refuelling, onshore equipment and vehicles must be serviced and refuelled at least 15 m away from sensitive habitats unless secondary containment is used; preferably over an impermeable surface (e.g. drip trays). Drip pans and / or other protective devices shall also be used to prevent spills of petroleum products and other potentially hazardous liquids (e.g. antifreeze) during servicing.
VE07.	Revvng of engines on mobile or stationary machines shall be limited and equipment not in use shall be shut down (restrict idling).
VE08.	Gas or diesel engine exhausts shall be fitted with noise mufflers, where available.
VE09.	The use of horns, bells, hooters, or other audible signals on mobile equipment shall be limited, while maintaining safe operation.
VE10.	Ongoing visual assessments of the potential for dust generation and combustion emissions shall be conducted (during work and/or when machinery is operating) to determine requirement for the implementation of dust suppression measures.
VE11.	Equipment (including material stockpiles and vehicle parking areas) shall be located as far as practical from residences or sensitive wildlife features (or habitats). If the noise source is directional, equipment will be orientated to minimize propagation in critical directions.
VE12.	When offshore equipment and marine vessels are refueled through a floating hose, Contractor will ensure that all hoses and equipment are in good working order, appropriate spill containment and clean-up equipment is available, and personnel are trained in refueling and spill response procedures.
VE13.	Equipment or vehicles shall not be moved unless the ground surface is in a state capable of fully supporting the equipment or vehicles without rutting or gouging. Overland travel of equipment or vehicles must be suspended if rutting occurs.
Other Applicable Environmental Measures	
HM19.	Engines shall be shut off and smoking shall be prohibited during fueling.
SP02.	Spill kits shall be readily available, and will be appropriate to the type and amount of hazardous and waste materials anticipated for the Project. Standard spill kits typically contain absorbent booms, socks, pads, waste bags and ties, and PPE such as gloves and goggles. Further details on the contents of the spill kits will be provided in the SPRP by the successful Contractor.
SP06.	Routine inspections of equipment for leaks, cracked hoses and other conditions that may result in spills shall be undertaken. The Contractors shall ensure external equipment surfaces are free of oil, diesel and other potential contaminants prior to use.

3.3.3 Marine Traffic And Transportation

During the construction works, a range of equipment will be present close to water. Tower Arctic will have 2 boats on site for safety. One of those two boat will be use to mount the bathymetric equipment in order to process the survey. During the whole construction process, water will be easily accessible outside the construction perimeter. An access ramp will be always available for fishermen.

The mitigation and monitoring measures to prevent interference with existing marine use and navigation are provided in Table 6. (Some measures about construction vessels are included in this table in the eventuality that some changes would be made to the planning)

Table 6: Mitigation Measures for Marine Traffic and Transportation

Reference #	Requirement
Marine Traffic Control Measures	
MT01.	Construction vessels will keep to pre-defined work areas and routes that will not interfere with sealift deliveries and to minimize the impact on existing traffic and navigation.
MT02.	Clear communication protocols or procedures for vessels working in the area will be established.
MT03.	Communication protocols will be established to notify the community of marine activities, including ongoing consultation with the community and HTO and Notice to Shipping.
MT04.	All delivery of construction equipment will occur through existing sealift shipments.
MT05.	A permit or approval will be issued by Transport Canada under the <i>Navigation Protection Act</i> , which will include notification and communication protocols for marine users to be aware of potential navigation interferences.
MT06.	Construction vessels will be appropriately marked in accordance with regulations administered by Transport Canada.
Other Applicable Environmental Measures	
MC13.	Project-related vessels shall maintain vigilance for marine mammals, document sightings, and employ minimum distances and best practices if within 100 m of any marine mammals. Collisions or any injured or distressed marine mammal must be reported immediately to the CA/EI and DFO.
MC14.	Rapid acceleration of vessels shall be avoided.
MC15.	Vessels must follow the guidance for marine mammals and protected areas as outlined in the most recent Notice to Mariners published by the Canadian Coast Guard.

3.4 Blasting Management And Quarry Development

Towers Arctic Ltd. has developed a Quarry Management Plan (See Appendix A) that includes all the information about quarry development. A Drilling and Blasting Method (See Appendix A) has been also developed to give more information about these procedures. The Quarry Management Plan has been prepared taking into consideration the Northern Land Use Guidelines for Pits and Quarries, INAC, 2010. Tower Arctic Ltd. will have all permits required for the transport, storage and use of explosives and will ensure that personnel responsible for managing explosives meet, as a minimum, the experience requirements under section 5 (2) of the Explosives Use Act.

The Drilling and Blasting Method includes:

- Strategies for dealing with excess explosives, mechanisms for collecting, treating and discharging seepage water that may be contaminated through blasting.
- Procedures to avoid debris from entering into the watercourse, if/when blasting near watercourses.
- Vibration and noise control where relevant to sensitive nearby sensitive receptors (i.e. workers, denning wildlife).
- Timing restrictions for when blasting will be prohibited (i.e. allowed 12 hours a day only).
- Traffic management procedures to safeguard the public and vehicles.

