Environment

Public Works and Government Services Canada

Phase III Environmental Site Assessment CAM-A, Sturt Point, NU Intermediate DEW Line Site

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November, 2010

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November 22, 2010

Matt McElwaine, P.Eng.
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Dear Matthew:

Project No: 60156118

**Regarding: Phase III Environmental Site Assessment
CAM-A, Sturt Point, NU Intermediate DEW Line Site**

AECOM Canada Ltd. is pleased to submit our report outlining the results of the Phase III Site Investigation conducted at the CAM-A, Sturt Point Intermediate DEW Line Site. We thank you for the opportunity to complete this work on behalf of Public Works and Government Services Canada. We trust that this report is consistent with your expectations.

Should you have any questions or require additional information, please do not hesitate to contact the undersigned at 780.486.7057.

Sincerely,
AECOM Canada Ltd.

Nick Oke, M.Sc., P.Chem. (Alberta)
Project Manager
nick.oke@aecom.com

NO:nh
Encl.
cc:

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Revision Log

Revision #	Revised By	Date	Issue / Revision Description
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Executive Summary

CAM-A was reserved by the Department of National Defence (DND) in 1956 for use as a DEW Line Site and was constructed in 1957. The station was typical of all intermediate sites with infrastructure consisting of a module train, a warehouse, a garage, an Inuit house, POL tanks, and a continuous wave radar tower. In addition to the main site, a beach POL area and beach landing area were also constructed approximately 900 m from the station. The airstrip is approximately 1200 m long and runs in a northwest-southeast orientation. A fresh water lake is located approximately 600 m northwest of the airstrip. Gravel roads were built linking the airstrips, beach areas and fresh water lake to the station facilities. An overall site plan showing the site infrastructure is shown on Figures 1 and 2, Appendix A.

The site was abandoned as part of the DEW Line system in October 1963, and the responsibility for the site was assumed by Indian and Northern Affairs Canada (INAC). Since that time, the POL tanks at both the station and the beach have been removed. The warehouse, garage and module train structures have also been dismantled and removed from the station area leaving behind the concrete and wood foundations with miscellaneous debris. A section of the module train building remains onsite. The fate of the POL tanks and warehouse structure are undetermined. The radar tower has been felled and is lying to the west of the module train foundation.

The objective of AECOM's Phase III Environmental Site Assessment (ESA) at CAM-A was to collect all data necessary to develop a detailed Remedial Action Plan (RAP) in accordance with the Abandoned Military Site Remediation Protocol (INAC 2009). The fieldwork for this assessment was conducted from August 1st to 9th, 2010.

The investigation and delineation of contaminated soil at CAM-A was completed for the contaminants of concern listed in the INAC Abandoned Military Site Remediation Protocol. The contaminants of concern are: arsenic, cadmium, cobalt, copper, lead, nickel, zinc, PCBs and petroleum hydrocarbons. Delineation of petroleum hydrocarbon (PHC) impacts was completed using the INAC Arctic PHC Evaluation Process, which is included in the INAC Abandoned Military Site Protocol (2009). Typical source areas for these contaminants are well documented from previous DEW Line site investigations and were the focus of the 2010 investigation.

Approximate volumes of contaminated soil identified at CAM-A include:

- Type B Hydrocarbon (1,124.8 m^3):
  - 425 m^3 of Type B hydrocarbon impacted soil was identified at the Beach POL within 30 m of the ocean.
  - 128.8 m^3 of Type B impacted soil was identified at the Beach POL Pad.
  - 571 m^3 of Type B impacted soil was identified at the module train foundation.
- Tier I (43 m^3):
  - 7.9 m^3 of Tier I contaminated soil was identified in the module train foundation.
  - 35.1 m^3 of Tier I contaminated soil was identified in the sewage outfall area.
- Tier II (75 m^3):
  - 9.25 m^3 of Tier II contaminated soil was identified at the garage.
  - 0.08 m^3 of Tier II contaminated soil was identified in the sumps on the garage foundation.
  - 21.48 m^3 of Tier II contaminated soil was identified at the module train foundation.
  - 44.19 m^3 of Tier II contaminated soil was identified in the worked area (Lobe J).

The above summary does not include any additional Tier I or Tier II contaminated soil, or PHC impacted soil that may be associated with potential landfill excavations.

Fourteen (14) buried debris lobes were identified onsite during the geophysical investigation. The presence of buried debris was confirmed at Landfill A (Lobes A, B, C, & D) and Landfill B (Lobes F, G & H). All other lobes identified onsite were determined to be localized, partially buried debris and/or surface debris and were assessed as surface debris areas rather than buried debris. Six (6) small anomalies were also identified by Associated Geosciences after the site investigation. The additional lobes identified in the geophysical report, but not identified on-site as buried debris areas (Lobes L, P, Q, R, S & T, Figures 2, 7 & 10), were assessed as part of the surface debris assessment during the field investigation rather than a buried debris assessment. The total area of buried debris between Landfill A and Landfill B at the CAM-A site is approximately 2,331 m^2. Once the perimeters of buried debris areas were identified, soil samples were taken in the proximity of the buried debris to identify if leaching of contaminants has historically occurred. Based on the location and physical condition of the buried debris areas and contaminant migration results, each Lobe was designated as Class A, B or C in accordance with the INAC Protocol.

Landfills A and B were classified as Class C and can therefore covered in place. For health and safety reasons, excavation was not conducted in the buried debris areas. However, based on AECOM's extensive history with DEW Line Site remediation and information collected regarding the volumes of materials that are typically removed during landfill excavations, the following volumes of material types likely to be encountered in the buried debris areas of Landfill A and Landfill B has been estimated as:

- 36 m^3 of Hazardous Soil Materials - Lobes A, B, C, D, F, G & H (estimated as 1% of total volume);
- 364 m^3 of Tier I Soil Materials - Lobes A, B, C, D, F, G & H (estimated as 10% of total volume);
- 364 m^3 of Tier II Soil Materials - Lobes A, B, C, D, F, G & H (estimated as 10% of total volume); and
- 729 m^3 of Non-hazardous Soil Materials - Lobes A, B, C, D, F, G & H (estimated as 20% of total volume).

The following is a summary of the estimated volume of contaminated soils identified at the CAM-A site:

Table EX-1 - Summary of Soil Materials at CAM-A

Location	Tier I	Tier II	PHC Type A	PHC Type B	Hazardous Soil Volume (m^3)	Non-Haz Soil Volume (m^3)
Contaminated Soil Areas						
Beach POL, Station Area, Sewage Outfall & Worked Area	43 m^3	75 m^3	-	1,124.8 m^3	-	-
Buried Debris Areas (Landfill A & B)	*Est. 10%*	*Est. 10%*	-	-	*Est. 1%*	*Est. 20%*
Landfill A, Lobes A, B, C & D and Landfill B, Lobes F, G, & H	*364 m^3*	*364 m^3*	-	-	*36.1 m^3*	*729 m^3*
Estimated Total	**407 m^3**	**439 m^3**	**-**	**1,124.8 m^3**	**36.1 m^3**	**729 m^3**

Notes: Volume estimates (est.) as a percentage. (Italicized)

Based on the combined results of the surface debris inventory, buried debris inventory, barrel assessment and demolition inventory, approximately 496 m^3 (crushed) of non-hazardous waste was identified. This material is suitable for disposal in a non-hazardous waste landfill. The estimated quantity of hazardous waste at CAM-A is 38.46 m^3 (crushed) of hazardous waste. The hazardous materials at CAM-A consist mainly of material coated with PCB amended paint (PAP) and asbestos-containing materials. The following is a summary of the estimated volume of hazardous and non-hazardous debris/materials identified at the CAM-A site:

Table EX-2 - Summary of Demolition Materials at CAM-A

Location	Hazardous Volume (m^3) (Crushed)	Non-Hazardous Volume (m^3) (Crushed)
Demolition	37.26 m^3	300.71 m^3
Alternative Demolition Option (included in separate estimated total)	*8.05 m^3*	*329.91 m^3*
Surface Debris		
Barrels (approx. 682)	-	136.3 m^3 *(682 m^3 uncrushed)*
Debris	1.2 m^3	58.8 m^3 *(72 m^3 uncrushed)*
Estimated Total (Crushed)	**38.46 m^3**	**495.81 m^3**
Alternative Estimated Total (Crushed)	*9.25 m^3*	*522.01 m^3*

Notes: Volume estimates are given in both non-crushed and crushed.

Seventeen (17) potential borrow areas were identified and investigated at CAM-A. It is estimated that there is 321,900 m^3 of granular materials available from these borrow areas. The most predominant soil type in the vicinity of work areas is sandy gravel. Most areas contain oversize material (cobbles and boulders) but this is generally well below 10% (trace) of the overall soil matrix. It is anticipated that sufficient volumes have been identified for construction purposes although additional borrow sourcing during construction can be carried out if necessary.

Depending on the remedial options selected, a combination of non-hazardous waste landfills, secure soil disposal facilities for disposal of contaminated soil and landfarms for the treatment of hydrocarbon-contaminated soils may be constructed at CAM-A. Four (4) proposed landfill/landfarm locations were investigated and identified as suitable locations.

The site access roads are in generally good condition for heavy equipment although regular grading will be required. Based on the information collected, all the noted aircraft would be able to use the existing runway during dry conditions at CAM-A. The Hercules C130 should not land with a full load during times when the airstrip may be saturated.

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Appendices

1. Introduction

CAM-A Sturt Point is located on Victoria Island, Nunavut (68º 47' N, 103º 20' W). The site is located along the coast and overlooks the Queen Maud Gulf. The site is located approximately 80 km east of Cambridge Bay. The terrain of the area is relatively flat with several ponds and lakes and an average elevation of 50 m above sea level.

CAM-A was reserved by the Department of National Defence (DND) in 1956 for use as a DEW Line Site and was constructed in 1959. The radar facility was typical of all intermediate sites and consisted of a module train, warehouse, garage, a POL storage facility, a radar tower, an airstrip and a beach cargo landing area. In addition to the main site, a beach landing area was constructed along with gravel roads linking the various facilities. Access to the site is provided by airstrips and the beach cargo area. The main airstrip (~1,200 m long) is located north of the station facilities with an approximate northwest-southeast orientation.

The site was abandoned as part of the DEW Line system in 1963, and the responsibility of the site was taken over by Indian and Northern Affairs Canada (INAC).

1.1 Scope of Work

The objective of the Phase III Environmental Site Assessment at CAM-A was to collect all data necessary to develop a detailed Remedial Action Plan (RAP), in accordance with the Abandoned Military Site Remediation Protocol (INAC 2009). Therefore, the tasks included in the scope of work for the Phase III ESA included the following:

- Identification, characterization and quantification of all hazardous and non-hazardous materials;
- Identification and delineation of contaminated areas;
- Evaluation of the potential impacts to the sediments and water in the Freshwater Lake and other significant water bodies;
- Completion of a detailed topographic and geophysical survey;
- Documentation of flora and fauna based on literature and professional experience;
- Identification of potential locations for an engineered landfill(s) and/or landfarm;
- Identification of borrow sources that may be used for the potential repair of site roads, airstrip, and barge landing areas as well as for the construction of a potential landfill(s) and/or landfarm;
- Evaluation of the condition of site access roads, barge/beach landing areas, and airstrip;
- Evaluation of the logistical challenges associated with mobilization, site remediation and demobilization activities;
- Provision for an increase in local community and Inuit involvement in the program;
- Obtain traditional knowledge regarding past and present land use of the site from the elders of the nearby communities; and
- Conduct an Archaeological Impact Assessment (AIA).

The site is represented on the Figures in Appendix A, which are referenced throughout the report. Data tables summarizing the environmental analytical results received from AGAT Laboratories and Maxxam Analytics are in Appendix B. Selected photographs of the site are in Appendix C. Copies of the environmental and geotechnical laboratory reports are included in Appendix D. The results of the geophysical survey are presented in a report prepared by Associated Geosciences Ltd. in Appendix E. The test pit logs are presented in Appendix F. The archaeological report prepared by Golder and Associates Ltd. is included in Appendix G; the Federal Contaminated Sites Action Plan scoring sheets are presented in Appendix H; and a DVD of site video is included in Appendix I.

2. Background

2.1 Site Description

CAM-A was reserved by the Department of National Defence (DND) in 1956 for use as a DEW Line Site and was constructed in 1957. The station was typical of all intermediate sites with infrastructure consisting of a module train, a warehouse, a garage, an Inuit house, POL tanks and a continuous wave radar tower. In addition to the main site, a beach POL area and beach landing areas were also constructed approximately 900 m south of the station. An airstrip was constructed at this site, which is approximately 1,200 m long in a northwest-southeast orientation. A fresh water lake is located approximately 600 m northwest of the airstrip. Gravel roads were built linking the airstrip, beach areas and fresh water lake to the station facilities. An overall site plan showing the site infrastructure is shown on Figures 1 and 2, Appendix A.

The site was abandoned as part of the DEW Line system in October 1963, and the responsibility for the site was assumed by Indian and Northern Affairs Canada (INAC). Since that time, the POL tanks at both the station and the beach have been removed. The warehouse, garage and module train structures have also been dismantled and removed from the station area leaving behind the concrete and wood foundations with miscellaneous debris. A section of the module train building (powerhouse section) remains onsite. The fate of the POL tanks and removed structures are undetermined. The radar tower has been felled and is lying to the west of the module train.

2.2 Previous Investigations

A Phase II ESA was completed at CAM-A Sturt Point, in 1994 by the Environmental Sciences Group (ESG 1995). This investigation was part of a large assessment program looking at multiple DEW Line sites. This study formed the basis for planning the 2010 Phase III ESA. The following report was available for review:

- Environmental Sciences Group. 1995. Environmental Study of Abandoned DEW Line Sites III: Six Intermediate Sites in the Canadian Arctic. Volumes I, II and III.

Two other reports were identified by PWGSC; however, they were not provided for review by AECOM as it was noted they had been substantially summarized in the ESG report. The two other reports were completed by Andzans and Associates (1984) and Environmental Protection, Western and Northern Region (1986).

2.3 Description of the Environment

A review of the historical aerial photography for the site was completed as part of the site investigation planning. The historical aerial photography available for the site was from 1964 at a scale of approximately 1:20,000, and can be found in Appendix A. The air photo review provided evidence of past land use, operational practices, and site development, all of which give insight into the potential environmental impacts. The air photos also allowed the evaluation of terrain types, and previous borrow sources.

2.3.1 Climate

The climate at CAM-A includes long cold winters and short mild summers. Average monthly and annual weather data has been measured at a nearby station (Cambridge Bay, Nunavut, 69° 6.483’ N, 105° 8.300’ W, elevation 27.40 m, data from 1971 to 2000, Canadian Climate Normals, Environment Canada) and summarized in the following table.

Table 2-1 - Meteorology, Precipitation and Temperature profiles at CAM-M, Cambridge Bay

Month	Daily Maximum (°C)	Daily Minimum (°C)	Daily Mean (°C)	Extreme Maximum (°C)	Extreme Minimum (°C)	Rainfall (mm)	Snowfall (cm)	Snow at Month-end (cm)
January	-29.3	-36.3	-32.8	7.8	-52.8	0	5.6	22
February	-29.3	-36.6	-33.0	-9.4	-50.6	0	6.4	26
March	-25.7	-33.7	-29.7	-6.1	-48.3	0	7.4	30
April	-16.7	-26.0	-21.4	6.2	-42.8	0.1	7.5	32
May	-5.3	-13.0	-9.2	13.0	-35.0	1.6	9.3	22
June	5.6	-0.8	2.4	23.3	-17.8	9.8	2.8	0
July	12.3	4.6	8.4	28.9	-1.7	21.7	0	0
August	9.4	3.4	6.4	26.1	-8.9	24.5	2.2	0
September	1.9	-2.5	-0.3	15.6	-17.2	11.4	8.9	2
October	-8.1	-14.9	-11.5	6.9	-33.0	0.4	16.2	12
November	-19.3	-26.5	-23.0	0	-42.2	0	9.3	16
December	-26.1	-33.0	-29.6	-4.8	-49.4	0	6.3	20

2.3.2 Ecoregion

The CAM-A site is part of the Northern Arctic ecozone, and specifically, the Amundsen Gulf Lowlands. This ecoregion occurs predominantly on southern Victoria Island, and to a minor extent on the mainland.

2.3.3 Geology

The site is characterized by hummocks, low rolling hills and raised beaches composed of coarse-grained gravel over bedrock.

2.3.4 Land Use

Current land use is limited to hunting and occasional trapping.

2.3.5 Vegetation

Vegetation in the Amundsen Gulf Lowlands ecoregion is characterized by a nearly continuous cover of dwarf tundra vegetation, consisting of dwarf birch, willow, northern Labrador tea, dryas spp., and vaccinium spp. Tall dwarf birch, willow, and alder occur on warm sites; wet sites are dominated by willow and sedge.

As noted in the 1995 ESG report, there is very little soil to support vegetation at the station area plateau; however, in undisturbed areas on the site a fairly continuous vegetation cover was present. Species present include grasses (poa spp.), willows (salix spp.) and sedges (carex spp.). A detailed list of all vegetation species present is provided in the 1995 ESG report.

2.3.6 Wildlife

Characteristic wildlife of the region includes muskox, caribou, arctic hare, arctic fox, snowy owl, raptors, polar bear, seal, seabirds, and waterfowl. Specific wildlife identified during the 2010 site investigation included arctic hare, muskox and geese. Muskox, hare and caribou droppings were also noted around the site.

3. Investigation

3.1 Contaminated Soil Delineation

3.1.1 Methodology

The investigation and delineation of contaminated soil at CAM-A was completed for the contaminants of concern identified under the INAC Abandoned Military Site Remediation Protocol: arsenic, cadmium, cobalt, copper, lead, nickel, zinc, and PCBs (INAC 2009). PCB and metal soil contamination at DEW Line sites tends to be restricted to surface or shallow depth. Typical source areas for these contaminants are well documented from previous DEW Line site investigations and were the focus of the 1995 investigation by ESG.

Delineation of petroleum hydrocarbon (PHC) impacts was completed using the INAC Arctic PHC Evaluation Process, which is a component of the INAC Abandoned Military Site Remediation Protocol (2009). The methodology is based on total petroleum hydrocarbon (TPH) criteria. TPH identity is broken down according to two types: Type A and Type B. Type A is comprised of heavier, less mobile hydrocarbons (such as lubricating oil) and includes the F3 and F4 hydrocarbon fractions, while Type B is comprised of the lighter, more mobile fractions such as those encountered in fuel oil and includes the F1, F2 and F3 hydrocarbon fractions. The dominant hydrocarbon type is defined by the percentage of the sum of F3 and F4, relative to the sum of F1 to F4 (total TPH). For Type A contaminated soil, the sum of F3 plus F4 must be greater than 70% of the total TPH concentration and the F2 concentration must be less than the F4 concentration.

Soil samples were collected in shallow test pits excavated by hand or in deeper test pits excavated using a small backhoe attachment mounted on an ATV (quadivator). A tag with a numerical identifier was placed where samples were taken to allow the position to be surveyed, and to allow location of the samples during the eventual site clean-up. The identifier on each tag corresponds to the individual sample number. Sequential tags were placed where more than one sample was taken at any particular location.

Samples were collected with a metal shovel or trowel that was cleaned between samples with a “soil wash” or wiped, as required. Samples were generally collected over a 0.3 m depth below ground surface (bgs) interval and the soil placed in jars provided by the laboratory. The jars were completely filled (no headspace) and the samples kept cool until shipment to the laboratory. Field duplicates were collected for approximately 10% of samples, given a separate numerical label and submitted blind to the laboratory. Typically, field duplicate pairs were collected at sample numbers 0/1 (e.g. 10/11). A review of quality assurance and quality control (QA/QC) for field and laboratory methodologies is provided in Section 3.11 and Table B8 in Appendix B.

Where the contaminant levels from the 1994 investigation were close to the remedial criteria, a surficial soil sample was collected at these locations in 2010 to confirm the contaminant levels. During the course of the 2010 investigation, additional areas where contamination was suspected were investigated.

The manner in which the investigation of PHC impacts was completed depended on whether the expected impacts were Type A (F3-F4 fraction), such as at lubricating oil stains, or fuel oil impacts Type B (F1, F2 and F3 fractions). Type A PHC impacts can often be defined by the limits of visual staining. Surficial and shallow depth soil samples were collected within the most heavily impacted area of the stain to identify maximum contaminant concentrations and the depth to which impacts persisted.

Type B (fuel oil) impacts were investigated with the collection of surface and depth samples. Initial sample locations were targeted to source areas such as POL pads. If impacts were identified in the source areas, then additional test pits were completed surrounding the source, targeted to intercept expected migration pathways. Although the excavation equipment did not generally allow for excavation of the full active layer depth, samples were collected as deep as could be achieved. The presence of staining or odour was also noted. Test pits were logged to identify soil types and saturation levels to assist in interpretation of data and contaminant migration pathways. Bulk soil samples were collected to determine grain size distribution in the primary hydrocarbon-impacted areas.

Contaminated soils that are regulated should be remediated and/or disposed of in compliance with the applicable regulations. Contaminated soils that are not regulated or deemed hazardous should be remediated to meet the DEW Line Clean Up Criteria (DCC) for Soil. Hydrocarbon impacted soils will be evaluated using the Remedial Objectives – Hydrocarbon Contaminated Soil – INAC Abandoned Military Sites included in the 2009 Protocol. Where multiple contaminants are present in the soils, the most conservative remedial option that addresses both contaminant types will be applied.

All soils with PCB concentrations of 50 parts per million (ppm) or higher are classified as PCB Waste under the Canadian Environmental Protection Act (CEPA 1999). Their handling and disposal are governed by the regulations, with a requirement for off-site disposal at a licensed facility. All soil with metal or PCB concentrations exceeding the DCC (but with PCB concentrations below CEPA) will be either disposed of off-site or encapsulated on-site.

Soil sampling around lobes of buried debris was carried out by targeting locations both upgradient and downgradient of the lobe. Downgradient sample locations were typically about 2 and 10 m from the edge of the lobe along the same pathway. Generally, samples were collected near surface and 0.3 m depth.

