Environment

Public Works and Government Services Canada

Northern Contaminated Sites Program

Environmental Impact Assessment CAM-C, Matheson Point, Nunavut Intermediate DEW Line Site

Prepared by:

AECOM
200 – 6807 Railway Street SE
Calgary, AB, Canada T2H 2V6
www.aecom.com

403 254 3301 tel
403 270 9196 fax

Project Number:

60299674 (503)

Date:

March 24, 2014

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AECOM
200, 6807 Railway Street SE
Calgary, AB, Canada T2H 2V6
www.aecom.com

403 270 9200 tel
403 270 0399 fax

March 24, 2014

Jessie Hoyt, P.Eng.
Project Manager
Public Works and Government Services Canada
Northern Contaminated Sites Program
5th Floor, 10025 Jasper Avenue
Edmonton, AB T5J 1S6

Dear Mr. Hoyt:

Project No: **60299674 (503)**

Regarding: **Project Specific Environmental Impact Assessment**
CAM-C, Matheson Point, Nunavut, Intermediate DEW Line Site

It is our pleasure to provide Public Works and Government Services Canada with the attached Environmental Assessment Screening report for the CAM-C, Matheson Point Intermediate DEW Line site.

Please contact the undersigned at 780-486-7057 if you have any questions.

Sincerely,
AECOM Canada Ltd.

Nick Oke, M.Sc., P.Chem.
nick.oke@aecom.com

NO:blb

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AECOM Signatures

Report Prepared By:

Eva Schulz, P.Ag. (AB)
Senior Environmental Scientist

Report Reviewed By:

Nick Oke, M.Sc., P.Chem.
Senior Environmental Scientist

Executive Summary

CAM-C Matheson Point is a former Distant Early Warning (DEW) Line site on the southeast coast of King William Island in Nunavut, with access to the Rae Strait in the Gulf of Boothia. Site co-ordinates are: 68.819°N and 95.289°W. The closest community is Gjoa Haven (estimated population of 1,279, Statistics Canada, 2011), which is situated approximately 30 kilometres (km) southwest of CAM-C.

The site is scheduled for remediation according to the Indian and Northern Affairs Canada Abandoned Military Site Remediation Protocol (2009). Activities will include: dump remediation, debris removal, contaminated soil remediation, and containerization and off-site removal of hazardous wastes.

Based on the requirements of the Nunavut Land Claim Agreement (NLCA) through the Nunavut Impact Review Board (NIRB), the project specific information requirements regarding the proposed remediation activities are to be provided and are to undergo an environmental assessment.

The remediation of the site will follow the 2013 Remedial Action Plan (RAP) prepared by AECOM. The following is the proposed order of activities schedule for the remediation of the CAM-C site according to the RAP:

- Source borrow material
- Construct the landfarm treatment area
- Excavate Type B hydrocarbon soil immediately upon landfarm construction
- Excavate the Airstrip Landfill
- Excavate contaminated soil
- Collect surface debris
- Regrade existing Station West Landfill and Lobes C, D and E

The following objectives are to be achieved as part of the remediation of CAM-C:

- To restore the site to meet the environmental objectives established for northern sites
- To prevent migration of contaminants into the Arctic ecosystem
- To remove physical hazards for the protection of human health and safety
- To implement a cost effective remediation solution

The remediation of the CAM-C site will have a net positive effect on the environment through the removal of physical hazards such as the debris, the removal and disposal of Tier I and Tier II impacted soils, the removal and disposal of hazardous and non-hazardous debris, the treatment of hydrocarbon impacted soils, and grading of the site to match the existing terrain. Through the implementation of the proposed mitigation and monitoring plans and project design, potential adverse effects of the proposed project will be minimized and no significant adverse residual effects are expected to occur.

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1. Introduction

Public Works and Government Services Canada (PWGSC) requested that AECOM prepare an Environmental Impact Assessment (EIA) for the proposed remediation of the CAM-C, Matheson Point Intermediate DEW Line Site. The EA will be submitted to the Federal and Territorial Regulators including Aboriginal Affairs and Northern Development Canada (AANDC) Land Administration, the Nunavut Water Board (NWB), and the Nunavut Impact Review Board (NIRB). The EA follows the NIRB Screening Part 2 form – Project Specific Information Requirements.

1.1 Location

CAM-C Matheson Point is a former Distant Early Warning (DEW) Line site on the southeast coast of King William Island in Nunavut, with access to the beach at Rae Strait in the Gulf of Boothia. Site co-ordinates are: 68.819°N and 95.289°W. The closest community is Gjoa Haven, which is situated approximately 30 kilometres (km) southwest of CAM-C.

1.2 History

CAM-C was reserved by the Department of National Defence (DND) in 1956 for use as a DEW Line Site and was constructed in 1957. The site operated until 1963, when it was abandoned as part of the DEW Line system, and the responsibility for the site was assumed by Indian and Northern Affairs Canada (INAC). Since that time, the site buildings and the POL tanks at both the station and the beach have been removed or dismantled, leaving behind the concrete and wood foundations with miscellaneous debris. The radar tower has been felled and is lying to the west of the module train.

The radar facility that was constructed as a part of the North Warning System was typical of all intermediate sites and consisted of a module train, warehouse, garage, POL storage facilities at the station and the beach, a radar tower, and an airstrip. In addition to the main site, a beach cargo landing area was constructed along with gravel roads linking the various facilities. Access to the site is provided by an airstrip and the beach cargo area. The airstrip (~900 metres (m) long) is located east of the station facilities with an approximate northwest-southeast orientation. A fresh water lake is located approximately 2 km northwest of the station. Gravel roads were built linking the airstrip, beach areas and fresh water lake to the station facilities. Overall site plans showing the site location and layout are shown on **Figures 1 and 2, Appendix A**.

1.3 General Project Information

1.3.1 Purpose

The purpose of the project is to be consistent with the requirements of the INAC Abandoned Military Site Remediation Protocol (AMSRP) (INAC 2009). This protocol provides assessment and remedial guidelines for Waste Disposal Areas (WDAs), disposal of barrel contents and provides clean-up criteria for contaminated soil. There are no criteria for the classification of hazardous waste at federal sites, except for materials regulated under the *Canadian Environmental Protection Act* (CEPA), including the Inter-provincial Movement of Hazardous Waste Regulations. The classification and remedial recommendations for materials not covered under CEPA has been based on the Transportation of Dangerous Goods (TDG) Regulations and the Nunavut/NWT Guideline for the General Management of Hazardous Waste (1998), under the territorial *Environmental Protection Act* (R.S.N.W.T 1998 c.E-7). More detailed information related to remedial guidelines or requirements under the sources noted above is provided in the task-specific sections below.

The ultimate goal is to create a positive environmental impact. The objectives are as follows:

- To restore sites in order to meet the environmental objectives established in the AMSRP
- To prevent migration of contaminants into the Arctic ecosystem
- To remove physical hazards for the protection of human health and safety
- To implement a cost effective remediation solution

To accomplish these objectives, the main remediation activities will include:

- Landfill Remediation
- Hazardous and Non-Hazardous Waste Removal
- Tier I and II Contaminated Soil Removal
- Petroleum Hydrocarbon (PHC) Contaminated Soil Remediation

1.3.2 Project Alternatives

As part of the project review, alternatives for each waste stream were considered during the development of the remedial action plan (RAP) and the recommended options were based on the cost, the Arctic environment, and several other considerations. However, due to the nature of the site and the location, the range of alternatives to the project is limited. Two alternatives to the remediation of CAM-C were identified, and include:

Commercial or other government use of the facilities: This alternative involves the sale of those facilities to commercial interests. Two possibilities are present, namely on-site commercial development or sale of the capital assets themselves and movement off-site.

Do Nothing (no clean up action): The second alternative involved examining the environmental impact of maintaining the status quo at the sites. It was quickly realized that failure to address the environmental problems identified during the site investigations could lead to the following:

- Placing the Arctic environment/food chain at risk
- Possible future legal liabilities for the federal government
- Greater clean-up costs in the future

1.3.3 Schedule

Based on the information provided in the Remedial Action Plan prepared by AECOM, it is anticipated that construction activities can be completed within one or two clean up seasons, excluding mobilization.

In order to complete the clean-up of the CAM-C site in one or two construction seasons, the anticipated schedule of activities would be as follows:

- Mobilization in the fall of 2016
- Source borrow material, construct the Landfarm in 2017
- Excavate dumps and contaminated soil, and demobilize from site in 2017 and/or 2018

1.3.4 Regulatory Overview

1.3.4.1 Lead Authorizing Agencies

The proponent for this project is Aboriginal Affairs and Northern Development Canada (AANDC). The management of this project is being provided by Public Works and Government Services Canada (PWGSC). These agencies will be responsible for obtaining permits, except in those cases where the clean up contractor is required to do so by legislation or as part of their contract.

1.3.4.2 List of Approvals, Permits and Licenses Required

The following is a list of permits required for the clean-up of the CAM-C site:

Land Use Permit: As per the *Territorial Land Use Act* and Territorial Land Use Regulations, a Class A permit issued by AANDC is required for the activities associated with the remediation of CAM-C. Contact: AANDC Land Administration, Iqaluit, NU (Tel) 867-975-4283.

Quarry Permit: As per the *Territorial Land Use Act* and Territorial Quarrying Regulations, a Quarry Permit(s) issued by AANDC is required for the extraction of granular material required for remediation. Contact: AANDC Land Administration, Iqaluit, NU (Tel) 867-975-4283.

Water Use License: As per the *Nunavut Land Claims Agreement Act*, a Class A water-use license issued by the Nunavut Water Board is required for camp operations and construction activities associated with the remediation of CAM-C. Contact: Nunavut Water Board, Gjoa Haven, NU (Tel) 867-360-6338.

In addition, the successful contractor may require a number of other permits or licenses. These permits or licenses pertain to the operation and maintenance of the contractors' camp or relate to his/her status as an employer. Examples of these permits include those related to the possession of firearms, day-to-day camp operation and federal/territorial labour codes. A list of these and other requirements is presented in **Table 1**. Please note that this list is not all-inclusive and other permits may also be required.

Table 1 - Other Authorizations

Authorization	Authority	Activity to Authorization Applies
Archaeological Research Permit	Department of Culture, Language, Elders and Youth, Gov't of Nunavut (*Nunavut Land Claims Agreement Act*)	Investigation of archaeological sites, mitigation, monitoring
Transportation Permits	Transport Canada (*Transportation of Dangerous Goods Act*)	Shipping
Transportation Permits	Transport Canada (International Air Transport Association Dangerous Goods Regulations)	Air transport
Fishing Licenses	Department of Fisheries and Oceans	Recreational fishing
Firearms Acquisition Certificates/ Firearms License (course required)	Royal Canadian Mounted Police (RCMP)	Use and storage of firearms

1.3.4.3 Conformance to Legislation and Policy

The remediation of the site will comply with all applicable environmental laws, regulations and requirements of Federal, Territorial and other regional authorities, and any permits, approvals, and authorizations that may be required. The contractor is subject to and must comply with all permits and approvals obtained on behalf of and by AANDC to conduct this work. Throughout all project phases, project personnel will work in close cooperation with regulatory authorities and compliance will be enforced.

Federal Acts, Regulations and Guidelines

Several Federal Acts, regulations and guidelines affect project activities across all Canadian jurisdictions. The most relevant to the remediation of CAM-C are outlined below:

The ***Canadian Environmental Protection Act*** regulates toxic substances from their production or import, to consumption, storage and disposal. This Act also incorporates, amongst others, the Storage Tank Regulations (SOR/2008-197) and the PCB Regulations (SOR 2008-273) and amendment (SOR/2010-57).

The ***Transportation of Dangerous Goods Act*** **and Regulations** promotes public safety in the transportation of dangerous goods. The Act applies to all handling, offering for transport and transporting of dangerous goods by any means of transport whether or not the goods originate from or are destined for any place or places in Canada.

The ***Fisheries Act*** protects fish and fish habitat from pollution, harmful alteration, disturbance and destruction, and impediments to fish movement.

The ***Arctic Waters Pollution Prevention Act*** **and Regulations** govern development and shipping activity in Arctic waters adjacent to the mainland islands of the Canadian Arctic to ensure the continuing welfare of the residents of the areas, and to protect the ecological balance in water, ice and land areas.

The ***Migratory Birds Convention Act*** provides for the protection of designated migratory species, their habitats, and the regulated harvest of certain species.

The ***Canada Wildlife Act*** provides for the involvement of the Government of Canada in cooperative research and management programs involving wildlife species that normally fall under the responsibility of provinces or territories. This is particularly relevant to rare and endangered species or species such as the Peary caribou, which seasonally move across various regulatory boundaries.

The ***Species at Risk Act*** aims to protect wildlife from becoming extinct or lost from the wild, with the objective of helping the numbers recover. The act identifies all wildlife species listed as being at risk nationally and protects populations and their habitats.

The ***Canada Shipping Act, 2001*** regulates shipping activities under the jurisdiction of Canada. Regulations cover technical standards of operation safety and pollution aspects related to shipping activities in Canadian waters.

The ***Navigable Waters Protection Act*** pertains to the erection of structures or facilities used to support or impede navigation in waters under the jurisdiction of Canada.

The ***Territorial Lands Act*** provides the authority for administering and protecting lands under the direct control of the Minister of AANDC. The following regulations are pursuant to this Act:

- The **Territorial Lands Regulations** provide regulatory control for maintaining sound environmental practises for any land use activities on Territorial lands. These regulations require that land use permits be issued for such operations as work involving the use of heavy equipment, establishment of camps, use of explosives, and clearing of lines, trails and rights-of-way, including construction of access roads.
- The **Territorial Quarrying Regulations** establish the procedures for extracting Crown-owned limestone, granite, slate, marble, gypsum, loam, marl, gravel, sand, clay or stone from Territorial lands. The regulations specify permits, applications, staking and dimensions of quarries.

The ***Nunavut Land Claims Agreement Act*** (1993) provides for the use, management and conservation of land, water, and resources of Nunavut. It also identifies the need to complete an environmental impact assessment for specific projects.

The ***Nunavut Waters and Surface Rights Tribunal Act*** provides the Nunavut Water Board with the power to issue water use licenses. The NWB evaluates the potential for detrimental effects occurring because of the use of water or a deposit of waste in water on other users.

Canada Labour Code contains the labour code for all Federal employees or activities on Federal owned or controlled land. Private, Provincial or Territorial employees are governed by the Provincial/Territorial Labour Acts, even when working on Federal lands or facilities. The Labour Acts control such things as statutory holidays, maximum work hours and minimum wages.

Atomic Energy Control Act **and Regulations** describe the packaging requirements and approvals needed for the transportation of radioactive materials.

National Fire Code (NFC) establishes the standard for fire prevention, fire fighting and life safety in buildings in use, including standards for the conduct of activities causing fire hazards, maintenance of sire safety equipment and egress facilities, standards for fire extinguishers, etc. In addition, the NFC established the standard for prevention, containment and fighting of fires originating outside buildings which may present a hazard to a nearby community, and sets the standards for the storage and handling of dangerous goods, flammable liquids and combustible liquids.

The following guidelines are identified as reference materials, and should be used where appropriate in the final design:

Freshwater Intake End-of-Pipe Fish Screen Guidelines (Department of Fisheries and Oceans (DFO)) provide instructions for the protection of anadromous and resident fish where freshwater is extracted from fish-bearing waters.

Code of Good Practise for Used Oil Management in Canada (Canadian Council of Minister of the Environment (CCME)) describes environmentally sound options for the handling, storage, collection, transportation, recycling, reuse and disposal of used oils in Canada. It is intended to provide guidance for used oil generators and to regulatory authorities in the formulation of provincial or regional used oil management strategies.

Canadian Environmental Quality Criteria for Contaminated Sites (CCME) provides numerical limits for contaminants in soil and water intended to maintain, improve, or protect environmental quality and human health at contaminated sites. The criteria are intended to provide general technical and scientific guidance to provincial, federal, territorial and non-governmental agencies in the assessment and remediation of contaminated sites across Canada. They serve as benchmarks against which to assess the degree of contamination at a site.

Canadian Drinking Water Guidelines (Health Canada) provide criteria for water that are protective of human health and also meet aesthetic objectives.

The **Canada-Wide Standard for Mercury (CCME)** applies to incineration activities on site.

Nunavut and Northwest Territory Acts, Regulations and Guidelines

In addition to the Federal Acts and Regulations identified in the previous section, the remediation of the CAM-C site is governed by the following:

Guidelines for the Discharge of Domestic Wastewater in Nunavut, by the Nunavut Water Board, outlines the requirements for water quality effluent from facilities in Nunavut.

Environmental Guidelines for Industrial Waste Discharges establish standards that should be followed when discharging waste from an industrial operation on Commissioners Land or lands administered by municipal governments in Nunavut.

The ***Explosives Use Act*** provides controls for surface blasting other than for mining purposes.

The ***Nunavut Wildlife Act*** provides for the protection of wildlife and wildlife habitats as well as regulated harvest of selected species.

The ***Nunavut Environmental Protection Act*** provides for the protection of the environment from the discharge of contaminants, clean up of contaminants and unsightly premises. In addition, the powers of inspectors, as well as offences and penalties, are defined. The Act applies only to situations not authorized by other Canadian Acts in the Nunavut Territory. The following guidelines under the Nunavut Environmental Protection Act may be applicable to the cleanup of the Matheson Point site:

- Contingency Planning and Spill Reporting
- Disposal Guidelines for Fluorescent Light Tubes
- Guideline: Dust Suppression
- Guidelines for the Management of Waste Asbestos
- Guideline for the Management of Waste Antifreeze
- Guideline for the Management of Waste Paint
- Guideline for the Management of Waste Solvents
- Guidelines for the General Management of Hazardous Waste in Nunavut

The ***Nunavut Environmental Rights Act*** provides the people of Nunavut the right to access information concerning the release or potential release of contaminants into the environment, and also the right to prevent the release or potential release of contaminants into the environment.

The **Spill Contingency Planning and Reporting Regulations** outline requirements for filing a contingency plan and for reporting spills.

The ***Nunavut Fire Prevention Act*** **and Regulations** provides for the regulation of the decommissioning of fuel lines and fuel tanks.

The ***Pesticides Act*** **and Regulations** specifies the requirements for use storage, handling and disposal of pesticides.

The **Nunavut Territorial Archaeological Sites Regulations**, pursuant to the *Nunavut Act*, protects archaeological sites in Nunavut from disturbance and prohibits the removal of archaeological specimens, except under permit.

The ***Safety Act*: Occupational Health Regulations** outline the health and safety standards to be maintained at workplaces to ensure the health and safety of persons.