An Abandonment and Restoration Plan is included in the Quarry Management Plan, to let a safe site to the community. Prior to the closure of the quarry, which will be transferred to the Hamlet, an engineer will certify that every walls are safe and that the quarry has been correctly closed.

Mitigation and monitoring requirements associated with blasting are provided in Table 7.

Table 7 Mitigation and Monitoring Measures for Blasting and Quarry Development

Reference #	Requirement
Blasting Measures	
BL01.	Construction should be initiated prior to the arrival of migratory birds (breeding season mid-May to mid-August) such that the quarry and surrounding area becomes unattractive for nesting. A pre-construction survey shall be conducted by the EM to identify all sensitive wildlife features, e.g. active bird nests, wildlife dens and wildlife foraging or traveling nests, if blasting commences within this window.
BL02.	Blasting shall be restricted to hours as agreed with the Hamlet.
BL03.	A notification protocol with input from the local community and other stakeholders for advance notification of planned substantial noise-causing activities shall be implemented.
BL04.	Buffers or exclusion zones shall be implemented, in the event a sensitive species or feature (e.g. nest) is identified, to ensure wildlife are not disturbed.
BL05.	Prior to blasting occurring, warning must be issued in affected area using loud signaling devices.
BL06.	Blast mats shall be used as needed to prevent physical damage from fly rock and suppress dust.
BL07.	Dust suppressants and/or watering shall be used to reduce dust generation from blasting to acceptable levels.
BL08.	No blasting shall occur in water.
BL09.	Quarry and pit boundaries shall be clearly staked and flagged so they remain visible to other land users.
BL10.	Natural drainage, flooding or channel diversion shall not be obstructed from quarry/pit access, stockpiles, or other structures or facilities.
BL11.	An undisturbed buffer zone shall be maintained between the periphery of quarry sites and the high water mark of any water body that is of an adequate distance to ensure erosion control.
BL12.	Screening and crushing equipment shall be located on stable ground, at a location with ready access to stockpiles.
Other Applicable Environmental Measures	
WL11.	A pre-construction wildlife sweep will be conducted by the EM to identify all sensitive wildlife features, e.g. active bird nests, wildlife dens and wildlife foraging or traveling.
TF07	Suitable dust suppressants (non-toxic and biodegradable) to reduce dust generation to acceptable levels shall be used. Dust suppressants will be in accordance with the Government of Nunavut, Department of Sustainable Development, Environmental Protection Service, and Environmental Guideline for Dust Suppression.
SE04	Sediment control measures shall be applied at the base of exposed slopes (i.e. silt fence) to minimize conveyance of sediment to a waterbody.

3.5 Sediment And Erosion Control

Sediment and erosion control is required for all surface disturbance activities, such as preparation of the laydown area; development of the quarry and construction of the haul road. Tower Arctic Ltd. will apply applicable sediment and erosion control methods (if needed) to meet water quality guidelines as well as measures to mitigate impacts from permafrost degradation and associated instability and erosion. The design and construction of the haul road will be in accordance with INAC's Northern Land Use Guidelines – Access: Roads and Trails and other relevant guidelines such as Land Development Guidelines for the Protection of Aquatic Habitat, Fisheries and Oceans Canada (DFO) and Ministry of Environment, Land and Parks, 1993.

Proposed mitigations are provided in Table 8.

Table 8: Mitigation and Monitoring Measures for Sediment and Erosion Control

Reference #	Requirement
Sediment and Erosion Control Measures	
SE01.	Perimeter controls shall be applied to act as a barrier, preventing sediment from reaching surrounding water courses (i.e. sediment/silt fence).
SE02.	Temporary sediment control measures shall be applied at the base of soil stockpiles.
SE03.	Soil stockpile storage areas shall be constructed to prevent sediment from entering waterways (i.e. contour soil stockpiles and bulk material stockpiles to reduce erosion potential).
SE04.	Sediment control measures shall be applied at the base of exposed slopes (i.e. silt fence) to minimize conveyance of sediment to a waterbody.
SE05.	Road surfaces shall be stabilized and controlled runoff channels created.
SE06.	Water quality in potentially impacted water bodies shall be monitored for sediment run-off. If visual monitoring identifies sediment run-off, turbidity will be measured and compared to the Canadian Council of Ministers of the Environment (CCME) guidelines for the protection of aquatic life (the water quality guidelines).
SE07.	Material shall be stockpiled in such a way that debris/sediments will not enter the marine environment. Material will not be stockpiled on the ice.
SE08.	Haul road embankments shall be constructed to a suitable thickness (1 to 1.5 m) before a surface course is applied in order to limit disturbance to thermal regime.
SE09.	The Contractor shall consider haul road design alternatives that allow for a reduction in grade, and minimizes watercourse crossings and disturbance to riparian areas.
SE10.	Regular monitoring of the haul road shall be undertaken to identify ground stability concerns.
SE11.	Sediment and erosion control measures shall be implemented as soon as possible after vegetation removal in riparian areas.
SE12.	Culverts and /or other drainage features shall be installed at water crossings and in lowland areas to avoid ponding and to maintain flow and fish passage.
Other Applicable Environmental Measures	
TF07.	Suitable dust suppressants (non-toxic and biodegradable) to reduce dust generation to acceptable levels shall be used. Dust suppressants will be in accordance with the Government of Nunavut, Department of Sustainable Development, Environmental Protection Service, and Environmental Guideline for Dust Suppression.
WL12.	Work site boundaries shall be flagged to prevent inadvertent loss or alteration of habitat outside of the designated Project footprint.
BL11	An undisturbed buffer zone shall be maintained between the periphery of quarry sites and the high water mark of any water body that is of an adequate distance to ensure erosion control.