3.1.2 Results

The results of the contaminated soil delineation are described in the following sections, specifically where exceedances were detected. The contaminant perimeters (and estimated depths) were generated by assuming a linear rate of contaminant concentration decline between adjacent samples (i.e. the concentration difference between adjacent samples was divided by the distance between them to derive a rate of concentration decline/metre and determine the point at which the concentration would be equivalent to the criterion).

Complete summaries of the analytical results for the sample locations shown on the site drawings can be found in Tables B1 to B7 in Appendix B. An overall summary of the contaminated soil areas identified at CAM-A is presented in Table 3-1.

Table 3-1 - Summary of Contaminated Soil Areas at CAM-A

Location	Figure	Contaminants	Tier I			Tier II			PHC Type B			Comments
			Area (m^2)	Depth (m)	Volume (m^3)	Area (m^2)	Depth (m)	Volume (m^3)	Area (m^2)	Depth (m)	Volume (m^3)	
Beach POL	10	Type B PHCs	-	-	-	-	-	-	257.6	0.5	128.8	Delineated
		Type B PHCs	-	-	-	-	-	-	850	0.5-1.0	425	Not delineated
Garage	4	Tier II PCBs	-	-	-	18.5	0.5	9.25	-	-	-	Delineated laterally not vertically (assumed max depth of 0.5 m bgs)
			-	-	-	0.5	0.15	0.08	-	-	-	Delineated (contents of sump)
Mod Train	4	Tier I PCBs	39.5	0.2 (0.3-0.5)	7.9	-	-	-	-	-	-	Delineated laterally not vertically (assumed max depth of 0.5 m bgs)
		Tier II PCBs; Type B PHCs	-	-	-	71.6	0.3	21.48	571	1.0	571	Delineated
Sewage Outfall	6	Tier I PCBs	41	0.3	12.3	-	-	-	-	-	-	Delineated
			45	0.3	13.5	-	-	-	-	-	-	
			31	0.3	9.3	-	-	-	-	-	-	
Worked Area: Lobe J	7	Tier II Lead (Pb)	-	-	-	147.3	0.3	44.19	-	-	-	Delineated
Total Volumes (m^3)			**43 m^3**			**75 m^3**			**1,124.8 m^3**			**1,242.8 m^3 (Site total)**

3.1.2.1 Airstrip

The airstrip is located approximately 500 m north of the station area and in 1994 was noted to be in good condition with a few minor pieces of debris located near the east end (a few barrels, bolts, wood). Four (4) samples were collected in the airstrip area in 1994. Three (3) were on or adjacent to the airstrip and one (1) was in a drainage path away from the airstrip. No contamination was identified.

In 2010, the airstrip area was reviewed on site and there were no indications of surficial hydrocarbon impacts. Therefore, no samples were specifically collected in this area.

3.1.2.2 Barrel Area A & B

Two (2) barrel piles and one (1) former vehicle storage area were identified at the site in 1994. Barrel Pile A and associated vehicle storage area were located in the vicinity of Landfill A at the end of the access road, southwest of the station area. There were twenty-seven (27) barrels identified in Barrel Pile A, some of which were leaking. Associated with Barrel Pile A were such items as wooden pallets, a barrel stove heater, scrap metal, and a USAF truck box. In 1994, three (3) soil samples were taken from Barrel Pile A, one (1) amongst the barrels and two (2) in drainage paths from the pile.

Barrel Pile B was located at the beach, west of the beach POL area and consisted of about 285 barrels, some of which contained liquid. Other debris associated with the Barrel Pile B included scrap metal caps and a large wooden cable spool. In 1994, two (2) soil samples were collected from Barrel Pile B, one adjacent to the pile and one (1) in a drainage path from the pile.

A former vehicle/equipment storage area was located adjacent to the Barrel Pile B, some barrels that had been buried and were partially exposed. In 1994, two (2) soil samples were taken in the former vehicle/equipment storage area; one (1) was taken near the buried drums.

In the 2010 investigation, Barrel Areas A and B were reviewed on site and there were no indications of surficial hydrocarbon impacts, as most of the areas had grown over with vegetation. No barrels were noted to contain contents or to be leaking. Therefore, no samples were specifically collected in these areas. The locations of both areas have been identified in Figure 2.

3.1.2.3 Beach POL

The beach POL area, located approximately 800 m southeast of the station was relatively free of debris. The POL tanks were removed, but the concrete foundations for the tanks and the pipeline barrel markers were still in place. In 1994, approximately thirty (30) barrels were noted in this area.

In 1994, three (3) soil samples were taken in this area; one (1) was adjacent to the tank pads and two (2) were collected along drainage paths away from the POL area. It was noted that one of the samples had a distinct hydrocarbon odour, although no metal or PCB contamination was detected.

In the 2010 investigation, fifty-five (55) samples were collected from the Beach POL area for PHC analysis. Of those 55 samples; twenty-nine (29) were collected at a depth of 0.1 m bgs; four (4) were collected between depths of 0.3 m and 0.4 m bgs; thirteen (13) were collected at a depth of 0.5 m bgs; four (4) were collected between depths of 0.7 m and 0.9 m bgs; and fourteen were collected at a depth of 1.0 m bgs.

The PHC results indicate there are both Type A and Type B hydrocarbons around the beach POL, however only two (2) of the samples collected exceeded criteria. Sample 867 collected on the pad at a depth of 0.1 m bgs had a Type B PHC result of 2,538 ppm which exceeds criteria. It is not anticipated that this impact would extend off the pad as the pad is elevated from natural ground surface. The estimated aerial extent of the Type B PHC contamination on the Beach POL pad is approximately 257.6 m^2 at a depth of 0.5 m bgs. (Refer to Figure 10) The estimated volume of Type B PHCs is 128.8 m^3.

Sample 904, collected downgradient of the POL pad, did not exceed the criteria for Type B PHCs (result of 1,268 ppm), however due to its proximity to the ocean (within 30 m), it does exceed the criteria for F2 (result 1,160 ppm). The estimated aerial extent of the PHC contamination downgradient of the Beach POL pad is approximately 850 m^2 at a depth of 1.0 m bgs. It should be noted that the top 0.5 m of material in this area did not exceed criteria. The depth of contaminated soil is calculated as 0.5 m, assuming that the top 0.5 m layer of non-contaminated material may be stripped and replaced. (Refer to Figure 10) The estimated volume of Type B PHCs is 425 m^3.

In this area, permafrost was noted to range from 0.7 m to approximately 1.0 m below ground surface, with the Type B contamination typically extending down to permafrost. The result for bulk grain size sample collected with sample 960 indicated that 98.8% of the soil was greater than 75 microns in size, indicating the soils in the beach POL area are coarse grained. A summary of the analytical results is presented in Table B1 in Appendix B.

3.1.2.4 End of POL Pipe and/or Pipe Break

During the 2010 investigation, the length of the POL line was assessed to determine if there were any surficial stain areas, or locations where the pipe was broken, resulting in a potential spill. No locations were noted where the POL pipe appeared to have been cut. Contamination was not suspected along the POL pipe line.

3.1.2.5 Garage

In 1994, four (4) samples collected in the station proximity focused on the garage area. Although no metal contamination was noted, two (2) of the samples were noted to have a distinct hydrocarbon odour and one (1) of the two (2) samples had PCB concentrations that exceeded DCC Tier I. Of the samples analyzed in this area, one (1) sample taken from the east end of the garage foundation (G5109) contained PCBs that exceeded DCC Tier I (1.1 ppm).

As part of the 2010 investigation, forty-eight (48) soil samples were collected for PHCs, PCBs, and metals. One (1) of the samples was placed on hold. Of the forty-seven (47) samples analyzed, thirty-seven (37) were for PHCs only; twelve (12) were for PCBs only; and two (2) samples were analyzed for both PHCs and PCBs. Eleven (11) samples were analyzed for metals.

Of the twelve (12) samples analyzed for PCBs, seven (7) of the samples were surface samples taken at 0.1 m bgs; three (3) of the samples were subsurface samples taken at a depth of 0.3 m bgs; and two (2) of the samples were subsurface samples taken at a depth of 0.4 m bgs. All of the samples analyzed for metals were taken at a depth of 0.1 m bgs.

Of the thirty-eight (38) samples analyzed for PHCs, twelve (12) samples were surface taken at 0.1 m bgs; two (2) of the samples were subsurface samples taken at a depth of 0.3 m bgs; eleven (11) of the subsurface samples were taken at a depth of 0.4 m bgs; and twelve (12) of the subsurface sample were taken at a depth of 1.0 m bgs.

PCBs were detected at one sample location on the north side of the concrete garage pad. The results for sample 806 at a depth of 0.1 m was 17.7 ppm, which exceeds Tier II criteria and sample 807 (0.4 m) had a result of 5.19 ppm, also exceeding the Tier II criteria. This sample point is delineated laterally, but not vertically. It is assumed that the depth of contamination will not exceed 0.5 m bgs. The estimated aerial extent of the PCB contamination at the north end of the garage pad is approximately 18.5 m^2 at a depth of 0.5 m bgs. (Refer to Figure 4) The estimated volume of Tier II PCBs is 9.25 m^3.

Tier II metals and PCBs were detected on one sample location taken from material found in the sump on concrete garage pad. Sample 839 had concentrations that exceeded the criteria for cadmium (8.4 ppm); lead (840 ppm); zinc (2,870 ppm) and PCBs (18.4 ppm). There were two sumps located on the garage pad, the sumps were approximately 0.25 m^2 in size and 0.3 m deep. The layer of impacted material inside the sump was approximately 0.15 m in depth. The estimated volume of Tier II material for both sumps is 0.08 m^3.

Both Type A and Type B PHCs were detected around the garage; however, the results were all below the INAC Criteria. The analytical results for metals analysis did not indicate any concentrations that were elevated above INAC Criteria. A summary of the analytical results is presented in Table B3 in Appendix B.

3.1.2.6 Module Train

In 1994, six (6) soil samples were collected in the module train area. Although no metals or hydrocarbon odours were noted, one (1) sample exceeded DCC-II criteria for PCBs.

In 2010, samples were collected at surface and shallow depth to delineate PCBs. Test pitting over the full depth of the active layer was completed at the powerhouse end of the building to investigate hydrocarbon impacts. In the 2010 investigation, forty-seven (47) samples were submitted for PHCs, PCBs and metals analysis from the former module train area (Refer to Figure 4). Of the 47 soil samples submitted for analysis; thirty-seven (37) were submitted for PHCs; fourteen (14) were submitted for PCBs and eleven (11) were submitted for metals. Nineteen (19) of the samples were collected at a depth of 0.1 m bgs; eight (8) samples were between depths of 0.3 m to 0.4 m bgs; ten (10) samples were collected between depths of 0.5 m to 0.6 m bgs; and ten (10) samples were collected between depths of 0.9 m to 1.0 m bgs.

PCBs were detected in two (2) testpit locations. The results for samples 1310, 1311 and 1313 taken at a depth of 0.1 m bgs were above Tier II criteria (6.88 ppm, 6.89 ppm, and 8.21 ppm respectively). The results for sample 1312, collected at 0.3 m bgs was above Tier I criteria (2.26 ppm). All other results for PCBs were below the INAC Criteria.

The impacts in this area are delineated laterally, but not vertically. It is assumed that the depth of contamination will not exceed 0.5 m bgs. The estimated aerial extent of the Tier II PCB contamination at the west end of the module train foundation is approximately 71.6 m^2 at a depth of 0.3 m bgs. The estimated volume of Tier II PCBs is 21.48 m^3. The estimated aerial extent of the Tier I PCB contamination at the west end of the module train foundation is approximately 39.5 m^2 at a depth of 0.2 m bgs (between 0.3 m and 0.5 m bgs). The estimated volume of Tier I PCBs is 7.9 m^3.

PHCs were detected in some of the testpits surrounding the module train foundation. The exceedance of PHCs criteria was noted in two (2) testpit locations in three (3) samples analyzed. The results for sample 1297 collected at 0.1 m bgs was 5670 ppm for Type B PHCs. The results for sample 1295 and 1298, collected at 0.5 m bgs were 4503 ppm and 6630 ppm Type B PHCs respectively. This hydrocarbon plume is not anticipated to extend off the pad, as noted in the adjacent testpitting program completed for the nearby station POL. The estimated aerial extent of the PHC contamination at the east end of the module train foundation is approximately 571 m^2 at a depth of 1.0 m bgs. The estimated volume of Type B PHCs is 571 m^3.

The analytical results for metals analysis did not indicate any concentrations that were elevated above INAC Criteria. A summary of the analytical results is presented in Table B3 in Appendix B.

3.1.2.7 Sewage Outfall

The sewage outfall area is located to the northwest of the module train. The barrel markers, portions of the pipeline, and wooden supports were still in the channel area. The outfall path was identified as a distinct, well defined channel extending approximately 300 m to a lagoon area. Six (6) samples were collected from the outfall area during the 1994 site investigation. Two (2) samples contained concentrations of PCBs that exceeded DCC Tier I Criteria. O5100, a sample from the beginning of the outfall and O5103, a sample from near the end of the outfall contained PCBs (1.9 and 1.4 ppm respectively) in excess of DCC Tier I. Remaining samples in the area were noted to be less than DCC Criteria but considerably higher than background.

In 2010, a total of one hundred and eleven (111) soil samples were taken in the outfall area, of those eighty-two (82) soil samples were placed on hold at the laboratory. Of the twenty-nine (29) samples analyzed twenty-one (21) were surface samples taken at a depth of 0.1 m bgs and eight (8) were subsurface samples collected at a depth of 0.3 m bgs. In an effort to obtain delineation, the sampling grid included sampling of the centre of the channel; the toe of the channel slope; top of channel slope; and an approximate five (5) metre setback from the top of the channel slope. The 2010 investigation focused on the assessment of PCB and inorganics (metal) impacts.

The results of the 2010 investigation identified Tier I PCBs in three (3) locations along the length of the sewage outfall channel. The Tier I impacts were limited to exceedances in three (3) surficial soil samples, and are delineated. The estimated aerial extent of the contamination at the south end of the channel is approximately 31 m^2 at a depth of 0.3 m bgs (volume of 9.3 m^3). The estimated aerial extent of the contamination located in the middle of the channel is approximately 45 m^2 at a depth of 0.3 m bgs (volume of 13.5 m^3). The estimated aerial extent of the contamination near the north end of the channel is approximately 41 m^2 at a depth of 0.3 m bgs (volume of 12.3 m^3). (Refer to Figure 6) The total estimated volume of Tier I PCBs is 35.1 m^3.

The result for grain size taken with sample 348 indicated that 96.2% of the soil was greater than 75 microns in size, which indicates the grain size is coarse. The analytical results for metals analysis did not indicate any concentrations that were elevated above INAC Criteria. A summary of the analytical results is presented in Table B2 in Appendix B.

3.1.2.8 Station POL

All four (4) previous POL tanks have been removed from the site. The pumphouse and pipeline have also been removed; however the foundations are still in place. In 1994 three (3) samples collected in the station proximity focused on the POL area. Although no metal or PCB contamination was noted, two (2) of the samples were noted to have a distinct hydrocarbon odour. The potential for hydrocarbon impacts specifically and DCC Criteria in this area was assessed in 2010.

In the 2010 assessment, sixty-five (65) samples were submitted for PHC analysis. Of the 65 samples submitted; twenty-four (24) were collected at depth of 0.1 m bgs; two (2) were collected at a depth of 0.25 m bgs; seven (7) were collected at a depth of 0.4 m bgs; fourteen (14) were collected at a depth of 0.5 m bgs; eight (8) samples were collected between depths of 0.6 m to 0.8 m bgs; and ten (10) subsurface soil samples were collected at a depth of 1.0 m bgs. (Refer to Figure 5)

The PHC results indicate there were both Type A and Type B hydrocarbons noted in the area; however, none of the samples exceeded the criteria for PHCs. The depth of samples varied in the area, as groundwater was noted to be very shallow in some testpit locations. Permafrost was typically found in the range of 0.7 to 1.0 m below grade. A summary of the analytical results is presented in Table B3 in Appendix B.

The result for grain size taken with sample 978 indicated that 87.5% of the soil was greater than 75 microns in size, which indicates the soils in the station POL area are coarse grained.

3.1.2.9 Warehouse

Two (2) samples were collected in the warehouse vicinity in 1994; no contamination was detected. Hydrocarbon impacts were expected to be primarily Type B, and expected to have been on the side of the warehouse where the diesel supply tanks would have been located.

In the 2010 investigation, a total of thirty-four (34) soil samples were collected in a halo pattern surrounding the warehouse foundation. All of the 34 soil samples collected were submitted for PHCs and surface samples were submitted for metals. Of those 34 samples; thirteen (13) were collected from a depth of 0.1 m bgs; seven (7) were collected from a depth of 0.4 m bgs; five (5) were collected from a depth of 0.5 m bgs; and nine subsurface samples were collected from a depth of 1.0 m bgs.

The testpitting surrounded the entire warehouse foundation, with additional testpitting completed near the northwest corner of the pad near the former diesel fuel ASTs. The results indicate that there were both Type and A and Type B PHCs within the area, however none of the samples exceeded the INAC criteria for PHCs. (Refer to Figure 4) The analytical results for metals analysis did not indicate any concentrations that were elevated above INAC Criteria. A summary of the analytical results is presented in Table B3 in Appendix B.

The result for grain size taken with sample 859 indicated that 95.3% of the soil was greater than 75 microns in size, which indicate the soils in the warehouse area are coarse grained.

3.1.2.10 Worked Areas

Lobe I, Figure 7

In 2010, a sampling program was completed in the surface debris area identified as Lobe I. In 1994, a sample taken in this area indicated an exceedance of cadmium. In 2010, fourteen (14) soil samples were collected in a halo pattern surrounding the debris area. Two (2) of the samples were analyzed. The results indicate that there were no metals exceedances. A summary of the analytical results is presented in Table B4 in Appendix B.

Lobe J, Figure 7

In 2010, a sampling program was completed in the surface debris area identified as Lobe J. A total of twelve (12) soil samples were collected in a halo pattern surrounding the debris area. Nine (9) of the samples were analyzed. The results indicate that there was Tier II exceedances of lead in the center of the area (sample 1354, 543 ppm). The

Tier II exceedance has been delineated. The estimated aerial extent of the contamination is approximately 147.3 m^2 at a depth of 0.3 m bgs. The estimated volume of Tier II soil is 44.19 m^3. A summary of the analytical results is presented in Table B4 in Appendix B.

Lobe M (northwest of Station Area), Figure 11
In 2010, a sampling program was completed in the surface debris area identified as Lobe M. A total of ten (10) soil samples were collected in a halo pattern surrounding the debris area. Two (2) of the samples were analyzed. The results indicate that there were no exceedance metals or PCBs. A summary of the analytical results is presented in Table B4 in Appendix B.

3.2 Assessment of Existing Buried Debris Areas (Dumps)

The assessment of dumps at CAM-A was completed with the goal of classifying the buried debris areas according to the three categories specified under the INAC Abandoned Military Site Remediation Protocol, which are:

Class A: Waste disposal area (WDA or buried debris) 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.

3.2.1 Methodology

Prior to the field investigation, historical air photos taken during site operation in 1964 were reviewed to identify potential buried debris locations in addition to those previously identified. In general, these areas are associated with disturbed ground not associated with borrow extraction. The identification and limits of these areas were used to target areas for geophysical surveys, and were referred to in the site investigation plan as ‘areas to be investigated’.

Upon arrival on site, each of the potential buried debris locations was ground-truthed to confirm that geophysical surveys were required, and if so, the geophysical survey boundaries were laid out on the ground with pin flags. The geophysical survey was completed using a GSM-19 Overhauser Effect Gradiometer with integrated GPS. The total field and vertical magnetic gradient survey data were collected at 1 second intervals as the operator walked over areas suspected of containing buried metallic debris. The magnetic survey data was used to identify the size and configuration of the buried debris. The magnetic anomaly perimeters were laid out in the field with pin-flags and the lobes identified alphabetically, i.e., Lobe A, prior to the commencement of the intrusive investigations. Each anomaly perimeter was modified as required to omit areas where metallic surface debris was situated within the surveyed area. The locations of the pin flags were surveyed before their removal upon completion of the site investigation.

To investigate a buried debris location as a potential contaminant source, soil samples were collected up and downgradient of the anomalies. Downgradient concentrations of naturally occurring inorganic elements (inorganics), were compared with upgradient concentrations, as well as average concentrations for all buried debris assessment samples at the site to identify potential contaminant migration away from the lobes. Where a downgradient concentration was three times the concentration of the average, it was flagged as potential evidence of contaminant migration and further investigated in terms of its location, whether there was continued evidence of contaminant migration further downgradient, and whether there were multiple elevated contaminants. If any anthropogenic contaminants were detected in downgradient samples, this was considered evidence of contaminant migration, unless there was an upgradient source (whose inputs would be captured by the upgradient sample).

Where potential contamination was suspected based on staining or specific debris exposure, samples were also collected to identify and delineate contamination. To help in establishing the environmental risk a particular buried debris area poses, information regarding downgradient aquatic and terrestrial habitat was noted, as well as physical characteristics that affect the potential for contaminant migration. The geotechnical stability of the buried debris location was also assessed. Evidence of, or potential for, erosion or slope failure was assessed at each location.

3.2.2 Geophysical Results

There were fourteen (14) buried debris areas identified on site in the 2010 field investigation at CAM-A. Each of these is described below:

Airstrip

- No buried debris areas were identified in this location during the geophysical field investigation. The area was assessed as a surface debris area.

Beach POL (Lobes S & T, Figure 10)

- No buried debris areas were identified in this area during the geophysical field investigation. The area was assessed for surface debris.
- During the post-field data processing, Associated Geosciences identified two (2) lobes with a relatively low magnetic response. The lobes are identified in Figure 10 as Lobes S and T. Based on the results of the investigation for surface debris, these lobes are considered to be surface debris areas and were assessed as such during the field program.