Guidelines for the Removal of Materials Containing Friable Asbestos outlines the procedures for the removal of friable asbestos.

1.4 DFO Operational Statement Conformity

Based on the work to be completed, there are no activities where a DFO Operation Statement would be applicable.

1.5 Transportation

Transportation associated with the movement of materials, equipment, and personnel to the site, as well as disposal of some waste materials off-site includes air, ground and barge transport. These activities are described as follows:

1.5.1 Air

Transport of personnel to and from the site, and weekly domestic supplies (i.e., food) will be completed using charter aircraft. It is anticipated that the airstrip will remain intact once the clean-up work is completed, with the exception of any culverts or other structures that may be part of the former DEW Line program or those that may have been required during the remediation program, which will be removed.

1.5.2 Ground

The CAM-C site is 30 km north of Gjoa Haven and there is potential for the independent development of an ice road or cat train that would be used for contractor mobilization. Mobilization by ice road or cat train offers more flexibility for a longer summer construction season as the contractor typically mobilizes his equipment and camp to site in March or April, clears snow from critical areas and can mobilize his staff to set up the camp and start work early in the summer. Barge access can be hindered in the early summer by ice conditions. Barge availability can also be an issue. If the Contractor is able to stage his equipment, camp and materials for CAM-C out of Gjoa Haven, overland mobilization (i.e. cat train) would be considered a viable option for contractor mobilization. It has therefore been assumed for the preparation of the RAP, and its associated cost estimate, that access to the site for mobilization and demobilization of contractor equipment and supplies will be either via barge, ice road or cat train.

Existing roads will be used at CAM-C while on-site. There are a number of gravel roads throughout the site connecting the Station Area with the Airstrip, Fresh Water Lake, existing dumps, and beach areas. All of the major roadways were surveyed during the 2013 site investigation (AECOM). The roads are constructed with local granular material and are generally well drained. The patches of vegetation are typical along the roadways, but are of no concern with respect to trafficability. The roads are in good condition for heavy equipment although regular grading will be required. Widened or pulled out sections will be required in select locations to accommodate two-way heavy equipment traffic.

The roadway sections include Road Section 1 from the Airstrip to the Fresh Water Lake, Road Section 2 from the Airstrip to the Station Area and other Station Area roads, and Road Section 3 connecting the Airstrip to the Beach POL. The road sections are shown on **Figure 2, Appendix A**.

It is anticipated that the existing roadways will remain intact once the clean-up work is completed, with the exception of any culverts or other structures that may have been part of the former DEW Line program or those that may have been required during the remediation program, which will be removed.

1.5.3 Barge

The CAM-C site is located along the coast and barges have historically landed at the Beach Area. The ground at the beach is comprised of generally well-drained, coarse-grained beach deposits, which are not expected to pose a problem for beaching or using heavy equipment in the area for movement of materials upon landing. The transport of the contractors' equipment and facilities may be by barge in the summer. In addition, any waste materials to be transported off-site may be removed via barge.

No significant change in the position of shoreline due to tidal influences was noted during the 2013 site investigation (AECOM), suggesting that the near shore water conditions are not excessively shallow. Tidal prediction rates for August and September of 2013 are available for the nearby areas of Gladman Point, Shepherd Bay and Cambridge Bay, from the DFO website. For this time of year, tidal fluctuations are in the order of approximately 0.3 to 0.6 m. Based on the above information, barge landing at Matheson Point is not expected to pose a significant challenge.

1.6 Camp Site

The recommended location for the camp/laydown area is located near the airstrip and Proposed Landfill LF-2. This area is centrally located with easy access to the airstrip. The area has been used for borrowing material in the past for construction of the airstrip and is relatively flat.

The temporary camp structures will include accommodations for the construction staff, the owner and support staff as well as associated facilities, such as offices, latrines and kitchen facilities. The facilities will be installed during mobilization, and will be removed as part of the demobilization from the site. The anticipated number of staff is approximately 30 to 40 people, from June 15 to September 15.

1.7 Equipment

The contract for this work has not yet been tendered or awarded; therefore, the exact types of equipment are not available. However, based on equipment used at other sites, the typical equipment can include, but is not limited to, the following:

- Rock truck
- Loader
- Excavator
- Grader
- Dozer
- Fuel truck
- Water truck
- Mack truck
- Passenger van
- Pick-up trucks
- Incinerator
- Generator

- Backhoe
- Compactor
- Drill
- Dumper
- Snow blower

1.8 Water

The only source of water for camp operations is the Freshwater Lake, shown on **Figure 2, Appendix A**. Water samples were collected at from the lake during the 2013 site assessment (AECOM). The criteria for the Guidelines for Canadian Drinking Water Quality (CDWQ) (May 2008) was exceeded for aluminum, iron, manganese, selenium and silver for the sample collected at the Freshwater Lake. Hydrocarbons and PCBs were non-detect in the sample. The results for the remaining parameters were below the detection limit. Due to the seasonal nature of coliform concentrations in surface water bodies, no coliform samples were collected. If this water body is to be used during construction as the drinking water source, coliform testing will be required on a regular basis throughout the construction season.

It is estimated that water use will be approximately 10 cubic metres (m^3) per day for the duration of the remediation program, for both camp and construction use. Prior to being used for drinking water, analysis and confirmation of all drinking water parameters will be required. Collection and analysis of all drinking water parameters is recommended to be completed at minimum, on a bi-weekly basis. No water will be returned to the source. If the results from the analysis of the Freshwater Lake samples continue to exceed the parameters for the Guidelines for Canadian Drinking Water Quality, drinking water will need to be brought into site for the duration of the remediation program.

1.9 Waste Water

The ultimate location of the camp and associated sewage, grey water, and waste disposal will need to consider the requirements of the Water Use License and Land Use Permit. Typically, the permits require that all waste disposal locations, including sewage treatment systems, grey water discharge areas, and fuel storage areas be located a minimum of 31 m from the high water mark of any water body or drainage course. In addition, a0ll effluent and wastewater must meet waste water quality requirements prior to discharge. Sewage lagoons are the usual method for sewage and grey water disposal at such sites, and as such, it is expected that a sewage lagoon will likely be used during camp operation at the CAM-C site. The prevailing wind direction will be taken into consideration for the location of waste water treatment and disposal operations.

In terms of waste disposal, licenses typically require that camp solid wastes be incinerated on-site, in an approved incinerator facility, and that non-hazardous, non-combustible waste and the ash generated from incineration be disposed of off-site. Therefore, all non-hazardous wastes will be disposed of on-site and only hazardous wastes will be shipped off-site.

1.10 Fuel

It is anticipated that fuel used on-site will be comprised of diesel and gasoline. The exact quantity and types of fuel, details of the secondary containment, method of fuel transfer and spill control measures are to be provided by the contractor, once the contract has been awarded. However, as a minimum, they must meet the requirements as outlined in **Section 4.3.2, Storage and Handling of Fuel and Other Hazardous Substances** in this report.

1.11 Chemicals and Hazardous Materials

All chemicals and hazardous materials will be dealt with according to **Section 4.3.16 Handling of Dangerous Goods and Hazardous Waste Materials**, in this report.

1.12 Workforce and Human Resources/Socio-Economic Impacts

The project is located near the community of Gjoa Haven, therefore, it is anticipated that much of the work force will be from that community. Workers coming from any communities will be transported to and from the site at the expense of the contractor. As part of the contract, the successful contractor is required to provide training programs for all employees. Typical positions available are heavy equipment operators, cooks, bear monitors and labourers.

The construction season will be from approximately June 15 to September 15. The exact start date during the mobilization year is dependent on the form of mobilization used by the contractor. If overland cat-train is used, the construction season can typically start in early June. If the contractor mobilizes using the barge, the construction season is expected to start in early to mid-August. The rotation schedule is decided by the contractor, and is required to comply with all applicable Government of Nunavut Labour Regulations.

1.13 Public Involvement/Traditional Knowledge

The community meeting for this project was completed in January 2014 in the community of Gjoa Haven. During the meeting, an outline of the proposed work was provided and questions and comments regarding the work were addressed. Information was also provided on the contracting process, so that people interested in working on the project are aware of when the positions will become available.

2. Project Specific Information – Site Cleanup/Remediation

2.1 Remedial Requirements for Existing WDAs

The assessment of waste disposal areas (WDA or buried debris areas) at CAM-C was completed with the goal of classifying the WDAs according to the three categories specified under the AMSRP, which are:

Class A: The WDA is located in an unstable, high erosion location. Remediation will involve relocation of buried debris to an engineered landfill. A WDA located at an elevation of less than two (2) metres above mean sea level will be removed.

Class B: The WDA is in a suitable, stable location, but there is evidence of contaminant migration. Remedial solutions include the installation of an engineered containment system, or relocation, whichever is deemed more cost effective.

Class C: The WDA is in a suitable, stable location, and there is no evidence of contaminant migration. In such cases, the debris may be left in place, with the placement of additional granular cover to ensure erosion protection and proper drainage.

2.2 Existing Waste Disposal Areas (Dumps)

There are two existing waste disposal at CAM-C:

- Station West Landfill
- Airstrip Landfill.

In addition, there were three small lobes of buried debris identified (Lobes C, D, E). A summary of the description of each landfill and buried debris location is provided in the following sections.

2.2.1 Station West Landfill

The Station West Landfill is located at the southwest side of the former station pad. The geophysical survey identified a waste disposal area (WDA) size of approximately 1,560 square metres (m^2), with an estimated depth of 1.2 m. The location of the Station West Landfill is shown on **Figure 2, Appendix A**.

Debris was observed on the surface and partially buried. The debris consisted of metal barrels, batteries, wood, pipe, machine parts, strapping, garage floor wire mesh, cable, wire and tin cans. The cover soil was predominantly comprised of coarse sand with some gravel. The overall area was dry, with a minor seasonal drainage channel noted downgradient of the toe. There was little evidence of erosion in the area, which slopes to the south. There was no contaminant migration identified; however, surface contamination associated with the locations of the batteries is suspected.

Based on the waste disposal area evaluation matrix presented in the AMSRP, the Station West Landfill scored as a low potential risk or Class C. The low score is due mainly to the lack of contamination, the stability of the lobes, lack of down-gradient receptors, and its small size. As a result, the remedial recommendation is to leave the Station West Landfill in place and, if required, additional granular cover will be placed on the surface following the removal of surface debris.

2.2.2 Airstrip Landfill

The Airstrip Landfill is located off of the southeast end of the airstrip in a drainage gully. The geophysical survey identified a WDA the size of approximately 1,000 m^2, with an estimated depth of 1.5 m. The location of the Airstrip Landfill is shown on **Figure 2, Appendix A**.

Debris was observed on the surface and partially buried. The debris consisted of metal barrels and other metal debris. The cover soil was predominantly comprised of coarse sand with some gravel. The overall area was dry, except within the drainage gully, which ran through the centre of the landfill. Evidence of erosion included barrels that had washed out of the landfill. There was no contaminant migration identified and no areas of suspected surface contamination.

Based on the waste disposal area evaluation matrix presented in the AMSRP, the Airstrip Landfill scored as a moderate potential risk or Class B, due to the noted and potential for erosion. Because it would be difficult to stabilize this landfill in its current location, the remedial recommendation is to excavate the Airstrip Landfill and backfill with clean granular material, as appropriate.

2.2.3 Lobes C, D & E

During the site assessment three lobes (Lobes C, D & E) of buried debris were identified north of the Station Area. The outlines of each location are indicated on **Figure 2, Appendix A**. The overall area of buried debris comprising these lobes was determined to be 320 m^2 by the geophysical survey and the depth was estimated to be 1.0 m below surface.

A piece of partially buried metal debris was observed at Lobe E, but otherwise the lobes were generally clear of surface debris. The cover soil was predominantly comprised of coarse sand with some gravel. Only trace amounts of organic material were noted over the area with the lobes, and there was minimal vegetation cover (5%). The primary vegetation cover was willows and sedges, with trace amounts of lichen. In general, there was minimal evidence of erosion, as the lobes are not within a drainage path (but lower elevation than the nearby Station Area); there is some seasonal overland flow, but this location is relatively flat.

Based on the landfill evaluation matrix, the lobes all scored as a low potential risk or Class C buried debris area. The low score is due mainly to the lack of contamination, the stability of the lobes, lack of down-gradient receptors, and the relatively small size. As a result, the remedial recommendation is to leave the lobes in place and, if required, place additional granular cover to a thickness of 0.75 m, following the removal of surface debris.

There were no WDAs identified at CAM-C that are considered to be high potential environmental risk; however, the Airstrip Landfill is located within a drainage gully, therefore excavation is recommended. **Table 2** below summarizes the anticipated remedial requirements for WDAs at CAM-C.

Table 2 - Summary of Recommended WDA Remedial Requirements

Waste Disposal Area	Area (m^2) & Depth (m)	Environmental Assessment	Landfill Evaluation	Recommended Remediation	Comments
Station West Landfill	1,560 1.2	• No evidence of contaminant migration. • No potential for surface contaminated soil identified. • Very little vegetation. • No erosion noted.	Class C Low Potential Environmental Risk.	Regrade, based on the stability of this landfill.	Remove surface debris and cover with additional granular fill to provide erosion protection and proper drainage.
Airstrip Landfill	1000 1.5	• No evidence of contaminant migration. • No potential for surface contaminated soil identified. • No vegetation. • Erosion noted.	Class B Moderate Potential Environmental Risk.	Excavate, based on the stability of this landfill.	Because this landfill is located within a drainage gully, it would be very difficult to make it stable. Excavate debris and backfill as appropriate.

2.3 Contaminated Soil

Contaminated soil areas will be excavated, typically using a backhoe, and then backfilled with granular material. The excavated soils will be disposed of according to the contaminant type. The disposal requirements are presented **Table 3** below:

Table 3 - Contaminated Soil Disposal Options

Contaminant Designation	Description	Estimated Soil Volume (m^3)	Disposal Options
Tier I Contaminated Soil	Soils containing concentrations of any or all contaminants listed as follows: Lead ..... 200 to 499 ppm PCBs ..... 1 to <5 ppm	63.0	Cap in place with a minimum of 0.3 m of granular fill, or dispose in on-site Non-Hazardous Waste Landfill.
Tier II Contaminated Soil	Soils containing concentrations of any or all contaminants listed as follows: Arsenic 30 ppm Cadmium 5 ppm Chromium 250 ppm Cobalt 50 ppm Copper 100 ppm Lead 500 ppm Mercury 2 ppm Nickel 100 ppm Zinc 500 ppm PCBs ≥5 ppm;<50 ppm	8.0	Dispose in SSDF or transport off-site for disposal in engineered territorial or provincial Landfill.
Type A Hydrocarbons	Soils contaminated with hydrocarbons consisting primarily of oil and grease.	n/a	Scarify and leave in place if under criteria, or dispose in on-site Non-Hazardous Waste Landfill.
Type B Hydrocarbons (*) Protection of Freshwater Aquatic Life	Soils contaminated with hydrocarbons consisting primarily of fuel oil, diesel, or gasoline with concentrations equal to or greater than the following: F1 fraction 1,290 ppm* F2 fraction 330 ppm* Station Area: Surface soils to 0.5 m depth 2500 ppm (TPH, sum of F1 through F3 fractions) for the Protection of Terrestrial Wildlife Subsurface soils below 0.5 m in depth 5000 ppm (TPH, sum of F1 through F3 fractions) for the Management Limit	570	Excavate and treat ex-situ through landfarming, treat in-situ with landfarming, or dispose of in SSDF. Note that disposal in the SSDF is only considered appropriate if concentrations are sufficiently low that there are no concerns for inhibiting freezing of contents and/or with free-product development, which could compromise the liner integrity at the facility.
CEPA/ Hazardous Soil	Soils contaminated with PCBs ≥ 50 ppm or with leachate concentrations above criteria.	n/a	Off-site at licensed southern disposal facility

A description of the contaminated soil areas identified at CAM-C by AECOM during the 2013 Phase III Environmental Site Assessment is presented below.

2.3.1 Tier I Soil

The 2013 site investigation identified the following Tier I impacted soils:

Tier I PCBs (60.9 m^3):

- 20 m^3 of Tier I contaminated soil was identified on the west side of the Warehouse Foundation to an estimated depth of 0.8 m
- 7.5 m^3 of Tier I contaminated soil was identified on the east side of the Warehouse Foundation to an estimated depth of 0.3 m
- 2.2 m^3 of Tier I contaminated soil was identified around the Garage Foundation; co-impacted with Tier I metals to an estimated depth of 0.3 m
- 21.5 m^3 of Tier I contaminated soil was identified at Debris Area #10 to an estimated depth of 0.3 m
- Two localized occurrences along the POL line; one of 7.5 m^3 and one of 2.2 m^3, both to a depth of 0.3 m

Tier I Metals (2.2 m^3)

- 2.2 m^3 of Tier I contaminated soil was identified around the Garage Foundation; co-impacted with Tier I metals to an estimated depth of 0.3 m

Airstrip Landfill Tier I Contaminated Soil Component:

- 100 m^3 from landfill excavation

The total volume of Tier I soil identified for remediation is 163 m^3, which has been delineated from contaminated soil areas.

2.3.2 Tier II Soil

The 2013 site investigation identified the following areas of Tier II impacted soils:

Tier II Metals (7.5 m^3):

- 7.5 m^3 of Tier II impacted soil (estimated to 0.3 m depth) down the slope from the Station Area pad, near the Module Train imprint.

Airstrip Landfill Tier II Contaminated Soil Component:

- 100 m^3 from landfill excavation.

The total volume of Tier II soil identified for remediation is 108 m^3, which has been delineated from contaminated soil areas.

2.3.3 Hydrocarbon Impacted Soils

2.3.3.1 Type A Soil

The 2013 site investigation did not identify any Type A contaminated soil.

2.3.3.2 Type B Soil

The following three areas of Type B impacted soil requiring remedial action were identified:

- 10 m^3 of Type B hydrocarbon impacted soil was identified in the imprint of the Module Train
- 185 m^3 of Type B hydrocarbon impacted soil was identified at the Beach POL
- 375 m^3 of Type B impacted soil was identified at the Station POL

The total volume of PHC Type B soil identified for remediation is approximately 570 m^3. A summary of contaminated soil volumes by area is presented in **Appendix B**.

In-situ treatment of the hydrocarbon impacted soil at the beach POL is not considered an option due to its close proximity to the shoreline. Based on the applicability of the various treatment options at the CAM-C site, the recommended remedial option is on-site ex-situ treatment, i.e. landfarming or aeration. Based on the volume of

impacted soil and moderate hydrocarbon concentrations observed during the 2013 investigation, it is anticipated that ex-situ biological treatment may be completed within a one year period provided site conditions are monitored and optimized where possible (i.e., moisture conditioning, nutrient amendment).