3.6 Marine Construction Management

Marine construction activities in the intertidal and subtidal areas comprise:

- Placement of rock
- Pile-driving
- Dredging
- Re-use and placement of dredged material

All marine activities are to be undertaken in compliance with all statutes, regulations, standards, guidelines and local by-laws, which include (but are not limited to):

- Fisheries Act (refer to Section 3.7).
- Navigation Protection Act: Part 3 states that: "It is prohibited to construct, place, alter, repair, rebuild, remove or decommission a work in, on, over, under, through or across any navigable water that is listed in the schedule except in accordance with this Act or any other federal Act".
- Canadian Environmental Protection Act: the beneficial re-use of dredged material in the construction of the breakwater will be undertaken such that the objectives of the Act are met.

During construction activities, fish and marine mammals are at risk of injury or behavioral effects from underwater noise or reduced water quality generated by in-water construction activities.

Mitigation and monitoring requirements associated with marine construction are provided in Table 9.

Table 9: Mitigation and Monitoring Measures for Marine Construction

Reference #	Requirement
Marine Construction Management Measures	
MC01.	The Contractor will prepare a Monitoring Plan for the Project shall be developed that includes requirements during dredging and placement of quarry material. This will include allowable levels of Turbidity/Total Suspended Solids (TSS) and marine mammal monitoring requirements.
MC02.	Measures to reduce sediment mobilization during in-water activities shall be used by the Contractor when TSS/turbidity exceeds Canadian Council of Ministers of the Environment (CCME) water quality guidelines for protection of aquatic life (the water quality guidelines).
MC03.	Prior to construction, contractor will communicate with HTO to obtain information relevant to the current marine mammal sightings before the onset of construction practices that could result in disturbance or injury.
MC04.	Soft-start procedure shall be implemented for pile-driving that could generate underwater noise above auditory thresholds for marine mammals.
MC05.	Vibratory piling equipment shall be used to reduce noise effects to community and marine fauna, where possible. A monitoring program shall be developed to verify that underwater noise levels are less than 30 kPa @ 10 m from the piling activity for the protection of fish.
MC06.	Additional mitigation measures, e.g. bubble curtains, shall be required for pile driving if the underwater noise auditory thresholds are exceeded.
MC07.	Pile driving shall be conducted within hours as agreed with the Hamlet.
MC08.	Mechanical dredging methods shall be used, which result in lower levels of underwater noise compared to hydraulic methods.
MC09.	MMOs will be employed to monitor for the presence of marine mammals in a defined marine mammal exclusion zone. During the open-water season, the exclusion zone will be initially set at 500 m, with in-situ underwater noise monitoring to be conducted at the onset of in-water works to verify the exclusion zone based on the underwater sound auditory threshold of 160 dB re 1µPa. Communication with construction teams and reporting of data will be included.
MC10.	An MMO will be present during dredging, dredge disposal and in-water placement of fill material to monitor for presence of marine mammals. The MMO will monitor for stress related behaviours to marine mammals. If observed, adaptive management will be implemented or, if necessary, stop work will be implemented until effective mitigation measures are in place.
MC11.	Prior to construction, stop-work conditions shall be specified. Such conditions will include exceedance of underwater noise thresholds for the protection of fish, or sighting of a marine mammal within the exclusion zone by the MMO. Work must not re-start until the marine mammal has moved out of the exclusion zone.
MC12.	If construction is to occur during the iced-season, the in-air sound levels will be measured and pinnipeds monitored on the ice. In the absence of Canadian guidelines, the United States in-air acoustic threshold for non-harbour seal pinnipeds of 100 dB re20µPa rms will be adopted. The construction activity will be suspended if the seals are exposed to noise levels above the threshold.