East of Station Area (Lobes N & O, Figure 2)

- Two (2) buried debris lobes were identified in this location during the geophysical field investigation, however, it was determined that these areas of localized partially buried debris and surface debris would be assessed as a surface debris area rather than a buried debris area.

Landfill A (Lobes A, B, C, D & E, Figure 8)

- Five (5) lobes of buried debris were identified in this area during the geophysical field investigation.
- Lobes A through D were clustered in a central location on a mound of material elevated from the surrounding topography. These four (4) lobes were assessed as part of the WDA assessment for Landfill A.
- Lobe E was identified in the field, however, it was determined that this area of localized partially buried debris and surface debris would be assessed as a surface debris area rather than a buried debris area.

Landfill B (Lobes F, G & H, Figure 9)

- Three (3) lobes of buried debris were identified in this area during the geophysical field investigation.
- Lobes F through H were identified as three separate lobes which appeared mounded from the surrounding topography. These three (3) lobes were assessed as apart of the WDA assessment for Landfill B.

Northwest of Station Area (Lobe M, Figure 11)

- One (1) lobe of buried debris was identified in this location during the geophysical field investigation, however, it was determined that this area of localized partially buried debris and surface debris would be assessed as a surface debris area rather than a buried debris area.

- Based on the staining noted near empty barrels in this area, surface and subsurface sampling was completed for Lobe M.

South of Station Area, Former Inuit Pad (Lobes P, Q & R, Figure 2)

- No buried debris areas were identified in this location during the investigation. The area was assessed as a surface debris area rather than a buried debris area.

Worked Area (Lobes I, J, K, L, Figure 7)

- Three (3) lobes were identified in this location during the geophysical field investigation, however, it was determined that these areas of localized, partially buried debris and surface debris would be assessed as a surface debris area rather than a buried debris area.
- The fourth lobe, Lobe L, was identified during post-field data processing by Associated Geosciences. Based on the results of the investigation for surface debris, this lobe has been assessed as surface debris areas rather than a buried debris areas.
- Surface and subsurface sampling was completed for Lobes I and J.

The results of the dump assessments and estimates of material volumes assumed to be associated with the waste component breakdowns are summarized in Table 3-2. Sampling for landfill lobes was completed with one testpit immediately at the toe of the lobe (approximately 2 m downgradient, when toe is well defined); and downgradient sampling with two (2) rows surrounding the lobe in a "halo" pattern. The first row of testpits was located approx. 6 to 8 m downgradient, with ten (10) m spacing between testpit locations. Three (3) testpits were also completed upgradient of the landfill lobes. The results of the assessment and the specific volumes associated with the waste component breakdowns are summarized in Table 3-2.

Table 3-2 - Existing Buried Debris Area Assessment Summary

Area	Landfill A	Landfill B
Lobes	**Four (4) lobes within one mound (Lobes A, B, C, D)**	**Three (3) distinct lobes (F, G & H)**
Reference Figure	Figure 8	Figure 9
Reference Photo	E-101, E-107, E-108, E-109	E-95, E-96, E-97, E-98, E-99, E-100
Estimated Aerial Extent	1,500 m^2 (30 m x 50 m) Landfill is a mounded, well defined and covered.	Landfill lobes are mounded, well defined and mostly covered. F: 208 m^2 (8 m x 26 m); G: 495 m^2 (33 m x 15 m); and H: 128 m^2 (4 m x 32 m)
Estimated Depth	Lobe is raised from surrounding land. Approximately 1.5 to 2.0 m above existing ground. (2,625 m^3)	Lobes are raised from the surrounding land. Approx. depth above existing ground: Lobe F: 1.0 m (208 m^3); Lobe G: 1.5 m (743 m^3); and Lobe H: 0.5 m (64 m^3)
Estimated Volume of Hazardous Material (1%)	26 m^3	Lobe F: 2.1 m^3; Lobe G: 7.4 m^3; Lobe H: 0.6 m^3
Estimated Volume of Non-Hazardous Material (20%)	525 m^3	Lobe F: 42 m^3; Lobe G: 149 m^3; Lobe H: 13 m^3
Estimated Volume of Tier I Contaminated Soils (10%)	263 m^3	Lobe F: 21 m^3; Lobe G: 74 m^3; Lobe H: 6 m^3
Estimated Volume of Tier II Contaminated Soils (10%)	263 m^3	Lobe F: 21 m^3; Lobe G: 74 m^3; Lobe H: 6 m^3;
Estimated Volume of Clean Fill	1,811 m^3	Lobe F: 123 m^3; Lobe G: 439 m^3; Lobe H: 38 m^3
Evidence of contaminate migration	No	No
Potential barriers to contaminant migration	No Topography d/g is slightly hummocky	No Topography d/g is slightly hummocky

Presence of Exposed Debris	Yes, both surface and partially buried (metal, barrels, domestic glass & tin cans)	Yes, both surface and partially buried (metals noted)
Slope of area (Topography)	Gentle slope towards south towards the ocean	Gentle slope towards south and west towards the ocean
Soil/sediment type (Cover Material)	Large cobbles on surface, mostly coarse sand. Some gravel and organics	Large cobbles on surface, mostly coarse sand. Some gravel and organics
Evidence of Erosion	No	No
Distance to drainage course	No distinct drainage channels noted.	No distinct drainage courses were noted; however, a small drainage pattern noted approximately 25 m d/g of Lobe G.
Drainage (Active or Dry)	Dry	Dry
Distance to standing freshwater body	Surface water body to south (~90 m). Surface water to west (~175 m).	One surface water body to the west (~90 m from Lobe G).
Approximate size of standing freshwater body	Range in size from approx. 400 m^2 to 5,000 m^2. (Both are shallow.)	Approximately 900 m^2 (shallow)
Description of significant aquatic life in standing freshwater body	No aquatic life noted.	No aquatic life noted.
Distance to marine environment	Approx. 600 m	>750 m
Percent Vegetation Cover downgradient (d/g) and distance to vegetation cover	First 20 m d/g: approx. 50% vegetation coverage. Greater than 20 m d/g from toe of lobe, veg. coverage is >90%. It should be noted that the surface area d/g was scraped for material to cover the landfill.	Approx. vegetation coverage: 60% for Lobe F; 90% for Lobe G; 90% for Lobe H Distance to vegetation coverage: 20 m d/g for Lobe F; at the toe for Lobe G; and at the toe for Lobe H. It should be noted that the surface area d/g of Lobe F was scraped for material to cover the landfill.
Type of vegetation	Typical for site (willows, sedges, moss)	Typical for site (willows, sedges, moss)
Evidence of stressed vegetation	No (n/a)	No (n/a)
Description of burrowing animals in contaminated area.	No burrows noted (n/a)	No burrows noted (n/a)
Description of birds and animals at the site.	Birds (snow buntings). Muskox and hare droppings were noted.	Birds (snow buntings). Muskox and hare droppings were noted.
Evidence of human presence.	No	No
Distance to permanent community	n/a	n/a
Distance to temporary community	n/a	n/a
Comments	Class C: The WDA is in a 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.	Class C: The WDA is in a 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.

3.2.2.1 Analytical Results - Landfill A

Two (2) landfill areas were identified on site in 1994. Landfill A, the main landfill is located at the west end of the access road, southwest of the station area. Six (6) soil samples were collected from Landfill A; four (4) around the toe and two in drainage areas. The samples collected in 1994 for this landfill contained levels of PCB and inorganic elements that were compatible with background levels.

In total sixty-one (61) soil samples were taken in the Landfill A area, of those forty-two (42) soil samples were placed on hold at the laboratory. All of the nineteen (19) samples analyzed were surface samples taken at a depth of 0.1 m bgs. In an effort to obtain delineation, the sampling grid was completed in a halo pattern downgradient of the lobe identified. Six (6) surface and subsurface samples were taken upgradient of the lobe at three (3) testpit locations. Of the six (6) samples taken upgradient, only the three (3) surface samples were analyzed. The 2010 investigation focused on the assessment of inorganics and PCBs. There were no staining or odours noted during the investigation, there was no reason to suspect hydrocarbon impacts in the sampling program. The results of the 2010 investigation did not identify any impacts or exceedances above criteria for either inorganics or PCBs. (Refer to Figure 8). A summary of the analytical results is presented in Table B5 in Appendix B.

The bulk sample result from Landfill A indicates the grain size is coarse. The result for grain size taken with sample 378 indicated that 99.3% of the soil was greater than 75 microns in size.

3.2.2.2 Analytical Results - Landfill B

Landfill B was located west of the station area and north of Landfill A. There are three (3) lobes to this landfill. Some debris is exposed in the landfills including treads, cables, barrels, metal straps, wood, bed frames, tin cans, and piping. Seven (7) soil samples were collected from Landfill B, four (4) around the lobes of the landfills and three (3) in the drainage area. In 1996, there were three lobes identified with Landfill B. The samples collected in 1994 for this landfill contained levels of PCB and inorganic elements that were compatible with background levels.

In total seventy-four (74) soil samples were taken in the Landfill B area, of those forty-seven (47) soil samples were placed on hold at the laboratory. All of the twenty-seven (27) samples analyzed were surface samples taken at a depth of 0.1 m bgs. In an effort to obtain delineation, the sampling grid was completed in a halo pattern downgradient of the three (3) lobes identified. Six (6) surface and subsurface samples were taken upgradient of the lobes at three (3) testpit locations. Of the six (6) samples taken upgradient; three (3) surface samples were analyzed. The 2010 investigation focused on the assessment of inorganics and PCBs. There were no staining or odours noted during the investigation, there was no reason to suspect hydrocarbon impacts in the sampling program. The results of the 2010 investigation did not identify any impacts or exceedances above criteria for either inorganics or PCBs. (Refer to Figure 9) A summary of the analytical results is presented in Table B5 in Appendix B.

3.3 Assessment of Surface Debris and Barrels

3.3.1 Surface Debris Assessment

In 1994, scattered debris observed onsite consisted mainly of building materials (mainly in the station area) and the felled radar antenna. Existing information also indicated that there were a couple of dilapidated houses located on the beach northeast of the station with associated debris.

A surface debris inventory was completed by collecting hand-held GPS waypoints where debris was visible or where debris fields appeared to terminate. At CAM-A, there are essentially two large scattered debris areas, one which encompasses the station pad, surrounding area and beach area; and the other debris area is northeast of the site near the former Inuit houses. A total volume and description of debris types was recorded for each debris area. Photos were taken for all major areas of surface debris. Where debris was identified sporadically within a large area, an individual description will be provided on the drawings as a reference to aid in locating these locations during site clean-up.

Table 3-3 presents an inventory of surface debris by location. It should be noted that the surface debris covered extensive areas, in particular in the vicinity of the station area. While there is always the potential to miss debris during the investigation, it is felt that the majority of the areas containing debris have been identified. The extent of debris in some locations, however, prevented a detailed inventory from being completed. In many areas, extensive hand picking of small debris will be required during site clean-up.

3.3.2 Barrel Assessment

Approximately 680 barrels were identified and checked at CAM-A during the 2010 assessment. Most of the barrels were concentrated within Barrel Storage Areas A and B; along the POL Line, (which were used as markers); and within the extents of the debris area. All of the barrels identified at CAM-A were empty, including those located at the Barrel Storage Areas. No barrel samples were collected.

Table 3-3 - Summary of Surface Debris Areas

Figure	Location	Description	Photos	Waypoint	Estimated Areal Extent (m^2)	Estimated Uncrushed Volume (m^3)	Estimated Crushed Volume (m^3)	Estimated Crushed Hazardous Volume (m^3)
2	Marker Barrels	POL markers (39) or conduit markers (29)	E-66	-	-	68 m^3	13.6 m^3	-
8	Barrel Area A	Barrels (35)	E-102-E-106	-	-	35 m^3	7 m^3	-
2	Barrel Area B	Barrels (284)	E-82, E-83	W-005	-	284 m^3	56.8 m^3	-
	Barrel Area B	Large wooden cable spool	E-84	W-006	2 m^2	6 m^3	3.1 m^3	-
Debris Area								
2	Airstrip threshold Lights	One (1) light standard (threshold light) consisting of one (1) 15 m steel channel, two (2) 5 m long round pipes, galvanized cables, and a wood marker.	E-66	W-232, W-234	2 m^2	1 m^3	1 m^3	-
2	Debris - Beach	Barrels (63)	-	-	-	63 m^3	12.6 m^3	-
	Debris - Beach	Wood debris	E-80	W-301	2 m^2	0.5 m^3	0.25 m^3	-
	Debris - Beach	Scrap metal	-	W-302	0.5 m^2	0.25 m^3	< 0.25 m^3	-
	Debris - Beach	Wood pallet	E-81	W-303	1 m^2	0.5 m^3	0.25 m^3	-
	Debris - Beach	Angle iron (metal stand)	E-79	W-328	3 m^2	1 m^3	0.25 m^3	-
8	Debris – Landfill A	Barrels (6)	-	-	-	6 m^3	1.2 m^3	-
	Debris – Landfill A	Metal garbage can	E-108	W-133	0.5 m^2	0.5 m^3	0.25 m^3	-
	Debris – Barrel Area A	Vehicle debris & scrap metal	E-105	-	2 m^2	0.6	0.6	-
9	Debris – Landfill B	Barrels (10.5)	-	-	-	10.5 m^3	2.1 m^3	-
	Debris – Landfill B	Partially buried cat track	E-95	W-166	3 m^2	4 m^3	2 m^3	-
	Debris – Landfill B	Partially buried/crushed 5 gal metal pails (30)	E-97	W-169	5 m^2	3 m^3	0.6 m^3	-
2	Debris – Station & Worked Area	Barrels (113)	E-87	W-067, W-073 to W-075	-	113 m^3	22.6 m^3	-
	Debris - Station	Wood pallets (3)	E-63	W-253	9 m^2	0.6 m^3	0.5 m^3	-
	Debris - Station	Wood cable roll; scrap iron, tire (1); wood and steel debris	E-64	W-255	2 m^2	0.5 m^3	0.25 m^3	-
	Debris - Station	Concrete debris	E-65	W-257	0.5 m^2	0.25 m^3	0.25 m^3	-
	Debris - Station	Channel iron; steel pipe	E-19	W-263	1 m^2	0.5 m^3	0.25 m^3	-
	Debris - Station	Tin cladding; scrap iron	E-20	W-264	2 m^2	4.3 m^3	3.5 m^3	-
	Debris - Station	Steel pipe; angle iron	E-21	W-267	1 m^2	0.5 m^3	0.25 m^3	-
	Debris - Station	Wood & metal debris	E-62	W-198	18 m^2	3 m^3	2 m^3	-
	Debris - Station	Concrete antenna anchor pad x 6 pads; (3.6 m x 3.2 m x 0.6 m)	E-78	W-179	69 m^2	42 m^3	42 m^3	-
	Debris - Station	Metal post 0.55 m stick-up	E-88	W-089	-	0.25 m^3	< 0.25 m^3	-
	Debris - Station	Steel pipe	E-90	W-098	4.2 m^2	1 m^3	0.5 m^3	-
2	Debris – Worked Area	Steel pipe	E-76	W-187	1.6 m^2	0.5 m^3	0.25 m^3	-

Figure	Location	Description	Photos	Waypoint	Estimated Areal Extent (m^2)	Estimated Uncrushed Volume (m^3)	Estimated Crushed Volume (m^3)	Estimated Crushed Hazardous Volume (m^3)
	Debris – Worked Area	Steel pipe	E-75	W-188	0.25 m^2	0.25 m^3	< 0.25 m^3	-
7	Debris – Worked Area	Steel Debris/battery cells (4)	E-71, E-72 to E-74	W-189	4 m^2	1.5 m^3	-	1.2 m^3
Inuit House Area								
13	Inuit House Area	Barrels (102)	E-112-E119	-	-	102 m^3	20.4 m^3	-
					TOTALS	**754 m^3**	**195.1 m^3**	**1.2 m^3**

3.4 Demolition Assessment

With the exception of one portion of the module train, no buildings remain standing on the site. Only the concrete and wood timber foundations of the former buildings remain at CAM-A. Facilities that were inventoried at the CAM-A site in 2010, include the remaining module train section, foundations, the sewage outfall pipe and markers, and any miscellaneous remaining structures.

Non-hazardous materials can be landfilled on-site, while hazardous materials should be containerized and shipped off-site for disposal at a licensed facility, or in the case of asbestos, double-wrapped in plastic and buried in an on-site, engineered facility. Typical hazardous materials that can be expected at the site include batteries, waste oil, residual sludge, PCB oil containing equipment, fire extinguishers, substrates painted with PCB amended paint, concrete contaminated by PCB oil, mercury (switches), and substrates painted with leachable lead paint. Asbestos coated with PCB amended paint will be identified as a separate item during the assessment as it requires separate disposal from other PCB waste.

The INAC Protocol states that PCB painted materials are considered regulated under CEPA when the component (paint and substrate) contains greater than 50 ppm total. However, PCB Regulations (SOR/2008-273) that came into effect on September 17, 2008 in Part 1 Section 1(2) state that, “For the purposes of these Regulations, if a solid or a liquid containing PCBs is composed of several matrices, the concentration of PCBs is based on the mass of the matrix in which the PCBs are located.” This means that for classification of waste painted with PCB amended paint, the mass of the substrate cannot be factored in with the mass of the paint to determine a total PCB concentration for the painted item as a whole, as has been done in previous assessments.

AECOM understands that Environment Canada will be coming out with a guidance document that states that the mass of the substrate can be used as a factor in the mass calculations for the total PCB concentration, as stated in the INAC Protocol in the near future. It is anticipated that the amendment may be available by the end of 2010 and may be included in the Remediation Action Plan. However, until such time when the official guidance document is available and for the purpose of this document, the substrate has not been factored in for PCB containing materials.

3.4.1 Methodology

The demolition investigation conducted an inventory of the site facilities that would require dismantling for disposal. The investigation noted the construction, and any anticipated special disposal requirements, with the collection of samples for applicable analysis to confirm disposal requirements. The following lists the components of the completed demolition assessment:

- Inventory existing buildings; confirm size, foundation and construction material.

- Identify and estimate quantity of hazardous and non-hazardous materials.
- Confirm the identity of potentially contaminated PCB amended painted materials (PAP) with collection of paint samples and note the amount of paint coverage.
- Identify all asbestos-containing material; note where asbestos material is painted with PAP.
- Confirm the identity of potentially leachable lead material with collection of painted substrate samples.
- Confirm number, size, and construction material of roadway culverts.

3.4.2 Demolition Assessment Results

There was one facility remaining at the CAM-A site which was identified for demolition, the powerhouse module from the module train. In addition, the tower and remaining sections of the POL line and communication cables will need to be removed. Twelve (12) paint samples were collected at CAM-A to assess PCB and lead concentrations; two (2) from the tower, two (2) from the warehouse and eight (8) from within the powerhouse module. The location, colour, substrate and percent coverage were also noted.

In 1994 one of three swab samples taken from the remaining section of the module train was analyzed for PCBs. The PCB concentrations were well below the guideline value. Also in 1994, one (1) floor tile was sampled from the module train section and analyzed for asbestos. The percentage of chrysotile asbestos detected was in the range of 1-5%. Four (4) insulation pieces were sampled and analyzed for asbestos content. Chrysotile asbestos was detected in the range of 25-50% for two samples: door insulation material from the module train section and a wall board material taken from around the warehouse foundation. Two (2) samples consisting of insulation around the boiler on the garage foundation and pipe insulation from the module train section were both found to contain more than 75% chrysotile asbestos.

Eight (8) concrete samples were collected, two (2) from the warehouse foundation, four (4) from the garage foundation and one (1) from the section of the module train floor. Eight (8) asbestos samples were collected, four (4) from debris associated with the warehouse, two (2) from the boiler on the garage pad, and two (2) from insulation in the section of the module train. Table 3-4 presents a summary of the demolition requirements at CAM-A.

Table 3-4 - Demolition Requirements

Material/ Structure	Photo	Description	Hazardous Material	Estimated Hazmat (m^3) (crushed)	Estimated Non-Haz (m^3) (crushed)	Comments
Radar Tower						
Painted surface	E-56, E-57	Painted steel pipe and triangular cross beam construction antenna. Cross section is approx. 66 m x 5 m x 5 m. Samples MAT-01 & MAT-02.	No	n/a	Steel: 165 m^3 *(1650 m^3 uncrushed)*	Paint samples were non-detect for PCBs and below 5 mg/L for leachable lead.
Module Train						
Section of Module Train building	E-22 to E-43 MAT-23 (E-38)	Module train section is L: 12 m x W: 8 m (96m^2) x H: 4.6 m. Paint – exterior (MAT-23 & MAT-24) Building had a Timber crib foundation. Exterior is metal cladding. Plywood walls (both interior and exterior.	Yes, PCB paint, both adhered and flaked on the walls.	<u>PCBs:</u> Plywood: 7.1 m^3; Metal: 0.7 m^3 *(2.9 m^3 uncrushed)*	Insulation: 28 m^3 *(57 m^3 uncrushed)* Misc. 3.3 m^3	Exterior paint exceeds CEPA, 763 ppm (MAT-23) and 190 ppm (MAT-24). Paint is below 5 mg/L for leachable lead.