Soils contaminated with Type B fractions should be excavated and treated ex-situ by aeration or biological treatment methods in an on-site landfarm facility. Soils concentrations should be reduced, as required, to meet the 2009 AMSRP Criteria.

2.4 Surface and Buried Debris Areas

There are 27 surface debris areas and three small buried debris areas at CAM-C. All debris areas are shown on **Figure 2, Appendix A**.

The volume of hazardous materials identified in the surface debris areas is approximately 4 m^3, while the crushed volume of non-hazardous waste is approximately 406 m^3. Non-hazardous waste will be disposed of off-site. Hazardous waste must be packaged in accordance with Transportation of Dangerous Goods Act (TDGA) regulations for shipping to an off-site licensed hazardous waste disposal facility.

In addition to the identified surface debris areas, it is also typically noted in clean-up specifications that all debris within 50 m of existing pads and roadways is picked up. The surface debris investigation generally covered off all of the areas near roadways, and the existing perimeters were drawn to include debris identified in this vicinity. Nonetheless, it is recommended that a small contingency for additional volume of debris to be collected under the 50 m from roadway criterion be carried for off-site disposal volume estimates.

2.4.1 Summary of Surface Debris

Table 4 below provides a summary of the debris areas inventoried at the CAM-C site.

Table 4 - Summary of Surface Debris

Area	Description	Location	Estimated Areal Extent (m^2)	Estimated Crushed Volume (m^3)	Hazardous Uncrushed Volume Component (m^3)	Comments
Station Area Pad	Weathered pipe wrap, heating oil burner, heat registers, water tank, 2 building train water tanks, 2 500 US gallon diesel tank, I-beams (3), piping, wood, cable, communication cable, metal mesh, weathered formerly painted plywood, metal framing, boiler, metal sheeting, tile, wood	Station Pad - this includes the former building train, garage, warehouse and station POL area - includes old building components	31,372	20	1.5	Weathered asbestos
Radar tower	Tower and 2" support cables	Station Pad	448	165 (1,650 uncrushed)	n/a	No paint samples were collected as samples from previous sites were below criteria
Barrels markers for POL line	Wood cribbing and barrels markers to support POL line from Station to the Beach. Approx. 100 barrels	Between Station and Beach	6,950	40	n/a	Barrels and cribbing
Barrel markers for each end of airstrip	Five barrels each off the north and south end of the airstrip	Each end of airstrip	400 (200 m^2 at each end)	2	n/a	
Debris Area #1	9 empty barrels, cans, 1 gallon cans (20-30), wood, culvert, garage metal mesh, wire	South/Southeast of Station	100	5	n/a	
Debris Area #2 (formerly South Landfill)	10 empty barrels, at least 1 battery, 1 gallon cans, machine parts, wood	South of the Station West Landfill	10,000	10	1	Battery debris
Debris Area #3	Very scattered, wood, barrel strapping, cable, barrels, metal grating	West of Station Pad at the base of pad near seasonal pond	5,625	3	n/a	Likely this was what was considered the West Landfill
Debris Area #4	Single piece of pipe	South of Station Area	1	<1	n/a	
Debris Area #5	Tire	South of Station Area, west of Debris Area #4	0.25	<1	n/a	
Debris Area #6	Barrel	South of Station Area, northeast of Debris Area #4	0.25	<1	n/a	
Debris Area #7	Cat tracks	Station Area, west of Debris Area #6	25	2	n/a	
Debris Area #8	3 sets of cat tracks	West of Station Area	25	3	n/a	

Debris Area #9	POL valve	North of Station Area	1	1	n/a	
Debris Area #10	Appears to include parts of the old building train. Very weathered painted plywood, metal cans, 'train' heating fan, metal staircase from tower, metal vents, red compressed CO_2 cylinder, very weather pipe wrap	West of Station Pad	900	3	<0.5	Asbestos-amended tiles and insulation
Debris Area #11	Piece of metal	North of Station Area beside road to Freshwater Lake	1	<1	n/a	
Debris Area #12	Metal, wood (miscellaneous debris)	Very scattered debris along road to Freshwater Lake	400	1	n/a	
Debris Area #13	7 empty barrels, wood and floating structure	At Freshwater Lake, west side of road	5,625	2	n/a	
Debris #14	Metal strapping, some wood along slope	West of Station and Radar Tower	400	1.5	n/a	
Debris #15	Wood strapping and 2 small barrels	West of Station and Radar Tower (north of Debris Area #14)	100	1	n/a	
Debris #16	Partly buried wood and metal on slope	West of Station and Radar Tower (north of Debris Area #15)	100	1	n/a	
Debris #17	Snow fencing	Northwest of the Station Area	75	1.5	n/a	
Debris #18	Barrel in drainage path	Northwest of the Station Area	1	<0.5	n/a	
Debris #19	Small barrel cache - 17 barrels and 4 wood pallets	South side of the Beach POL pad -	100	6	n/a	
Debris #20	former storage area - 4 barrels, 2 pallets, sink, stove, furnace, machine parts, hot water tank	Lower portion of East Barrel Cache	400	7	n/a	
Debris #21	Metal garbage bin	Upper portion of East Barrel Cache	4	2	n/a	
East Barrel Cache	Empty barrel cache - approx. 300 barrels	East Barrel Cache adjacent to Beach	10,000	60	n/a	
West Barrel Cache	Empty barrel cache - approx. 200 barrels	West Barrel Cache adjacent to Beach	5,625	40	n/a	
		Totals	**78,679**	**377**	**3**	

2.5 New Landfill and/or Landfarm Facilities

2.5.1 Potential Locations

Three potential landfill locations (LF-1, LF-2, and LF-3) were identified and evaluated during the field program. The locations of landfills are shown on **Figure 2, Appendix A**. The preferred locations for a NHWLF are LF-1 or LF-2. The preferred location for a landfarm is LF-3, while an alternate location for a landfarm is LF-2. The preferred locations for a Secure Soil Disposal Facility (SSDF) are LF-1 or LF-2. **Table 5** provides a summary of the potential landfill and landfarm locations that were assessed. It should be noted that there are no current plans to construct a Non-Hazardous Waste Landfill or a Secure Soil Disposal Facility at CAM-C.

Table 5 - Potential Landfill and Landfarm Locations

Area	Location	Estimated Available Surface Area (m^2)	Environmental Considerations	Engineering Considerations
LF-1 (NHWLF and SSDF) (Figures 2 & 3)	The area is adjacent to several borrow areas and a road and is easily accessible.	16,166 m^2	The area has a slight slope away from the ocean to the Freshwater Lake, which is at least 2 km away.	The general subsurface conditions encountered across the site are expected to exist within this area, and generally consisted of sand and gravel. Permafrost was encountered between 1.15 mBGS and 1.3 mBGS in adjacent borrow area testpits. A seepage zone is common in permafrost areas above the permafrost, and should be expected in this area during construction. Grain size analyses conducted on samples from adjacent borrow areas contained 33% to 57% gravel, 43% to 67% sand and 0% fines. Coarse sand was described in the profile at TP13-55, within the potential location.
LF-2 (NHWLF, SSDF or Landfarm Location) (Figures 2 & 3)	The site is located on a partially disturbed area west of the Airstrip, encompassing Borrow Areas 6, 7, 8 and 9.	70,362 m^2	The area is flat, was previously disturbed, and has minimal debris.	The general subsurface conditions generally consisted of sand and gravel. Permafrost was encountered between 1.1 mBGS and 1.3 mBGS; a seepage zone is common in permafrost areas above the permafrost, and should be expected in this area during construction. Grain size analyses conducted on samples within the area contained 6% to 57% gravel, 43% to 93% sand and 0% to 1% fines.
LF-3 (Landfarm) (Figures 2 & 3)	It is relatively flat and in a central location to the main PHC impacted soil areas. It is situated several km from both water bodies at the site.	5,000 m^2	It is situated several km from both water bodies at the site	The approximate size of this area is: 5,000 m^2, which can sustain up to 1,000 m^3 of PHC impacted soil at a depth of 0.2 m, which conservatively estimates the PHC impacted soil (double the known quantity). It also allows for a shorter time to complete soil remediation, if desired, since 0.4 m is the typical depth for soil windrows at landfarms in this geographical location.

2.5.2 Recommended Locations and Construction Details

2.5.2.1 Secure Soil Disposal Facility

Disposal of Tier II contaminated soils generated from known site areas (11.7 m^3) will be required at CAM-C. Based on the limited volume of Tier II soil to be excavated, off-site transport is the most feasible option for remediation of the Tier II impacted soils.

2.5.2.2 Non-Hazardous Waste Landfill

The total volume of non-hazardous waste, including Tier I soil, is estimated at approximately 477 m^3. Based on preliminary volume estimates for non-hazardous waste generated from landfill excavation and site surface debris at CAM-C, it is recommended that the materials be packaged and disposed of off-site.

2.5.2.3 Hydrocarbon Treatment Area

The total volume of Type B soil identified for remediation is approximately 570 m^3. The Type B soil was identified mainly at the Station and Beach POL areas. It would be preferable to locate the treatment facility within easy access to both the Beach Area and Station sites. As such, the proposed treatment location is at the south end of the airstrip, adjacent to the access road, as shown on **Figure 2, Appendix A**.

The approximate surface area required for the treatment of Type B hydrocarbon contaminated soils is approximately 2,500 m^2, which accounts for the treatment area and the construction of containment berms around the perimeter of the area.

The construction of the hydrocarbon treatment area is a priority as the treatment of soil could potentially delay contractor's demobilization from site.

2.6 Borrow Areas

Borrow quantities were investigated as part of the geotechnical field investigation completed by AECOM in 2013. Twenty borrow areas were investigated during the site investigation, most of which were located within previously disturbed areas. The locations of the borrow areas are shown on **Figure 2, Appendix A**.

Remedial work at CAM-C will require borrow material for the following:

- Regrades
- Backfill of contaminated soil excavations
- Backfill of Airstrip Landfill excavation
- Landfarm construction
- Reconstruction of drainage channel at the Airstrip Landfill

It is anticipated that approximately 7,300 m^3 of granular materials will be required. Based on a review of the borrow areas at CAM-C, it is estimated that over 200,000 m^3 of material is available.

2.6.1 Borrow Types

Based on the construction requirements during remediation, it is anticipated that sufficient granular material sources were identified during the Phase III ESA. The soil types encountered in the borrow areas generally comprise Type 2 and Type 4 Granular Fills. **Table 6** provides a summary of the granular material types and estimated volumes at each of the borrow areas.

Table 6 – Summary of CAM-C Granular Borrow Sources

Borrow Area	Available Granular Fill Types	Area (m^2)	Depth (m)	Volume (m^3)	Comments
BA-1	Type 2, Type 3, Type 6	12,600	1	12,600	Disturbed
BA-2	Type 2, Type 3, Type 6	4,700	1	4,700	Disturbed
BA-3	Type 2, Type 3, Type 6	17,600	1	17,600	Disturbed
BA-4	Type 2, Type 3, Type 6	2,400	0.75	1,800	Disturbed
BA-5	Type 2, Type 3, Type 6	6,100	1	6,100	Excessive sloughing of sand
BA-6	Type 6, possibly Type 3	4,000	1	4,000	
BA-7	Type 5	8,400	1.0	8,400	Excessive sloughing of sand
BA-8	Type 2, Type 3, Type 6	4,900	1	4,900	
BA-9	Type 2, Type 3, Type 6	16,400	1	16,400	
BA-10	Type 5	15,700	1	15,700	
BA-11	Type 2, Type 3, Type 6	34,000	1	34,000	Excessive sloughing of sand, Disturbed
BA-12	Type 2, Type 3, Type 6	3,900	1	3,900	
BA-13	Type 2, Type 3, Type 6	1,900	1	1,900	Undisturbed
BA-14	Type 2, Type 3, Type 6	2,100	1	2,100	Undisturbed
BA-15	Type 2, Type 3, Type 6	53,000	1	53,000	Disturbed
BA-16	Type 4	4,800	0.5	2,400	
BA-17	Type 2, Type 3, Type 6	14,700	1	11,800	Disturbed
BA-18	Type 5	18,000	0.5	9,000	Sloughing and water ingress
BA-19	Type 2, Type 3, Type 6	10,000	1.0	10,000	Disturbed
BA-20	Type 2, Type 3, Type 6	4,400	0.75	3,300	Refusal due to boulders, Disturbed

2.7 Removal of Hazardous Material

"Hazardous" waste materials are defined as waste materials that are designated as 'hazardous' under Nunavut or Federal legislation; or as 'dangerous goods' under the TDGA. The *Canadian Environmental Protection Act* (CEPA) regulates material containing PCBs at concentrations greater than 50 parts per millions (ppm). Specific hazardous materials may include: batteries, asbestos, fuel tank bottom sludges, solvents, PCB-containing fluids, fuels and lubricating oils, alcohols and glycols, and heavy metal contaminated liquids. Disposal requirements of these hazardous waste materials are presented in **Table 7**.

Table 7 - Hazardous Waste Material Disposal Requirements

Hazardous Waste Material	Disposal Requirement
Batteries Heavy metal contaminated organic liquids Liquids containing organic compounds with chlorine concentrations >1000 ppm Liquids containing organic compounds with PCB concentrations >2 ppm and <50 ppm	Off-site licensed treatment/disposal facility
Fuel tank bottom sludges Fuels, lubricating oils, alcohols and glycols	Off-site licensed treatment/disposal facility **OR** On-site incineration in accordance with the contract specifications
Liquids and solids containing organic compounds with PCB concentration >50 ppm	Off-site licensed treatment and disposal facility

2.8 Transportation of Hazardous Materials Off-Site

Hazardous materials are placed in environmentally suitable containers (typically lined and braced sea-cans) at an approved containment facility on-site. A storage area is established and registered with Environment Canada. The hazardous materials are removed by sea-lift in accordance with the TDGA Regulations.

2.9 Grading and Addition of Granular Materials

There are numerous areas identified that require grading and possible addition of granular materials. These areas generally consist of piles of buried or partially buried non-hazardous debris that will be covered with additional granular material and shaped to blend in with the natural terrain and promote positive drainage.

3. Description of the Existing Environment

3.1 Physical Environment

3.1.1 Geology and Terrain

This region's landscape is shaped by glaciers, which left wide, flat plateaus and gently rolling plains; coastal land is rising over time as it decompresses after the glacial pressure. Permafrost is evident throughout the region, where freeze/thaw cycles shape the soil and drainage channels, while simultaneously degrading the limestone and sandstone bedrock. Some parts of the region have steep coastal cliffs, but CAM-C is situated in a small cove, with a somewhat protected and gently sloped beach.

King William Island is entirely aligned with a geological formation comprising Cambrian-Silurian carbonate and siliciclastic rocks (Geological Survey of Canada, Canada-Nunavut Geoscience Office, 2006). The CAM-C site geomorphology is characterized by hummocks, low rolling hills, several ponds, and raised beaches composed of coarse-grained gravel over bedrock. Regional overland drainage from the site is generally towards Rae Straight to the west.

Based on the results of the 2013 investigation, none of the soil types identified are particularly prone to erosion. However, areas near the coast may be subject to future erosion by wave action in the event of sea level rise with global warming. Any borrow development in the vicinity of the Beach Area may require drainage control to prevent sediment loading to the coastal area. Areas identified for new development (borrow and potential new landfill construction) in the Station Area are not considered at risk for any significant erosion.

3.2 Biological Environment

3.2.1 Flora and Fauna

Vegetation in the Victoria Island Lowlands ecoregion is sparse and stunted. Species present include: arctic poppy, purple saxifrage, mountain avens, moss campion, arctic bladder campion, arctic daisy, crustose lichens, arctic willow, white arctic heather, yellow oxytrope, cotton grass, mastodon flower, arctic lousewort, mountain sorrel, pygmy buttercup, river beauty, chickweed, and various sedges, (Environment Canada, 1999).

Previous reports noted the presence of the following plant species:

- Arctic willow: *Salix arctica*
- Grasses: *Poa sp.* (including Poa arctica (arctic bluegrass), *Festuca sp.* (including Festuca brachyphylla (alpine fescue)), *Elymus sp*.
- Sedges: *Carex sp.* (including *Carex membranacea* (fragile sedge)
- Purple saxifrage: *Saxifraga oppositifolia*
- Mountain avens: *Dryas octopetala*
- Mountain sorrel: *Oxyria digyna*
- Lichens (various)
- Mosses (various)

No formal vegetation survey was completed in 2013, but a general species characterization was noted. Overall, the site had sparse vegetation cover, with re-establishment occurring at most previously disturbed locations. On-site species observations included: arctic willow, arctic poppy, mountain avens, moss campion, mountain sorrel, arctic bluegrass, horned dandelion (*Taraxacum hyparcticum*), arctic daisy (*Chrysanthemum arcticum*), two types of lichen

(possibly reindeer lichen and white lichen), arctic lousewort (*Pedicularis arctica*), thrift (*Armeria maritima*), tufted saxifrage (*Saxifrage cespitosa*), three-toothed saxifrage (*Saxifrage tricuspidata*), Burser's saxifrage (*Saxifraga burseriana*).

Characteristic wildlife of the region includes: muskox, Peary caribou, long-tailed Jaeger, glaucous gull, short-tail weasel (ermine), horned lark, collared lemming, black-bellied plover, ruddy turnstone, red phalarope, oldsquaw, brant, king eider, red-throated loon, snow goose, arctic hare, arctic fox, snowy owl, polar bear. (Environment Canada, 1999) Previously noted wildlife included muskox, Arctic hare, lemmings, horned larks, ravens, snow buntings, and glaucous gulls (ESG, 1994).

No formal wildlife survey was completed, but incidental sightings were noted. Observations made by the wildlife monitors were noted, and evidence of the site use by local people for hunting was widespread. Wildlife sighted or evidence identified during the 2013 site investigation included: Arctic fox, muskox, Canada geese, swans, caribou, loon (and chick), long-tailed Jaeger, plover (presumed to be a black-bellied with at least one chick), Arctic tern, one burrowing rodent (lemming or vole possibly), spider, bee, and unidentified small, brown songbirds.

3.3 Socioeconomic Environment

While completing the site work at the CAM-C site, discussions were held with the Bear Monitors to find out if there was any historical information available regarding the site. The CAM-C site is close to Gjoa Haven and often visited for recreational purposes; no other information was available. According to the Bear Monitors, most hunting and fishing occurs on the north side of King William Island.