Reference #	Requirement
MC13.	Project-related vessels shall maintain vigilance for marine mammals, document sightings, and employ minimum distances and best practices if within 100 m of any marine mammals. Collisions or any injured or distressed marine mammal must be reported immediately to the CA/EI and DFO.
MC14.	Rapid acceleration of vessels shall be avoided.
MC15.	Vessels must follow the guidance for marine mammals and protected areas as outlined in the most recent Notice to Mariners published by the Canadian Coast Guard.
MC16.	The area of sea that is artificially illuminated shall be minimized.
MC17.	Water-based equipment or machinery shall be located and secured in such a way as to prevent grounding in identified sensitive habitats.
MC18.	Rock material used for in-water construction, will be free of material that would result in exceedances of the water quality guidelines outside the work area.
MC19.	An EM will be present during all in-water construction activities to monitor for stress related behaviours or for fish kills. If observed, adaptive management will be implemented or, if necessary, stop-work will be implemented until effective mitigation measures are in place.
MC20.	All lubricants and hydraulic fluids used on equipment that will be working below the high water level will be biodegradable and non-toxic.
MC21.	All Project marine construction vessels and equipment shall be clean and free of marine fouling to avoid the introduction of invasive species.
Other Applicable Environmental Measures	
BL03.	A notification protocol with input from the local community and other stakeholders for advance notification of planned substantial noise-causing activities shall be implemented.
SP01.	All workers shall be trained in the spill prevention and response requirements during site induction and subsequent toolbox talk sessions.
WW08.	All waste shall be stored in plastic bags while conducting marine work to prevent waste being released into the water.

3.7 Wildlife And Vegetation

The Pond Inlet Marine Infrastructure Project will potentially affect wildlife (birds, fish and mammals) and vegetation during construction. Activities are to be undertaken in compliance with all statutes, regulations, standards, guidelines and local by-laws, which include:

- Federal
 - Fisheries Act
 - Species at Risk Act
 - Migratory Birds Convention Act
- Territorial
 - Wildlife Act

Subsections are provided below for wildlife, birds and vegetation that provide the management and mitigation measures to minimize potential adverse effects.

Fish and Fish Habitat management measures will be determined through the Fisheries Act process, which covers:

- Section 35: No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery, unless authorized under Section 35(2).
- Section 36: Subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

Some issues have been identified by the NIRB to have the potential to result in significant impacts for the ecosystem and wildlife habitat. Mitigations and monitoring measures about those issues will appear in the following sub-sections.

This CEMP will be updated if additional mitigation and monitoring requirements are defined by the Environmental Monitor.

3.7.1 Wildlife

There are several prohibited activities related to wildlife stated in Acts and Regulations that include (but are not limited to):

- Wildlife Act:
 - Section 90(1): No person shall intentionally feed a wild animal
 - Section 90(2): No person shall deposit or place in, on or about a place an attractant, if there is a reasonable likelihood that it would endanger a person, a wild animal or a domestic animal



- Species At Risk Act:
 - Section 32(1): No person shall kill, harm, harass, capture or take an individual of a wildlife species that is listed as an extirpated species, an endangered species or a threatened species
 - Section 36(1): If a wildlife species that is not listed has been classified as an endangered species or a threatened species by a provincial or territorial minister, no person shall: (a) kill, harm, harass, capture or take an individual of that species that is on federal lands in the province or territory; (b) possess, collect, buy, sell or trade an individual of that species that is on federal lands in the province or territory, or any part or derivative of such an individual; or (c) damage or destroy the residence of one or more individuals of that species that is on federal lands in the province or territory

According to the NIRB screening report (17XN030), the activities may take place within habitat for Arctic fox, Arctic hare, various species of marine fish, marine mammals and upland and coastal migratory birds, including Species at Risk including Ivory Gull, Peregrine Falcon, Polar Bear, Red Knot, Ross’s Gull and Wolverine.

The mitigation and monitoring measures to minimize the potential adverse effects on wildlife are provided in Table 10.

Table 10: Mitigation and Monitoring Measures for Wildlife

Reference #	Requirement
Wildlife Measures	
WL01.	A zero-tolerance policy regarding the harassment, disturbance and feeding of wildlife, whilst working on the Project, shall be implemented and communicated through the induction process.
WL02.	The EM shall be on site as required to assess the presence of wildlife (including Species at Risk) and determine potential impacts to construction activities.
WL03.	All workers shall be trained in relation to the wildlife (particularly species at risk) expected to occur in the area, including traditional knowledge, through site induction and tool box sessions.
WL04.	Polar bear sightings shall be reported immediately to the EM and CA/EI so that appropriate actions are taken.
WL05.	Sightings of wildlife species, with particular attention to species at risk, shall be recorded on a wildlife sighting form (including recording the time, date, location, activity, and proximity to workers).
WL06.	Wildlife sightings shall be tracked in order to respond appropriately to emerging trends.
WL07.	Food, food waste, and other attractants shall be handled, stored and disposed of safely to avoid attracting and habituating animals.
WL08.	Speed limits will be implemented and enforced on all roadways and wildlife will be given the right-of-way so as not to chase, weary, harass or injure animals on the road.
WL09.	Escape routes for wildlife on access roads shall be provided (where possible), particularly during winter (i.e. avoid creating continuous berms of snow adjacent to roads that restrict wildlife).
WL10.	Appropriate mitigation measures will be implemented in the event large congregations of wildlife and birds occur in the Project Area.