Material/ Structure	Photo	Description	Hazardous Material	Estimated Hazmat (m^3) (crushed)	Estimated Non-Haz (m^3) (crushed)	Comments
		Approx. 0.15 m thick walls are insulated. Miscellaneous ducting, cables, structural steel for equipment, wiring, light fixtures (no bulbs) and wood doors.				
	E-39 to E-43, E-37	The building contained electrical cabinets; three (3) CO^2 tanks; two (2) generators; two (2) furnace fans two (2) diesel tanks. Paint – interior (MAT-17, MAT-18, MAT-19, MAT-20, MAT-21, MAT-22) Asbestos (ACM) pipe wrap & tank insulation.	Yes, PCB paint, both adhered and flaked on the walls, ceiling, interior structures such as tanks and generators. Yes, Asbestos (ACM).	<u>PCBs</u>: Walls: 11.3 m^3; Tanks: 0.7 m^3 *(3 m^3 uncrushed)* Generator 1 m^3 *(2 m^3 uncrushed)* Tanks: 0.24 m^3 *(2.4 m^3 uncrushed)*	ACM: 1.8 m^3	PCB paint exceeds CEPA (261,100 ppm, 1,310 ppm, 11,100 ppm, 162 ppm, 1,280 ppm, and 11,100 ppm respectively) Paint is below 5 mg/L for leachable lead. ACM: MAT-27, MAT-28, MAT-29, MAT-90
	E-43, E-35, E-36	Concrete 0.1 m thick (MAT-17, MAT-25 & MAT-26)	Yes, PCB concrete	PCBs: 9.6 m^3		PCB concrete exceeds CEPA (261,000 ppm, 250 ppm, 473 ppm respectively)
Module Train Foundation	E-12	Eighteen (18) 9x9 timber beams, 11 m in length. Foundation covers an area of L: 24.6 m x W: 8.6 m (211.6 m^2)	No, creosote levels were not of a concern (MAT-31).	n/a	10.35 m^3	
Associated debris	E-58	Four (4) 9x9 timber beams, 2 m in length; fourteen (14) 2x4 timbers, 2 m in length.	No	n/a	0.56 m^3	
	E-60	Plywood, entrance to module train 4 m x 1.5 m hollow wooden entrance with 2x4 wood frame (10 cm thick). Three (3) support beams (9x9 timbers) of 3 m length are associated with the entrance.	No	n/a	3.7 m^3 *(4 m^3 uncrushed)*	
	E-62	Four (4) 9x9 timbers of 9 m length; metal basin 0.65 m x 70 cm x 30 cm (0.04 m thick)	No	n/a	1.9 m^3 *(2 m^3 uncrushed)*	
Garage						
Foundation	E-13, E-14, E-15, E-47, E-46, E-45, E-44	12.5 m x 10.2 m pad, 0.1 m thick, (12.75 m^3) concrete floor with two grates on the pad Four (4) concrete samples were taken on the pad. ¼ of the concrete (MAT-14) exceeded Tier I PCBs, 1.02 ppm; ½ the pad (MAT-15, MAT-16) exceeded Tier II PCBs, 116, 126 ppm respectively.	PCB concrete (approx. ¾ of the pad, 9.56 m^3)	Tier II: 6.38 m^3	Tier I: 3.19 m^3 3.19 m^3	PCB concrete exceeds CEPA (MAT-15, MAT-16) exceeded Tier II PCBs, 116, 126 ppm respectively.
Associated Debris	E-52	Boiler – paper insulation (MAT-06)	Asbestos wrap on boiler, >75% Asbestos	n/a	ACM: 1.1 m^3	
	E-52	Boiler – plaster (trowel) insulation (MAT-07)	Asbestos wrap on boiler, 30-50% Asbestos	n/a		

Material/ Structure	Photo	Description	Hazardous Material	Estimated Hazmat (m^3) (crushed)	Estimated Non-Haz (m^3) (crushed)	Comments
Warehouse						
Warehouse foundation	E-18, E-47, E-48, E-53, E-54, E-55 MAT-08 E-16, E-51	Concrete Floor elevated on concrete base. There are eight (8) 0.75 m x 0.75 m x 0.25 m footings and eight (8) 0.45 m x 0.45 m x 1.0 m footings. Concrete pad is 12.5 m x 9 m (112.5 m^2) and 0.4 m thick. Paint on wooden stairs (MAT-08)	PCB Paint on wooden staircase exceeds Tier I criteria (1.89 ppm)	n/a	45 m^3 Tier I: 2 m^3	The concrete pad and footing remains intact. There is an area of extensive debris surrounding the foundation. Debris includes asbestos wallboard, painted diesel tanks (2), plywood, 5-step wood staircase.
	E-16, E-49, E-50	Painted plywood, entrance to warehouse (MAT-09) 3.6 m x 2.5 m hollow wooden entrance with 2x4 frame. Three (3) support beams (9x9 timbers) of 3 m length are associated with the entrance.	No	n/a	3.7 m^3 *(4 m^3 uncrushed)*	
Associated Debris	E-17, E-39 MAT-21	Painted AST tanks	PCB Paint exceeds CEPA. Based on the results of the paint sample from the AST within the module train section, PCB impacts are assumed to be comparable.	Tanks: 0.24 m^3 *(2.4 m^3 uncrushed)*		
	E-17, E-18	Concrete pad for ASTs (1.6 m x 2 m (3.2 m^2), 0.1m thick	None	n/a	0.32 m^3	
	E-55	Vinyl tile (MAT-03)	No	n/a	0.5 m^3	
	E-54	Cement board (MAT-04)	15-30% Asbestos		ACM: 0.5 m^3	
	E-53	Press board (MAT-05)	No	n/a	1.0 m^3	
POL Pad Piping and Associated Infrastructure						
POL Pad (Beach & Station POLs)	E-110	Concrete associated with former POL pads.	No	n/a	7.6 m^3	
Inuit Houses						
House #1 (northern house)	E-112, E113, E-114	Degraded house (28 m^2), 2x4 wood frame with plywood walls	No	n/a	7.5 m^3	
House #2 (southern house)	E-112, E-115 to E118	Degraded house (38 m^2), 2x4 wood frame with plywood walls	No	n/a	10.5 m^3	
			TOTALS	**37.26 m^3**	**300.71 m^3**	**(Total crushed volumes)**

3.4.2.1 Alternative Summary of Demolition Assessment

As previously discussed, with regards to the INAC Protocol for PCB painted materials regulated, it is anticipated that a guidance document from Environment Canada is being prepared that will allow for the mass of the substrate to be factored in the mass calculations for the total PCB concentration will be issued. In anticipation of the guidance document, an alternate summary of demolition assessment disposal requirements has been prepared.

The alternate demolition assessment disposal requirements outlined in Table 3-5 calculated the mass of the substrate into the total PCB concentrations. However, until such time when the official guidance document is available, the summary provided in Table 3-5 where the substrate has not been factored in for PCB containing materials should be utilized.

Table 3-5 – Alternate Demolition Requirements

Material/ Structure	Photo Reference	Description	Hazardous Material	Estimated Hazmat (m^3) (crushed)	Estimated Non-Haz (m^3) (crushed)	Comments
Radar Tower						
Painted surface	E-56, E-57	Painted steel pipe and triangular cross beam construction antenna. Cross section is approx. 66 m x 5 m x 5 m. Samples MAT-01 & MAT-02.	No	n/a	Steel: 165 m^3 *(1650 m^3 uncrushed)*	Paint samples were non-detect for PCBs and below 5 mg/L for leachable lead.
Module Train						
Section of Module Train building	E-22 to E-43 MAT-23 (E-38)	Module train section is L: 12 m x W: 8 m ($96m^2$) x H: 4.6 m. Paint – exterior (MAT-23 & MAT-24) Building had a Timber crib foundation. Exterior is metal cladding. Plywood walls (both interior and exterior. Approx. 0.15 m thick walls are insulated. Miscellaneous ducting, cables, structural steel for equipment, wiring, light fixtures (no bulbs) and wood doors.	Yes, PCB paint, both adhered and flaked on the walls.	PCB: Plywood: 7.1 m^3	Insulation: 28 m^3 *(57 m^3 uncrushed)* Metal: 0.7 m^3 *(2.9 m^3 uncrushed)* Misc. 3.3 m^3	Exterior paint after substrate calculation exceeds CEPA, 86.5 ppm (MAT-23).
	E-39 to E-43, E-37	The building contained electrical cabinets; three (3) CO^2 tanks; two (2) generators; two (2) furnace fans two (2) diesel tanks. Paint – interior (MAT-17, MAT-18, MAT-19, MAT-20, MAT-21, MAT-22) Asbestos (ACM) pipe wrap & tank insulation.	Yes, PCB paint, both adhered and flaked on the walls, ceiling, interior structures such as tanks and generators. Yes, Asbestos (ACM).	PCBs: Tanks: 0.7 m^3 *(3 m^3 uncrushed)*	ACM: 1.8 m^3 Walls: 11.3 m^3 Tanks: 0.24 m^3 *(2.4 m^3 uncrushed)* Generator: 1 m^3 *(2 m^3 uncrushed)*	PCB paint after substrate calculation exceeds CEPA , 1,258 ppm (MAT-22). ACM: MAT-27, MAT-28, MAT-29, MAT-90
	E-43, E-35, E-36	Concrete 0.1 m thick (MAT-17, MAT-25 & MAT-26)	Yes, PCB paint No, PCB concrete	PCBs: 0.25 m^3	9.35 m^3	PCB concrete after substrate calculation does not exceed CEPA . Paint should be scraped off the concrete.
Module Train Foundation	E-12	Eighteen (18) 9x9 timber beams, 11 m in length.	No, creosote levels were not of a concern.	n/a	10.35 m^3	

Material/ Structure	Photo Reference	Description	Hazardous Material	Estimated Hazmat (m^3) (crushed)	Estimated Non-Haz (m^3) (crushed)	Comments
Associated debris	E-58	Four (4) 9x9 timber beams, 2 m in length; fourteen (14) 2x4 timbers, 2 m in length.	No	n/a	0.56 m^3	
	E-60	Plywood, entrance to module train 4 m x 1.5 m hollow wooden entrance with 2x4 wood frame (10 cm thick). Three (3) support beams (9x9 timbers) of 3 m length are associated with the entrance.	No	n/a	3.7 m^3 *(4 m^3 uncrushed)*	
	E-62	Four (4) 9x9 timbers of 9 m length; metal basin 0.65 m x 70 cm x 30 cm (0.04 m thick)	No	n/a	1.9 m^3 *(2 m^3 uncrushed)*	
Garage						
Foundation	E-13, E-14, E-15, E-47, E-46, E-45, E-44	12.5 m x 10.2 m pad, 0.1 m thick, (12.75 m^3) concrete floor with two grates on the pad Four (4) concrete samples were taken on the pad. ¼ of the concrete (MAT-14) exceeded Tier I PCBs, 1.02 ppm; ½ the pad (MAT-15, MAT-16) exceeded Tier II PCBs, 116, 126 ppm respectively.	PCB concrete (approx. ¾ of the pad, 9.56 m^3)	n/a	12.75 m^3	PCB concrete after substrate calculation does not exceed CEPA .
Associated Debris	E-52	Boiler – paper insulation (MAT-06)	Asbestos wrap on boiler, >75% Asbestos	n/a	ACM: 1.1 m^3	
	E-52	Boiler – plaster (trowel) insulation (MAT-07)	Asbestos wrap on boiler, 30-50% Asbestos	n/a		
Warehouse						
Warehouse foundation	E-18,E-47, E-48, E-53, E-54, E-55 E-16, E-51	Concrete Floor elevated on concrete base. There are eight (8) 0.75 m x 0.75 m x 0.25 m footings and eight (8) 0.45 m x 0.45 m x 1.0 m footings. Concrete pad is 12.5 m x 9 m (112.5 m^2) and 0.4 m thick. Paint on wooden stairs (MAT-08). PCB Paint exceeds Tier I criteria (1.89 ppm)	None	n/a	45 m^3 Tier I: 2 m^3	The concrete pad and footing remains intact. There is an area of extensive debris surrounding the foundation. Debris includes asbestos wallboard, painted diesel tanks (2), plywood, 5-step wood staircase.
	E-16, E-49, E-50	Painted plywood, entrance to warehouse (MAT-09) 3.6 m x 2.5 m hollow wooden entrance with 2x4 wood frame. Three (3) support	No	n/a	3.7 m^3 *(4 m^3 uncrushed)*	

Material/ Structure	Photo Reference	Description	Hazardous Material	Estimated Hazmat (m^3) (crushed)	Estimated Non-Haz (m^3) (crushed)	Comments
		beams (9x9 timbers) of 3 m length are associated with the entrance.				
Associated Debris	E-17, E-39 (MAT-21)	Painted AST tanks	Based on the results of the paint sample from the AST within the module train section, PCB impacts are assumed to be comparable.	n/a	Tanks: 0.24 m^3 *(2.4 m^3 uncrushed)*	PCB concrete after substrate calculation does not exceed CEPA
	E-17, E-18	Concrete pad for ASTs (1.6 m x 2 m (3.2 m^2), 0.1m thick	None	n/a	0.32 m^3	
	E-55	Vinyl tile (MAT-03)	No	n/a	0.5 m^3	
	E-54	Cement board (MAT-04)	15-30% Asbestos		0.5 m^3	
	E-53	Press board (MAT-05)	No	n/a	1.0 m^3	
POL Pad Piping and Associated Infrastructure						
POL Pad (Beach & Station POLs)	E-110	Concrete associated with former POL pads.	No	n/a	7.6 m^3	
Inuit Houses						
House #1 (northern house)	E-112, E113, E-114	Degraded house (28 m^2), 2x4 wood frame with plywood walls	No	n/a	7.5 m^3	
House #2 (southern house)	E-112, E-115 to E118	Degraded house (38 m^2), 2x4 wood frame with plywood walls	No	n/a	10.5 m^3	
			TOTALS	**8.05** m^3	**329.91** m^3	**(Total crushed volumes)**

3.5 Hazardous and Non-Hazardous Waste Assessment Summary

Based on the combined volumes of surface debris inventory, buried debris inventory, barrel assessment, and demolition inventory, the anticipated breakdown of hazardous versus non-hazardous debris at the CAM-A site is as follows:

- The total volume of non-hazardous waste is estimated to be 495.81 m^3 (crushed).
- The total volume of hazardous waste is estimated to be 38.46 m^3 (crushed).

3.5.1 Alternative Hazardous and Non-hazardous Waste Assessment Summary

Based on the combined volumes of surface debris inventory, buried debris inventory, barrel assessment, and demolition inventory, the anticipated breakdown of hazardous versus non-hazardous debris at the CAM-A site is as follows:

- The total volume of non-hazardous waste is estimated to be 525.01 m^3 (crushed).
- The total volume of hazardous waste is estimated to be 9.25 m^3 (crushed).

3.6 Sediment and Surface Water Assessment

3.6.1 Methodology

The water supply lake for the site is located approximately 1.2 km northwest of the station. In 1994 one (1) sediment sample and one (1) water sample were collected near the turn-around point of the access road.

In 2010, three (3) surface water samples were collected from two (2) locations and one (1) sediment sample was collected to assess potential contaminant levels. Results from the 2010 sampling will be used to assess the potential for impact on aquatic life caused by PCBs, PHCs and metals as a result of site activities. Samples were collected at the freshwater lake and the outfall (sample numbers include duplicates (W-001, W-002) and a trip blank (W-003). The samples from the freshwater lake were analyzed to determine whether it can be used as a potable water supply during construction.

Where soft depositional sediment exists along the shoreline(s), a sample was collected (within wading depth) as a grab sample. Water samples were collected from the freshwater lakes by inverting a pre-cleaned and rinsed sampling container and slowly tilting upright at a depth of about 30 cm below the water surface. The sediment sample was collected from the water sample location. Because of the coarse grain size of the sediments, the samples were collected as grab samples using a shovel.

3.6.2 Results

3.6.2.1 Surface Water

Freshwater Lake

Hydrocarbons and PCBs were non-detect in all surface water samples collected. Of the dissolved metal parameters, only barium, boron, copper, manganese, sodium and zinc were detected, although not an exceedance of the Guidelines for Canadian Drinking Water Quality (May 2008). The results for the remaining parameters were below the detection limit. The criteria for the Guidelines for Canadian Drinking Water Quality (CDWQ) (May 2008) were exceeded for chloride, and total dissolved solids (TDS) for the samples taken at the freshwater Lake. The chloride results for the two (2) water samples taken at the freshwater lake W-001 and W-002 were 256 and 260 mg/L respectively. The reported results for TDS were 514 and 511 respectively. This site does not appear to have been negatively impacted by former site activities.

Surface water near former Outfall

The sample, taken from the surface water near the north end of the outfall, had an aluminum concentration of 0.24 mg/L; a cadmium concentration of 0.000053 mg/L; and a copper concentration of 0.005 mg/L which exceed the CCME Protection of Aquatic Life Guideline - Freshwater of 0.1 mg/L (aluminum); 0.000017 mg/L (cadmium); and 0.002 mg/L (copper), respectively. None of the parameters were above the criteria for drinking water (CDWQ).

Testpit water samples

Two (2) monitoring wells were installed in the area of the Beach POL. One well was installed upgradient (MW-01) of the pad and the other was installed downgradient (MW-02). MW-01 had an arsenic concentration of 0.81 mg/L; a cadmium concentration of 0.00227 mg/L; and a chromium concentration of 0.147 mg/L. MW-02 had an arsenic concentration of 0.029 mg/L; a cadmium concentration of 0.00297 mg/L; and a chromium concentration of 0.084 mg/L. Both wells had parameters which exceed the CCME Protection of Aquatic Life Guideline - Freshwater of 0.0125 mg/L (arsenic); 0.00012 mg/L (cadmium); and 0.056 mg/L (copper). It appears likely that there have been some impacts to the water collected in the testpits surrounding the POL pads from previous site activities. A summary of the freshwater results is presented Table B6 in Appendix B.

3.6.2.2 Sediment

The results from the sediment sample collected from the lake northwest of the airstrip had no results that exceeded the INAC criteria and concentrations did not appear to be elevated as a result of the previous site activities. Neither hydrocarbons or PCBs were detected. A summary of the sediment results is presented in Table B6 in Appendix B.

3.7 Assessment of Granular Borrow Sources

Granular fill is required for construction of new landfills, remediation/re-grading of existing dumps and debris areas, as general backfill for excavation areas, and for landfarm construction. To minimize environmental impacts associated with clean-up construction existing disturbed areas will be utilized before exploiting undeveloped areas, where possible.

3.7.1 Methodology

During investigation planning air photos of the site were reviewed to identify potential borrow areas and potential landfill/landfarm locations. The air photo scale was too large (1:20,000) to be effective. Therefore, locations of potential borrow areas and landfills were identified during the site investigation. Confirmation of the potential borrow areas as suitable sources of granular fill material, was also completed during the site investigation. Locations of the potential borrow areas and proposed landfills are shown on Figure 2.

The site investigation consisted of excavating shallow testpits using hand tools (pickaxe and shovel) and/or a small backhoe attachment on an excavator (quadivator). Testpit locations are shown on Figure 3. Soil samples were collected from each testpit for laboratory index testing. The testpit depths varied from approximately 0.5 m to 1.2 m, terminating on frozen ground, boulder, due to seepage and sloughing, or due to equipment limitations. The testpits were backfilled with excavated soils after completion.

Photographs were taken of each borrow area, excavated testpits, excavated material and any other feature of note. Selected site photographs are in Appendix C.

Laboratory testing was conducted on selected soil samples to determine soil types encountered in each borrow area. The laboratory testing generally included determination of moisture contents, particle size distribution (sieve and hydrometer analysis), and soil salinity. The laboratory test results are presented in Appendix D and are also shown on testpit logs in Appendix F.

3.7.2 Granular Material Types and Specifications

An assortment of granular fill materials is required for construction of landfills and landfarms, remediation of existing landfill, backfill of excavated areas, and repair of roads and airstrip. Specifications of six granular materials (Type 1 to 6 Granular Fills) required for different applications were developed by EBA Engineering Consultants Ltd. as part of the original DEW Line Clean Up Program for Department of National Defence and Defence Construction Canada. The granular fill types were also adopted by Indian and Northern Affairs Canada for their abandoned military sites. The granular fill types are also used for the current project and are described below.

3.7.2.1 Type 1 Granular Fill

Type 1 Granular Fill typically consists of coarse gravel or cobble size material used for erosion protection on finished slopes or within drainage courses. The gradation requirements of Type 1 Granular Fill may vary significantly depending on the material availability and specific application. Type 1 Granular Fill can be obtained from Borrow

Area 8 and from screening of oversize material from other granular materials on site. If Type 1 granular material is in limited quantity, finished slopes may be flattened by using Type 2 granular material without armouring. The grain size distribution shown in Table 3-6 is recommended:

Table 3-6 - Grain Size Distribution Limits - Type 1 Granular Fill

Particle Size (mm)	% Passing
500	100
200	40-100
100	20-70
50	0-50
10	0-10

3.7.2.2 Type 2 Granular Fill

Type 2 Granular Fill is well graded sand and gravel used for construction of berms and cover. Type 2 Granular Fill should have a grain size distribution within the limits presented on Table 3-7.

Table 3-7 - Grain Size Distribution Limits - Type 2 Granular Fill

Particle Size (mm)	% Passing
150	100
50	60-100
5	25-60
0.425	8-37
0.08	2-25

Type 2 Granular can be obtained from Borrow Areas 1, 2, 3, 4, 5, 6, 6A, 7, 8, 9, 11, and 15.

3.7.2.3 Type 2A Granular Fill

Type 2A material would be suitable for armouring landfills if sufficient quantities of Type 1 material are not available. Typically, the Type 2A would be placed about 0.5 m thick with the requirement to use this material dependent upon the finished slopes. Based on the material available on site, the grain size distribution shown in Table 3-8 is recommended for Type 2A granular fill:

Table 3-8 - Grain Size Distribution Limits - Type 2A Granular Fill

Particle Size (mm)	% Passing
150	100
50	40-100
25	20-65
5	0-25
0.425	0-15
0.08	0-8

3.7.2.4 Type 3 Granular Fill

Type 3 Granular Fill is a select material with a maximum particle size of 200 mm. It is generally obtained from excavations or other approved sources and is used for general site grading and backfilling excavations. At this site Type 2 and Type 4 Granular Fills are acceptable alternatives for Type 3 Granular Fill.

3.7.2.5 Type 4 Granular Fill

Type 4 Granular Fill is a non-saline, well graded sand and silt with some gravel used for construction of containment berms and backfill of key trench excavations for the Tier II Soil Disposal Facility. If used as backfill for the key trench excavations, the water content of Type 4 Granular Fill must be adjusted to achieve a minimum degree of saturation of 90%. Type 4 Granular Fill may be wet and soft at the time of production from the borrow source and it may be necessary to air-dry it, if used for construction of berms, so that it can be placed and compacted to achieve density specification. The material should have a maximum salinity of 5 parts per thousand (5 ppt) and have a grain size distribution within the limits presented on Table 3-9.