3.3.1 Heritage Resources

There were no previously identified archaeological sites within the CAM-C area, so a general assessment of all known project activity areas such as debris areas, borrow areas, storage areas, the Station Area and the Beach Area was targeted during the 2013 assessment. The *Final Report on Archaeological Inventory and Assessment at CAM-C, Matheson Point, King William Island, Kitikmeot, NU*, was completed by Thomson Heritage Consultants Inc. in July, 2013.

At the beach area, several recent Inuit camp sites and one older site were observed on a high ridge. The terrain consists largely of old beach ridges, some parallel to the present beach, others curving around former now relict bays. None of these contained any sites older that the Inuit period, *i.e.* from the Thule, Dorset or Pre-Dorset periods. All of the site features can likely be avoided and preserved, even though most date only to the last few decades. As sites in Nunavut are general required to be at least 50 years old to qualify as archaeological sites, many of the incidences of traditional use at CAM-C were not recorded as they are too recent to meet that classification.

Eighteen sites (eight archaeological and 10 recent historic) were found in the vicinity of the CAM-C during the pedestrian surveys in 2013. The sites range in time from the early Palaeoeskimo period, approximately 4,000 years ago, through the historic period to the very recent Inuit era, with some features being only a year or two old. The preliminary conclusion from the Thomson 2013 report is that the potential for additional archaeological and historic sites is moderate. Depending on future clean up and remediation activities, potential risks to heritage resources considered are low to moderate.

Should additional areas be identified for investigation or clean up, additional archaeological site inventory and assessment is recommended.

Observed incidences of recent historic sites:

- CAM-C 1 (Low Significance): On the main road from the airstrip/Station Area to the Beach Area; five tent rings, some with tea bags. An elder and site guide, Paul Ikuallak, told the archaeologist that it was a Ranger camp occupied last October (2012). The tent ring was disturbed during the site investigation by the wildlife monitors, as it was in the way of a quad trail.
- CAM-C 2(Low Significance): About 100 m west of the south end of the Station-Beach access road, one tent ring was found on a sandy terrace behind the beach. It contained recent materials such as wooden stakes and a rusted tin can.
- CAM-C 3 (Low Significance): North of the beach (northeast of the south end of the access road), a rectangular tent ring with recent tin cans was noted on a rectangular gravel storage pad. The pad was most likely used for the storage of POL containers.
- CAM-C 4 (Medium Significance): On a terrace below the fuel tank storage pad east of the lower end of the beach access road and extending northeastward about 200 m were seven tent rings were found, most containing recent materials.
- CAM-C 5 (Medium Significance): Along the first terrace above the beach (extending for more than 200 m at about 10 metres above sea level (masl)): the terrace is littered with modern debris. Nine tent rings were recorded; others may be present.
- CAM-C 6 (Low Significance): Adjacent to the Station-Beach road on the POL line from the Beach to the Station Area: small goose hunting camp on a terrace at about 30 masl, consisting of two tent rings - one with a buckshot cartridge inside. Surrounded by abundant goose droppings.
- CAM-C 7 (Low Significance): Near a small debris area: a circular tent ring on largely undisturbed tundra. The contents (battery and wooden tent stakes) and location (in the shelter of the Station Area pad) suggest a fairly recent occupation.
- CAM-C 8 (Low Significance): One tent ring with a wooden tent stake noted 55 m north of the Freshwater Lake northwest of the Station on the access road: post-dates the station era.
- CAM-C 9 (High Significance): A T-shaped wooden sign, adjacent to the outline of a large rectangular tent, as interpreted from the rock and gravel used to hold down the bottom of the tent walls. Additional features associated included: a ring of larger rocks used to anchor guy ropes, a paved entrance to the tent area, and a raised, walled bed of soil that may have been used as a garden for local flora. An additional eleven smaller tent rings were also recorded in the vicinity, on the east side of the runway, southeast of the larger tent ring.
- CAM-C 10 (Low Significance): Flat, vegetated plain at 18 mASL on the east side of the beach access road: recent alignment of rocks, most likely a disturbed tent ring, and a hearth containing some broken glass.

The following list is a brief summary of the observed incidences of archaeological sites at CAM-C. Full descriptions of each location are provided in the CAM-C archaeological report (Thomson 2013):

1. NeJv-1 (High Significance): THC2013-2:1, found on top of a high ridge between the elevations of about 17 to 21 masl, above the beach northeast of the end of the beach road. Six boulder features were initially recorded.

2. NeJv-2 (Low Significance): An early historic period hearth or foxtrap anchor consisting of flat limestone slabs on a high, undisturbed beach ridge (approximately 30 masl), 50 m north of the Freshwater Lake road.

3. NeJv-3 (High Significance): A circular tent ring located on a beach ridge 28 masl about 500 m west of the north end of the beach access road.

4. NeJv-4 (High Significance): A Palaeoeskimo site comprising two separate loci. The site is located on the front edge of a long high beach that curves inland around a large relict marine bay, about 250 m west of NeJv-3, at an elevation of 28 masl.

5. NeJv-5 (Medium Significance): Palaeo-Eskimo tent ring site with a scatter of patinated and black chert on the front edge of a long high beach that curves inland around a large relict marine bay at about 12 masl.

6. NEJv-6 (Low Significance): Large boulder meat cache on a terrace below the Palaeo-Eskimo beach ridges, probably dating to the Thule period. Located approximately 15 masl and 1.4 km from the shore of Rae Strait.

7. NeJv-7 (Low Significance): Located on a lower beach terrace 9-11 masl approximately 800 m from the shore and consists of three recent tent rings and an older meat cache, possibly dating to the Thule period.

8. NeJv-8 (High Significance): Palaeo-Eskimo tent ring and associated patinated chert found on a beach terrace approximately 1 km east side of the beach access road, just east of the secondary, northernmost access road.

3.4 Summary

A total of 18 sites were found during the three days at CAM-C: 10 recent sites most likely all post-dating the closure of CAM-C in 1963, and thus not considered to be archaeological sites, and eight sites with at least one feature dating to prior to the construction of CAM-C in the 1950s (more than 50 years old), so these are considered archaeological sites. The sites range in time from the early Palaeoeskimo period, approximately 4,000 years ago, through the historic period to the very recent Inuit era, with some features being only a year or two old.

At least two of the sites appear to have been disturbed by previous site activities, with the extent of site disturbance around the Station and Beach Areas, most likely destroying any additional sites. While many of the sites are low significance, avoidance/preservation is recommended for all locations, where possible.

Based on the results of the AIA completed by Thomson Heritage Consultants for AECOM and PWGSC, it is recommended that PWGSC be allowed to proceed with the remediation of the CAM-C DEW Line site area with the condition that no impacts occur within 30 m of the historic sites with ‘High Significance ‘identified in the AIA.

4. Identification of Impacts and Proposed Mitigation Measures

An important part of the assessment process involves identifying mitigation measures that would result in a reduction or elimination of potential environmental effects associated with the remediation of CAM-C. In the case of this Project, all potential effects were addressed, not just those deemed to be significantly adverse. The proposed mitigative actions described herein should form part of the overall project design and planning documentation.

Details of the remediation verification and post-remediation long-term monitoring are provided in the 2013 Remedial Action Plan completed by AECOM and are not included in this report.

4.1 Mitigation Plan Objectives

The mitigation plan provides a description of the general environmental protection measures required to minimize or avoid potential adverse effects, a description of protection measures required for specific valued environmental components at the CAM-C site, and details related to environmental inspection responsibilities and procedures.

The protection measures described herein should be implemented by the contractor to minimize or avoid adverse environmental impacts. These procedures are considered appropriate for known and anticipated situations and conditions. However, should certain procedures or protection measures prove impractical, imprudent or insufficient in field situations, appropriate modifications or substitutions will be proposed by field personnel and then reviewed and approved by the Proponents' Representative on-site.

4.2 Environmental Inspection

As part of its general overall commitment to a strategy of environmental protection and quality assurance, AANDC employs dedicated environmental inspection staff to monitor its own compliance with the mitigation plan and all applicable laws, regulations, permits, guidelines and standards. AANDC will be represented at the site by the Proponents' Representative, who will report to the PWGSC Project Manager. Communications will include, but not be limited to:

- Attendance at regular meetings as scheduled with the inspector
- Immediately reporting concerns over any aspect of the mitigation plan
- Immediately reporting any spills or other event that may have an effect on human or environmental health and/or safety

4.3 General Operational Procedures for Protection of Valued Ecosystem Components

The procedures and requirements provided in the following sections are intended to be protective of the Valued Ecosystem Components (VECs) identified at the CAM-C site.

4.3.1 Site Operations

The contractor will establish a construction camp on the site, which should be located in a previously disturbed area or an area with minimal vegetative ground cover. The selected location should be in an area that is as close as practical to the main area(s) of clean up.

Surface drainage should not be impeded and a distance of at least 30 m from the nearest body of water should be maintained. Permafrost should be protected by construction of gravel pads, and/or elevation of heated buildings on wooden structures. Areas containing archaeological resources need to be avoided in accordance with the recommendations in the Archaeological Impact Assessment.

Vehicle and mobile equipment travel should be restricted at the site to established roads, stream crossings and work pads unless specifically exempted by the Proponents' Representative. Recreational use of vehicles, including all terrain vehicles (ATVs), should not be allowed off the existing road network. Overland movement of equipment and vehicles should be minimized where damage to the vegetation or underlying soils may occur. Rubber tired vehicles and wide-turning radii should be used to minimize disturbance to tundra. Following heavy rains, vehicle and heavy equipment use outside of road and work pad areas should not be permitted until the soil has drained sufficiently to prevent excessive rutting.

Mobile equipment and vehicle operators are to yield the right-of-way to wildlife where safe to do so, and should not be operated in a manner that harasses any species of wildlife. Vehicle and equipment servicing should be performed in designated areas only, where special care can be taken to contain, handle, and dispose of maintenance fluids, parts and waste. Fuelling and lubrication of equipment should be conducted in a manner that avoids spillage of fuels, oils, greases and coolants. When refueling equipment, leak-free containers and reinforced rip and puncture proof hoses and nozzles should be used. Drip trays should also be provided and ensure that all storage container outlets are properly sealed after use.

4.3.2 Storage and Handling of Fuel and Other Hazardous Substances

All fuel storage containers should be compliant with the *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations* (CEPA SOR/2008-197). Fuel should be stored at a minimum, in self-dyking, double-walled containers or be in containers positioned over an impervious liner and surrounded by an impervious dyke of sufficient height to contain not less than 110% of the capacity of the tank. Sites that slope towards waterways or other environmentally sensitive areas, exhibiting ponding or flooding, or have high groundwater tables, excessive seepage, or ice-rich (thaw sensitive) soils should be avoided, as must archaeological resources. Smoking is prohibited within 7.5 m of the fuel storage facility. Appropriate signage should be posted around the fuelling facility. Fuel storage facilities should be inspected once per day for the duration of the project and documentation of the inspection maintained. Fire-fighting equipment should be made available for immediate access at each fuel storage facility. All barrels containing fuel and other similar materials need to be stored in an elevated position either on their side with the bungs facing the 9 and 3 o'clock positions, or on pallets, in an upright position. All barrels should be individually identified with all information necessary for health and safety, and environmental purposes. Material Safety Data Sheets for all chemicals and fuels stored in the construction camp need to be available to all personnel.

Regular inspections should be conducted of all machinery hydraulic, fuel and cooling systems and any leaks will be repaired immediately. Emergency spill equipment should be pre-assembled and stored at all permanent fuel storage sites and work areas, including at least two fuel pumps, empty 200 litre (L) barrels and absorbent material sufficient to clean up a 1000 L spill. All barrels, redundant fuel storage facilities and associated materials and equipment need to be removed from the site at the conclusion of the clean up.

4.3.3 Surface Water Management

A water use license is required from the Nunavut Water Board for the development of potential water sources. All conditions of the license must be complied with. Water withdrawals must not endanger fish or drawdown the water level so as to adversely affect fish habitat. Water withdrawal rates should not exceed 10% of total water body

volume. All water hoses need to be equipped with a mesh size of 2.5 millimetres (mm) or less to prevent the intake of fish as per the *Freshwater Intake End-of-Pipe Fish Screen Guidelines*.

4.3.4 Wastewater Management and Monitoring

Remediation activities generate wastewater from dewatering activities including contact water from landfill and contaminated soil excavations, new landfill operation, and contaminated soil treatment areas. Water management on-site is the Contractors' responsibility. However, given the nature of the Arctic terrain, site logistics, and support, climate and weather makes the mitigation of discharge water a challenging task. Contact water associated with landfill and contaminated soil excavations, the operation of new landfills and landfarms potentially contain a number of constituents of concern.

The parameters selected for the monitoring plan are based on and are a reflection of the types of contaminants found at the sites during the environmental assessment. The criteria for the wastewater are considered conservative and appropriately protective of the arctic environment.

Wastewater may be temporarily stored while awaiting test results, provided that it is not stored over the winter months. The volume of wastewater storage during any one construction season should not exceed the available treatment capacity during that construction season. See **Table 8** below for a summary of the typical wastewater discharge criteria, as provided by the Nunavut Water Board for other abandoned military sites.

Table 8 - Construction Wastewater Discharge Criteria

Parameter	Criteria (µg/L)
pH	6-9 pH units
Oil & Grease	5000
Arsenic (total)	100
Cadmium (dissolved)	10
Chromium (dissolved)	100
Cobalt (dissolved)	50
Copper (dissolved)	200
Lead (dissolved)	50
Mercury (total)	0.6
Nickel (dissolved)	200
PCB (total)	1000
Zinc (total)	500

The collected wastewater needs to be tested each time prior to discharge. Once it is confirmed that the wastewater meets the discharge criteria, it can be released onto the ground in an area that is at least 30 m from natural drainage courses and 100 m from fish-bearing waters.

The locations of the discharge areas will vary, depending on the work areas. Wastewater that collects at contaminated soil excavations is typically sampled and treated in place. In areas where the volume of wastewater is significant and affects the progression of work, the wastewater may be recirculated.

4.3.5 Sewage Effluent Monitoring

The sewage management system at CAM-C will likely be a simple facultative system where treatment is achieved by the natural degradation of organic substances or biogeochemical activity. Aerobic or anaerobic micro-organisms digest the organic solids and utilize the released energy and nutrients in the effluent to grow and increase in numbers, which in turn accelerates the process. In this type of system, aerobic respiration is the most complete and efficient degrader of organic solids and therefore, the most important element in a stable and healthy biological treatment process. This method of treatment within the Arctic environment, combined with relatively short effluent retention times requires good management to achieve the desired level of treatment prior to discharge. See **Table 9** below for a summary of the effluent discharge criteria, as provided by the Nunavut Water Board for other abandoned military sites.

Table 9 - Sewage Effluent Criteria

Parameter	Criteria
pH	6-9 pH units
Oil & Grease	No visible sheen
Biological Oxygen Demand	120 mg/L
Total Suspended Solids	180 mg/L
Faecal Coliforms	10,000 CFU/dL

In order to maximize the performance of the system, the specifications (which are to be stamped by a qualified engineer) will require sewage lagoons to have sufficient volume to accommodate 100% of the camp water consumption for the duration of the construction season. Each of the two cells will hold 50% of the seasonal flow, to a maximum depth of 1.0 m. The required effluent volume per lagoon can be calculated as follows:

- Effluent volume per lagoon = (200 litres/person/day) x (number of people) x (construction duration days) x 50%
- Effluent monitoring must be completed prior to discharge

4.3.6 Domestic Waste Management

Kitchen wastes should be stored in metal, animal-proof containers to prevent scavenging of waste by wildlife and to reduce scattering of debris prior to daily incineration. All residual kitchen wastes and other non-hazardous wastes should be stored and disposed of off-site unless otherwise specified.

4.3.7 Road Construction and Maintenance

Existing roads and trails provide access to most sources of granular materials. Emphasis on the preservation of the permafrost regime, vegetation patterns, existing surface drainage patterns, water quality and stream flows should be maintained. Establishment of new roads off-site is subject to the terms of the land use permit and the approval of the Proponents' Representative. New roads should be located at least 30 m from any water bodies or water courses. Ice-rich soils, especially peatlands, should also be avoided during road construction. The road bed should be prepared with a sufficient thickness of fill to prevent terrain damage. Culverts, if required, should be installed to maintain natural cross-drainage and prevent ponding. Any culverts installed need to be removed from the roads and drainage restored at the end of the cleanup operations. Access roads should be monitored for signs of erosion and remedial action taken where necessary. Dust suppression, if required, can be maintained with water only.

4.3.8 Stream Crossing and Diversion

The contractor must adhere to all government regulations, licensing requirements/procedures and inspections regarding the protection of water quality and stream integrity. Existing stream crossings should be utilized as required. Authorizations for any additional works employed are the responsibility of the contractor.

In the event a stream crossing is required, siltation of waterways and disruption of streambeds should be prevented and erosion control best management practices will be implemented by using the following procedures:

- Minimize activities adjacent to watercourses
- Install cofferdams, silt barriers or other suitable barriers
- Do not operate equipment in waterways
- Do not use streambeds for borrow material
- Do not dispose of excavated fill, waste materials and debris in waterways

4.3.9 Borrow Pit Development and Operation

Environmental protection measures must be implemented for the purpose of minimizing the impact of development and extraction activities on surface drainage patterns, water quality, soil erosion, and in some cases, wildlife or fish. The number of borrow areas opened should be minimized by using existing borrow areas, roads and building pads where feasible. Use of alternative sources is subject to the approval of the Proponents' Representative and acquisition of a quarry permit. All terms and conditions of the quarry permit are to be complied with, including the recontouring/reclamation of the borrow area and site cleanup prior to site abandonment.

Borrow areas must be located at least 30 m from the nearest water body providing potential fish habitat, and other sensitive resources. A 30 m buffer zone should be marked out prior to commencement of gravel quarrying operations. Organic overburden, if present, should be stripped and stockpiled separately for use in restoring the borrow area. Following excavation, the area needs to be recontoured to restore natural drainage and the overburden needs to be worked into the recontoured borrow area to prevent erosion. Drainage and run-off control needs to be provided using diversion ditches and sediment filters, as required, to prevent sediment laden run-off from reaching water bodies.

During aggregate extraction, vehicle and equipment operations should be controlled in areas adjacent to the borrow pit to minimize the extent of disturbance. Aggregate should be stockpiled on ice-poor, well drained ground such that surface drainage is not impeded. The stockpile should be located in an area that is a minimum of 30 m from archaeological resources, water bodies, and other sensitive resources. If archaeological features or artifacts are encountered during borrow pit operations, the Proponents' Representative is to be notified, the area of the find avoided, and activities in other areas of the pit restricted until further instructions are received.