WL11.	A pre-construction wildlife sweep shall be conducted to identify all sensitive wildlife features, e.g. active bird nests, wildlife dens and wildlife foraging or traveling.
WL12.	Work site boundaries shall be flagged to prevent inadvertent loss or alteration of habitat outside of the designated Project footprint.
WL13.	Lighting shall be limited to the extent required to provide a safe work site and shielded and directed to reduce diffusion outside of the work area.
WL14.	In the event caribou are sighted, protection measures implemented will follow those outlined in Appendix I of the North Baffin Regional Land Use Plan.
WL15.	If fish are encountered in creeks during haul road construction, they will be salvaged from the area and returned downstream. Adaptive management measures will be implemented for any further construction in or about that creek.
WL16.	The Contractor shall not construct within, abstract water from or disturb any stream, lakebed or the banks of any definable water course unless written permission is given by GN and an authorization is obtained from the Nunavut Water Board.
BL04.	Buffers or exclusion zones shall be implemented, in the event a sensitive species or feature (e.g. nest) is identified, to ensure wildlife are not disturbed.
WW05.	Domestic waste containers shall be kept closed (e.g. equipped with lids, covers / tarps over skips) at all times except when bins are being emptied or filled, to prevent scavenging by wildlife and domestic animals, as well as to control odour.
SE12	Culverts and /or other drainage features shall be installed at water crossings and in lowland areas in order to maintain flow and fish passage.

3.7.2 Birds

There are several prohibited activities related to birds stated in Acts and Regulations that include (but are not limited to):

- Migratory Bird Regulation:
 - Section 6: Subject to subsection 5(9), no person shall (a) disturb, destroy or take a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird, or (b) have in his possession a live migratory bird, or a carcass, skin, nest or egg of a migratory bird except under authority of a permit therefore

Relevant BMPs for birds include the following:

- General Nesting Periods of Migratory Birds in Canada, ECCC (<https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1>)
- Safeguarding Migratory Birds – Technical Information, ECCC (https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=8D910CAC-1#_03_1)
- Migratory Birds Environmental Assessment Guideline, Government of Canada, 1998.
- Guidelines to Avoid Disturbance to Seabird and Waterbird Colonies in Canada, Environment and Climate Change Canada (ECCC), 2016.
- Avoidance of Detrimental Effects to Migratory Birds (Incidental Take), ECCC, 2017 (https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=8D910CAC-1#_03_1).

The mitigation and monitoring measures to minimize the potential adverse effects on avian are provided in Table 11.

Table 11: Mitigation and Monitoring Measures for Birds

Reference #	Requirement
Bird Measures	
BR01.	Activities and infrastructure will be sited away from nests and roosts that will be protected by prohibited entry buffers based upon government or biologist recommended setback distances. Any nest that is disturbed will result in immediate notification to ECCC and the Government of Nunavut.
BR02.	Construction activities will not begin until the area has been surveyed for migratory birds and nests (in a non-intrusive manner).
BR03.	Nest monitoring may be periodically required to determine efficacy of setbacks and buffers.
Other Applicable Environmental Measures	
BL01.	Construction should be initiated prior to the arrival of migratory birds (breeding season mid-May to mid-August) such that the quarry and surrounding area becomes unattractive for nesting. A pre-construction survey shall be conducted by the EM to identify all sensitive wildlife features, e.g. active bird nests, wildlife dens and wildlife foraging or traveling nests, if blasting commences within this window.
BL04.	Buffers or exclusion zones shall be implemented, in the event a sensitive species or feature (e.g. nest) is identified, to ensure wildlife are not disturbed.
WL01.	A zero-tolerance policy regarding the harassment, disturbance and feeding of wildlife shall be implemented.
WL10.	Appropriate mitigation measures will be implemented in the event large congregations of wildlife and birds occur in the Project Area.
WL11.	A pre-construction wildlife sweep shall be conducted to identify all sensitive wildlife features, e.g. active bird nests, wildlife dens and wildlife foraging or traveling.
WL12.	Work site boundaries shall be flagged to prevent inadvertent loss or alteration of habitat outside of the designated Project footprint.
WL13.	Lighting shall be limited to the extent required to provide a safe work site and shielded and directed to reduce diffusion outside of the work area.



3.7.3 Vegetation

Note that vegetation is absent for the construction site and that it is minimal for the hauling route and quarry site.

The mitigation and monitoring measures to minimize the potential adverse effects on vegetation are provided in Table 12.