Table 3-9 - Grain Size Distribution Limits - Type 4 Granular Fill

Particle Size (mm)	% Passing
150	100
50	80-100
25	55-95
12.5	55-90
5	45-90
2	35-85
0.425	25-75
0.08	20-60

Type 4 Granular Fill was encountered in Borrow Areas 5A, 10, 12, 13, and 14. Minor blending may be required to bring material with the gradation limits of Type 4 Granular Fill.

3.7.2.6 Type 5 Granular Fill

Type 5 Granular Fill is used for geomembrane bedding and should consist of rounded particles with a maximum size of 5 mm. This type of fill material should be free from angular particles, stones larger than 25 mm in diameter, waste or other deleterious materials. Type 5 Granular material should have a particle size distribution with the limits presented on Table 3-10.

Table 3-10 - Grain Size Distribution Limits - Type 5 Granular Fill

Particle Size (mm)	% Passing
25	100
5	80-100
1	60-95
0.425	30-90
0.15	0-70
0.08	0-10

3.7.2.7 Type 6 Granular Fill

Type 6 Granular Fill is generally used as an intermediate cover within landfills and is obtained from excavations or other sources generally consisting of gravel or sand in an unfrozen state and free of deleterious material. The maximum particle size of the material should be less than 150 mm with less than 8% of the material, by weight, passing 0.08 mm sieve.

3.7.3 Borrow Area Locations

Seventeen borrow areas were investigated during the site investigation. The borrow areas contained oversized material (boulders); therefore, screening of oversized material may be required. The oversized material may be suitable as Type 1 material for erosion protection of landfill surfaces. The locations of the borrow areas are shown on Figure 2 and locations of testpits are shown on Figure 3. Each of the borrow areas is described in the following sections.

3.7.3.1 Borrow Area 1 (BA-1)

Borrow Area 1 is located south of the Fresh Water Lake on an undisturbed area as shown on Figure 2. The area is adjacent to the road and is easily accessible. Two testpit (TP10-05 and 06) were excavated in this borrow area to characterize the subsurface material and to determine groundwater and permafrost conditions. Subsurface stratigraphy in the borrow area consisted of a layer of peat underlain by sand and gravel. Frozen ground was encountered in TP10-05 at 0.95 m depth. Photos G1 to G8 (Appendix C) show the borrow area, seepage in TP10-05 and excavated material from both testpits.

A sieve analysis was conducted on a combined sample from Testpits 10-05 and 10-06. The sample had 47 % gravel, 49 % sand, and 4% silt/clay indicating that the borrow area contains material generally suitable as Type 2 Granular Fill although minor blending may be required to bring material within Type 2 gradation limits. The particle size results and gradation limits of Type 2 Fill are shown on Figure 14. The average moisture content of the soil samples was approximately 7.7 %.

The identified area is approximately 24,000 m^2 in size. Assuming an average thickness of 0.5 m of material, the volume of the material that can be obtained from this area is approximately 12,000 m^3.

Two testpits (TP10-03 and 04) were excavated near BA-1 as shown on Figure 2. The area had frequent frost boil pattern and was expected to have Type 4 Granular Fill. However, fine-grained soils (silty clay) were encountered in both testpits.

3.7.3.2 Borrow Area 2 (BA-2)

Borrow Area 2 is located south of the Fresh Water Lake on a disturbed area as shown on Figure 2. The area is adjacent to the road and is easily accessible. The area appeared to have been previously used as a borrow source. Two testpits (TP10-07 and 08) were excavated in this area to characterize the subsurface material and to determine groundwater and permafrost conditions. The subsurface stratigraphy in TP10-07 consisted of cobbly gravel and sand. In TP10-08 the subsurface soils consisted of gravel and sand to 0.7 m depth underlain by sand. Seepage or permafrost was not encountered in either testpits. Photos G9 and G10 (Appendix C) show TP10-07, borrow area, and excavated material in TP10-07.

A sieve analysis was conducted on a combined sample of gravel and sand from Testpits 10-07 and 10-08. The sample had 56 % gravel, 42 % sand, and 2% silt/clay indicating that the borrow area contains material generally suitable as Type 2 Granular Fill. The particle size results and gradation limits of Type 2 Fill are shown on Figure 15. The moisture content of the soil sample was approximately 2.7 %.

The identified area is approximately 22,000 m^2 in size. Assuming an average thickness of 0.7 m of material, the volume of the material that can be obtained is approximately 15,400 m^3.

3.7.3.3 Borrow Area 3 (BA-3)

Borrow Area 3 is located north of the airstrip on a disturbed area as shown on Figure 2. The area is at the end of a road and is easily accessible, although minor regrading of the road may be required. The area appeared to have been previously used as a borrow source. Four testpits (TP10-16 to 18 and TP-31) were excavated in this borrow area to characterize the subsurface material and to determine groundwater and permafrost conditions. The subsurface soils in all testpits predominantly consisted of gravel and sand. Frozen ground was encountered in TP10-16 and TP10-17 at approximately 0.95 m depth and seepage was not encountered in any testpit. Photos G11 to G14 (Appendix C) show the borrow area, testpits and excavated material from the area.

A sieve analysis was conducted on a combined sample from Testpits 10-16 to 18. The sample had 58 % gravel, 39 % sand, and 3% silt/clay indicating that the borrow area contains material generally suitable as Type 2 Granular Fill. The particle size results and gradation limits of Type 2 Fill are shown on Figure 16. The moisture content of the soil sample was approximately 3.1 %.

The identified area is approximately 51,000 m^2 in size. Assuming an average thickness of 0.7 m, the volume of the material that can be obtained is approximately 35,700 m^3.

3.7.3.4 Borrow Area 4 (BA-4)

Borrow Area 4 is located near the east end of the airstrip and is divided in 4 sub-areas (BA-4A, 4B, 4C and 4D). The sub-areas are located around a pond and are connected by trails from the airstrip. All the sub-areas are disturbed and appeared to have been used previously as borrow sources. The locations of the sub-areas are shown on Figure 2. Six testpits (TP10-23 to 27 and TP10-53) were excavated in the sub-areas, as shown on Figure 3, to characterize the subsurface material and to determine groundwater and permafrost conditions. The subsurface soils in all testpits predominantly consisted of gravel and sand. Frozen ground was not encountered in any testpits and refusal was encountered at approximately 1 m depth on boulders. Photos G15 to G18 (Appendix C) show the borrow area, testpits and excavated material from the area.

Sieve analyses were conducted on combined sample from TP10-23 and 24, TP-25, TP10-26 and 27, and TP10-53. The samples had 64 to 69 % gravel, 29 to 35 % sand, and 1 to 2 % silt/clay indicating that the borrow area contains material generally suitable as Type 2 Granular Fill. The particle size results and gradation limits of Type 2 Fill are shown on Figures 17 to 20. The moisture content of the soil samples varied from 1.6 to 4.1 %.

The total identified area of all sub-areas is approximately 52,000 m^2 in size. Assuming an average thickness of 0.7 m, the volume of material that can be obtained from all sub-areas is approximately 36,400 m^3.

3.7.3.5 Borrow Area 5 (BA-5)

Borrow Area 5 is located on an undisturbed ground near Borrow Area 3 as shown on Figure 2. The area can be accessed from Borrow Area 3. One testpit (TP10-33) was excavated in this area to characterize the subsurface material and to determine groundwater and permafrost conditions. The subsurface soils in the testpit consisted of gravel and sand. Frozen ground was not encountered in the testpit. Refusal was encountered on a boulder at approximately 0.95 m depth. Photo G18 (Appendix C) show the borrow area, testpits and excavated material from the area.

A sieve analysis was conducted on a combined sample from Testpits 10-31 and 33. The sample had 66 % gravel, 32 % sand, and 2% silt/clay indicating that the borrow area contains material generally suitable as Type 2 Granular Fill. The particle size results and gradation limits of Type 2 Fill are shown on Figure 21.

The identified area is approximately 9,000 m^2 in size. Assuming an average thickness of 0.7 m, the volume of material that can be obtained from this area is approximately 6,300 m^3.

3.7.3.6 Borrow Area 5A (BA-5A)

Borrow Area 5A is located on undisturbed ground near Borrow Area 13 (Landfill 1) and Borrow Area 5, as shown on Figure 2. The area can be accessed from Borrow Areas 3, 5 or 13. The area is characterized by a frost boiled pattern indicating presence of fine-grained soils (sand, silt, clay). Three testpits (TP10-28, 30 and 32) were excavated in the borrow area, as shown on Figure 3, to characterize the subsurface material and to determine groundwater and permafrost conditions. The subsurface soils in testpits consisted of silty sand, sandy silt or silty gravel and sand. Frozen ground was encountered in TP10-30 at 1.1 m depth and refusal was encountered in TP10-32 on boulder/cobbles at 0.9 m depth. Photos G19 to G21 (Appendix C) show the borrow area, testpits and excavated material from the area.

Sieve analyses were conducted on three soil sample from TP10-28, 30 and 32. The samples from TP10-30 and 32 (S-36 and S-38) had 17 to 47 % gravel, 35 to 51 % sand, and 18 to 32 % silt/clay indicating that the soil from these testpits fall within the limits of Type 4 Fill. The soil sample from TP10-28 had 0 % gravel, 23 % sand, 48 % silt and 29 % clay. The grain size analyses results and gradation limits of Type 4 Fill are shown on Figures 22. The moisture content of the soil samples varied from 4.3 to 5.9 % indicating that moisture conditioning of the soil will be required if used for backfill of key trench excavation for the Tier II facility.

The total identified area is approximately 27,000 m^2 in size. Assuming an average thickness of 0.7 m, the volume of material that can be obtained from this area is approximately 18,900 m^3.

3.7.3.7 Borrow Area 6 (BA-6)

Borrow Area 6 is located on disturbed ground as shown on Figure 2. The area is near road (Road Section 5) and is easily accessible. The area appeared to have been used previously as a borrow source. Two testpits (TP10-35 and 36) were excavated in this borrow area to characterize the subsurface material and to determine groundwater and permafrost conditions. The subsurface soils in both testpits predominantly consisted of gravel and sand. Frozen ground was encountered in TP10-36 at 1.1 m depth and refusal was encountered on boulder at 1 m depth in TP10-35. Seepage was not encountered in any of the testpits. Photos G22 to G26 (Appendix C) show the borrow area, seepage above frozen ground, testpits and excavated material from the testpits.

A sieve analysis was conducted on a combined sample from Testpits 10-35 and 36. The sample had 65 % gravel, 33 % sand, and 2 % silt/clay indicating that the borrow area contains material generally suitable as Type 2 Granular Fill. The particle size results and gradation limits of Type 2 Fill are shown on Figure 23.

The identified area is approximately 19,000 m^2 in size. Assuming an average thickness of 0.7 m, the volume of material that can be obtained from this area is approximately 13,300 m^3.

3.7.3.8 Borrow Area 6A (BA-6A)

Borrow Area 6A is located on a partially disturbed ground as shown on Figure 2. The area is near Borrow Area 6 and road (Road Section 5) and is easily accessible. Parts of the area appeared to have been used previously as a borrow source. Four testpits (TP10-37 to 40) were excavated in this area to characterize the subsurface material and to determine groundwater and permafrost conditions. The subsurface soils in the area were variable and consisted of peat underlain by gravel and sand (TP10-37), peat underlain by sand (TP-38) or peat underlain by sand underlain by gravel and sand (TP10-39 and 40). Frozen ground was not encountered in any of the testpits and testpits were terminated due to seepage and sloughing of sand or refusal on boulders/cobbles. Photos G27 to G30 (Appendix C) show the borrow area, seepage, testpits and excavated material from the testpits.

A sieve analysis was conducted on combined soil samples from TP10-38 and 10-40. The sample had 7 % gravel, 92 % sand and 1 % silt/clay. The sand encountered within this area does not fall within the gradation limits of Type 2 or Type 4. The sand can be used as Type 5 Fill after screening or Type 6 Fill within the landfills.

A sieve analysis was also conducted on a combined sample of gravel and sand from Testpits 10-37, 39 and 40. The sample had 59 % gravel, 40 % sand, and 1 % silt/clay indicating that the borrow area contains material generally suitable as Type 2 Granular Fill. The particle size results and gradation limits of Type 2 Fill are shown on Figure 24.

The identified area is approximately 48,000 m^2 in size. Assuming an average thickness of 0.7 m, the volume of material that can be obtained from this area is approximately 33,600 m^3.

3.7.3.9 Borrow Area 7 (BA-7)

Borrow Area 7 is located near the Station Area and is easily accessible (Figure 2). The area is disturbed and appeared to have been constructed by placing fill from the adjacent areas. Testpits 10-41 and 10-42 were excavated in this area. The soils in TP10-41 predominantly consisted of gravel and sand and in TP10-42 the subsurface stratigraphy consisted of 300 mm thick layer of sand underlain by gravel and sand. Frozen ground was not encountered in any of the testpits and seepage was encountered in TP10-42 at 0.9 m depth.

Sieve analyses were conducted on two samples from the sand and gravel in TP10-41 and 10-42. The samples had 55 to 64 % gravel and 36 to 45 % sand indicating that the borrow area contains material generally suitable as Type 2 Fill although Type 6 or Type 5 Fill (after some screening) may be available at surface. The particle size results and gradation limits of Type 2 Fill are shown on Figure 25.

The identified area is approximately 26,000 m^2 in size. Assuming an average thickness of 0.7 m, the volume of material that can be obtained from this area is approximately 18,200 m^3.

3.7.3.10 Borrow Area 8 (BA-8)

Borrow Area 8 is located near the ocean and contains material that may be suitable as Type 1 Fill (Photos G33 and G34 in Appendix C). The area is disturbed and it is approximately 30,000 m^2 in size. Assuming an average thickness of 0.3 m, the volume of Type 1 Fill that can be obtained from this area is approximately 9,000 m^3.

3.7.3.11 Borrow Area 9 (BA-9)

Borrow Area 9 is on a disturbed area located near the airstrip (Photos G35 to G38 in Appendix C). It appears that the airstrip has been constructed by stripping material from Borrow Area 9. Four testpits (TP10-54 to 57) were excavated in this area. The subsurface soils predominantly consisted of gravel and sand. Frozen ground was not encountered in any of the testpits and seepage was encountered in TP10-56 and 57. Refusal was encountered on boulders in TP10-54 and 55. Photos G35 to G38 in Appendix C show the borrow area, seepage in testpits, excavated material and boulders at the bottom of the testpits.

Sieve analyses were conducted on two combined samples from TP10-54 and 55 and TP10-56 and 57 to characterize the soil. The samples had 56 to 62 % gravel, 36 % sand and 2 to 8 % silt/clay indicating that the borrow area contains material generally suitable as Type 2 Fill. The particle size results and gradation limits of Type 2 Fill are shown on Figure 26.

The identified area of this borrow is approximately 24,000 m^2 in size. Assuming an average thickness of 0.5 m, the volume of material that can be obtained from this area is approximately 12,000 m^3.

3.7.3.12 Borrow Area 10 (BA-10)

Borrow Area 10 is near airstrip on an undisturbed area. Two testpits (TP10-58 and 59) were excavated in this borrow area. The subsurface soils consisted of peat underlain by silty sand in TP10-58 and peat underlain by gravel and sand underlain by silty sand in TP10-59. Frozen ground was not encountered and testpits terminated at 0.8 to 0.9 m depth due to seepage. Photos G39 to G42 in Appendix C show the borrow area, testpits, excavated material and seepage in testpits.

Sieve analyses were conducted on two samples from the sand unit in TP10-58 and 10-59. The samples had 29 to 41 % gravel, 49 to 53 % sand and 10 to 18 % silt/clay. The moisture content of the samples varied from 6.7 to 7.2 % indicating that the soils above the groundwater table are relatively dry. The particle size results and gradation limits of Type 4 material are shown on Figure 27 which indicate that material from this borrow generally falls within the gradation limits of Type 4 Fill but minor blending may be required.

The identified area of this borrow is approximately 24,000 m^2 in size. Assuming an average thickness of 0.5 m, the volume of material that can be obtained from this area is approximately 12,000 m^3.

3.7.3.13 Borrow Area 11 (BA-11)

Borrow Area 11 is located on an undisturbed area and is not connected by any road. One testpit (TP10-60) was excavated in this area. The subsurface soils consisted of gravel and sand. Frozen ground or seepage was not encountered and refusal was encountered on boulder at 0.9 m depth. Photos G43 and G44 in Appendix C show the borrow area, testpit and excavated material.

A sieve analyses was conducted on a soil sample from the testpit. The sample had 68 % gravel, 30 % sand, and 2 % silt/clay. The particle size results generally fall with the gradation limits of Type 2 Fill as shown on Figure 28.

The identified area of this borrow is approximately 7,000 m^2 in size. Assuming an average thickness of 0.5 m, the volume of material that can be obtained from this area is approximately 3,500 m^3.

3.7.3.14 Borrow Area 12 (BA-12)

Borrow Area 12 is on undisturbed area and is not accessible by any road. Two testpits (TP10-61 and 62) were excavated in this area. The subsurface soils consisted of peat underlain by gravel and sand underlain by silty sand in TP10-61. The subsurface soils in TP10-62 consisted of silty and sandy clay. The area is characterized by a frost boiled pattern indicating presence of fine-grained soils (silt, sand, clay). Frozen ground was encountered in TP10-61 at 0.95 m depth.

A sieve analysis was conducted on a soil sample from TP10-61. The sample had 15 % gravel, 43 % sand, and 42 % silt/clay. The particle size results of this sample generally fall with the gradation limits of Type 4 Fill as shown on Figure 29. A hydrometer analysis was conducted on a soil sample from TP10-62. The sample had 10 % gravel, 23 % sand, 36 % silt and 31 % clay. The particle size results of this soil sample fall slightly outside the upper bound of Type 4 Fill gradation limits indicating that the borrow material contains mix of Type 4 and finer material (Figure 29). The moisture content of the soil samples was less than 10 % indicating that the material above groundwater table is relatively dry and moisture conditioning of the soil may be required if used for backfill of key trench of Tier II facility.

The identified area of this borrow is approximately 40,000 m^2 in size. Assuming an average thickness of 0.5 m, the volume of material that can be obtained from this area is approximately 20,000 m^3.

3.7.3.15 Borrow Area 13 (BA-13)

This location was initially identified as potential landfill location (LF-1 on Figures 2 and 3) but site investigation revealed that there are other suitable locations for landfills therefore this location may be considered as a borrow source. The area contains primarily Type 4 Fill but some Type 2 Fill is also available at surface.

The area is located on disturbed ground near the road and is easily accessible (Photos G44 to G48 in Appendix C). Four testpits (TP10-01, 02, 13 and 29) were excavated in this area to characterize subsurface material. The subsurface soils consisted of peat underlain by gravel and sand underlain by sand in TP 10-01 and 10-02. In TP10-13 the subsurface soils consisted of silty and gravely sand and in TP10-29 the subsurface soils consisted of sandy and clayey silt. Seepage was encountered in all but TP10-29 below 0.6 m depth (Photos G45 to G47 in Appendix C) and frozen ground was encountered in TP10-13 at 1.1 m depth below ground.

Sieve analyses were also conducted on silty sand samples from TP10-02 and TP10-13. The samples had 8 to 27 % gravel, 49 to 55 % sand, and 18 to 19 % silt. Particle size of sand generally falls within the gradation limits of Type 4 Fill as shown on Figure 30.

Sieve analysis was conducted on a combined sample from surficial gravel and sand in TP10-01 and 02. The sample had 52 % gravel, 45 % sand and 3 % silt/clay. The particle size results of this soil sample fall within the gradation limits of Type 2 Fill (Figure 31).

The soils encountered in this area are variable and may contain Type 2 near surface and Type 4 at depth. The identified area is approximately 42,000 m^2 in size. Assuming an average thickness of 0.5 m, the volume of material that can be obtained from this area is approximately 21,000 m^3.

3.7.3.16 Borrow Area 15 (BA-15)

This location was identified as potential landfill location (LF-4 on Figure 2 and 3) but site investigation revealed that this area is a suitable source of Type 2 Granular Fill. Also, other suitable locations were found during site investigation for landfill therefore this area can be used as borrow source of Type 2 Fill.

BA-15 is located on partially undisturbed area near the airstrip and is easily accessible by roads (Photos G56 to G59 in Appendix C). The area is also located close to the proposed landfill/landfarm locations. Four testpits (TP10-49 to 51) were excavated in this area to characterize soils. The subsurface soils in the area consisted predominantly of gravel and sand or peat underlain by sand underlain by gravel and sand. Seepage was encountered in TP10-49 and 51 below 0.9 m depth and frozen ground was not encountered in any testpit.

Sieve analyses were conducted on combined samples from TP10-49 to 52. The samples had 58 to 64 % gravel, 30 to 37 % sand and 5 to 6 % silt/clay. The soils encountered within this borrow area fall within gradation limits of Type 2 Fill as shown on Figure 34.

The identified area of this borrow is approximately 45,000 m^2 in size. Assuming an average thickness of 0.6 m, the volume of material that can be obtained from this area is approximately 27,000 m^3.

3.7.4 Summary of Borrow Materials

The soil types encountered in the borrow areas generally comprise Type 2 and Type 4 Granular Fills. A summary of granular material that can be obtained from the potential borrow areas is presented in Table 3-11.

