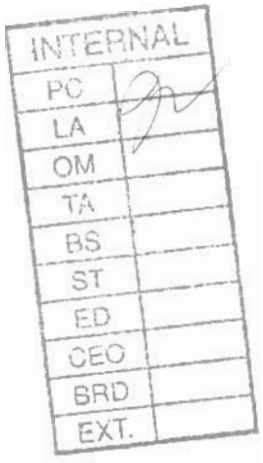
Environmental Screening Report
for the Remediation of the Beach Refuel Area at the FOX-M, Hall Beach DEW Line Site

Prepared by:
UMA Engineering Ltd.

August 2002

File: FOX-M 3.6



August 2, 2002 File: FOX-M 3.6

Mr. Jim Wall
Technical Advisor
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0

Dear Mr. Wall:

RE: Water Use License Application for the FOX-M, Hall Beach DEW Line Site

UMA Engineering Ltd. is submitting the attached Water Use License Application for the Remediation of the Beach Refuel Area at the FOX-M, Hall Beach Distant Early Warning (DEW) Line site, on behalf of Defence Construction Canada (DCC) and the Department of National Defence (DND). The submission includes the application form and the work specifications and drawings.

We understand that because the proponent is a federal agency, that no application fees are required.

We trust that sufficient information has been provided to process this application. If you require any further information or clarification, please contact the undersigned at (403) 270-9200. Thank you for your consideration of this application.

Sincerely,

UMA ENGINEERING LTD.

Eva Schulz, P.Ag.
Environmental Scientist
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EMS:elt

Encl. Water Use License Application
Specifications and Drawings

cc: Scott Hamilton

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1. BACKGROUND

The DEW Line Clean Up plan was originally developed with stakeholder input, including Environment Canada, in 1992 through 1995. The plan included a Clean-up Protocol developed to protect the Arctic Ecosystem.

There are environmental concerns or issues at all 21 DEW Line Sites; the majority of these concerns do not pose an immediate, or acute risk to sensitive receptors, such as permanent water bodies. Contamination impacting permanent, fish-bearing water bodies is prohibited under the Fisheries Act which specifies that deleterious substances must not enter a fish-bearing water body. Recently, Environment Canada has expressed some concern regarding locations where there is a risk of contamination impacting water bodies, and in particular, areas where levels of contamination in excess of regulations under the Canadian Environmental Protection Act (CEPA) have been identified near water bodies, but will remain in place for an extended period of time. This has prompted two warning letters from Environment Canada enforcement personnel - one regarding hydrocarbon contaminated soil near the ocean at the FOX-5, Broughton Island site and one regarding hazardous contaminated soils present in an eroding landfill at the DYE-M, Cape Dyer site.

To further address the environmental concerns, a review was conducted of existing information regarding contaminant sources (known or suspected), and migration pathways in areas proximal to water bodies at the sites where decommissioning and clean up activities have not yet begun. A workshop, attended by representatives from the Department of National Defence (DND), Defence Construction Canada (DCC), Environmental Sciences Group (ESG), and UMA Engineering Ltd. (UMA), was held in February 2002, to discuss the concerns highlighted during the review.

1.1 Previous Environmental Assessments

As a federal proponent, the Department of National Defence is required to conduct an environmental assessment for the clean up of each DEW Line site.

The initial investigations, which took place from 1989 to 1994 were used to provide a baseline study of the existing environment (both biological and physical) and ecological pathways and possible transport mechanisms that will exist during the clean up. Studies of socio-economic aspects, in particular a detailed archaeological survey of the sites, were also completed during this time.

As an early planning tool, environmental assessments were drafted in 1994 for each DEW Line site by DND under the auspices of the Environmental Review Process Guidelines Order (ESG, 1994). These assessments were preceded by extensive on-site environmental and engineering investigations completed by the Environmental Sciences Group (ESG) at Royal Military College and UMA Engineering Limited (UMA). The objectives of these studies were as follows:

- to identify the nature and extent of chemical contamination at the sites;
- to determine the possible impact of these contaminants on the Arctic ecosystem, particularly to the food chain; and
- to develop practical environmental clean up strategies appropriate for the Arctic.