Table 12: Mitigation and Monitoring Measures for Vegetation

Reference #	Requirement
Vegetation Measures	
VG01.	Working areas shall be inspected prior to clearing to confirm the absence of rare plants by the environmental monitor.
VG02.	Vehicle and equipment mobilized to site shall be inspected to ensure they are clean and free of soil, invasive plants and/or their seeds.
VG03.	All personnel shall be trained through the induction and subsequent toolbox talk session on the risk of damaging or disturbing vegetation and sensitive communities.
VG04.	Monitoring of disturbed areas for potential weed infestations shall occur on a regular basis by the environmental monitor.
Other Applicable Environmental Measures	
TF07.	Suitable dust suppressants (non-toxic and biodegradable) to reduce dust generation to acceptable levels shall be used. Dust suppressants will be in accordance with the Government of Nunavut, Department of Sustainable Development, Environmental Protection Service, and Environmental Guideline for Dust Suppression.
VE05.	A regular maintenance program for Project vehicles and equipment shall be implemented to ensure construction equipment is in good working order.
VE06.	When existing local facilities are not available for refuelling, onshore equipment must be serviced and refuelled at least 15 m away from sensitive habitats unless secondary containment is used; preferably over an impermeable surface (e.g. drip trays). Drip pans and / or other protective devices shall also be used to prevent spills of petroleum products and other potentially hazardous liquids (e.g. antifreeze) during servicing.
SP04.	Hydraulic, fuel, and lubrication systems of equipment near watercourses and sensitive habitats shall be inspected periodically to ensure that the systems are in good condition and free of leaks.
WL12.	Work site boundaries shall be flagged to prevent inadvertent loss or alteration of habitat outside of the designated Project footprint.

3.8 Archaeological Resource Discovery Plan

There is potential to unearth cultural, heritage or archaeological resources during surface disturbance activities, such as preparation Tower Arctic Ltd.'s laydown area; development of the Quarry and construction of the Haul Road. Refer to the PSIR 4.3.1 for the status of Archaeological Impact Assessments (AIA).

There are several prohibited activities related to cultural, heritage or archaeological resources stated in Acts and Regulations that include (but not limited to):

- Nunavut Archaeological and Paleontological Sites Regulations; Part 5(1) states that: "No person shall excavate, alter or otherwise disturb an archaeological site, or remove an archaeological artifact from an archaeological site, without a Class 2 permit."
- Nunavut Agreement: Section 33 in part states that: "a permit holder shall not survey, investigate, excavate or alter an archaeological site without the consent of the title holder to the land."
- Territorial Land Use Regulations: Part 16 states that: "If, in the course of a land use operation, a suspected historic or archaeological site or burial site is unearthed or otherwise discovered, the permittee shall immediately:
 - (a) suspend the land use operation on the site
 - (b) notify the engineer or an inspector of the location of the site and the nature of any unearthed materials, structures or artifacts"

The mitigation and monitoring measures to minimize the potential adverse effects on cultural, heritage and Archaeological are provided in Table 13. The Project Archaeological Resource Discovery Protocol is provided in Appendix A.

Table 13: Mitigation and Monitoring Measures for Cultural, Heritage and Archaeological

Reference #	Requirement
Cultural, Heritage and Archaeological Measures	
CH01.	If historical or palaeontological features (e.g. stone features, stone tools, modified bone, fossils) not previously recorded are identified within the construction footprint during construction, the measures outlined in the Archaeological Resource Discovery Protocol shall be implemented.
CH02.	All workers shall be briefed regarding the potential negative effects of construction activities to archaeological and palaeontological resources and shall be familiar with this CEMP, including the Archaeological Resource Discovery Protocol.
CH03.	If potential human remains are found within the footprint during construction, the measures outlined in the Archaeological Resource Discovery Protocol shall be implemented.
CH04.	Project personnel shall be prohibited from collecting any archaeological or palaeontological materials.

3.9 Community Health, Infrastructure And Tourism

There is potential during construction for the Project to increase pressure on community health services and infrastructure such as utility services (water, sewage, solid waste, and fuel), health care and fire response.

Tourism from cruise ships will not be affected by construction works because Tower Arctic Ltd. is committed to provide a constant water access.

Mitigation measures to minimize the potential adverse effects on community health, infrastructure and tourism are provided in Table 14.

Table 14: Mitigation Measures for Community Health, Infrastructure and Tourism

Reference #	Requirement
Cultural, Heritage and Archaeological Measures	
CI01.	A dedicated emergency responder shall be provided for the Project and an emergency medi-vac plan will be in place for the construction workforce.
CI02.	Contractor employees shall be required to sign a Code of Conduct governing behaviour on the Project and during recreational hours to reduce the likelihood of negative social effects on the community.
CI03.	Contractor shall implement a cultural awareness program for all staff to promote understanding and respect for local residents.
CI04.	The Project shall impose a zero tolerance policy for alcohol and illicit drug possession or use.
CI05.	Contractor shall work with the local hotels and Hamlet to determine available bed space and develop a plan for housing workers, maximize use of hotel space but leaving sufficient reserve for normal community needs.
CI06.	The Project shall implement an on-site fire response plan to reduce impacts to local fire services. Project staff shall be trained in the use of fire suppression aids.
CI07.	A dedicated fuel truck shall be used to meet Project fuel requirements, if fuel supplies in the Hamlet are insufficient.
CI08.	Ongoing communication and consultation, as agreed with the Hamlet administration and the HTO, will inform hunters, fishers, cruise ship operators and outfitters during construction to minimize access restrictions and maintain safety.
CI09.	Access to the existing boat ramp shall be maintained until the new ramp is constructed to allow continuing access to water.