Table 3-11 - Summary of Granular Borrow Sources

Borrow Area	Available Granular Fill Type	Area (m^2)	Depth (m)	Volume (m^3)	Comments
BA-1	Type 2, Type 3, Type 6	24,000	0.5	12,000	Undisturbed
BA-2	Type 2, Type 3, Type 6	22,000	0.7	15,400	Disturbed
BA-3	Type 2, Type 3, Type 6	51,000	0.7	35,700	Disturbed
BA-4A	Type 2, Type 3, Type 6	8,000	0.7	5,600	Disturbed
BA-4B	Type 2, Type 3, Type 6	26,000	0.7	18,200	Disturbed
BA-4C	Type 2, Type 3, Type 6	11,000	0.7	7,700	Disturbed
BA-4D	Type 2, Type 3, Type 6	7,000	0.7	4,900	Disturbed
BA-5	Type 2, Type 3, Type 6	9,000	0.7	6,300	Undisturbed
BA-5A	Type 4, Type 3, Type 6	27,000	0.7	18,900	Undisturbed
BA-6	Type 2, Type 3, Type 5,Type 6	19,000	0.7	13,300	Disturbed
BA-6A	Type 2, Type 3, Type 5, Type 6	48,000	0.7	33,600	Partially disturbed
BA-7	Type 2, Type 3, Type 5, Type 6	26,000	0.7	18,200	Disturbed
BA-8	Type 1	30,000	0.3	9,000	Disturbed
BA-9	Type 2, Type 3	24,000	0.5	12,000	Disturbed
BA-10	Type 4, Type 3	24,000	0.5	12,000	Undisturbed
BA-11	Type 2, Type 3	7,000	0.5	3,500	Undisturbed
BA-12	Type 4, Type 3	40,000	0.5	20,000	Undisturbed
BA-13 (LF-1)	Type 4, Type 2, Type 3	42,000	0.5	21,000	Undisturbed
BA-14 (LF-2)	Type 4, Type 2, Type 3	46,000	0.6	27,600	Undisturbed
BA-15 (LF-4)	Type 2, Type 3, Type 6	45,000	0.6	27,000	Partially Undisturbed

3.8 Assessment of Proposed Landfill Locations

It is anticipated that the final clean-up of the site will incorporate a non-hazardous waste landfill (NHWLF) for the disposal of demolition material and debris. Depending on the contaminated soil volumes a secure soil disposal facility (SSDF) for Tier II (and potentially hydrocarbon) contaminated soil and/or a landfarm for the treatment of hydrocarbon impacted soils may be required. None of these facilities (SSDF and landfarm) will be permitted to accept hazardous soil or demolition material (other than asbestos).

3.8.1 Methodology

For investigation purposes it was assumed that each of the facilities noted above would be required for site clean-up. During site investigation planning potential locations could not be identified due to the scale of available air photos, therefore landfill locations were identified and investigated during the field program, noting grade, surface hydrology, vegetation cover, and subsurface soil, permafrost and groundwater conditions. Subsurface conditions were observed with the excavation of testpits. The potential landfill areas were assessed on a conceptual basis for the purpose of selecting the preferred location once the final remedial volumes have been defined. While the volume of contaminated soil will dictate the final size of the SSDF and landfarm, it is the requirement for the landfill in the final design that will most greatly influence the location for each facility. For example, based on soil conditions, there may be a preferred location for an SSDF that would preclude the construction of a NHWLF at that particular location.

Information requirements investigated during the 2010 field program considered the following issues:

- ***Size of the Area*** - the selected area should be of sufficient size based on disposal facilities constructed on similar sites. In this regard, it is anticipated that an SSDF and NHWLF will have footprints in the order of 3,500 m^2. The footprint for a landfarm may be in the order of 15,000 m^2.
- ***Foundation Conditions*** - the selected area should have suitable soil, groundwater and permafrost conditions for the facility under consideration. For example, it is important to reach either saturated ground or ice rich permafrost in an area where a perimeter cut-off trench is required, e.g., SSDF.
- ***Drainage*** - the selected area should be in a location with limited surface water run-off or where surface run-off can be redirected away from the facility.
- ***Topography*** – the site should have relatively flat topography. In some cases, a uniformly but gently sloping ground surface may be preferable to achieve adequate drainage on final covers without raising gradient berms.
- ***Setback Distances*** – the selected area should have an appropriate setback distance from water bodies.
- ***Previous Contamination*** - The selected location should avoid or minimize the possibility of previously contaminated soil or sub-surface migration of contaminants below the facility where it may be detected in post-construction monitoring.
- ***Proximity to Work Areas*** - The selected area should be in close proximity to work areas (landfill excavation, demolition, contaminated soil excavation, etc.).
- ***Site Access*** – the selected site should have good access for construction equipment
- ***Disturbed Areas*** - Preference should generally be given to previously disturbed areas to minimize the impact on the natural environment.

A description of each site under consideration with respect to the design issues identified above is provided in the following sections.

3.8.2 Non-Hazardous Waste Landfill

It is our understanding that a non-hazardous landfill (NHWLF) will be constructed to accept waste that primarily includes material from the demolition of existing structures, surface debris and any debris sorted out from landfill excavations. The majority of the waste would be treated and untreated wood, metal, concrete and empty (cleaned) crushed barrels. Asbestos from demolition of buildings is considered to be non-hazardous if properly packaged and therefore can be disposed of in the NHWLF. Creosote coated timbers (utility poles) would be wrapped in plastic prior to their disposal in the NHWLF.

3.8.2.1 Design Considerations

The landfill should be located in an area where concentrated surface water run-on does not occur, e.g., within the confines of a natural drainage course or where its construction could impede natural drainage. Ponding of water as a result of construction should be avoided as this may impact the thermal stability of the ground leading to post-construction settlement.

The landfill cover and berms can be constructed using the Type 2 Granular Fill available on site. The recommended gradation for Type 2 Granular Fill is provided in Section 3.7.2. All granular fill should be placed in horizontal lifts not exceeding 250 mm and compacted to a minimum of 95 percent of Standard Proctor Dry Density (ASTM D698). The landfill footprint should be graded and any organic material removed prior to fill placement. The extent of grading should be kept to a minimum to avoid disturbance to the permafrost. Below grade cells are not recommended. Any boulders or oversize material should be pushed aside and wasted or saved for final armouring.

The berms should be constructed with exterior side slopes of 3H:1V and interior slopes of 1.5H:1V with a minimum final top width of 2 m. Staging berm construction to achieve the design height may be desirable until waste volumes have been better established towards the end of the clean-up operation. Doing so may allow the overall height of the landfill to be reduced by incorporating the top of the berm into the final cover. Unless the environmental assessment of the debris material would suggest that the environmental impact from leachate is unacceptable, the landfill cover does not need to be designed for freeze-back and minimum cover thickness of 1.0 m is acceptable. Depending on the final berm height, it should not be necessary to armour the Type 2 granular fill with Type 1 material.

In the case of the NHWLF, leachate is any liquid produced when water comes into contact with the waste contained within the landfill. Because the waste is in a dry condition, leachate contribution from decomposing or compressing debris is negligible. Because the waste material is primarily non-putrescible and the environment within the landfill is non-acidic, the potential for the generation of hazardous leachate is considered very low. The design objectives are therefore to minimize the amount of water coming into contact with the waste by minimizing infiltration by careful site selection and promoting surface water run-off by compacting and properly grading the final cover. Leachate collection is not considered necessary.

Landfill gas generation is not considered to be a significant factor in the design of the NHWLF and gas collection/venting systems are not considered necessary. The rate of decomposition of any biodegradable waste within the landfill cell and any associated gas generation will be extremely slow as compared with landfills in the south. The potential for gas generation and associated odours is best controlled by minimizing infiltration of water into the landfill. Any gas that is generated will dissipate through the permeable cover soils.

Settlement of the landfill surface can lead to ponding and increased infiltration. To minimize this potential, large debris should be reduced in size such that the maximum lift of debris across the landfill cell is 0.5 m. Each lift of debris should be compacted with tracked equipment to reduce void space/size. Free draining intermediate fill (Type 6 Granular Fill) should be placed to a uniform thickness of 0.15 m thick across each lift of debris and worked into the underlying debris using track mounted equipment. The intermediate fill lift should be inspected to confirm that large void spaces have been filled. The intermediate fill should be non-frost susceptible to reduce the potential for seasonal frost jacking of debris. The final thickness of the debris and intermediate fill layers should not exceed 3 m.

3.8.3 Secure Soil Disposal Facility

Soils contaminated with PCBs and heavy metals are known to be present on the site. Unless these soils are removed from the site, a secure soil disposal facility (SSDF) consisting of a lined containment system is recommended. Depending on the final contaminated soil volumes, co-disposal of the Tier II contaminated soil with hydrocarbon impacted soil may be considered. The design objective for this facility would be to encapsulate the contaminated soil with a geomembrane and sufficient granular cover to allow it to freeze-back over time. Additional containment would be provided by a frozen core of saturated soil keyed into permafrost or saturated ground. The design will result in little to no infiltration of moisture into the landfilled soil and as such, leachate generation is not expected in either the short term (before freeze-back) or in the long term. In this regard leachate and gas control measures are not required.

3.8.3.1 Design Considerations

The SSDF should be located in an area where concentrated surface water run-on does not occur, e.g., within the confines of a natural drainage course or where its construction could impede natural drainage. Ponding of water as a result of construction should be avoided as this may impact the thermal stability of the ground leading to post-construction settlement.

The SSDF berms should be constructed with Type 2 granular fill incorporating a core of Type 4 granular fill. Both granular material types are available on site. The core material should have a minimum degree of saturation of 90 percent and be compacted to a minimum of 95 percent of Standard Proctor Maximum Dry Density (SPMDD). All granular fill should be placed in horizontal lifts not exceeding 250 mm and compacted to a minimum of 95 percent of SPMDD (ASTM D698). The berms should be constructed with exterior side slopes of 3H:1V and interior slopes of

1.5H:1V with a minimum final top width of 2 m. If the final berm is limited in height, Type 1 granular fill for armouring the finished slopes may not be required.

The SSDF footprint should be graded and any organic material removed prior to fill placement. The extent of grading should be kept to a minimum to avoid disturbance to the permafrost. Below grade cells are not recommended. Any boulders or oversize material should be pushed aside and wasted or saved for future incorporation as armouring. The Type 4 granular fill needs to be keyed into either saturated ground or ice rich permafrost. In this regard, preferred locations may be in lower lying areas where a shallower depth to the groundwater table or frozen soil is expected.

The geomembrane should be protected using a non-woven geotextile and a sand layer (Type 5 Granular Fill in Section 3.7.2). The bedding sand may be obtained by screening Type 2 Fill or screening of sand encountered in Borrow Areas 6, 6A, and 7 to meet the grading requirements, in particular the maximum particle size. The landfill cover should be constructed using Type 2 granular fill available on site. It is anticipated that the final cover above the contaminated soil will be in the order of 4.0 m thick to maintain the active layer within the cover material. The final cover thickness should be confirmed using thermal modelling during detailed design.

3.8.4 Landfarm

Hydrocarbon impacted soils have been found on site. Depending on the volume of impacted soil a landfarm may be a suitable remedial option for soil treatment.

3.8.4.1 Design Considerations

The landfarm would consist of a containment cell with perimeter berms in the order of 1 to 1.5 m high. Because the total thickness of contaminated soil is generally limited to about 400 mm, the landfarm footprint may be of considerable size. The landfarm footprint should be uniformly graded (reshaped) towards the down-gradient side and any organic material removed prior to fill placement. The extent of grading should be kept to a minimum to avoid disturbance to the permafrost. It is not anticipated that any fill material will be required to achieve the cell floor grades. Any boulders or oversize material should be pushed aside.

The berms should be constructed using granular Type 2 granular fill with exterior side slopes of 3H:1V and interior slopes of 2H:1V with a minimum final top width of 2 m. A hydrocarbon resistant liner is recommended around the perimeter of the cell. The liner should be incorporated into the granular berms and keyed into permafrost. Once land-farming is complete the granular berms should be collapsed and the liner removed for disposal in the NHWLF. It is only necessary to exhume the portion of the liner within the berms, i.e., the portion above existing grade. All granular fill should be placed in horizontal lifts not exceeding 250 mm and compacted to a minimum of 95 percent of SPMDD (ASTM D698). The final landfarm surface should be graded at 2 to 4 percent towards the outside edge(s) and uniformly compacted with the random action of tracked equipment.

3.8.5 Recommended Landfill/Landfarm Locations

Four potential landfill locations (LF-2, LF-3, LF-5 and LF-6) were identified and evaluated during the field program. The locations of landfills are shown on Figure 2.

The preferred locations for an SSDF are LF-3 or LF-6. An alternative location for a SSDF is LF-2 but LF-2 may also be considered as a borrow source of Type 4 Granular Fill.

The preferred locations for a NHWLF are LF-5 or LF-6. An alternative location for NHWLF is LF-2 but LF-2 may also be considered as a borrow source of Type 4 Granular Fill

The preferred location for a landfarm is LF-5. An alternate location for a landfarm is LF-6.

3.8.5.1 LF-5 (Proposed NHWLF and Landfarm Location)

The location of LF-5 is shown on Figures 2 and 3. The site is located on a well drained undisturbed area south of the Station Area (Photos G60 to G66 in Appendix C). The area is adjacent to several borrow areas and a road and is easily accessible. The area slopes at approximately 3 % to the south (towards the ocean). Five testpits (TP10-09 to 12 and TP10-22) were excavated in this area to determine subsurface soil, groundwater and permafrost conditions. The subsurface soils generally consisted of peat underlain by sand underlain by gravel and sand. Seepage was encountered in all testpits below 0.8 m depth (Photos G62, G64 and G66). Frozen ground was also encountered in TP10-10, 11 and 12 below 0.9 m depth. A seepage zone is common in permafrost areas above the permafrost and should be expected in this area during construction.

Grain size analyses were conducted on combined samples from gravel and sand layer in TP10-10 and 11, and TP10-12 and 22. The samples had 63 to 65 % gravel, 33 to 36 % sand, and 1 to 2% silt/clay. A sieve analysis was also conducted on a sand sample from TP10-22. The sample had 3 % gravel, 94 % sand, and 1 % silt/clay. The soils encountered in this area generally fall within the gradation limits of Type 2 Fill (Figure 35).

Salinity was also measured on two soil samples from TP10-10 and 22. Salinity of both samples was less than 1 ppt indicating that the foundation soil is non saline.

Because of the permeability of these soils, the perimeter containment system described in Section 3.8.4 is also recommended for the landfarm. The liner has to be keyed into the permafrost. If at some locations the permafrost is deeper than 1.5 m the liner will have to be keyed into the existing ground by at least 1.5 m in consideration of the freeze-back that will occur during the first season.

The investigated area for LF-5 is approximately 100,000 m^2, therefore a landfarm or both a landfarm and a NHWLF can be constructed at this site. The east limit of LF-5 can be adjusted to maintain the required separation from the shoreline and high water mark. Considering the size of the area and its proximity to roads and borrow areas, LF-5 is suitable from a geotechnical perspective for construction of a NHWLF; landfarm; or both.

3.8.5.2 LF-6 (Proposed NHWLF, SSDF or Landfarm Location)

The LF-6, as shown on Figures 2 and 3, is on a well drained partially undisturbed area south of the Station Area (Photos G67 to G72 in Appendix C). The area is adjacent to several Borrow Areas, the Station Area and road and is easily accessible. The area slopes at approximately 2 % to the south (towards the ocean).

Three testpits (TP10-19, 20, and 21) were excavated at this location to determine subsurface soil, groundwater and permafrost conditions. The testpits were excavated in the undisturbed area. The subsurface stratigraphy generally consists of a layer of peat, underlain by sand, gravely sand or gravel and sand. Frozen ground was encountered in TP10-19 and 21 at approximately 0.95 m depth and seepage was encountered in all testpits below 0.8 m depth (Photos G70 and G72 in Appendix C).

A sieve analysis was conducted on a combined sample from the gravel and sand or gravely sand layer in TP10-20 and 21. The sample had 61 % gravel, 37 % sand, and 2 % silt/clay. The sample was collected above the seepage zone and its moisture content was approximately 2 %. A sieve analysis was also conducted on a soil sample from sand in TP10-10. The sample had 3 % gravel, 95 % sand, and 2 % silt. The sample was collected above the seepage zone and its moisture content was 1.6 %. The sieve analysis results and gradation limits of Type 2 Fill are shown on Figure 36 which indicate that the subsurface soils in this area are variable consisting of gravel and sand, gravelly sand, and sand.

Salinity testing of a soil sample from TP10-20 was also conducted. The sample had a salinity of less than 1 ppt indicating that the foundation soil is non-saline.

Considering the site topography, seepage below 0.8 m depth and permafrost at approximately 0.95 m depth, access and proximity to work area, LF-6 location is considered suitable for construction of both a NHWLF and SSDF. The location is also considered suitable for a landfarm. Considering the depth of permafrost and groundwater at the site the depth of a key trench may be in the order of 1 to 1.2 m for the SSDF. The investigated area for LF-6 is approximately 43,000 m^2, with room to extend in north and west directions.

Because of the permeability of the soils encountered at the site, the perimeter containment system described in Section 3.8.4 is recommended if this location is used for construction of a landfarm. The liner has to be keyed into the permafrost. If at some locations the permafrost is deeper than 1.5 m the liner will have to be keyed into the existing ground by at least 1.5 m in consideration of the freeze-back that will occur during the first season.

3.8.5.3 LF-2 (Proposed SSDF or NHWLF Location)

This location can be considered as an alternative location for construction of an SSDF or NHWLF. This location has also been identified as a potential borrow area of Type 4 Fill (BA-14), therefore, it can be used as a borrow source.

Three testpits (TP10-43 to 45) were excavated in this area to determine subsurface soil, permafrost and groundwater conditions and to characterize subsurface material. The subsurface soils encountered in TP10-43 and 44 consist of peat underlain by a layer of gravel and sand underlain by silty and gravely sand. In TP10-45, drilled near a pond, the subsurface soils consisted of peat underlain by a layer of gravel and sand underlain by silty and clayey sand. Seepage was encountered in all testpits below 0.8 m depth (Photos G50 and 51 in Appendix C) and frozen ground was not encountered in any of the testpits. A zone of seepage is common above frozen ground in permafrost areas and should be expected at this location.

A sieve analysis was conducted on a combined soil sample from silty gravely sand in TP10-43 and 44. The sample had 35 % gravel, 45 % sand and 20 % silt/clay. The soils from these two testpits generally fall within the gradation limit of Type 4 Fill (Figure 19 in Appendix A). A hydrometer analysis was also conducted on a soil sample from TP10-45. The sample had 3 % gravel, 44 % sand and 23 % clay. The soil in TP10-45 falls slightly outside the gradation limit of Type 4 Fill (Figure 32) therefore blending with coarse material may be required if this area is used as a borrow source of Type 4 Fill. Moisture conditioning may also be required if soils from this area are used for backfill of key trench excavations for a SSDF.

Soil salinity of a combined soil sample from TP10-43 and 44 was also measured. The sample had a salinity of 1.5 ppt indicating that the foundation soils are non-saline.

The LF-2 location is on a relatively flat undisturbed ground which slopes gently (approximately 0.5 %) towards the south. The investigated area is approximately 46,000 m^2 which may be sufficient for construction of a SSDF, NHWLF or both. This area may be considered an alternative location for construction of a SSDF or NHWLF considering the foundation conditions (soils and depth to groundwater) proximity to roads, airstrip, borrow areas, and the Station Area.

3.8.5.4 LF-3 (Proposed SSDF Location)

The Landfill 3 (LF-3) location may be considered for construction of a SSDF. The area is bounded by roads to the south, east and west and the airstrip to the north. Most of the area is on undisturbed ground (Photos G52 and 53 in Appendix C). The site is in a low lying area with shallow depth to groundwater table. The area is also near several borrow areas, easily accessible and of reasonable size (45,000 m^2).

Three testpits (TP10-46 to 48) were excavated in this area to investigate subsurface soil, groundwater and permafrost conditions. The subsurface soil consisted of a layer of peat underlain predominantly by gravel and sand. Seepage was encountered in all testpits below 0.6 m depth but frozen ground was not encountered in any testpit due to shallow refusal on boulders. However, a seepage zone is common above frozen ground in permafrost areas and should be expected in this area.

A sieve analysis was conducted on a combined sample from all testpits. The sample had 45 % gravel, 45 % sand and 10 % silt and clay. The soil in this area falls within the limits of Type 2 Fill (Figure 33). Salinity of the soil sample was less than 1 ppt indicating that the foundation soils are non-saline.

This area may be considered for construction of a SSDF considering the foundation conditions (soils and depth to groundwater) proximity to roads, airstrip, borrow areas, and the Station Area.

3.9 Assessment of Site Access

3.9.1 Airstrip Evaluation

3.9.1.1 General

The airstrip at CAM-A is approximately 0.9 km long and 28 m wide and is constructed from Type 2 Granular Fill borrowed from the adjacent areas north and south of the airstrip. The airstrip was in good condition during the site investigation and minor grading may be required during remediation (Photos G73 to G76). A 600 mm barrel culvert exists under the airstrip near its west end as shown on Figure 2. The culvert was damaged and appeared to be blocked thus restricting flow through it (Photos G78 and G83). The blocked culvert may result in ponding of water near the airstrip. Ponding may weaken the subgrade of the section of airstrip near the culvert and the culvert may settle. Therefore the culvert should be repaired if this section of the airstrip is to be used.

The aircraft used during the site investigation were Dornier 228 and Shorts Skyvan, both operated by Summit Air. The Summit Air pilots considered the airstrip to be in very good condition. According to the Summit Air pilots, the airstrip in its existing condition is suitable for aircraft like Shorts Skyvan, Dornier 228, Twin Otter DHC6, and Buffalo DHC5.

3.9.1.2 Site Investigation

Two testpits (TP10-14 and TP10-15) were excavated on the airstrip to investigate the fill thickness and subsoil and permafrost conditions. The locations of the testpits are shown on Figure 3. The testpit depths were limited to 1 m due to equipment limitation. Permafrost was encountered in TP10-14 at approximately 1 m depth. The subsurface soils encountered in the testpits consisted of cobbly gravel and sand with trace silt/clay. Sieve analyses were conducted on soil samples collected from both testpits. The samples had 52 to 61 % gravel, 36 to 45 % sand and 3 % silt/clay. The material from which the airstrip was built generally falls within the gradation limits of Type 2 Granular Fill. Two CBR tests were also conducted on the soil samples from TP10-14 and TP10-15. The un-soaked CBR values of samples varied from 37.3 % to 62.1 % and soaked CBR values varied from 33.9 % to 41.3 %.