The investigations included the following:

An initial environmental clean up study of the DEW Line sites in Canada carried out on behalf of the United States Air Force by a consortium of Canadian consultants: The objectives for this study included: identifying and investigating areas impacted by past waste disposal practices and spills; determining and evaluating remediation alternatives for the waste disposal and spill area and; developing disposal options for debris arising from the demolition of DEW Line structures. This study provided information on the presence of hazardous materials, the biophysical environment, facility details, and the existing landfills.

An environmental study of ten of the 21 sites carried out in 1989/90 by the Environmental Sciences Group (ESG) at Royal Roads Military College for the Canadian Department of

National Defence: This study provided a detailed physical and chemical inventory of the stations and considered the impact of chemical contaminants on the Arctic ecosystem. The study also included information on the debris found on site, contents of landfills, fuel spills and patterns of contaminant dispersal.

In addition, two studies designed to assess the impact of the historically common practice of disposing debris into the ocean through the ice were carried out in 1994 and 1995 by a consortium of several Canadian government departments. These studies concluded that there were no significant chemical effects arising from the presence of debris on the ocean floor.

Environmental Screening Report for 15 DEW Line Sites in the NSA: Subsequent changes to overall project planning have been assessed over time and the assessment document updated. An Environmental Screening Report for 14 of the 15 DEW Line sites in Nunavut (Project Management Officer DEW Line Clean Up, 1998) was submitted with the Project Description of the Fifteen DEW Line site in the Nunavut Settlement Area to the Nunavut Impact Review Board (NIRB) in June 1998 (Project Management Office DEW Line Clean Up, 1998b).

Final Site Investigation: In the summers of 1997, 2000 and 2001, scientific and engineering investigations were conducted to delineate contaminated areas and obtain environmental and engineering information required to finalize the clean up plans. This information has been reviewed and the environmental screening was updated to include relevant new information.

1.2 Objective

The objective of the workshop was to identify which site locations represent a severe risk to an aquatic environment and to recommend remedial work. The information gathered during the review was evaluated in terms of level of risk of impact and the severity of that impact. All those areas that were rated in the most serious category were reviewed to determine appropriate remediation measures.

2. CATEGORIES AND EVALUATION CRITERIA

As a first step toward evaluating the environmental concerns, categories and evaluation criteria were established and defined. The categories established were Acute (A), Potentially Acute (P) and Chronic (C). The evaluation criteria included: legal liability (in compliance with Fisheries Act Regulations), environmental impact, visible evidence or confirmation of the source (e.g. free product), and evidence of changing conditions that would increase the environmental impact (e.g. erosion or slope instability of a landfill).

Acute issues were defined as issues where there is a high likelihood, or known impact to an aquatic environment. The impact is expected or known to be severe in terms of contaminant levels. Acute issues were identified as requiring action as soon as possible.

Potentially Acute issues were defined as environmental concerns that do not require immediate attention but that could become more serious with time and changing conditions. Potentially Acute issues were areas where the severity of impact to the environment was expected to be lower in terms of contaminant levels, or rate of contaminant migration. Also included in this category were environmental concerns that did not have sufficient information to be defined as Acute. Some of these were at sites that had not been visited for over eight years.

Chronic issues were defined as the major of the DLCU environmental concerns where there is an impact on the environment; however, the magnitude of the immediate impact is not serious in terms of contaminant levels and there is low potential for migration or an increase in contaminant levels over time.

3. REMEDIATION OPTIONS

There is one area identified as Acute at FOX-M. This area was further reviewed to identify options for remediation. The objective of the remediation is not to complete clean up, but rather to reduce of the level of environmental impact to the Potentially Acute or Chronic level. This meant that temporary solutions or interim measures were also assessed.

A summary of the potential remediation measures for the site areas identified as Acute is as follows:

a) Beach Refuelling Area – hydrocarbon contamination
   i) Excavate the hydrocarbon plume and treat the soil.
   ii) Undertake all hydrocarbon remediation for this site.
   iii) Install a liner over the surface of the plume and construct an interceptor trench or install a barrier.

Based on a review of the potential remediation options, the recommended course of action is to excavate the hydrocarbon plume at the Beach Refuel Area at FOX-M.

Please refer to the specifications and drawings for the detailed scope of work.

4. ENVIRONMENTAL COMPONENTS

4.1 Description of the Environment

Detailed environmental conditions at FOX-M were documented by UMA (1991) and RRMC (2001). Those environmental components potentially impacted by, or influencing cleanup operations are summarized below.