4.3.10 Hazardous Waste Material Processing Area

A hazardous waste material processing area needs to be developed for the processing of excavated soils. The hazardous waste material processing area should be located a minimum of 30 m from any archaeological site or water body, on ice poor, well drained soil, and as close to the location of work as practical. Movement of vehicles and equipment between the hazardous material processing area and work site should be minimized to prevent the spread of potentially hazardous material along the roadways.

4.3.11 Contaminated Soils

Soils exceeding the criteria established for the AMSRP are to be removed. Disturbance to adjacent areas during excavation of contaminated soil should be minimized. Spillage of material during transportation between the excavation site and the stockpile/treatment location is to be avoided and any spillage should be cleaned up to the satisfaction of the Proponents' Representative. Following excavation of contaminated soils, equipment should be decontaminated. All workers need to wear appropriate protective clothing/equipment when handling contaminated soil. A program of sampling and confirmatory testing of specific contaminated areas will be carried out as part of the clean-up program.

4.3.12 WDA Closure

The existing dumps will be covered with gravel to provide a minimum cover thickness as previously discussed in **Section 2.1**. The dump areas will be regraded and restored to natural drainage patterns and topography. Although the Airstrip Landfill is only considered to be a moderate risk, it is to be excavated as it would be very difficult to maintain the stability of the landfill.

Drainage controls such as diversion ditches and sediment filters may need to be provided, as required, to prevent runoff from reaching water bodies during closure, remediation and construction of dumps.

4.3.13 Disposal of Site Debris

Site debris should be collected, sorted into hazardous and non-hazardous materials and disposed of accordingly. Workers need to wear appropriate protective clothing when handling potentially hazardous waste material. Off-road activity should be minimized during collection of site debris.

4.3.14 Demolition of Structures

All residual debris is to be removed from the site down to grade. Structures should be demolished to the top of the concrete foundation level. Gravel pads and other foundations should be regraded to restore natural drainage patterns and to match adjacent topography. The warehouse foundation will be collapsed prior to regrading.

4.3.15 Aircraft Movements

It is anticipated that fixed wing chartered aircraft will be used to transport personnel, perishable supplies and some construction materials and equipment to and from the site. Charter pilots will be advised to maintain an altitude of at least 610 m and preferably 1000 m above ground or water when passing over the site. Low level flights to observe or photograph wildlife will not be permitted. Charter aircraft pilots will be informed of all applicable mitigation plan requirements when scheduling arrangements are made or at other appropriate periods prior to the arrival of the aircraft on site.

4.3.16 Handling of Dangerous Goods and Hazardous Waste Materials

4.3.16.1 Packaging

The *Transportation Dangerous Goods Act (*TDGA) and Regulations govern the packaging and shipment of dangerous goods within Canada. If shipping out of Canada, Canadian regulations and the regulations of the destination country both apply. Requirements of the International Marine Dangerous Goods Code (IMDGC) must be

addressed in international waters. Any material classified by the TDGA must be accompanied by the appropriate shipping documents. The documents must include: the shipper, the receiver and all carriers involved in the transport of the shipment. Non-hazardous materials are also to be accompanied by a document indicating ownership and responsibility of the receiver. The contractor should refer to the TDGA and regulations for more details regarding shipping document requirements. All dangerous goods will be packaged in accordance with the TDGA.

Waste manifests will be initiated for each shipment, specifying a unique reference number and INAC's waste generator number to accompany the shipment to the final destination. Any waste of unknown TDGA hazard will be tested to determine whether any transport hazard exists according to the regulations. Any substance that is considered hazardous will be packaged under the TDGA in accordance with the regulations and the national standard *Performance Packaging for Transportation of Dangerous Goods*. The TDGA regulations specify the packaging requirements for dangerous or hazardous goods according to risk.

4.3.16.2 Labeling

Each item will be labeled and placarded according to its hazard class and division. A label or placard design is unique to each classification. Large containers will be placarded as defined by the class and division with the TDGA product identification number clearly defined. The product identification number is indicated by the substance name in the regulations.

4.3.17 Explosives

The use of explosives is potentially dangerous to human and animal health. If required, the following procedures should apply:

- Obtain all necessary permits and licenses
- Handle, transport, store and use explosives and all other related material in accordance with all applicable laws, regulations and orders of regulating authorities
- Electric detonation methods are prohibited
- Restrict use of explosives to authorized and certified/licensed personnel who have been trained in their use
- Minimize defacement of landscape features and other surrounding objects controlling the scatter of blasted material beyond the cleared working area
- Minimize shock or instantaneous peak noise levels
- Prevent blasting scatter from reaching fuel or hazardous substance storage locations. A minimum distance of 300 m in rocky terrain and 1000 m in the presence of metal is required
- Do not conduct blasting in the vicinity of wildlife populations

4.3.18 Work Site Clean-Up and Abandonment

The contractor must comply with all terms and conditions of the water use license and the land use permit. All temporary buildings, fuel barrels, vehicles, equipment, waste materials and surplus materials will be removed from the site following completion of the work. All large earthworks slopes should be stabilized. Gravel access roads required for operation and maintenance may remain. All disturbed areas should be graded to match natural drainage patterns.

4.4 Specific Protection Measures for Valued Ecosystem Components

This section describes the required protection measures for the valued environmental components identified at the CAM-C site.

4.4.1 Human Health and Safety

A comprehensive health and safety plan (HASP) is of one of the contractors' main deliverables. The HASP will be prepared in accordance with Nunavut's regulatory requirements and will govern all remediation activities at the site.

Potential hazards to human health and safety are present at the CAM-C site in the form of hazardous materials and contaminated soil, unpredictable weather conditions and wildlife encounters. Hazardous material and contaminated soil have the potential to enter water bodies and the food chain, and thereby affect vegetation, fish, wildlife and the health of people who travel, hunt and fish in these areas. Site debris may present a physical hazard to people traveling through these locations.

All necessary precautions should be taken when handling and transporting hazardous material and contaminated soil to ensure that the materials do not come into contact with site personnel. Site workers need to wear protective clothing when handling hazardous materials. All site personnel working on or in the vicinity of the cleanup operations must be trained in, made aware of and adhere to the requirements of the Workplace Hazardous Materials Information System (WHMIS) program.

Outdoor recreation activities of the site personnel have the potential to adversely affect nearby fish, wildlife and heritage resources. Subject to camp rules and the requirements of territorial fishing licenses and regulations, staff may be permitted to leave the site for recreational purposes; however, recreational use of vehicles, including ATVs, should not be permitted off of the existing road network. Normal precautions for Arctic travel include: provisions for rapidly changing weather conditions, tactics for possible polar bear and other wildlife encounters, filing a trip plan, first aid kit, a survival kit and insect repellent.

4.4.2 Local Economy and Contact with Local Residents

Employment and local business opportunities in the north should be maximized as much as possible. Regular briefing meetings should be scheduled with all camp personnel to discuss and explain camp rules.

4.4.3 Aesthetic Value

It is anticipated that the cleanup activities will have an overall positive effect on the aesthetic value of the CAM-C site in that all disturbed areas (landfills, debris piles, sewage outfall and borrow pits) will be restored as practically as possible to their original appearance. Construction personnel are to ensure that their activities do not contribute to any degradation of the local environment.

4.4.4 Surface Water and Potential Fish Habitat

The following should apply to work adjacent to waterways:

- Prevent siltation of water bodies potentially supporting fish by the use of berms or silt fences as required, and by minimizing activities adjacent to watercourses
- Do not operate equipment in waterways
- Do not use streambeds for borrow material

- Do not dispose of excavated fill, waste material or debris in waterways
- Where possible, conduct in-stream work during low-flow periods, in late winter before spring freshet or after mid-August
- When removing culverts, slope banks to conform to the grade of the adjacent stream bank, as applicable. If required, stabilize the bank using erosion resistant material

Recreational fishing should not be permitted except in compliance with the applicable federal and territorial regulations and guidelines.

4.4.5 Permafrost Soils

Ice-rich soils are common in areas that have vegetation cover and are thus susceptible to permafrost degradation. The top layer provides a protective thermal barrier that prevents permafrost degradation. These soils are susceptible to erosion due to their fine texture. Erosion removes the thermal protection and causes permafrost degradation. Vehicle and equipment traffic, and soil excavation can disturb the surface layer and degrade the permafrost. Disturbance to permafrost soils needs to be minimized by restricting vehicle and heavy equipment traffic to existing roads and designated work areas unless approved by the Proponents' Representative. Activity in areas adjacent to work areas should also be minimized. Vehicles or heavy equipment should not be operated off-road following heavy rain or melting snow until the soil has dried sufficiently to prevent excess rutting. Appropriate drainage and erosion control structures should be installed along access roads, where required. The following measures should be implemented during the site cleanup operations to minimize disruption of permafrost:

- Facilities such as work camps and storage areas should be located such that they do not impede surface drainage or result in ponding
- Gravel pads should be constructed and used to protect ice-rich soil from thermal or physical damage
- Disturbance during excavations should be minimized
- Excavated areas should be backfilled promptly with granular fill, upon receipt of confirmatory samples
- Development of new borrow areas should be minimized
- Materials should not be stored directly on unprotected ground surfaces
- Disturbed areas should be regraded to restore natural drainage patterns
- Any rutting that occurs and impedes local drainage or exposes permafrost in ice-rich soils should be repaired to the satisfaction of the Proponents' Representative

4.4.6 Terrestrial Wildlife

There is always concern over human/wildlife contact at Arctic sites. This could include harassment by project personnel causing disruption of activities such as calving, breeding, nesting and rearing, all of which may take place on the site proper.

The following procedures should be implemented to prevent human/wildlife conflicts:

- Employ a dedicated wildlife monitor(s) at all times
- All on-site personnel should be required to be familiar with the on-site bear safety training for all workers
- Wildlife may not be fed, injured or harassed by site personnel
- Do not disturb birds nesting on site
- Vehicle and aircraft movements should conscientiously avoid all known populations of wildlife or areas known to be frequented by known populations of wildlife
- Do not attempt to chase, catch, divert, follow or otherwise harass wildlife by aircraft, vehicle or on foot
- Control refuse and make it inaccessible to bears and other scavengers

- Equipment and vehicles should yield to wildlife, where possible
- Except in the vicinity of the airfield, advise charter aircraft pilots not to fly at elevations lower than 610, and preferably 1000 metres above ground or water
- In the event that wildlife is spotted from the air, aircraft should not make descents for observations or photography
- Domestic or wild pets are not allowed in camps with the exception of controlled watchdogs
- Project personnel should not be permitted to possess personal firearms. The only firearms allowed on site should be for protection from bears and shooting of animals exhibiting aberrant behavior. The firearms should be controlled by the contractors' site superintendent and in the possession of the Bear Monitors.

4.4.7 Avifauna

Disruption of avifauna during the nesting period can result in reproductive failure. For this reason, populations of nesting birds should be avoided during this period. Impacts on these species should be minimized by removing any nests before they become active, discouraging nesting at work areas and scheduling disruptive activities outside of the nesting period. Based on the observations during the 2013 site investigation and the lack of buildings (where most avifauna at northern sites make nests) scheduled for demolition at the CAM-C site, it is not anticipated that work scheduling will be required. It is recommended that the remaining water tanks from the Module train and the fallen radar tower be inspected for potential nesting sites prior to demolition.

The arrival of avifauna at specific locations in the Arctic is influenced by weather conditions and a number of other factors. Inclement weather or a delayed spring melt may delay arrival by several weeks. In general, however, the chronology of arrival, nesting and departure is relatively consistent. Typically within two weeks of arrival, nesting commences and continues for one to two months until the young leave the nest. Following this, the birds feed in preparation for the fall migration and depart by mid to late September.

4.4.8 Heritage Resources

The former DEW Line sites are often located in areas which have been seasonally settled or visited by Inuit over the past 1000 years, by their Paleo-Eskimo predecessors for as many as 3000 years before the Inuit, and by Europeans and Euro-Canadians over the past four centuries. Archaeological sites and recent camps and cemeteries exhibiting evidence of the presence of the former occupants have been found on or adjacent to all of the DEW Line sites. The traditional and scientific value of heritage resources is greatly diminished if they are disturbed or moved. Archaeological sites in Nunavut are protected by law, and disturbance of these sites and collection of specimens is prohibited except under the terms of an archaeological research permit.

In the event that heritage resources are discovered during cleanup activities, the following procedures apply:

- Report the discovery immediately to the Proponents' Representative
- Cease work in that area and notify the appropriate authorities with the Department of Culture, Language, Elders and Youth (CLEY)
- Reports of all archaeological finds should include:
  - The identity of the person making the discovery
  - A description of the site, including topography, landmarks, etc.
  - The nature of the activity resulting in the discovery
  - A description of the archaeological site, including size, features, or visible details, supplemented by sketches or photographs
    - Actions currently undertaken to protect the archaeological features
    - Any extenuating circumstances.

- Do not resume activities in the vicinity of the find until confirmation and direction from the Department of CLEY is received

These mitigation measures were identified because they will result in a reduction or elimination of likely environmental effects, including potential adverse effects, associated with the clean up.

5. Summary of Effects and Proposed Mitigation

Table 10 provides a summary of the project tasks, the anticipated impacts, proposed mitigations measures, residual impacts and the level of significance of the residual impacts. The overall significance is rated as follows:

- P – Positive
- N – Negative and non-mitigable
- M – Negative and mitigable
- U - Unknown

Table 10 - Summary of Project Tasks, Impacts, Mitigation Measures, Residual Impacts and Significance

VEC	Activity	Description of Impact	Proposed Mitigation Measure	Residual Impact	Overall Significance
Air Quality	Hydrocarbon Contaminated Soil Removal/Treatment	Air quality may be impacted by the removal of hydrocarbon-contaminated soils and/or treatment practices.	The hydrocarbon treatment area will be constructed away from the camp area. Impact is minimal and short-term.	None. Once the impacted soil has been removed, the potential for a residual impact is removed.	N
	Site Grading/Borrow Source Development	The extraction of granular materials and grading activities has the potential to create dust and impact air quality.	Implement dust control measures. Only water will be used for dust control.	None.	M
	Vehicle, Incinerator and Camp Infrastructure (furnaces, generators) Emissions	Operation of the camp and associated equipment will result in emissions that could negatively impact air quality.	Use appropriate furnace filters, do not leave vehicles and equipment running unnecessarily. Impacts occur over the short-term.	None.	M
Soil Quality	Waste Disposal Area Closure	If not managed properly, contaminants may migrate from the existing landfills during remediation, potentially degrading soil quality. The remediation of the existing waste disposal areas will reduce the risk of impacting soil quality.	The waste disposal area cover is graded to promote surface runoff. Other erosion protection measures will be taken as necessary to prevent soil movement during remediation, such as silt fences.	The existing waste disposal areas may need maintenance work in the future as they are intended to remain on site for the foreseeable future.	M
	Contaminated Soil and Hazardous Materials Removal	The removal of the contaminated soil and hazardous materials from contact with the environment will improve soil quality.	n/a	Improved soil quality and reduced potential for future adverse effects.	P
	Transport of Hazardous Material, Fuel and Contaminated Soil	The potential exists for accidental release of hazardous materials, contaminated soil and/or fuels during transport, which could impact soil quality.	Proper handling, storage, and transportation procedures for hazardous materials to be implemented as per TDGA regulations. All workers to be trained in proper handling procedures for all hazardous materials on-site. Workers to follow the spill contingency plans. All materials and equipment to implement contingency plans to be available on-site.	None.	M

	Camp Operation	The operation of the construction camp will include treatment and disposal of domestic waste, and could negatively impact soil quality.	Hazardous materials will not be disposed of in the camp waste system. All sewage to be disposed of in accordance with Land Use Permit and Water Use License.	None.	M
Water Quality	Waste Disposal Closure	If not constructed according to the specifications, leachate may be generated and migrate from the existing waste disposal areas during the construction, which has the potential to degrade water quality, both surface and active layer water. The development and closure of the existing waste disposal areas has the potential to disrupt drainage at the site and cause siltation of waterways.	waste disposal area covers are graded to promote surface runoff. Prevent siltation by use of berms and/or silt fences.	The existing waste disposal areas may need maintenance work in the future and they are intended to remain on site for the foreseeable future. As such, even though mitigation measures will be implemented, there may be future impacts to water quality.	M
	Contaminated Soil and Hazardous Materials Removal	Removal of the contaminated soil and hazardous materials from the environment will reduce the risk of contamination to the surface and active layer water.	Prevent sediments from entering water bodies by use of berms and/or silt fences. Implement other environmental protection measures as necessary.	Reduced potential for future negative effects.	P
	Transport of Hazardous Material, Fuel and Contaminated Soil	The potential exists for accidental release of hazardous materials, contaminated soil, and/or fuels. An accidental release could impact water quality.	Proper handling, storage, and transportation procedures for hazardous materials to be implemented as per TDGA regulations. All workers to be trained in proper handling procedures for all hazardous materials on-site. Workers to follow the spill contingency plans. All materials and equipment to implement contingency plans to be available on-site. Implement mitigation measures to prevent deleterious substances from entering the aquatic environment.	None.	M
	Site Grading/Borrow Source Development	Erosion and sedimentation of water bodies during grading and gravel extraction activities has the potential to negatively impact water quality. Drainage will be improved as a result of grading disturbed areas. The extraction of granular material will alter the terrain of the borrow area and has the potential to disturb drainage.	Prevent siltation by use of berms and/or silt fences. Do not operate equipment within the wetted perimeter. Disturbed areas adjacent to water are to be stabilized, if required. Site to be graded upon completion to promote positive drainage and to match the existing terrain as much as practical.	None.	M
	Camp Operation	The operation of the construction camp will include treatment and disposal of waste. The potential exists for waste to impact water quality.	Hazardous materials not to be disposed of in the camp waste system. All sewage to be disposed of in accordance with Land Use Permit and Water Use License.	None.	M