In addition to the laboratory CBR test Dynamic Cone Penetrometer (DCP) tests were also conducted at six locations to evaluate the airstrip. With DCP it is possible to determine in-situ California Bearing Ratio (CBR) of the gravel airstrip and subgrade. The locations of the DCP tests are shown on Figure 2 and variation of CBR with depth is shown on Figure 3. The test results show that CBR generally increases with depth. The variation of CBR with depth is summarized in Table 3-12.

Table 3-12 - Variation of CBR with Depth

Depth (m)	CBR (%)		
	Minimum	Maximum	Average
0.0-0.25	4	60	15
0.25-0.50	12	100	28
0.50-0.75	3	80	33
Below 0.75	5	100	39

Generally, the average CBR increased with depth. Low CBR values (less than 10 %) were recorded in the upper 0.15 m of the pavement structure. Low CBR values were also recorded at DCP-1 at 0.6 m depth and at DCP-3 at approximately 1.1 m depth. The CBR from the laboratory tests and average CBR values from DCP tests indicate that the pavement consists of a competent granular material even in a saturated condition.

3.9.1.3 Overall Airstrip Load Capacity

Based on the condition of the airstrip and the in-situ CBR values the existing gravel airstrip would have the capacity to support aircraft with an Aircraft Loading Rating (ALR) up to 8. Table 3-13 obtained from Transport Canada (2004) provides an indication of the type of aircraft within each ALR classification, operating weights, Aircraft Classification No. (ACN) and design tire pressure.

Table 3-13 - Typical Aircraft for ALR Classification

Aircraft	ALR Max/Min	Operating Weight (kN) Max/Min	ACN Max/Min	Design Tire Pressure (MPa)
Otter DHC3	1.0/1.0	36/20	N/A	0.20
Twin Otter DHC6	1.0/1.0	56/35	2/2	0.26
Short Skyvan	1.0/1.0	67/35	3/3	0.28
DC-3	4.1/2.3	147/80	7/4	0.31
Buffalo (DHC5)	4.3/4.2	187/115	8/4	0.41
DC-4	6.3/4.2	335/200	15/8	0.53
DC-9	7.8/6.5	404/300	23/16	0.93
Hercules C-130	9.1/6.0	778/360	34/14	0.67

Most of the aircraft in Table 3-13 would be able to use the existing airstrip at CAM-A subject to any repair or regrading that may be required. It should be noted that the CBR values based on DCP can deviate throughout the year (i.e., the surface CBR values may be low when airstrip is wet). Considering the low CBR values (less than 10) in the upper 0.15 m of the airstrip at most of the locations a fully loaded Hercules C-130 should not land on the airstrip during wet conditions.

The DCP testing and subsequent determinations of ALRs consider the entire granular structure with respect to supporting aircraft loads. This analysis does not consider the internal stability of the sand and gravel and its potential for rutting. The successful (and conventional) use of aircraft with wide tires such as the Skyvan and Dornier used for the site investigation suggests that wide tires may be necessary because of the quality of granular material. For this reason, it is recommended that the airstrip be inspected by aircraft crew familiar with necessary gravel surface requirements prior to its use, in particular for aircraft the size and weight of a Hercules C-130.

3.9.2 Roadway Evaluation

There are a number of gravel roads on the site connecting the Station Area with the Airstrip, Beach POL, Barrel Pile B, Landfill A and Fresh Water Lake. A visual inspection was conducted to evaluate the general condition of gravel roads and to assess the maintenance required to make it passable by construction equipment, haul trucks and other passenger vehicles during the remediation activities. Photographs and videos were taken of the roads during the site investigation. Selected photographs are included Appendix C. Site videos are included in Appendix I.

Most of the roads are elevated and are constructed with locally available granular material. The gravel roads at the CAM-A site have been divided in eight sections (Sections 1 to 8) for the purpose of this report as shown on Figure 2. The roads are generally in good condition but may require regular grading during remediation. Small patches of vegetation are typical along some roads but are of no concern with respect to trafficability. The road sections are described below.

3.9.2.1 Road Section 1

Road Section 1 connects the west end of the airstrip with the Fresh Water Lake (Photos G77 to G81). This road section is approximately 5 to 6 m wide and 500 m long. The road section is generally in good condition. The only exception is a 20 m long reach near the airstrip where settlement was noted (Photo G79). The settlement is caused by ponded water on both sides of the road. A turn-around section, approximately 24 m by 14 m, exists at the end of the road (Photo G81). This road section is in good condition for heavy equipment although regular grading will be required during remediation activities. The section where settlement was noted will also need repair.

Pull-out sections do not exist on this section therefore a pull-out section may be required to allow for two way traffic.

3.9.2.2 Road Section 2

Road Section 2 connects the airstrip with the Station Area via Road Section 3 (Photos G82 and G84 to G88). This road section is approximately 5 to 6 m wide and 200 m long. The road is built from granular material and is generally in good condition for heavy equipment. A barrel culvert approximately 600 mm diameter exists on this road section as shown on Figure 2 and Photos G85 to G87. The culvert was damaged at both ends and there is no soil cover above it. The culvert may need replacement during remediation. Soil cover may also be required above the culvert to protect it from any damage due to construction traffic.

3.9.2.3 Road Section 3

Road Section 3 connects the west end of the airstrip with the Station Area (Photos G89 to G95). The road is approximately 5 to 6 m wide and 600 m long. The road is well elevated and is in good condition for heavy construction equipment. A CSP culvert of approximately 600 mm diameter exists on this road section (Photos G91 to G93). The culvert is extended by connecting a barrel with the CSP. The culvert may need minor repair during remediation (i.e., properly extending the CSP culvert, and fill placement above culvert to protect it from damage due to heavy equipment, etc.).

3.9.2.4 Road Section 4

Road Section 4 connects the east end of the airstrip with the Station Area (Photos G96 to G102). This road section is approximately 850 m long and 5 m wide. The road is partly elevated and partly at grade. Small patches of vegetation are typical along this road section but are of no concern with respect to trafficability. A barrel culvert exists on this road section as shown on Figure 2. The culvert is damaged and has no soil cover. The culvert may need replacement and enough soil cover above it to protect it from any damage due to heavy equipment. The road is generally in good condition for heavy equipment but regular grading will be required during remediation. Pull-out sections may be required along the road to allow two way traffic.

3.9.2.5 Road Section 5

Road Section 5 connects Station Area with Beach POL (Photos G103 to G110). This road section is approximately 850 m long and 4 to 4.5 m wide. The road is elevated and small patches of vegetation are typical on the road surface along this section. A big turn-around section exists at the end of this section. The road is generally in good condition but will require regular grading and some pull-out sections to allow two-way traffic. The turn-around section is on grade; its surface consists of sand and is covered with vegetation. Some fill placement may be required on the turn-around section to raise grade and to facilitate turn-around of vehicles.

3.9.2.6 Road Section 6

Section 6 branches off from Section 5, as shown on Figure 2, and ends at Barrel Pile B. This road section is approximately 120 m long and 4 m wide (Photos G111 and G112). A big turn-around exists at the end of this road section. The road is generally in good condition but regular grading will be required during remediation.

3.9.2.7 Road Section 7

Section 7 branches off from Section 6, as shown on Figure 2, and ends at Landfill A (Photos G113 and G114). This road section is approximately 300 m long and 4 to 5 m wide. The road is covered with patches of vegetation. The road was constructed by placing granular fill and is generally in good condition but regular grading will be required during remediation.

3.9.2.8 Road Section 8

Road Section 8 connects the airstrip with Borrow Area 3 (Photos G115 and G116). The road is mostly on grade and covered with vegetation. The road section is approximately 200 m long and 3 to 3.5 m wide. The road surface may need to be raised by placing fill if this road section is used during remediation activities for borrowing material from Borrow Area 3.

3.9.3 Beach Landing Area

The preferred barge landing area is between Barrel Pile B and the Beach POL as shown on Figure 2 where barges would have historically accessed the site. The area is in good condition with little upgrading required and is connected with roads.

3.9.4 Contractor Camp and Laydown Area

The preferred location for the camp/laydown area is near the airstrip and LF-3 as shown on Figure 2. The area has been used for borrowing material in the past for construction of the airstrip and is relatively flat. Alternatively the contractor’s camp can be located on landfill/borrow area locations LF-1 (BA-13) or LF-2 (BA-14).

3.10 Traditional Land Use

While in Cambridge Bay, attempts were made to contact Elders familiar with the sites; however, many of the Elders were out on the land while the team was in Cambridge Bay.

Table 3-14 - Historical Information

Area	Reference Figure	Reference Photo	Waypoint	Comment
Worked Area	2	E-68, E-69, E-70	W-192, W-193	Heritage Point –Cairn dedicated by St. John's Ambulance.

Based on the results of the AIA completed by Golder Associates for AECOM and PWGSC, it is recommended that PWGSC be allowed to proceed with the remediation of the CAM-A DEW Line site area with the condition that no impacts occur within 30 m of six (6) historic sites identified in Figure 2. It is also recommended that the Harrop Cairn, identified in Table 3-14 be avoided and remain intact.

3.11 Environmental Data Quality Assurance and Quality Control (QA/QC) Procedures

3.11.1 QA/QC Procedures and Evaluation

In order to confirm that the sampling and analytical data collected for CAM-A was interpretable, defensible and comparable, a Quality Assurance and Quality Control (QA/QC) program was implemented for the project. QA/QC measures were taken in both the collection and analysis of the environmental sampling program. The following sections outline the QAQC program completed during the investigation.

3.11.2 Summary of AECOM QA/QC Program & Results

Quality Control (QC) measures used in the collection, preservation, shipment, and analysis of samples included the following:

- Sampling techniques were performed in accordance with standard written AECOM protocols;
- Field notes were recorded during the investigation;
- All samples were kept cool prior to shipment to the laboratory;
- Samples were assigned unique sample control numbers and transported under chain of custody procedures; and
- The analytical laboratory has proficiency certification issued by the Canadian Analytical Laboratories Association (CALA) for the specific analyses conducted.

Quality Assurance (QA) measures established for the investigation included collection of duplicate field samples at a rate of approximately 10%. A blind duplicate sample consists of a second aliquot of an individual sample that is submitted to the analytical laboratory under a separate label such that the analytical laboratory has no prior knowledge that it is a duplicate. Duplicate samples from numerous locations were submitted to the laboratory for analysis.

The relative percent difference (RPD) between duplicate results was used to assess overall sampling precision. The RPD is a measure of the variability between two duplicate analyses and is calculated by the following equation:

$$RPD = 100 \times ((2 \times (x1 - x2))/(x1 + x2))$$

Where x1 is the primary result and x2 is the blind duplicate result.

Table B8 in Appendix B compares sample analysis between the original samples and their duplicates. Acceptable RPD values vary on the analytical parameters, the sample matrix and the concentrations of analytes in the sample.

Acceptable RPD values vary based on the analytical parameters, the sample matrix, and the concentrations of analytes in the samples. For metals in soils acceptable RPD values are 35% and for organics in soils (PHCs and PCBs), the acceptable RPD values are 50%. Only when concentrations are at least ten times the method detection limit are RPD calculations considered valid.

3.11.2.1 Field Duplicate Samples

During this program, forty-three (43) field duplicates for soil samples were collected and twenty-six (26) field duplicates were analyzed to provide an indication of the overall sampling and analytical precision. The blind field duplicates were analyzed for various parameters based on their location and expected contaminant(s) present. Relative percent differences (RPDs) were calculated for all parameters analysed in each sample. For the majority of the parameter results, the RPD values were below 35% for metals and 50% for PHCs and PCBs. The results of these calculations are summarized in Table B8 in Appendix B.

Two (2) of the twenty-six duplicates were found to have exceedances in alert criteria. One (1) set of duplicate samples from the modular train with sample numbers 1310 and 1311 exceeded the recommended alert criteria for mercury and zinc parameters. The resulting RPDs were 57% and 58, respectively. Samples 830 and 831 located around the garage exceeded the PHC F2 alert criteria with a calculated RPD of 108%.

Based on the field notes the material type in these areas was composed of gravels and sands. The coarse nature of this material provides explanation as to why it may have been difficult to obtain a homogeneous sample.

Five (5) other duplicate sets did have calculated RPDs that were above the recommended alert criteria; however, the concentrations of one or both samples in the duplicate set were less than ten times the detection limit. The RPD is therefore not considered to be strictly valid. All other parameters within the duplicate sets had acceptable RPD values.

3.11.2.2 Laboratory QA/QC

AGAT Laboratories (AGAT) was the main analytical laboratory for the 2010 analytical program. (Four samples were sent to Maxxam Analytics). AGAT ran calibration check samples, matrix spike samples, surrogate spike analysis, and standard reference material analysis to determine analytical accuracy. The Quality Assurance (QA) report for the investigation was within acceptable limits for all parameters. The QA program completed by AGAT included duplicated, Method Blank, Method Blank Spikes and Matrix Spikes.

Laboratory duplicates are two aliquots taken from the same sample container, and processed through the entire analytical procedure separately. Measured results are used to compare the analytical precision of the entire analytical process including the sample preparation, digestion/extraction, and instrument measurement. Matrix spike duplicates are used to determine method precision. These samples involve taking two aliquots from a client sample and preparing two matrix spikes from the two aliquots.

Matrix spikes and Method blank spikes measure both the accuracy of the analytical method and the effect a particular sample matrix has on the accuracy of measurement. A Matrix spike is prepared by adding a known amount of the target analyte(s) to a volumetric aliquot of the client sample. The recovery of the matrix spike is then calculated. The percentage recovery of the matrix spike will indicate the accuracy of the analytical method. It will also provide a measure of the suitability of the method used for the samples undergoing analysis. The method blank spike is there to act as a check on the equipment and the analyst technique used to prepare the Matrix Spike.

All results were within acceptable limits. The laboratory also ran laboratory duplicate samples to ascertain analytical precision and again, all results were within acceptable limits. Method blank samples were run to ensure that there was no carry-over from analysis to analysis, and that analytes were not introduced due to the reagents or methods used. The blank analyses were observed to be less than the method detection limit (MDL).

4. Conclusions

The conclusions included in this report are based on the information and data collected during the Phase III Environmental Assessment at the CAM-A, Sturt Point Intermediate DEW Line site. The following is a summary of the conclusions:

Contaminated Soil Areas

Approximate volumes of contaminated soil identified at CAM-A include:

- Type B Hydrocarbon (1,124.8 m^3):
  - 425 m^3 of Type B hydrocarbon impacted soil was identified at the Beach POL within 30 m of the ocean.
  - 128.8 m^3 of Type B impacted soil was identified at the Beach POL Pad.
  - 571 m^3 of Type B impacted soil was identified at the module train foundation.
- Tier I (43 m^3):
  - 7.9 m^3 of Tier I contaminated soil was identified in the module train foundation.
  - 35.1 m^3 of Tier I contaminated soil was identified in the sewage outfall area.
- Tier II (75 m^3):
  - 9.25 m^3 of Tier II contaminated soil was identified at the garage.
  - 0.08 m^3 of Tier II contaminated soil was identified in the sumps on the garage foundation.
  - 21.48 m^3 of Tier II contaminated soil was identified at the module train foundation.
  - 44.19 m^3 of Tier II contaminated soil was identified in the worked area (Lobe J).
- The above summary does not include any additional Tier I or Tier II contaminated soil, or PHC impacted soil that may be associated with landfill excavations.

Buried and Surface Debris Areas

- There were fourteen (14) lobes of buried debris areas identified onsite during the geophysical investigation. The presence of buried debris was confirmed at Landfill A (Lobes A, B, C, & D) and Landfill B (Lobes F, G & H). All other lobes identified onsite were determined to be localized partially buried debris and/or surface debris and were assessed as surface debris areas. Six (6) small anomalies were also identified by Associated Geosciences during post-field data processing after the site investigation. The areas of the additional lobes not identified onsite (Lobes L, P, Q, R, S & T, identified on Figures 2, 7 & 10), were assessed as part of the surface debris assessment completed onsite rather than a buried debris assessment.
- The results indicate that Landfill A, Lobes A, B, C, D were clustered in a central location on a mound of material elevated from the surrounding topography. These four (4) lobes were assessed as part of the WDA assessment for Landfill A and identified as Class C, as they were considered a low environmental risk.
- Landfills B, Lobes F, G & H were identified as three separate lobes which appeared mounded from the surrounding topography to varying degrees. These three (3) lobes were assessed as apart of the WDA assessment for Landfill B. These three (3) lobes were assessed as apart of the WDA assessment for Landfill B and identified as Class C, as they were considered a low environmental risk.
- Landfills A and B were classified as Class C, and therefore do not require removal from the site. However, if these landfills were to be excavated, the volumes of estimated materials expected to be encountered are calculated based on AECOM's extensive history with DEW Line Site remediation and years of landfill excavation data. The following is a summary of expected material volumes:
  - 36 m^3 of Hazardous Soil Materials - Lobes A, B, C, D, F, G & H (estimated as 1% of total volume);
  - 364 m^3 of Tier I Soil Materials - Lobes A, B, C, D, F, G & H (estimated as 10% of total volume);
  - 364 m^3 of Tier II Soil Materials - Lobes A, B, C, D, F, G & H (estimated as 10% of total volume); and
  - 729 m^3 of Non-hazardous Soil Materials - Lobes A, B, C, D, F, G & H (estimated as 20% of total volume).

- All other lobes that were identified in the field were determined to be areas of localized partially buried debris and surface debris that would be assessed as a surface debris area rather than a buried debris area.

Demolition & Debris Materials

- Based on the combined results of the surface debris inventory, buried debris inventory, barrel assessment and demolition inventory approximately:
  - 495.81 m^3 (crushed) of non-hazardous waste was identified. This material is suitable for disposal in a non-hazardous waste landfill on the CAM-A site.
  - 38.46 m^3 (crushed) of hazardous waste was identified. This material consists mainly of material coated with PCB amended paint (PAP), as assessed under the new regulations.

Alternative Summary of Demolition & Debris Materials

- Based on the combined results of the surface debris inventory, buried debris inventory, barrel assessment and demolition inventory approximately:
  - 525.01 m^3 (crushed) of non-hazardous waste was identified. This material is suitable for disposal in a non-hazardous waste landfill on the CAM-A site.
  - 9.25 m^3 (crushed) of hazardous waste was identified. This material consists mainly of material coated with PCB amended paint (PAP), as assessed under the new regulations, and asbestos-containing materials.

Geotechnical

- Seventeen (17) potential borrow areas were identified during the site investigation. An estimated 321,900 m^3 of granular material is available from these borrow areas.
- Four (4) landfill/landfarm locations were investigated and identified as suitable locations.
- Based on the information collected all of the noted aircraft would be able to use the existing runway during dry conditions at CAM-A after minor repairs identified during the airstrip inspection. The Hercules C-130 should not land with a full load during times when the airstrip may be wet.
- The roads are in good condition for heavy equipment although regular grading will be required. Pull out sections may be required at some locations to allow two-way traffic.

Archaeological

- Based on the results of the AIA completed by Golder Associates for AECOM and PWGSC, it is recommended that PWGSC be allowed to proceed with the remediation of the CAM-A DEW Line site area with the condition that no impacts occur within 30 m of six (6) historic sites identified in Figure 2. It is also recommended that the Harrop Cairn be avoided and remain intact.

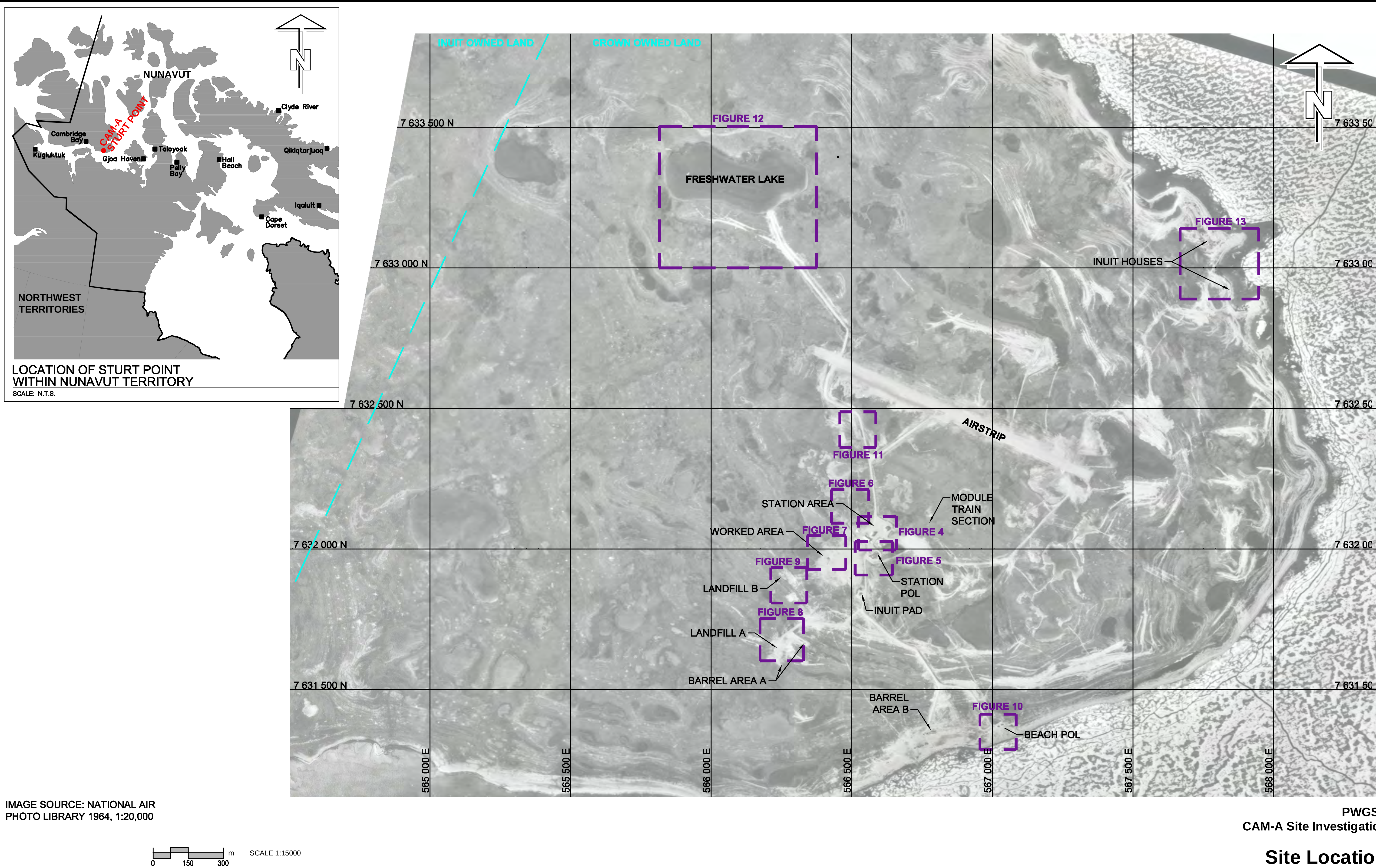
Recommendations regarding preferred remedial options will be completed as part of the development of the Remedial Action Plan (RAP).