4.1.1 General Geology

The Hall Beach site is located on the east coast of Melville Peninsula within the Arctic Platform and lies on top of a knoll approximately 5 metres above sea level. The area is covered by gravel and appears to be an emerging sea bottom. The underlying bedrock consists of limestones and dolomitic limestones, Ordovician and Silurian in age.

The landscape is characterized by a surficial cover of marine reworked glacial drift consisting mostly of sand, gravel, and cobble sized bedrock rubble. The landscape is typically undulating to nearly flat-lying with raised beach ridges and nearshore marine features superimposed on the landscape. The raised beach configuration broadly reflects the morphology of the present day shoreline. The elevation rarely exceeds more than 5 metres above sea level and numerous water-filled depressions occur throughout the landscape.

Drainage patterns are complex and controlled to some degree by differential melting of the active layer. Regionally, the landscape is imperfectly or poorly drained, and most drainage is included by man-made ditches and channels.

Surface materials consist mostly of sand, gravel and cobble sized, angular to subangular, flat, shingle-like fragments of locally derived dolomitic limestone. These materials are distributed throughout the

landscape and are typically overlain by an organic-rich lacustrine black or brown mud and silt veneer in low lying or depressional terrains, particularly in areas which are water saturated.

No bedrock exposures occur within the study area; however, Trettin (1975) mapped the region as part of a succession of variable dolomitic limestone that appears in isolated outcrops at Igloolik and Ouilliam Bay, consisting of finely crystalline, yellowish grey to buff dolostone. The succession is complete in the Rowley Island Aquataine well and consists of approximately 200 m of dolomite that carries an Arctic Ordovician fauna that may be at least partly correlative with Ordovician limestones and dolostones along the Arctic Platform.

4.1.2 General Hydrology

Site drainage and topography of FOX-M and the surrounding area is governed by shallow relief. The FOX-M site is located on the eastern shore of Melville Peninsula and is situated on top of what appears to be a gravel covered, emerging sea bottom. The area is a flat-lying coastal plain with an approximate elevation of 5 metres, which gently increases in elevation inland to the west.

Overall surface drainage generally flows east towards Foxe Basin. There are several isolated lakes and shallow catchments west of the site which are typical of the coastal area of Melville Peninsula. There are four large lakes immediately upgradient of the site which feed the site water supply reservoir.

There are several catchments and man-made depressions in the immediate vicinity of the site buildings and facilities due to extensive gravel extraction over the years at this site. Surface drainage from many of the buildings, POL, and drum storage areas will collect in these catchments and depressions. Other surface drainage will continue through shallow ditches or along the ground surface toward Foxe Basin.

The water supply reservoir is located west of the main module train area. The reservoir was part of a lake which completely occupied a natural depression. The reservoir was constructed using man-made dykes on all sides and by the installation of a dam in the southwest corner. It is recharged from another large lake located immediately upgradient and west of the reservoir. The lake was at one time isolated from the reservoir, but was joined through the excavation of a channel between them.

Drainage is towards the shore. Drainage in the vicinity of the airstrip and associate buildings is dictated by local topography and generally flows to the east. Drainage from the facilities along the western edge of the airstrip including the dry storage flows to a lake located immediately southwest.

4.1.3 Flora

The FOX-M site is located on a relatively flat, raised beach adjacent to Foxe Basin. Wet meadows which surround ponds and lakes, common in and around the camp, are underlain by a thin, organic mat, and are dominated by a near complete cover of grass and sedge species.

The following types of vegetation may be found at the site: groundsel; cotton grass, polar grass, bluegrass, wild rye, fescue, arctic poppy, mountain avens, mosses and lichens.

4.1.4 Fauna

4.1.4.1 Terrestrial Mammals

The following is a summary of the terrestrial fauna identified and observed at the FOX-M site:

- Barren ground caribou - Hall Beach is located approximately 100 km north of the Northeastern Keewatin Caribou Grounds which include an extensive area (11,000 km2) of special interest to the Government of Nunavut. However, No caribou were observed during the period of the site investigations in 1997, 2000 or 2001.