Terrain Quality	Debris Removal	The removal of site debris has the potential to disturb existing terrain.	Regrade and reshape disturbed areas to match existing terrain and drainage paths. Use existing roads for movement around the site wherever possible.	Although every effort will be made to match worked areas to the existing terrain and drainage paths, it is unlikely to be exact, and may take significant time for the area to blend into the undisturbed terrain.	M
	Site Regrading	Terrain and drainage will be improved as a result of grading disturbed areas. Previously disturbed areas will blend into the natural environment.	All structures implemented either during the operation of the site or as part of the remediation will be removed to restore natural surface drainage patterns.	Positive impact.	P
	Borrow Source Development	The extraction of granular material will alter the terrain of the borrow areas.	Regrade and reshape disturbed areas to match existing terrain and drainage paths. Use existing roads for movement around the site wherever possible.	Although every effort will be made to match worked areas to the existing terrain and drainage paths, it is unlikely to be exact, and may take significant time for the area to blend into the undisturbed terrain.	M
	Contaminated Soil Excavation	The excavation of contaminated soil has the potential to degrade the permafrost.	Minimize the time permafrost is exposed. Minimize surface area of exposed permafrost or active zone.	Although the permafrost may be disturbed, it is anticipated once the work is completed, permafrost depth will be restored.	M
	Camp Operation	Movement of contractor's equipment and personnel around the site has the potential to disturb the tundra.	Regrade and reshape disturbed areas to match existing terrain and drainage paths. Use existing roads for movement around the site wherever possible.	Although every effort will be made to limit movement to existing roads, the Arctic tundra is quite sensitive and it may take significant time for the disturbed area to recover.	M
Terrestrial Animals	General Clean Up Activities	The use of heavy equipment during the clean-up has the potential to disturb wildlife.	Avoid areas of known wildlife colonies or bird nesting areas. Employ minimum distance requirements for transportation activities around the site.	None. The work is seasonal, short-term and temporary.	M
	Contaminated Soil and Hazardous Materials Removal	The removal of hazardous materials and contaminated soil from the environment reduces the risk of exposure to terrestrial animals.	n/a	Reduced risk of future adverse effects.	P
Terrestrial Habitat	Facility Demolition (water tanks at Mod Train and fallen radar tower)	The existing facilities may be used by wildlife as habitat. The demolition of these facilities has the potential to impact availability of habitat.	Inspect facilities prior to demolition for use by wildlife. Contact appropriate wildlife officer for additional guidance to ensure disturbance of wildlife is minimized.	None.	M

	Borrow Source Development	The extraction of granular material will disturb the ground and has the potential to impact terrestrial habitat.	Regrade and reshape the disturbed areas to match existing terrain to facilitate recovery of ecosystem components.	Although every effort will be made to match the disturbed area to the existing terrain, the Arctic tundra is quite sensitive and it may take significant time for the disturbed area to recover.	M
Aquatic Habitat and Animals	Site Regrading/Borrow Source Development	The extraction of granular material and grading adjacent to water bodies has the potential to impact aquatic habitat, and thereby affect aquatic animals, due to sediment entering the water.	Prevent siltation by use of berms and/or silt fences. Do not operate equipment within the wetted perimeter. Disturbed areas adjacent to water are to be stabilized, if required.	None.	M
	Contaminated Soil and Hazardous Materials Removal	The removal of contaminated soil and other hazardous materials from areas close to water bodies reduces the risk of exposure to aquatic animals. The excavation of contaminated soils from the beach POL area has the potential to degrade the aquatic environment in the event of an accidental release and impact aquatic animals in close proximity to the aquatic environment.	Implement mitigation measures to prevent deleterious substances from entering the aquatic environment. Prevent siltation by use of berms and/or silt fences. Do not operate equipment within the wetted perimeter. Disturbed areas adjacent to water are to be stabilized, if required.	Reduced risk of future adverse effects.	P/M
Health and Safety	General Clean Up Activities	The collection and disposal of potentially hazardous debris, the removal of hazardous materials from the facilities and the general handling of hazardous materials has the potential to impact the health and safety of workers.	Transportation of any hazardous materials is to be in accordance with the TDGA Regulations. Workers must wear and use appropriate personal protective equipment. Workers are to be trained in the use of personal protective equipment and proper handling procedures for hazardous materials. Proper procedures for working around heavy equipment to be implemented.	None.	M
	Contaminated Soil and Hazardous Materials Removal	The removal of contaminated soil and other hazardous materials from the environment reduces the risk of exposure to people.	n/a	Reduced risk of future adverse effects.	P
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.	Clearly mark and avoid all archaeological resources. Contact authorities in the event a new resource is discovered or a known resource is disturbed.	None.	M

Land Use	General Clean Up Activities	Clean up activities may disturb traditional land use, i.e., hunting and fishing activities that would occur along the coastal areas during the summer months; although it has been noted the area is not used.	Contact the local hunters and trappers organization to coordinate clean-up activities and traditional land use, if applicable.	None.	M
Aesthetics	General Clean Up Activities	Generally, the clean-up will improve the aesthetics of the site by removing unsightly debris and restoring the site to a more natural state.	n/a	Site is restored to a more natural state and therefore is more aesthetically pleasing.	P
Economy	Contractor Support	The contractor will be encouraged to have a significant Inuit content in the workforce for clean up. This will provide employment benefits and related economic benefits.	n/a	Greater number of trained Inuit workers.	P

6. References

AECOM (2013) Phase III Environmental Site Assessment, CAM-C, Matheson Point, Nunavut, Intermediate DEW Line Site

AECOM (2013) Remedial Action Plan - Draft, CAM-C, Matheson Point, Nunavut Intermediate DEW Line Site

Thomson Heritage Consultants Inc. (2013) Interim Report on Archaeological Inventory and Assessment at CAM-C, Matheson Point, King William Island, NU.

Indian Affairs and Northern Development Canada (INAC). March, 2010. Abandoned Military Site Remediation Protocol.

Appendix A

Figures (from the Remedial Action Plan)

LOCATION OF MATHESON POINT
WITHIN NUNAVUT TERRITORY

SCALE: N.T.S.

PLAN

IMAGE SOURCE: BING MAPS AERIAL
DATUM: NAD83 (CSRS)
PROJECTION: UTM ZONE 15

0 3750 7500 m

1:150000

Issue Status: FINAL

SITE LOCATION

CAM-C, MATHESON POINT INTERMEDIATE DEW LINE SITE
REMEDIAL ACTION PLAN
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
Project No.: 60299674 Date: 2014-02-20

AECOM
Figure: 1

Project Management Initials: Designer: JK Checked: WK Approved: JM ANSI B 279.4mm x 431.8mm

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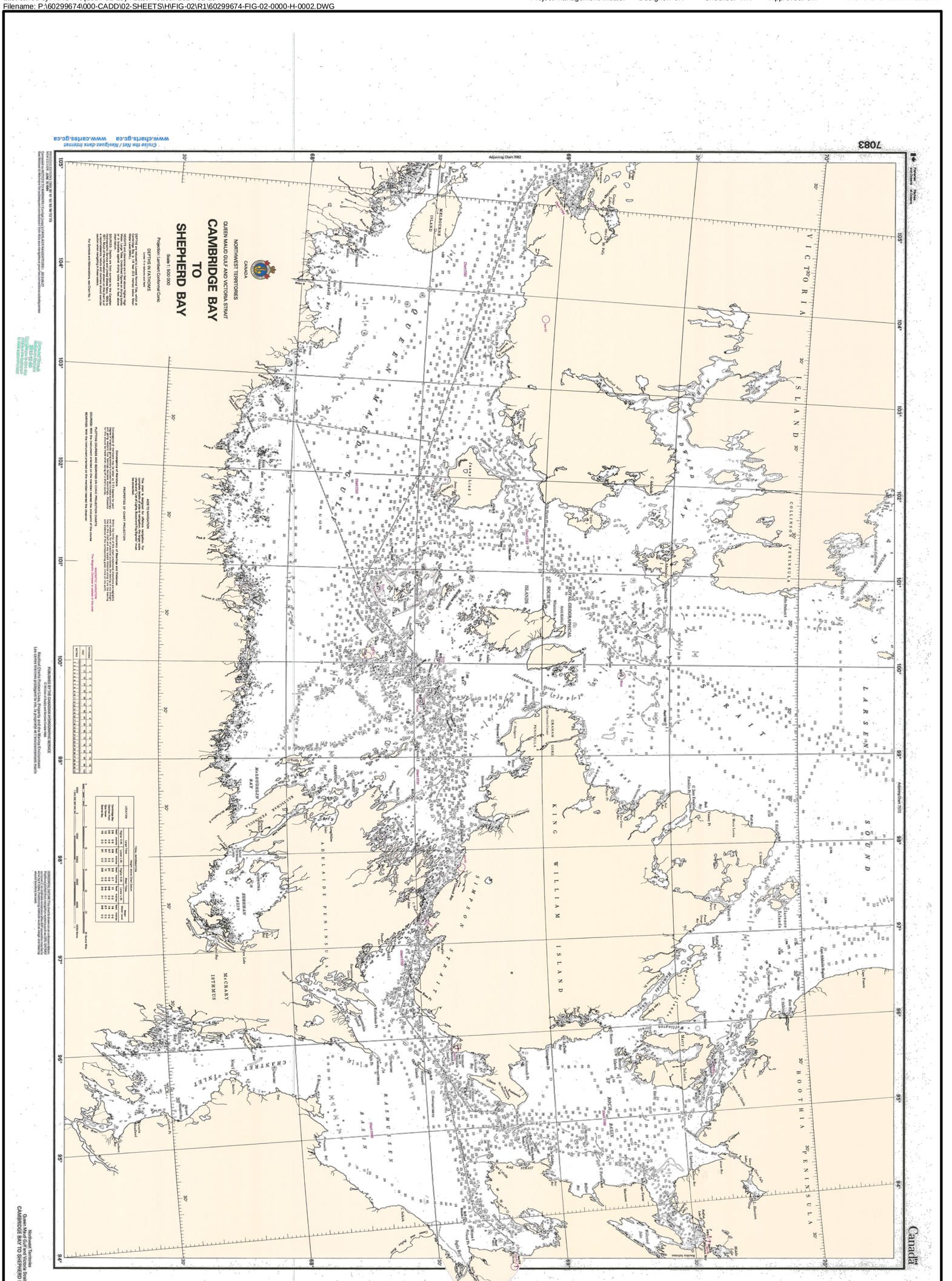


Issue Status: FINAL

Project Management Initials: Designer: JK Checked: WK Approved: JM ANSI B 279.4mm x 431.8mm

406 000 E
407 000 E
408 000 E
409 000 E
410 000 E
7 637 000 N
7 636 000 N
7 635 000 N

FRESHWATER LAKE
RAE STRAIT

DEBRIS AREA #13
BA-14 ARCHAEOLOGICAL ARTIFACT (HEARTH)
ACCESS ROAD
BA-13
DEBRIS AREA #12
DEBRIS AREA #10
BA-15
BA-16
BA-9
BA-8
BA-7
LOBE E
DEBRIS AREA #18
DEBRIS AREA #17
DEBRIS AREA #9
LOBE C
DEBRIS AREA #16
DEBRIS AREA #15
DEBRIS AREA #14
DEBRIS AREA #3
LOBE D
DEBRIS AREA #8
STATION POL
AIRSTRIP
BA-6
BA-5
BA-10
BA-11
AIRSTRIP LANDFILL
BA-2
BA-3
BA-4
DEBRIS AREA #7
STATION WEST LANDFILL
BA-1
DEBRIS AREA #5
DEBRIS AREA #2
DEBRIS AREA #4
DEBRIS AREA #1
DEBRIS AREA #6
BA-12
BA-18
BARREL CULVERT
ACCESS ROAD
BARREL CULVERT
BA-19
SEE CALL OUT ABOVE
BA-20
DEBRIS AREA #21
BA-17
DEBRIS AREA #19
BEACH POL
DEBRIS AREA #20
EAST BARREL CACHE
WEST BARREL CACHE
ARCHAEOLOGICAL ARTIFACT (TENT RING)
ARCHAEOLOGICAL ARTIFACT (INUKSUK)
ARCHAEOLOGICAL ARTIFACT (TENT RING)
ARCHAEOLOGICAL ARTIFACT (TENT RING)
ARCHAEOLOGICAL ARTIFACT (CACHE)
ARCHAEOLOGICAL ARTIFACT (CACHE)
ARCHAEOLOGICAL ARTIFACT (QAMAQ -AUTUMN HOUSE)
ARCHAEOLOGICAL ARTIFACT (INUKSUK)
ARCHAEOLOGICAL ARTIFACT (QAMMAQ)
ARCHAEOLOGICAL ARTIFACT (CACHE)
ARCHAEOLOGICAL ARTIFACT (TENT RING, LITHIC SCATTER, BONE)
ARCHAEOLOGICAL ARTIFACT (TENT RING WITH BLACK AND PATINATED CHERT)
ARCHAEOLOGICAL ARTIFACT (LITHIC SCATTER)
ARCHAEOLOGICAL ARTIFACT (LITHIC SCATTER)

IMAGE SOURCE: GOOGLE EARTH PRO(2006)
DATUM: NAD83 (CSRS)
PROJECTION: UTM ZONE 15

LEGEND

- CULVERT
- ARCHAEOLOGICAL SITE
- BORROW AREA
- DEBRIS AREA
- PROPOSED LANDFILL LOCATION (LF-1)
- PROPOSED CAMP LOCATION (LF-2)
- PROPOSED LANDFARM LOCATION (LF-3)
- ROAD SECTION 1
- ROAD SECTION 2
- ROAD SECTION 3

0 375 750 m
1:15000

Last saved by: KNOTTJ(2014-02-20) Last Plotted: 2014-02-20
Filename: P:\60299674\000-CADD\002-SHEETS\HFIG-02\R1\60299674-FIG-02-0000-H-0003.DWG

Issue Status: FINAL

AECOM

Figure: 3

OVERALL SITE PLAN

CAM-C, MATHESON POINT INTERMEDIATE DEW LINE SITE
REMEDIAL ACTION PLAN
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
Project No.: 60299674 Date: 2014-02-20

N

407 600 E

407 650 E

407 700 E

407 750 E

7 635 950 N

7 635 900 N

STATION PAD DEBRIS AREA

FOUNDATION

ACCESS ROAD

ACCESS ROAD

BORROW AREA 7

TOWER

PROPOSED LANDFILL LOCATION

FOUNDATION

LOBE B

TP13-62

ESG: G3108

TP13-48

TP13-52

TP13-51

ESG: G3107

WESA: C-SS-005

ESG: G3101

TP13-50

TP13-47

TP13-40

TP13-23

WESA: CAM-C-SS-006

TP13-41

AREA=25m²

ESG: G3106

ESG: G3109 (0.15m)

TP13-22 (0.8m)

AREA=25m²

TP13-42

TP13-46

AREA=7m²

TP13-49 (0.3m)

ESG: G3102 (SURFACE)

WESA: CAM-C SS-007

AREA=7m²

TP13-44

TP13-45

TP13-43

TP13-60

TP13-21

WAREHOUSE FOUNDATION

GARAGE FOUNDATION

ESG: G3103

ESG: G3120

ESG: G3119

TP13-61

AREA=25m²

ESG: G3104 (0.15m)

TP13-01

POL LINE

MODULE TRAIN IMPRINT

ESG: G3118

TP13-64

TP13-63

TP13-20

STATION PAD DEBRIS AREA

ESG: G3117

TP13-59

TP13-58 (0.3m)

AREA=20m²

TP13-53 (0.45m)

TP13-54

TP13-02

AREA=7m²

ESG: G3105 (0.15m)

TP13-03

TP13-56

ESG: G3114

SEWAGE OUTFALL LINE

TP13-04

FOUNDATION

TP13-57

ESG: G3115

ESG: G3110

ESG: G3116

DATUM: NAD83 (CSRS)
PROJECTION: UTM ZONE 15

FIGURE 4

KEY MAP
N.T.S

LEGEND

- CLEAN TEST PIT
- PCB IMPACTED
- PHC IMPACTED
- METALS IMPACT
- VALVE
- TIER I PCB EXCEEDANCES
- TYPE B HYDROCARBON PLUMES
- TIER II METALS EXCEEDANCE (COPPER)
- TIER I METALS EXCEEDANCE (LEAD)

0 12.5 25 m

1:500

Issue Status: FINAL

AECOM

Figure: 4

STATION POL CONTAMINATED SOIL AREA

CAM-C, MATHESON POINT INTERMEDIATE DEW LINE SITE
REMEDIAL ACTION PLAN
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
Project No.: 60299674 Date: 2014-02-20

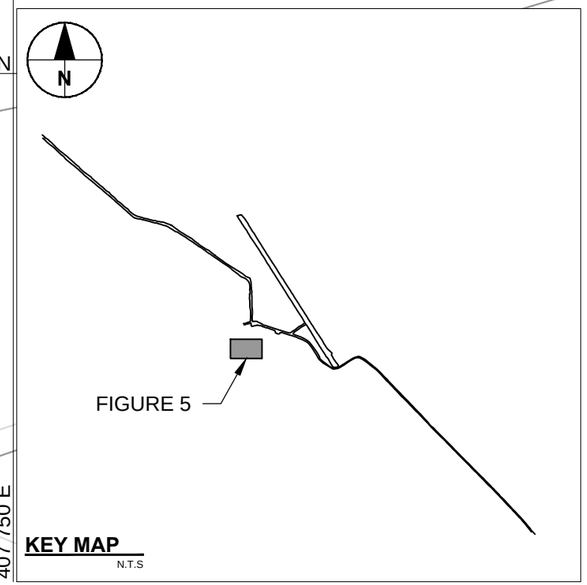
N

407 650 E
407 700 E
407 750 E

7 635 850 N
7 635 800 N

TP13-57
ESG: G3115
ESG: G3116
60
WOOD CRIBBING SUPPORT FOR LINE
FOUNDATION
SEWAGE OUTFALL LINE
59
TP13-04
ESG: G3110
POL TANK FOUNDATION
AREA=375m²
PUMPHOUSE FOUNDATION
WESA:CAM-C-SS-004
TP13-09
ESG: G3112
POL LINE
WESA:CAM-C-SS-001
TP13-11
WESA:CAM-C-SS-002
TP13-13 (0.7m)
TP13-10 (0.6-1.24m)
TP13-05
POL TANK FOUNDATION
ESG: G3113
WESA:CAM-C-SS-003
TP13-08
ESG: G3111
TP13-07
TP13-06
TP13-12
58
57
TP13-19
STATION PAD DEBRIS AREA
ESG: O3100
TP13-14
TP13-15
FOUNDATION
58
ESG: O3101
57
BARREL
SEWAGE OUTFALL DRAINAGE AREA
TP13-17
TP13-18
TP13-16
SO1
ESG: O3102
SO2
56
55
SO3