4. MONITORING & REPORTING

4.1 Monitoring

The effectiveness of environmental protection measures will be assessed regularly by Tower Arctic Ltd. and Construction Administration Team. Contractor monitoring will occur throughout construction with the frequency of monitoring dependent on the construction activities taking place. In addition, the Construction Administration Team will conduct inspections.

- Tower Arctic Ltd. is responsible for inspecting tools and equipment before use; and to ensure all environmental protection measures put in place are in good working condition and appropriate for the work/activities being undertaken on a daily basis.
- Contractor Environmental Monitor will review the implementation of mitigation measures and monitoring results. Environmental monitoring reports will be prepared on a daily or weekly basis (depending on construction activities and as agreed with the Construction Administration Team) for submission to the Construction Administration Team. Any Environmental Incidents, including reportable spills and spills to water, non-compliance with permit conditions and the implementation of stop-work will also be recorded. Environmental Incidents will be reported to the Construction Administration Team within 24 hours and then notified to regulators, as required.

Environmental Incidents will be investigated. Mitigation measures will then be updated via adaptive management to further minimize / prevent additional environmental effects.

4.1.1 Turbidity

Monitoring of all of the construction activities will be conducted by visual monitoring from the Environmental Monitor. In the event there are concerns/considerations for effects to water quality during in-water construction activity based on visual monitoring, turbidity monitoring will be conducted outside of the work area and results compared to the CCME guidelines for the protection of aquatic life.

These are as follows:

- Turbidity (nephelometric unit [NTU]) Allowance Over Background ("Induced" Turbidity): maximum increase of 8 NTU from background levels for a short-term exposure (e.g. 24 hour period). Maximum average of 2 NTU from background levels for a longer term exposure (e.g. 30 day period).

If there are exceedances of the guidelines adaptive management measures will be implemented as discussed in Section 4.2.1.

4.1.2 Noise

4.1.2.1 In-Water Pile Driving

An MMO will monitor for the presence of marine mammals in defined marine mammal exclusion zones around construction activities that have the potential to exceed the underwater noise auditory threshold (specifically for pile driving at the SCH) for marine mammals of 160 dB re 1 μ Pa. The exclusion zone will be initially set at 500 m, with in-situ underwater noise monitoring to be conducted at the onset of the construction activity to verify the exclusion zone based on the underwater noise auditory threshold.

If there are exceedances, adaptive management measures will be implemented as discussed in Section 4.2.2.

4.1.2.2 Other In-Water Construction Activities

According to the construction schedule, iced-season works are not supposed to occur. If construction is to occur during the iced-season, in-air sound levels will be measured when pinnipeds are observed on the ice during construction activities that have the potential to exceed the in-air acoustic threshold (pile driving). In the absence of Canadian guidelines, the United States in-air acoustic threshold for non-harbour seal pinnipeds of 100 dB re 20 μ Pa rms will be adopted. The construction activity will be suspended if seals are exposed to noise levels above the threshold.

An MMO will be present during dredging, dredge disposal and in-water placement of fill material to monitor for presence of marine mammals. The MMO will monitor for stress related behaviors to marine mammals. If there are exceedances, adaptive management measures will be implemented as discussed in Section 4.2.2.

4.2 Adaptive Management

During construction it may be necessary to modify construction and/or management/mitigation methodologies to address site conditions not foreseen in this CEMP. Should adaptation be required, the Environmental Monitor on site will work with the Construction Administration Team to develop appropriate methodology and implement additional mitigation measures, as required. The CEMP will be updated to reflect any changes in methodology, management, mitigation and monitoring. Further engagement with relevant regulatory authorities will be undertaken on the adaptation, as required.

In the event that the mitigations outlined in the CEMP are found to be ineffective, Tower Arctic Ltd. will work with the Construction Administration Team/Environmental Inspector and CGS to revise the specific mitigations appropriately and ensure that they are deployed in the field. Further engagement with relevant regulatory authorities will be undertaken as required by CGS. Changes to mitigations will still be in compliance with all relevant permits/approvals and if necessary relevant regulators will be notified.

4.2.1 Turbidity

Turbidity monitoring is proposed to manage the risk of sediment mobilization effecting water quality. Should exceedances of water quality guidelines outside of the work area occur, the following steps will be taken:

- Steps will be taken to reduce turbidity to within guideline levels or the activity leading to the increased turbidity will be suspended by the EM.
- If the activity is suspended, changes to construction methodology and/or additional mitigation measures will be implemented, and construction activity will resume.

4.2.2 Noise

4.2.2.1 In-Water Pile Driving

In-water pile driving will be suspended if a marine mammal enters the exclusion zone and will not restart until 30 minutes after it is last observed or it is seen leaving the exclusion zone.

4.2.2.2 Other In-Water Construction Activities

If marine mammals are observed in proximity to construction activities, a stop work will be implemented if the MMO determines that the animal(s) could be harmed or is showing signs of distress. The stop work will be in effect until the animal(s) has moved away and the MMO has determined it is safe to restart construction activities.