- Polar Bears - Polar bears in this area are within Management Zone C, which may support one of the largest polar bear populations in the Canadian Arctic. Prince Charles and Air Force Islands and immediately south of Hall Beach are important summer retreats for the bears of Foxe Basin, which is largely ice-free during that season. During winter, bears in this region are found on land-fast ice along the southern half of Melville Peninsula. Polar bears have been reported at this site; however, none were seen during the 1997, 2000 or 2001 site visits.

- Arctic Wolf – Known to occur on Melville Peninsula; however, none were observed during the site visits.

- Arctic Fox - Dens are typical for coastal areas. These animals were likely initially attracted to the artificial food sources (landfill and litter), as foraging is common. None were observed during the site visits.

- Arctic Hare – known to occur in the area.

- Brown lemming – known to occur in the area.

- Collared lemming – known to occur in the area.

4.1.4.2 Marine Mammals

Foxe Basin is one of the least known areas of the Canadian Arctic. Pack ice does not completely clear until September or October, making surveys for marine mammals difficult. No sightings of marine mammals were recorded during the site visit, but archaeological surveys at the time located bones of walrus, ringed seal, harp seal and bearded seal that may have been hunted in the area. Skulls of bowhead whales were also found in the areas. Walrus and seals are hunted along the coast during fall by residents of Hall Beach and Igloolik, 50 km to the north.

Beluga whales, narwhal whales and bowhead whales may pass through Hudson Strait and summer in Foxe Basin as the ice melts. Walrus may also pass through Hudson strait and summer in Foxe Basin

or may remain in Foxe Basin throughout the year. Large areas of Foxe Basin stay open throughout the winter, at which walrus are often found. Bearded seals, ringed seals and harp seals may migrate into Foxe Basin via Husdon Strait.

4.1.4.3 Avifauna

Arctic terns are very common along the coast of the FOX-M site. The tundra swan, brandt goose and common eider were also observed at the site. Large Snow Goose colonies have been known to occur immediately north and south of the site. Although no sightings of the snowy owl, peregrine falcon gyrfalcon or rough-legged hawk were reported, these raptors have been known to occur in the region.

4.1.4.4 Fish

There are no commercial fisheries in the Hall Beach area; however, Hall Lake contains a population of Arctic char.

4.1.5 Heritage Resources

Two previously recorded sites occur in the vicinity of FOX-M. The recorded locations of both of these sites placed them well off the station facilities. Evidence suggests that at least one of these sites, a Thule village, is located inside the southern edge of the radar property. It consists of twelve house foundations with interior features. The western edge of the site has been destroyed by road construction and the northern edge by gravel extraction activities. In addition, disturbance by souvenir collectors was obvious. The location of the second previously recorded site was not verified.

Two newly identified prehistoric sites were recorded. One site is located southwest of the Hamlet of Hall Beach. The single artifact recovered suggests that the site has a Dorset Palaeo-Eskimo component, although other evidence suggests that the major part of the site dates to the Thule and

subsequent Inuit period. This location has been disturbed by pipeline construction in the past and exhibited more recent disturbance, possibly by souvenir collectors. The other site, south of the station, consists of seven features including inuksuit and meat caches. Examination of fragments of a soapstone vessel found near the features suggests that at least part of the site contents may be Thule in age. Approximately 500 metres to the south is a single large cache with associated walrus crania. The depth of the vegetation and lichen on this site suggests some antiquity. The site is currently undisturbed.

The Hall Beach area is of high archaeological potential. Disturbance of relevant sites has already occurred.

4.1.6 Socio-Economic Setting

It is expected that, for the short term in particular communities and the longer term (i.e. approximately 20 years), a significant number of person-years of employment will be generated as a result of this project. Additionally, further enhancement of the areas' economy is expected resulting from increased local purchases and use of local businesses.

4.1.7 Native Land Use

It is recognised that hunting and the relationship to the land are of profound cultural and spiritual importance to the Inuit. Hunting itself provides a means for linking modern day lifestyles and culture with the past. Hunting is valued by the Inuit, as it contributes to both independence and community well-being.

No special conservation land status has been designated at this site.

4.2 Valued Ecosystem Components

The Valued Ecosystem Components (VEC's) identified for this Project include physical, biological, socio-economic, and archaeological, historical and cultural components. These components are listed below:

- Protection of Permafrost soils;
- Surface water, particularly related to the drinking water supply;
- Feeding and nesting areas for birds;
- Feeding areas for herbivores;
- Feeding and calving areas for caribou and bears;
- Local vegetation;
- Local wildlife;
- Regional employment opportunities;
- Regional business opportunities;
- Regional training opportunities;
- Hunting and fishing in local area; and,
- Archaeological sites identified around the station.