DATUM: NAD83 (CSRS)
PROJECTION: UTM ZONE 15



KEY MAP
N.T.S

LEGEND

- CLEAN TEST PIT
- PHC IMPACTED
- TYPE B HYDROCARBON PLUME

0 12.5 25 m
1:500

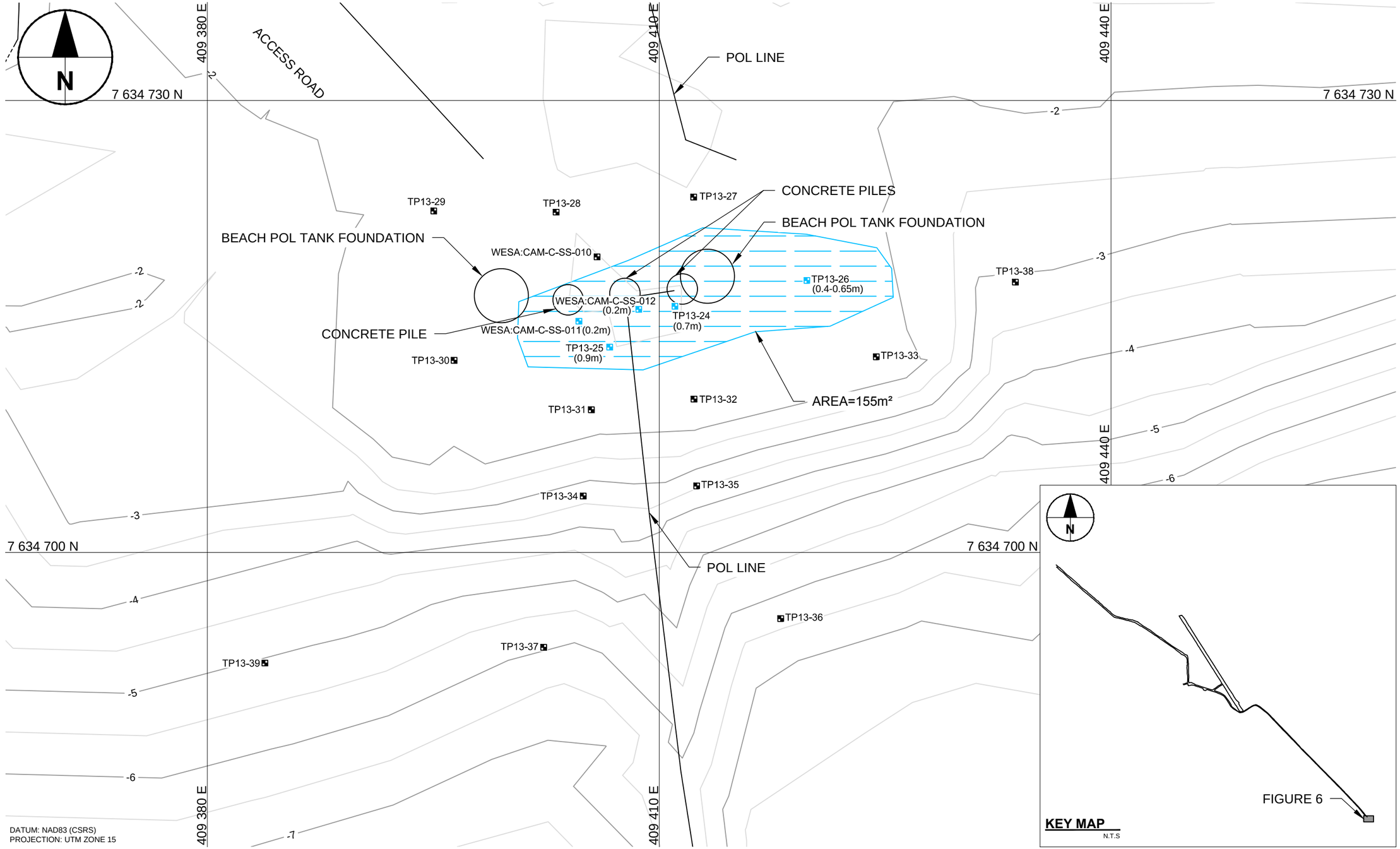
Issue Status: FINAL

AECOM

Figure: 5

STATION AREA POL
CONTAMINATED SOIL AREA

CAM-C, MATHESON POINT INTERMEDIATE DEW LINE SITE
REMEDIAL ACTION PLAN
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
Project No.: 60299674 Date: 2014-02-20



LEGEND

- CLEAN TEST PIT
- PHC IMPACTED
- TYPE B HYDROCARBON PLUME

0 6.25 12.5 m

1:250

Issue Status: FINAL

AECOM

Figure: 6

BEACH SITE
CONTAMINATED SOIL AREA

CAM-C, MATHESON POINT INTERMEDIATE DEW LINE SITE
REMEDIAL ACTION PLAN
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
Project No.: 60299674 Date: 2014-02-20

7 636 350 N

407 450 E

407 500 E

407 550 E

7 636 300 N

7 636 250 N

ESG: G3122

ESG: G3123

DEBRIS AREA 10

AREA=71m²

DEBRIS AREA #10 (0.05m)

TP13-65 (0.15m)

68

37

38

ACCESS ROAD

39

39

39

40

FIGURE 7

KEY MAP

N.T.S

DATUM: NAD83 (CSRS)
PROJECTION: UTM ZONE 15

LEGEND

- CLEAN TEST PIT LOCATION
- PCB IMPACTED
- WAYPOINT
- TIER I PCB IMPACT

0 12.5 25 m

1:500

Issue Status: FINAL

DEBRIS AREA 10

CAM-C, MATHESON POINT INTERMEDIATE DEW LINE SITE
REMEDIAL ACTION PLAN
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
Project No.: 60299674 Date: 2014-02-20

AECOM

Figure: 7

Appendix B

Photos

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
DSCN008	26-08-13

Direction Photo Taken:

View north- northeast

Description:

Site overview
(taken from airplane).

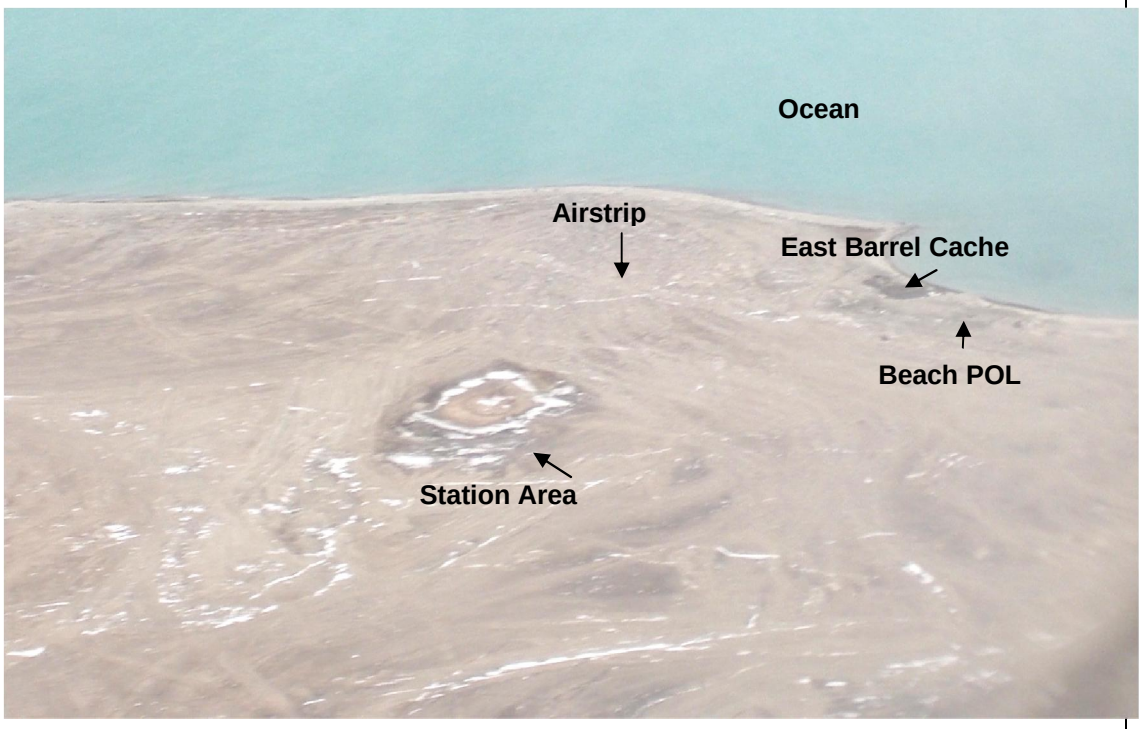
Photo No.	Date:
DSCN0009	26-08-13

Direction Photo Taken:

View north- northeast

Description:

Site overview
(taken from airplane).



PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	**Date:**
DSCN0065	26-08-13

Direction Photo Taken:
Facing northwest

Description:

View of remaining foundations at Station Area and partially buried debris areas, including Lobe D.

Photo No.	**Date:**
DSCN0070	26-08-13

Direction Photo Taken:

View facing west-northwest

Description:

View of remaining concrete pads, radar tower, and structures at the Station Area; view across Lobe C.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	**Date:**
DSCN0073	26-08-13

Direction Photo Taken:

View facing west-northwest

Description:

Top end of radar tower from Lobe C (pink flag in foreground).

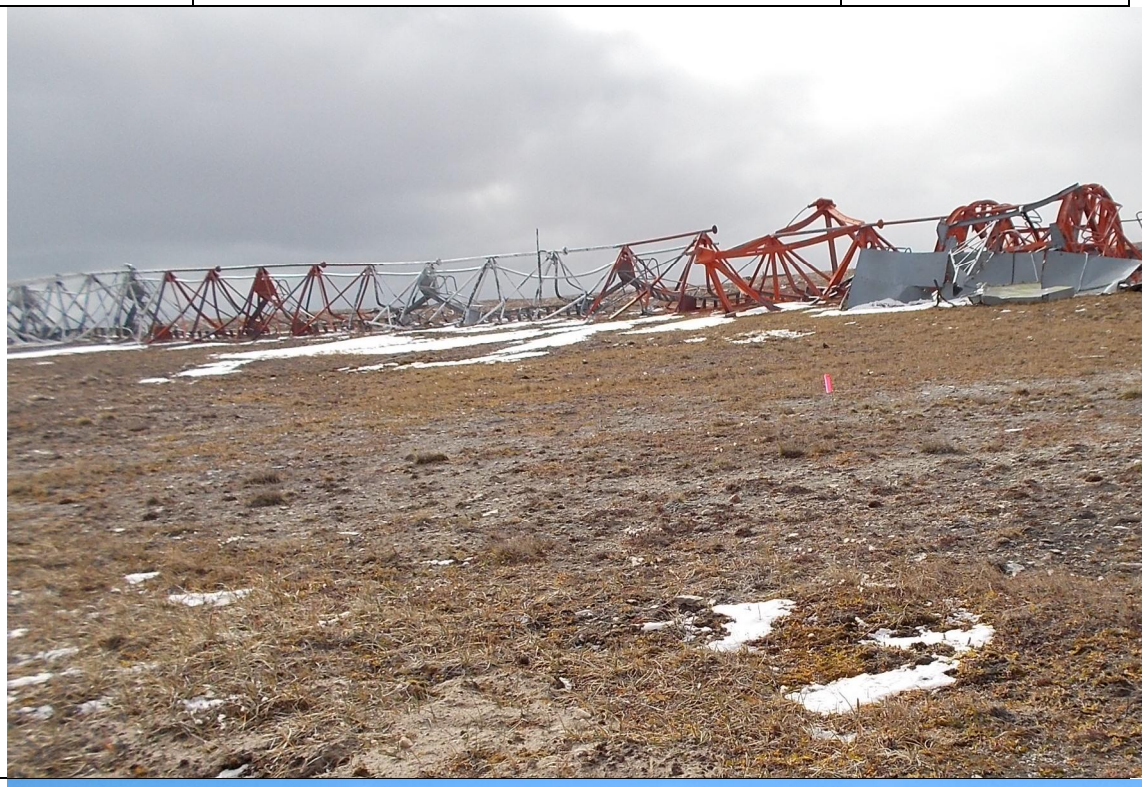


Photo No. 091	**Date:**
	29-07-13

Direction Photo Taken:

View facing northeast

Description:

Top end of radar tower and cables.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
090	29-07-13

Direction Photo Taken:

Facing south

Description:

Top end of radar tower and associated debris.

Photo No.	Date:
090	29-07-13

Direction Photo Taken:

Ground

Description:

Size and type of cable from radar tower.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
094	29-07-13

Direction Photo Taken:

View facing northwest

Description:

Debris around top of radar tower.

Photo No.	Date:
IMG_0742	29-07-13

Direction Photo Taken:

View facing east

Description:

Base of radar tower; concrete foundation to right of photo; Station Area infrastructure in background.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
080	29-07-13

Direction Photo Taken:
Facing southeast

Description:

View of remaining water tanks at Station Area.

Photo No.	Date:
081	29-07-13

Direction Photo Taken:

View facing east

Description:

Side profile of water tanks.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
IMG_0751	29-07-13

Direction Photo Taken:

View facing east

Description:

Former module train water tanks.

Photo No.	Date:
085	29-07-13

Direction Photo Taken:

View facing southeast

Description:

West side of Station Area (in front of radar tower). Imprint of module train in foreground. Water tanks and diesel tanks from module train can be seen in the background.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
083	29-07-13

Direction Photo Taken:

View facing northeast

Description:

Diesel tanks and debris around water tanks; note radar tower in background left.

Photo No.	Date:
084	29-07-13

Direction Photo Taken:

View facing southeast

Description:

Water tanks and imprint of module train (foreground); garage pad in background right, and concrete anchor pads for the radar tower in background left.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
099	29-07-13

Direction Photo Taken:

View facing southeast

Description:

Anchor pad for radar tower (east side), and barrels; North of Station Area.

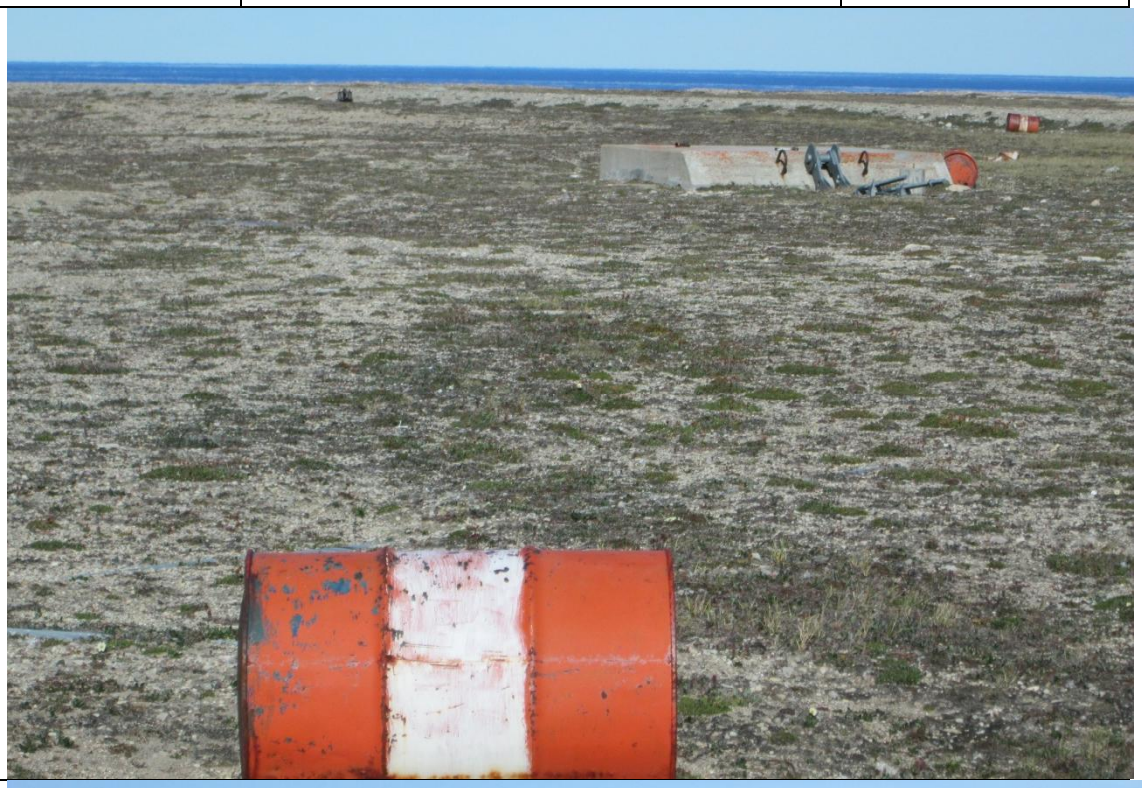


Photo No.	Date:
100	29-07-13

Direction Photo Taken:

View facing east.

Description:

Venting and other wood/metal debris on the north side of the garage pad.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
102	29-07-13

Direction Photo Taken:

View facing northeast

Description:

Debris area at southwest end of Station Area.

Photo No.	Date:
103	29-07-13

Direction Photo Taken:

View facing south

Description:

Signal structure and scattered debris.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
104	29-07-13

Direction Photo Taken:

View facing northeast

Description:

Warehouse foundation and scattered debris.

Photo No.	Date:
105	29-07-13

Direction Photo Taken:

View facing east

Description:

Top of warehouse foundation.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
110	29-07-13

Direction Photo Taken:

View facing east

Description:

West end of warehouse foundation and surrounding debris, including tanks, wood and other miscellaneous metal.

Photo No.	Date:
111	29-07-13

Direction Photo Taken:

View facing west

Description:

Warehouse foundation with barrel and wood debris in foreground.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
106	29-07-13

Direction Photo Taken:

View facing west

Description:

Station Area debris east of radar tower.

Photo No.	Date:
107	29-07-13

Direction Photo Taken:

View facing north-northeast

Description:

Concrete radar tower anchor foundation.

Small amount of surficial debris at north end of the Station Area pad.

Airstrip (airplane) visible in top right of photo.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
097	29-07-13

Direction Photo Taken:

View facing south-southeast

Description:

View of northwest corner of Station Area pad Area.

Photo No.	Date:
105	29-07-13

Direction Photo Taken:

View facing east

Description:

View from south side of Station Area pad over east side of the Station Area.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
113	29-07-13

Direction Photo Taken:

View facing east

Description:

Garage foundation.

Former boiler and tanks remaining on former garage pad.

Photo No.	Date:
115	29-07-13

Direction Photo Taken:

View facing southeast

Description:

Garage foundation.

Former boiler, tanks, barrel and other miscellaneous metal debris remaining on pad.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
IMG_0771	29-07-13

Direction Photo Taken:

View facing east

Description:

Garage foundation.

Weathered asbestos pipe wrap

Two sumps noted below foreground of photo.

Photo No.	Date:
IMG_0769 and 0770	9-Aug-10

Direction Photo Taken:

View north

Description:

Garage foundation with two sumps on pad.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
118	29-07-13

Direction Photo Taken:

View facing northwest

Description:

Garage foundation and metal tank. Note weathered asbestos wrap behind tank.