4.3 Records And Reporting

Tower Arctic Ltd. will maintain all records, checklists, inspection reports, including any non-compliances or non-conformances and corrective action plans. Records shall be and remain legible, identifiable, and traceable.

Weekly Environmental Monitoring Reports shall be prepared by Tower Arctic Ltd. and submitted to the Contract Administration Team and CGS.

These reports shall include the following details:

- A summary of construction activities undertaken.
- Description of environmental incidents.
- Number of environmental inspections and trending report on findings and corrective actions and status.
- Brief review of environmental issues raised by employees at meetings or reported to the Contractor's site team and the respective corrective actions.
- Brief overview of past month's environmental activities.
- Brief overview of the upcoming month's environmental activities.
- List environmental concerns, environmental milestones and environmental initiatives implemented.
- A log of wildlife observed in or near the project site, including:
 - Identification of the wildlife, including marine mammals, observed and a brief description of the animal or group's behavior;
 - A description of mitigation activities undertaken, specifically stop work events, and the outcome of the encounter; and
 - Discussions that occurred with any regulatory authorities regarding wildlife encounters, recommendations, and any updated procedures that resulted.



An annual report on the implementation and monitoring of DFO conditions mitigation measures will be prepared and submitted by January 31, 2019, 2020 and 2021. The reports will demonstrate elements (photographs with dates, monitoring report, etc.) that prove the effectiveness of mitigation measures for fish and fish habitat.

At the end of construction, Tower Arctic Ltd. will prepare a final construction report, as required under the NIRB Screening Decision Reports, including but not limited to:

- A summary of activities undertaken during the construction phase and primary mitigations measures implemented
- A log of wildlife observed in or near the project site, especially marine mammals
- Description of any fuel spills, or other environmental incidents, and response measures undertaken to contain or clean up the spill

Changes to work processes/methods or design must be evaluated through a management of change process to ensure risks are managed. Tower Arctic Ltd. has established a management of change procedure and all workers must receive training on how to identify a change, how to initiate the management of change process, and how to evaluate risks associated with change. Environmental incidents shall be reported by the Contractor to CGS within 24 hours.

Additional reporting requirements are summarized in Table 15.

Table 15: Reporting Organizations

Organization	What to Report	Contact Number
Fisheries and Oceans Canada	Marine mammal distress	1-867-979-8000
Government of Nunavut, Department of Environment Conservation Office	Problem wildlife or interaction with carnivores	1-867-924-6235
Government of Nunavut, Department of Environment, Department of Environment Manager	Registration of shipping of dangerous goods	1-867-975-7748
Department of Culture and Heritage	Encounter or disturbance of archaeological site or specimen, or a palaeontological site or fossil	1-867-934-2046 or 1-867-975-5500

5. TRAINING & COMPETENCY

5.1 Induction

All employees working on the Pond Inlet Marine Infrastructure Project will be given induction training covering the key environmental risks and controls required for work on site. The induction program will be designed by the Environmental Monitor and will be reviewed by the Construction Administration Team and CGS, as required. Training will be delivered to the entire Contractor workforce at the beginning of the construction works.

Tower Arctic Ltd. will be responsible for ensuring workers are informed and implementing the environmental requirements, including associated monitoring and reporting.

5.2 Training And Awareness

Tower Arctic Ltd. workers will be provided with environmental training to achieve a level of awareness and competence appropriate to their assigned activities. Targeted environmental awareness training will be provided to individuals or groups of workers with a specific authority or responsibility for environmental management or those undertaking an activity with an elevated risk of environmental impact. Such training may be delivered in the form of site orientation and toolbox meetings or through formal training programs (as applicable). All records of personnel training will be maintained by the Environmental Monitor.

6. COMMUNICATIONS

6.1 Communications With Regulators

Communications with Regulators will be carried out by Tower Arctic Ltd. The Contractor will communicate directly with Regulators regarding all permits and keep CGS informed. Tower Arctic Ltd. will have copies of all permits, licenses, key communication, inspection reports and compliance reports.

6.2 Communications For Construction Planning

Tower Arctic Ltd. will establish communications with the Hamlet to notify and advise of construction activities and to gather feedback.

Every updates about the project will be also available on the project's website. (www.towerarctic.net)

6.3 Complaints/Grievances

As part of the communications protocol, a complaints process will be maintained whereby complaints are received and recorded by Tower Arctic Ltd. and responded to if response is required.

A complaint section for the project will be also available on the project's website. (www.towerarctic.net)



APPENDIX A

CONSTRUCTION WORK PLANS

- Marine Safety Plan
- Quarry Management Plan
- Spill Response Plan
- Construction Method
- Fueling Method
- Traffic Management Plan



APPENDIX B

PERMITS

- Explosives Magazines
 - DFO
 - NPA
 - NIRB 17QN015
 - NIRB 17XN030
 - Seabed License