4.3 Identification of Environmental Effects

As part of this environmental assessment for the FOX-M DEW Line site clean up, potential interactions between the project components and the environment were identified. The focus of the assessment was on the location, sensitivity, seasonal presence and abundance of these components (i.e. bird nesting areas). Through this assessment Valued Ecosystem Components were identified, which can include physical, biological, socio-economic, historical or cultural components.

4.3.1 Environmental Effects

4.3.1.1 Value Ecosystem Components vs Project Components

Table 4.1 summarizes the interaction and potential impacts between Valued Ecosystem Components and the various activities associated with the clean up.

Table 4.1: Summary of Potential Impacts

VEC	Activity	Description of Impact
Air Quality	Contaminated Soil Removal	The removal of the contaminated soil from the environment will reduce the risk of negative impact to air quality.
	Site Grading / Borrow Source Development	The extractions of granular materials and grading activities have the potential to create dust and impact air quality.
Soil Quality	Contaminated Soil Removal	The removal of the contaminated soil from the environment will improve soil quality.
	Removal and Transport of Fuel and Contaminated Soil	The potential exists for accidental release of contaminated soil during handling and transport. An accidental release could impact the soil quality.
Water Quality	Contaminated Soil Removal	The removal of the contaminated soil from the environment will reduce the risk of contamination of water (both surface and groundwater) quality.
	Removal and Transport of Fuel and Contaminated Soil	The potential exists for accidental release of contaminated soil during handling and transport. An accidental release could impact the water quality.
	Site Grading/Borrow Source Development	Erosion and sedimentation of waterbodies during grading and gravel extraction activities may impact water quality. Terrain and drainage to be improved as a result of grading disturbed areas.
Terrain	Site Regrading	Terrain and drainage to be improved as a result of grading disturbed areas. Previously disturbed areas will blend into the natural environment.
	Borrow Source Development	The extraction of granular material will alter the terrain of the borrow area.
	Contractor Support	Movement of contractor's equipment and personnel around the site may disturb the tundra.
	Contaminated Soil Removal	The excavation of contaminated soil may degrade permafrost

VEC	Activity	Description of Impact
Terrestrial Animals and Habitat	Contaminated Soil Removal	The removal of contaminated soil from the environment reduces the risk of exposure of terrestrial animals.
	Demolition of Site Facility	Removal of facilities will minimize the risk of animals to unsafe building conditions. The existing facilities may be used by wildlife as habitat (i.e. nests in structures). The demolition of these facilities has the potential to impact availability of habitat.
	Borrow Source Development	The extraction of granular material requiring disturbance of the ground may impact terrestrial habitat (including vegetation).
	General Clean Up Activities	The presence and movement of people around the site has the potential to disturb the animals (caribou, bear, wolf, fox, hare, ground squirrel) identified around the site.
Aquatic habitat and animals	Site Regrading/ Borrow Source Development	The extraction of granular material and grading adjacent to waterbodies (both fresh and marine) has the potential to impact aquatic habitat due to sediment entering the water. The potential would then exist for impacts on aquatic animals.
	Contaminated Soil Removal	The removal of contaminated soil from areas close to waterbodies, reduces the risk of exposure to aquatic animals.
	Removal and Transport of Fuel and Contaminated Soil	The excavation of contaminated soil from the beach area may impact the aquatic environment in the event of an accidental release and may also impact aquatic animals due to close proximity to the marine environment.
	Contractor Mobilization to and from Site via marine transport	The transportation to/from the site has the potential to disturb aquatic animals.
Health and Safety	Contaminated Soil Removal	The removal of contaminated soil the environment reduces the risk of exposure of people. The improper handling of contaminates soil during removal has the potential to impact health and safety of workers.
Archaeological	General Clean Up Activities	The presence and movement of people around the site has the potential to disturb the archaeological resources identified around the site.
Land Use	General Clean Up Activities	Clean up activities may disturb traditional land use, i.e. hunting and fishing activities that would occur during the summer months. Conversely, the clean up will improve the safety of people using the land area by removing potentially unsafe buildings, debris, and contaminated soil.