Photo No.	Date:
120	29-07-13

Direction Photo Taken:

View facing east

Description:

Metal debris (heater) on west side of Garage foundation.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
IMG_0774	29-07-13

Direction Photo Taken:

View facing north

Description:

Debris along the north slope of the Station Area, mid-way along the site (north of the Garage).

Photo No.	Date:
IMG_0775	29-07-13

Direction Photo Taken:
View facing northeast

Description:
View of the northern end of the slope along the Station Area base; north of the Garage. Note communications cables in metal pipe.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
IMG_0776	29-07-13

Direction Photo Taken:

View facing east

Description:
Metal debris at northeast end of Station Area.

3 'I' Beams east of garage.

Photo No.	Date:
IMG_0777	29-07-13

Direction Photo Taken:
View facing east

Description:
3 'I' Beams east of garage; this debris is the same as in the previous photo.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
IMG_0779	29-07-13

Direction Photo Taken:

View facing west

Description:

Metal 'I' Beams (same as in above photo, but from east side).

Photo No.	Date:
IMG_0778	29-07-13

Direction Photo Taken:

View facing northeast

Description:

Metal panels from garage. Now located to the east of the garage pad.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	**Date:**
IMG_0781	29-07-13

Direction Photo Taken:

View facing southeast

Description:

Vent stack south of Garage foundation.

Photo No.	**Date:**
133	29-07-13

Direction Photo Taken:

View facing northeast

Description:

View along south side of Station Area from top of POL line. Coolers in centre of photo located north of TP13-01.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area POL	60299674

Photo No.	Date:
P7290033	29-07-13

Direction Photo Taken:

View facing north

Description:

View from south end of Station Area POL Pad.

Photo No.	Date:
P7290034	29-07-13

Direction Photo Taken:

View facing northeast

Description:

View of centre of Station Area POL structures.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area POL Line to Beach	60299674

Photo No.	**Date:**
P7290037	29-07-13

Direction Photo Taken:

View facing west

Description:

View from south side of Station Area pad over POL line (continues towards beach).

Photo No.	**Date:**
SAM_1096	29-07-13

Direction Photo Taken:

View facing north

Description:

Location of TP13-09 (at flag and trowel); sampling beneath POL pipe valve.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station to Beach POL	60299674

Photo No.	Date:
DSCN0018	26-08-13

Direction Photo Taken:

View facing southwest

Description:

Culvert across road towards Beach POL line.

Photo No.	Date:
P7310070	31-07-13

Direction Photo Taken:

View facing northeast

Description:

View of Beach POL line from the access road leading from the Station Area towards the Beach Area. Note the barrel markers for the POL line, as well as the barrel markers (orange) for the end of the airstrip.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Beach Area	60299674

Photo No.	Date:
J6	31-07-13

Direction Photo Taken:

View facing north from north side of Beach POL

Description:

Standing at Beach POL facing north over West and East Barrel Caches

Photo No.	Date:
J8	31-07-13

Direction Photo Taken:

View facing southeast from south side of Beach POL pad

Description:

Note pink flag marking TP13-39. Minimal debris.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60156118

Photo No.	Date:
J25	01-08-13

Direction Photo Taken:

Ground

Description:

TP13-24 soil profile to approximately 0.48 metres. Sand and cobbles.

TP13-24 was located on the south side of the Beach POL pad.

Photo No.	Date:
J27	31-07-13

Direction Photo Taken:

Ground

Description:

TP13-28 soil profile to approximately 1.05 metres. Sand and some cobbles.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60156118

Photo No.	Date:
IMG_0800	01-08-13

Direction Photo Taken:

View facing west

Description:

Downgradient of the Beach POL pad, note the Beach POL line. Quad and quadavator on Beach POL pad.

Photo No.	Date:
IMG_0801	01-08-13

Direction Photo Taken:

View facing northwest

Description:

End of Beach POL line, closest to ocean. Note barrel cache on northeast corner of Beach POL pad.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60156118

Photo No.	Date:
IMG_0788	01-08-13

Direction Photo Taken:

View southeast

Description:

View from north side of East Barrel Cache over both barrel caches.

Photo No.	Date:
IMG_0788	01-08-13

Direction Photo Taken:

View facing southwest

Description:

View of south side of East Barrel Cache; quadavator at work on Beach POL pad (photo left).

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area – Module Train Section	60156118

Photo No.	**Date:**
IMG_0788	01-08-13

Direction Photo Taken:

View facing southwest

Description:

View of south side of West Barrel Cache; quadavator at work on Beach POL pad (photo left).

Photo No.	**Date:**
DSCN0045	26-08-13

Direction Photo Taken:

View west.

Description:

Close up of West Barrel Cache.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60156118

Photo No.	Date:
IMG_0790	01-08-13

Direction Photo Taken:

View facing west

Description:

Closer view of north side of East Barrel Cache.

Photo No.	Date:
DSCN0042	26-08-13

Direction Photo Taken:

Ground

Description:

Debris Area #20. Sink, stove, furnace and other metal debris. In respect to previous picture, sink is between the barrels (foreground) and the large tank (background) near the remains of machinery.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area – Module Train Section	60156118

Photo No.	Date:
DSCN0039	26-08-13

Direction Photo Taken:

View facing northeast

Description:

Close up of East Barrel Cache; no barrels with residual contents observed.

Photo No.	Date:
IMG_0805	01-08-13

Direction Photo Taken:

View facing west

Description:

Barrels and wood pallets located on the south side of the Beach POL pad, comprising Debris Area #19.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Debris Area #1	60299674

Photo No.	**Date:**
IMG_0701	29-07-13

Direction Photo Taken:

View facing northeast

Description:

View of part of Debris Area #1 located south/southeast of the Station Area. Composition: 9 empty barrels, cans, 1 gallon cans (20-30), wood, wire, culvert, metal mesh from garage floor, wire. Approximate size is 10 m x 10 m.

Photo No.	**Date:**
IMG_0705	29-07-13

Direction Photo Taken:

View facing northwest

Description:

Alternate view of Debris Area #1.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station West Landfill	60299674

Photo No.	Date:
IMG_0709	29-07-13

Direction Photo Taken:

View facing north

Description:

Toe of Station West Landfill - surface debris includes batteries, tin cans, wood, pipe, strapping, mesh, barrels, cable, and machine parts.

Photo No.	Date:
IMG_0710	29-07-13

Direction Photo Taken:

View facing west

Description:

View of south face of station West Landfill. Note battery in foreground. At least 5 batteries noted scattered over landfill surface.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Debris Areas	60299674

Photo No.	Date:
DSCN0082	26-08-13

Direction Photo Taken:

View facing west

Description:

Station West Landfill/Debris Area.

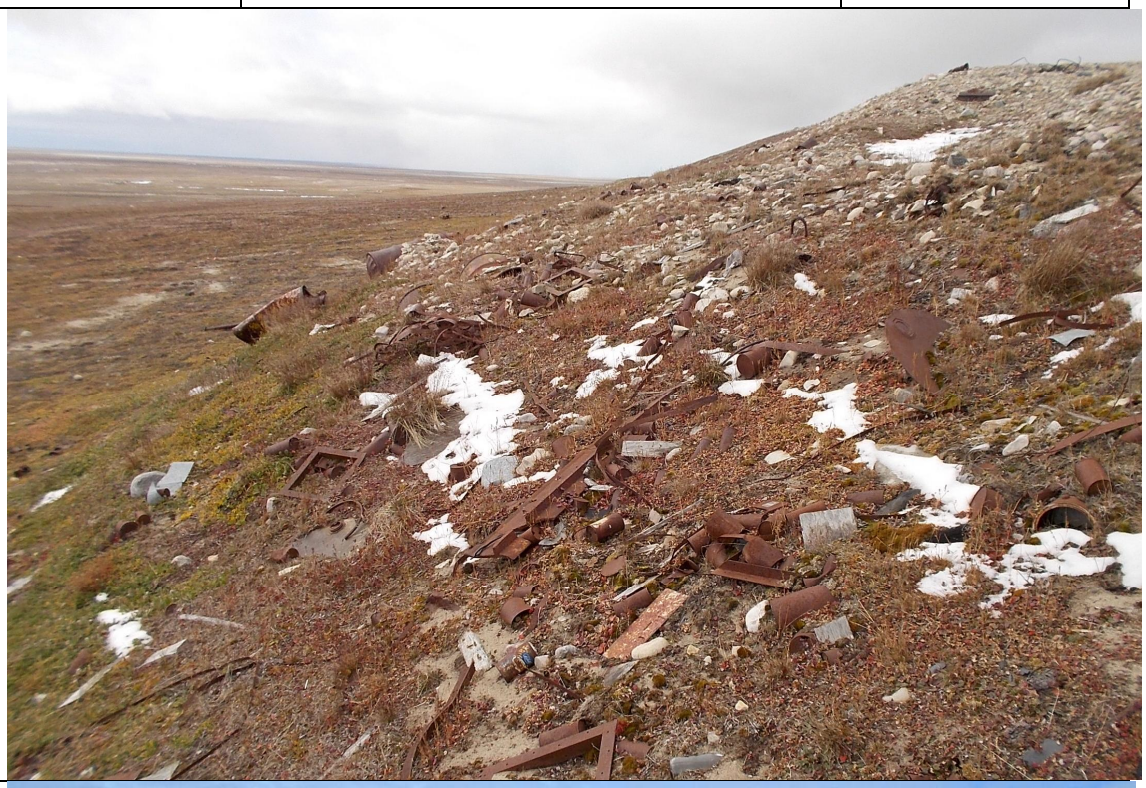


Photo No.	Date:
055	29-07-13

Direction Photo Taken:

View facing north

Description:

Extent of Station West Landfill/Debris Area (background of photo). Debris Area #5 in foreground.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Airstrip Landfill	60299674

Photo No.	Date:
P7310056	31-07-13

Direction Photo Taken:

Facing northwest

Description:

View upslope view of Airstrip Landfill

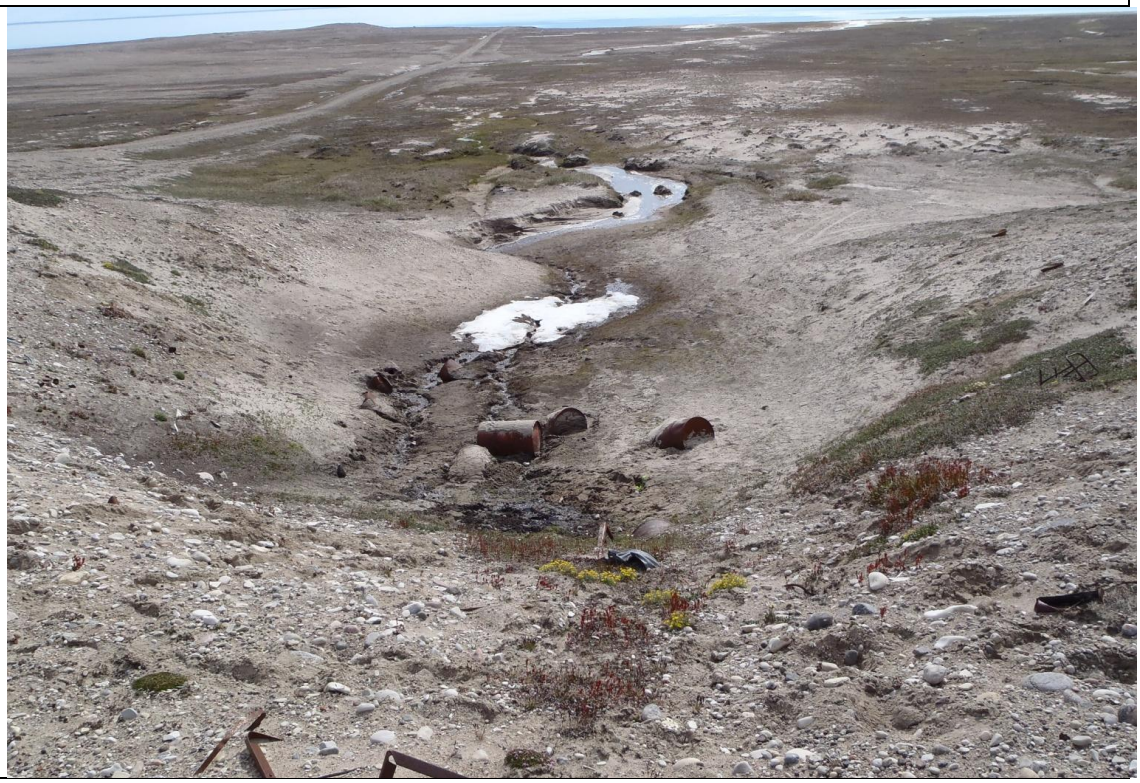
Photo No.	Date:
P7310062	31-07-13

Direction Photo Taken:

Facing southeast

Description:

Downslope view of Airstrip Landfill



PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
IMG_0712	29-07-13

Direction Photo Taken:

View facing north

Description:

South of Station West Landfill (formerly called South Landfill), located within the former borrow area, timber cribbing was noted.

Photo No.	Date:
IMG_0713	29-07-13

Direction Photo Taken:

West

Description:

Debris Area #6 located south of the Station West Landfill

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
IMG_0715	29-07-13

Direction Photo Taken:

View facing south.

Description:

Debris Area #2; surface debris of metal, wire, and cans.

Photo No.	Date:
IMG_0722	29-07-13

Direction Photo Taken:

View facing northwest.

Description:

Debris Area #2; surface debris of metal, empty barrels, wire, and cans.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
IMG_0720	29-07-13

Direction Photo Taken:

View facing west

Description:

Closer view of surface debris in Debris Area #2.

Photo No.	Date:
076	29-07-13

Direction Photo Taken:

View facing East

Description:

Debris Area #3, including strapping and cans west of the station pad.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
IMG_0707/ SAM_1143	30-07-13

Direction Photo Taken:

View facing Upslope and Downslope west of Station Area

Description:

Debris Area #14 with metal strapping and partially buried wooden debris.

Photo No.	Date:
IMG_0724	29-07-13

Direction Photo Taken:

View facing north

Description:

Debris Area #7: Three sets of cat tracks.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Debris Areas	60299674

Photo No.	Date:
SAM_1137	30-07-13

Direction Photo Taken:

View facing northwest

Description:

View of Debris Area #10.

Photo No.	Date:
SAM_1136	30-07-13

Direction Photo Taken:

Ground

Description:

Miscellaneous metal, wood, and wire debris beside Freshwater Lake Road.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
SAM_1103	30-07-13

Direction Photo Taken:

Facing south

Description:

West side of the Warehouse Foundation - location of asbestos sample ASB #1 (painted wall board).

Photo No.	Date:
IMG_0724	29-07-13

Direction Photo Taken:

View facing north

Description:

East side of the Garage Foundation - location of asbestos sample ASB #2 (floor tile).

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Asbestos Samples	60299674

Photo No.	Date:
SAM_1107	30-07-13

Direction Photo Taken:

View facing east

Description:

Location of asbestos sample ASB #3 (weathered pipe wrap): northwest corner of the Station Area Pad.

Photo No.	Date:
SAM_1109	30-07-13

Direction Photo Taken:

Ground

Description:

Location of asbestos sample ASB #4 (weathered tank wrap): northwest corner of the Station Area Pad; southeast of ASB #3 location.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Airstrip	60299674

Photo No.	Date:
DSCN0053	26-08-13

Direction Photo Taken:

View facing southeast

Description:

Airstrip; Summit Air Dornier parked on runway.

Photo No.	Date:
DSCN0011	26-08-13

Direction Photo Taken:

Runway

Description:

South end of runway (view from plane).

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Airstrip/Freshwater Lake	60299674

Photo No.	Date:
SAM_1087	29-07-13

Direction Photo Taken:

View facing east-southeast

Description:

Middle of airstrip.

Photo No.	Date:
J9	31-07-13

Direction Photo Taken:

View facing southwest from road to Freshwater Lake

Description:

View of Freshwater Lake shore and minimal debris northwest of the lake (Debris Area #13). Water sample obtained from shore at the end of the road. A loon with a baby was noted in the lake.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Beach POL Pad and Road	60299674

Photo No.	Date:
DSCN0050	26-08-13

Direction Photo Taken:

View facing southwest

Description:

Road immediately west of Beach POL

Photo No.	Date:
DSCN0050	26-08-13

Direction Photo Taken:

View facing southeast

Description:

West side of Beach POL pad; also termination of road from Station Area.

PHOTOGRAPHIC LOG

Site Name: CAM-C, Matheson Point	Site Location: Vegetation	Project No. 60299674

Photo No. J14	Date: 31-07-13

Direction Photo Taken:

Ground

Description:

Mountain sorrel
Oxyria arvenses

Photo No. J16	Date: 31-07-13

Direction Photo Taken:

Ground

Description:

Red stem cinquefoil
Potentilla rubricaulis

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	**Date:**
J22	31-07-13

Direction Photo Taken:

Ground

Description:

Three toothed saxifrage
Saxifraga tricuspidata

With sedges *(Carex sp.)*

Photo No.	**Date:**
J23	31-07-13

Direction Photo Taken:

Ground

Description:

Trift
Armeria maritime

With grasses

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
J23	31-07-13

Direction Photo Taken:

Ground

Description:

Arctic fleabane
Erigeron humilis

With grasses and willow leaves.

Photo No.	Date:
J2, J3	31-07-13

Direction Photo Taken:

Ground

Description:

Arctic poppy
Papaver laestadianum

Closeup inset.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
J23	31-07-13

Direction Photo Taken:

View northeast

Description:

Arctic willow,
Salix arctica
White lichen (unidentified species),
White mountain avens
Dryas integrifolia

Photo No.	Date:
J23	31-07-13

Direction Photo Taken:
Ground

Description:

Arctic Willow and goose droppings.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Station Area	60299674

Photo No.	Date:
J13	31-07-13

Direction Photo Taken:

Ground

Description:

Moss campion
Silene acaulis

Photo No.	Date:
J21	31-07-13

Direction Photo Taken:

Ground

Description:

White mountain aven
Dryas integrifolia
(blooming specimen from site inset) and grasses.

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-C, Matheson Point	Wildlife evidence/Freshwater Lake	60299674

Photo No.	Date:
J32	31-07-13

Direction Photo Taken:

Ground

Description:

Caribou skull, antlers, and vertebrae identified near Freshwater Lake (northeast side of road).

Photo No.	Date:
J37	31-07-13

Direction Photo Taken:

On Freshwater Lake

Description:

Loon and chick noted on Freshwater Lake