VEC	Activity	Description of Impact
Aesthetics	General Clean Up Activities	Generally, the clean up, specifically landfill closure, collection of site debris, site grading and demolition of old facilities will improve the aesthetics of the site by removing unsightly debris and restoring the site to a more natural state. The use of heavy equipment in various aspects of the clean up including, landfill development and closure, demolition, grading and transportation will increase noise levels, which has the potential to disturb wildlife. Marine transportation to and from the site has the potential to disturb marine mammals.
Economy	Contractor Support	The contractor will be required to have a minimum Inuit content in the workforce and subcontractors for the clean up. This will provide employment benefits and related economic benefits.
	General Clean Up Activities	It is likely there will be requirements for training and employment that will benefit the local community.

4.3.2 Impact of the Environment on Project

The implementation of a clean up project, such as the remediation of the Beach Refuel Area at FOX-M, in an Arctic environment brings unique logistical issues. The potential exists for delays in the clean up associated with bad weather. These delays may include work stoppage on-site or delays in the transportation to and from the site of personnel and supplies. Conditions related to the Arctic climate, such as ice and frozen ground may also delay clean up activities. Ice may delay marine transport to and from the site. Clean up activities which are best completed at maximum thaw may be delayed depending on seasonal climate changes.

4.4 Identification of Cumulative Environmental Effects

Cumulative effects have been defined as changes to the biophysical, social, cultural or economic environments caused by a project component in combination with any on-going, past or future activities. Cumulative effects can occur as interactions between project components (either from the same or more than one site) and/or between environmental components. Effects can occur in one of four ways:

- Physical or chemical transport mecha nisms;
- "Nibbling loss" (i.e., gradual disturbance);
- Spatial or temporal crowding;
- Growth induction initiated by the project.

4.4.1 Analysis of Cumulative Environmental Effects

Four steps in the analysis of the cumulative environmental effects of this project include scoping, analysis of effects, mitigation measures, and significance. Each of these four steps are discussed below:

Scoping: Scoping includes the identification of issues of potential concern, VEC's that could be affected and boundary setting. The activities considered included the operation of the FOX-M North Warning System Long Range Radar site.

The spatial boundaries included impacts over a larger (regional) area including the crossing of jurisdictional boundaries. Temporal boundaries have been extended beyond the time frame required to complete the clean up work.

Analysis of Effects: The analysis included an evaluation of baseline data and possible effects on VEC's. The combined interactions between the clean up activities and future land use and those Valued Ecosystem Components (VECs) which are similar were identified.

Mitigation Measures: Mitigation measures were identified for project-environment interactions.

Significance: The interactions are defined as having a low (L), moderate (M) or high (H) probability of occurring. The next step is to determine the likelihood of significant adverse effects, taking into account appropriate mitigation measures.

4.4.2 Identification of Mitigation Measures and Residual Impacts

Mitigation measures resulting in a reduction or elimination of potential adverse effects associated with the clean up were identified. Mitigation measures are outlined in the DLCU Environmental Protection Plan (EPP) for FOX-M. The EPP forms part of the contract documents and requires all on-site personnel to adhere to the mitigation measures outlined.

Table 4.2 summarizes the mitigation measures identified for the potential adverse environmental impacts detailed above. Taking into account the mitigation measures, the significance or anticipated residual impacts were identified for all potential adverse impacts.

Table 4.2: Summary of Mitigation Measures

Potential Impact	Mitigation Measure	Significance
The extractions of granular materials and grading activities may create dust and impact air quality.	• Implement dust control measures. Waste oil will not be used for dust suppression.	Not significant.
Accidental release of contaminated soil could impact the soil and water quality.	• Implement proper handling, storage and transportation procedures for contaminated soils. • All workers to be trained in proper handling procedures for all contaminants on site. • Do not store contaminated soil or fuel, on beach. • Adhere to spill contingency plans. Ensure all materials and equipment to implement contingency plans are available on-site. • Handle all fuel in accordance with EPP.	Significant impacts are not likely provided mitigation measures are implemented.
Erosion and sedimentation of waterbodies during grading and gravel extraction activities may impact water quality.	• Prevent siltation by use of berms or silt fences. • Disturbed areas adjacent to water to be stabilized if required.	Significant effects not likely provided mitigation measures are implemented.

Potential Impact	Mitigation Measure	Significance
Disturbance of the terrain and drainage due to extraction of granular material, the removal of contaminated soil, and movement of contractor's equipment and personnel around the site.	• Regrade and reshape disturbed areas to match existing terrain and drainage paths. • Use existing roads for movement around the site.	Not significant provided mitigation measures are implemented.
The use of heavy equipment for demolition, grading and transportation, will increase noise levels, and may disturb wildlife. Marine transportation to and from the site may disturb marine mammals.	• Survey for wildlife concentrations. • Avoid known wildlife colonies or bird nesting areas. • Employ minimum distance/ height restrictions for transportation activities. • Mitigation measures to be implemented to minimize noise impacts in event of wildlife on site.	Not significant provided mitigation measures are implemented.
Loss of habitat, specifically vegetation as a result of the extraction of granular material in previously undisturbed areas.	• Regrade and reshape the disturbed areas to match existing terrain to facilitate recovery of ecosystem components.	Not significant.
The existing facilities may be used by wildlife as habitat (i.e. nests in structures). The demolition of these facilities may impact availability of habitat.	• Inspect facilities prior to demolition for use by wildlife. • Do not demolish while birds are nesting. • Contact appropriate wildlife officer for additional guidance to ensure disturbance of wildlife is minimized.	Not significant
Impact on aquatic habitat due to sediment and/or contaminated soils entering an aquatic environment, the extraction of granular materials, and handling and handling of contaminated.	• Visually inspect aquatic habitat for fish and marine mammals prior to work beginning. • Implement mitigation measures to prevent deleterious substances from entering the aquatic environment.	Significant effects not likely provided mitigation measures are implemented.
The transportation to/from the site may disturb aquatic animals.	• Obtain information regarding wildlife concentrations in work areas. • Transportation of any hazardous materials to be in accordance with Transportation of Dangerous Goods Regulations. • Follow designated routes for shipping activities.	Significant effects not likely provided mitigation measures are implemented.

Potential Impact	Mitigation Measure	Significance
The presence and movement of people around the site has the potential to disturb archaeological resources in the area.	• Clearly mark the archaeological resources identified in previous assessments. • Avoid resources. • Contact authorities in the event a new resources is discovered or a known resource is disturbed.	Not significant.
Clean up activities may disturb traditional land use, hunting and fishing activities that would occur during the summer months	• Contact local hunters and trapper organization to coordinate clean up activities and traditional land use.	Not significant.

5. PROPOSED SURVEILLANCE NETWORK PROGRAM

The following monitoring program is being proposed to help quantify the success of the mitigative measures implemented for the remediation of the Beach Refuel Area. Interpretation of the data will also help to identify whether any further action is required to prevent impact to the environment. Table 5.1 summarizes the locations of sampling, the analytes to be measured and the frequency of the monitoring.

Table 5.1: Proposed Surveillance Network Program

Location/Description	Frequency	Analysis Requirements	Criteria
Waste water discharge area: Includes wash water, meltwater collection, rinse water from cleaning of fuel tanks and pipelines, and/or any other effluent stream.	Prior to every waste water discharge event or once per month.	pH Oil and grease Arsenic (total) Cadmium (dissolved) Chromium (total) Cobalt (dissolved) Copper (dissolved) Lead (dissolved) Mercury (total) Nickel (dissolved) PCB* PCB** Phenols Zinc (total)	6 to 9 none visible 100 ìg/L 10 ìg/L 100 ìg/L 50 ìg/L 200 ìg/L 50 ìg/L 0.6 ìg/L 200 ìg/L 50 ìg/L 5 ìg/L 20 ìg/L 1000 ìg/L
Construction activity in close proximity to water bodies	Daily	Visual monitoring with photos (for surface sheens and turbidity on both sides of the silt fences)	
	Weekly	pH Conductivity Temperature Turbidity	
	Monthly	Total Petroleum Hydrocarbons Total Suspended Solids	

*Indicates PCB: discharge to a barren area. **Indicates PCB: discharge to a vegetated area.

Note 1: The sampling and testing frequency will be increased if the visual inspections indicate a potential concern.

Note 2: There will be no sewage discharge, as the contractors will either be staying in the Hamlet of Hall Beach, or at the NWS Long Range Radar station.

Note 3: Any waste water tested that does not meet the discharge criteria is to be handled as hazardous waste.