5. References

- Environment Canada, 2008. Canadian Climate Normals 1971-2000 Cambridge Bay Nunavut.
- Environmental Sciences Group, 1995. Environmental Study of Abandoned DEW Line Sites
- One Auxiliary and Eight Intermediate Sites in the Canadian Arctic.
- Indian and Northern Affairs Canada, 2009. Abandoned Military Site Remediation Protocol.
- Environment Canada, 2008. PCB Regulations published in the Canada Gazette, Part II, on September 17, 2008 (Current Regulations as of 22, October, 2010)

Appendix A

Figures



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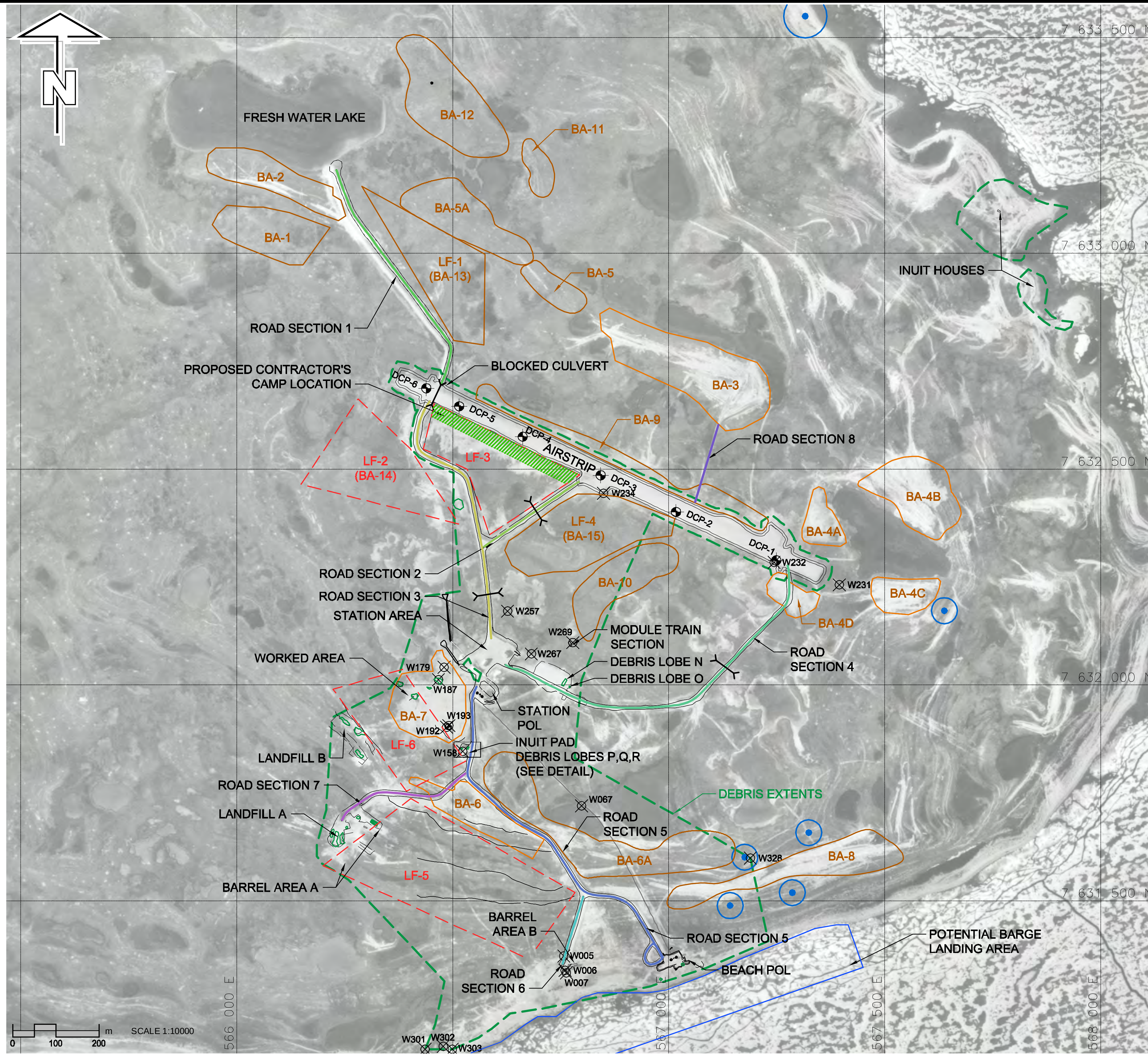
AECOM

PWGSC
CAM-A Site Investigation

Site Location

Figure 1



LEGEND

- PROPOSED LANDFILL LOCATIONS
- BORROW SOURCE LOCATIONS
- EXISTING CULVERTS
- HERITAGE BUFFER AREAS
- DCP-1 DCP POINT
- DEBRIS WAY POINT
- POTENTIAL CONTRACTOR LAY DOWN
- DEBRIS EXTENTS

Landfill/Borrow area	AREA (m^2)
LF-1 (BA-13)	42,000
LF-2 (BA-14)	46,000
LF-3	45,000
LF-4 (BA-15)	45,000
LF-5	100,000
LF-6	43,000
BA-1	24,000
BA-2	22,000
BA-3	51,000
BA-4A	8,000
BA-4B	26,000
BA-4C	11,000
BA-4D	7,000
BA-5	9,000
BA-5A	27,000
BA-6	19,000
BA-6A	48,000
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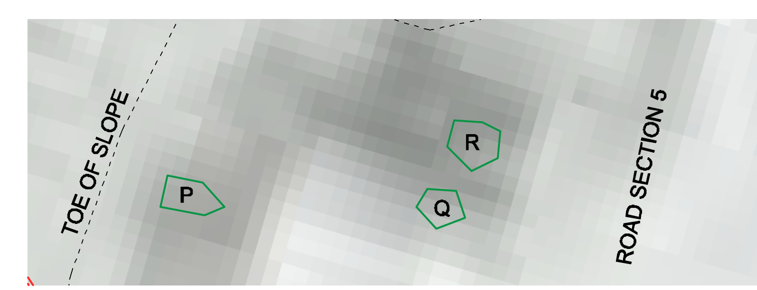
BA-10	24,000
BA-11	7,000
BA-12	40,000



INUIT PAD - DEBRIS LOBES P,Q,R
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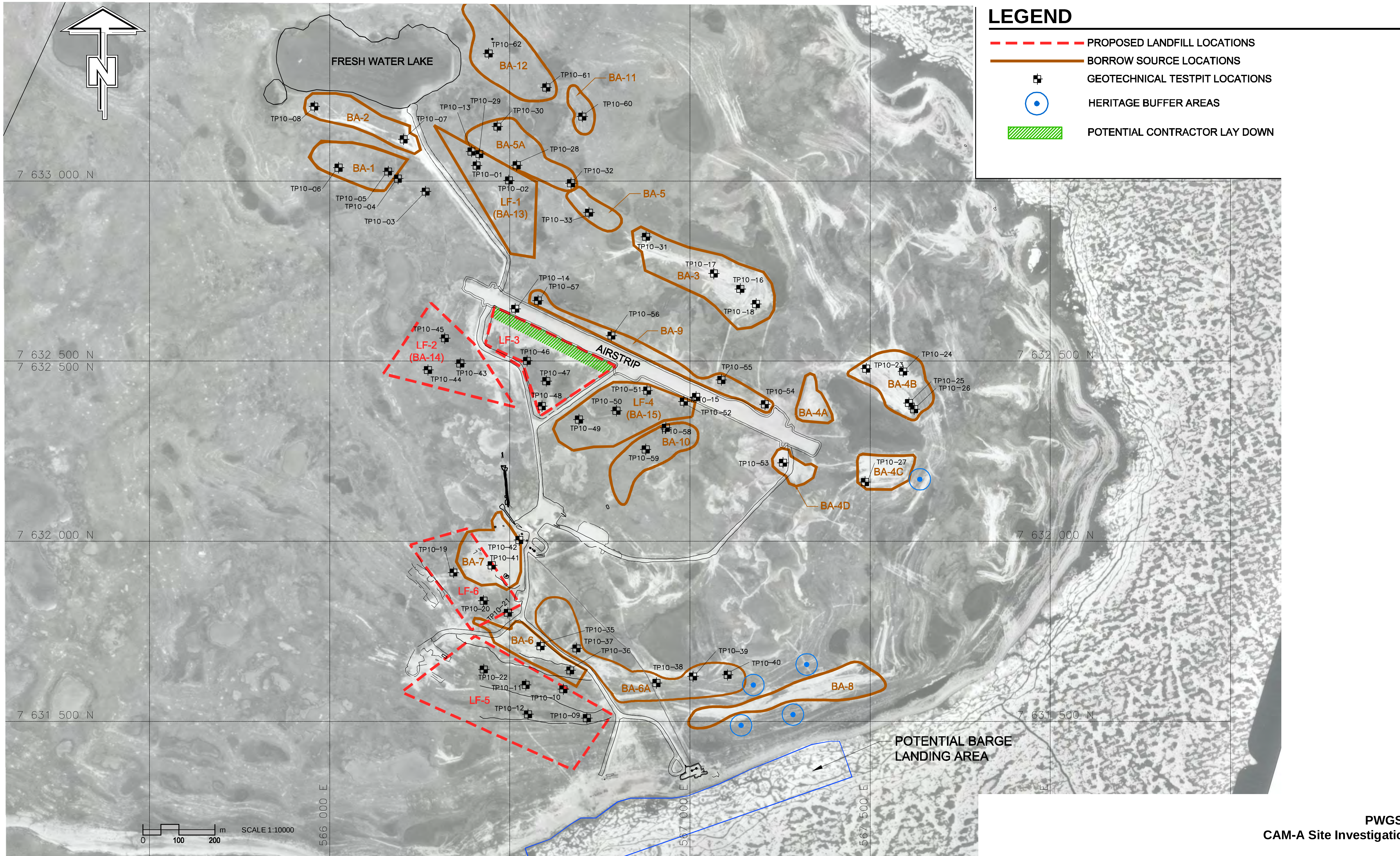
PWGSC
CAM-A Site Investigation

AECOM

Site Layout

Figure 2



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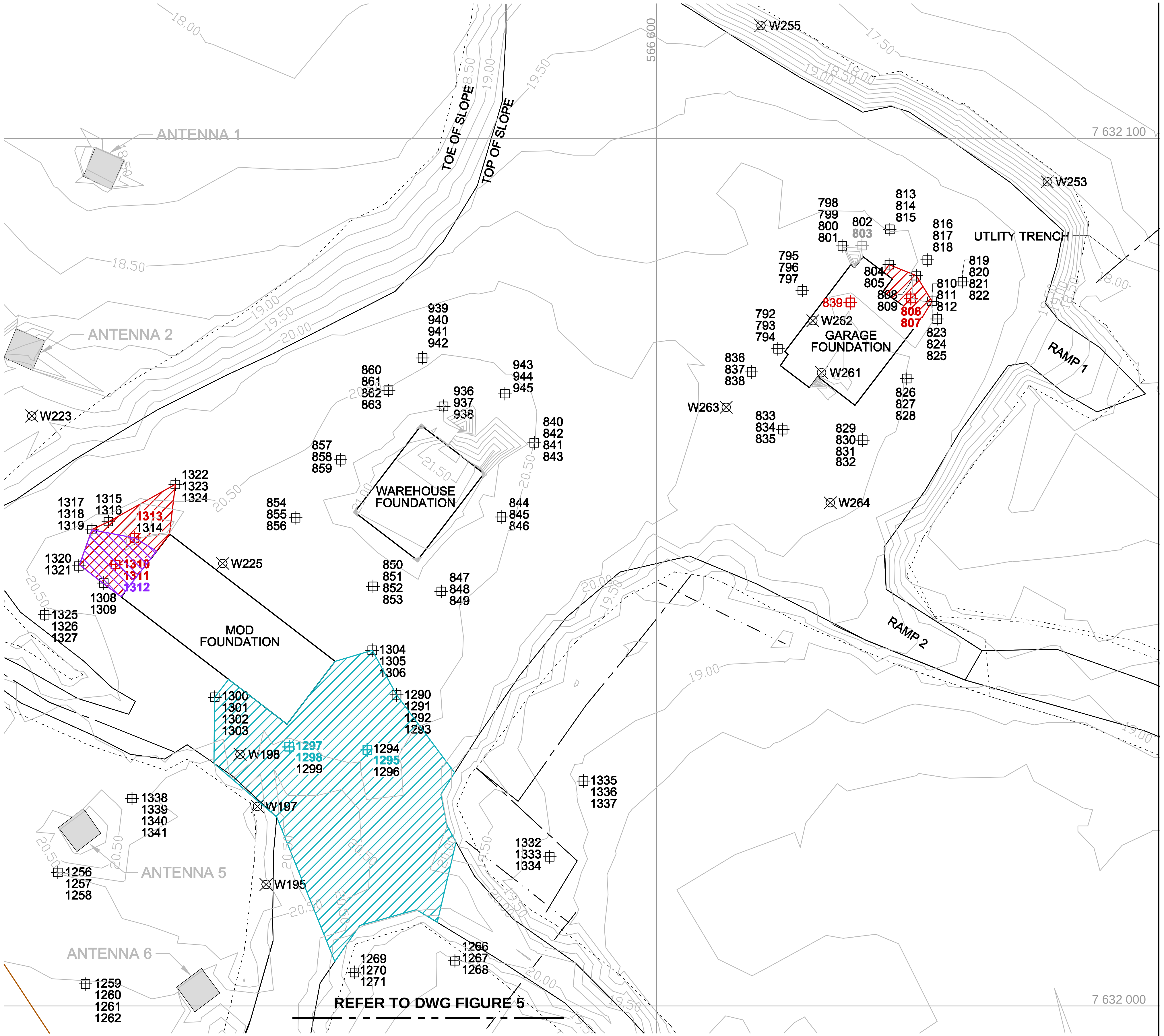
PWGSC
CAM-A Site Investigation

Geotechnical Testpit Locations

Figure 3



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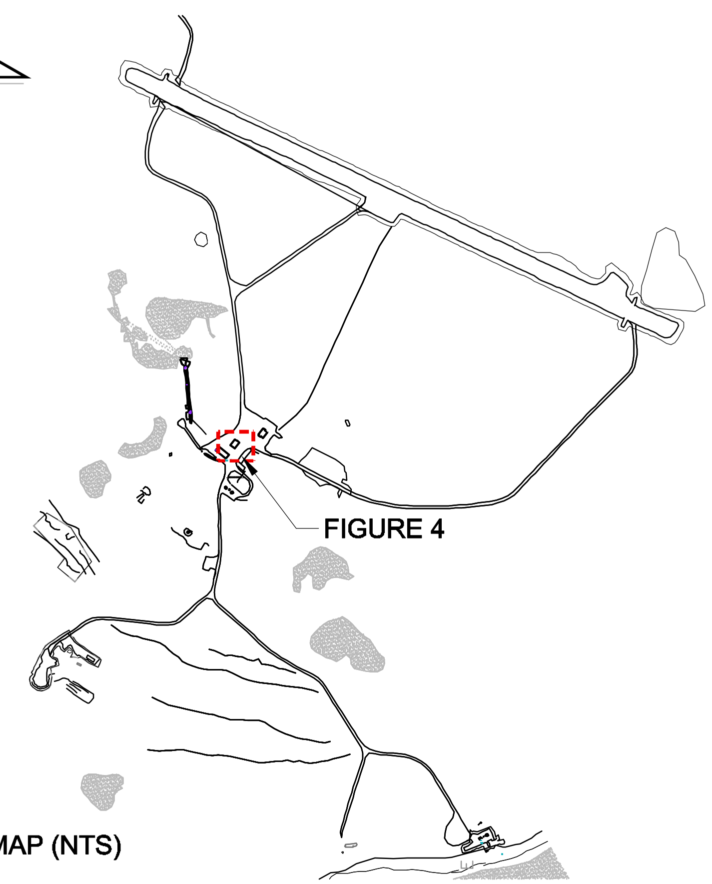
- #### SAMPLE NUMBER - HELD
- #### SAMPLE NUMBER - EXCEEDS TIER II
- TIER II CONTAMINATED SOIL
- #### SAMPLE NUMBER - EXCEEDS TIER I
- TIER I CONTAMINATED SOIL
- #### SAMPLE NUMBER - TYPE B PHC CONTAMINATION
- TYPE B PHC CONTAMINATED SOIL
- CONCRETE ANCHOR PAD
- UTILITY TRENCH
- PIPE (SURFACE)
- TOE OF SLOPE

0 5 10 m SCALE 1:500

N



KEY MAP (NTS)

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AECOM

PWGSC

CAM-A Site Investigation

Station Area

Figure 4

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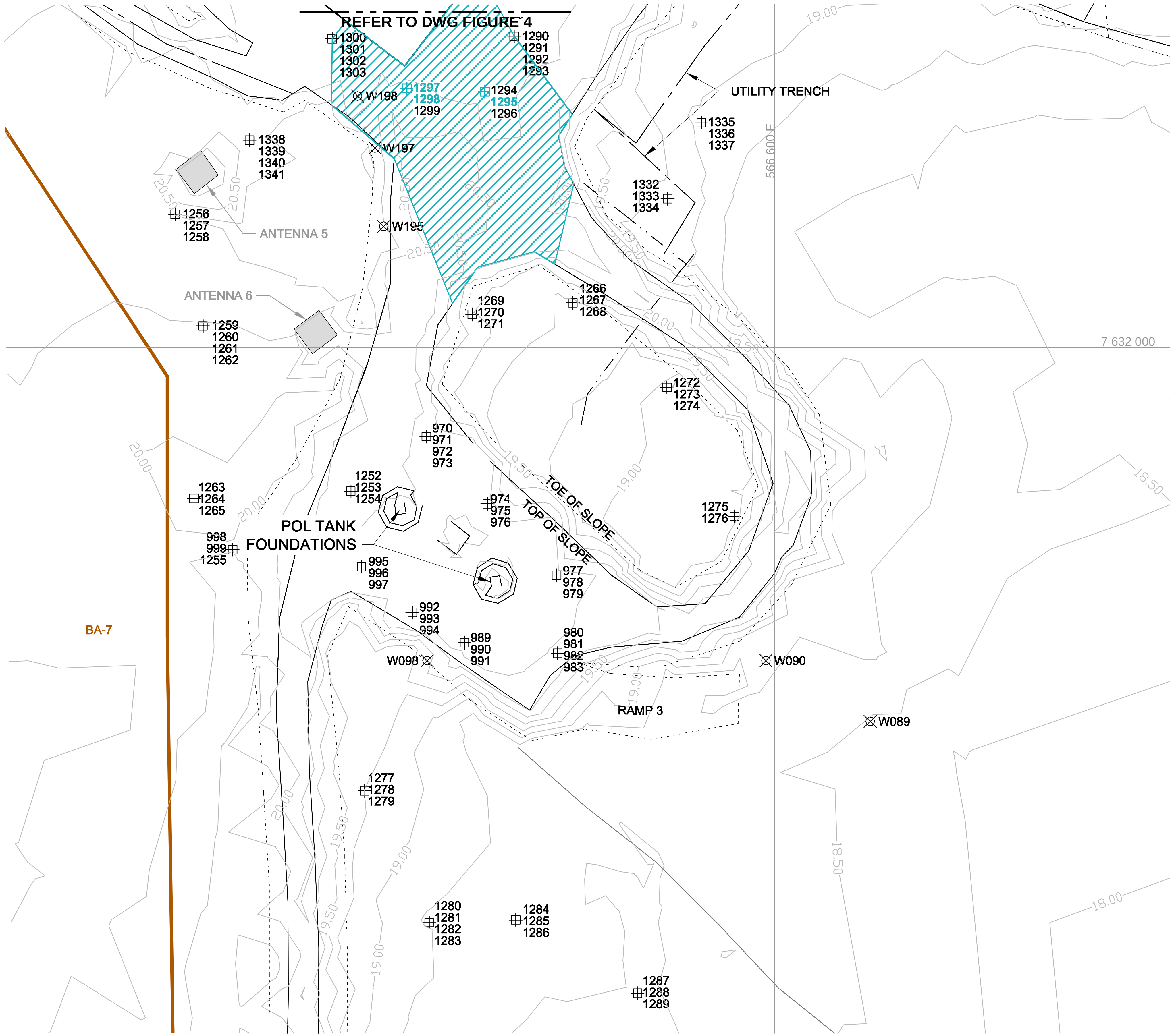

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- #### SAMPLE NUMBER - HELD
- #### SAMPLE NUMBER - EXCEEDS TIER II
- #### SAMPLE NUMBER - EXCEEDS TIER I
- SAMPLE NUMBER - TYPE B PHC CONTAMINATION
- CONCRETE ANCHOR PAD
- UTILITY TRENCH
- PIPE
- DEBRIS AREA
- TOE OF SLOPE

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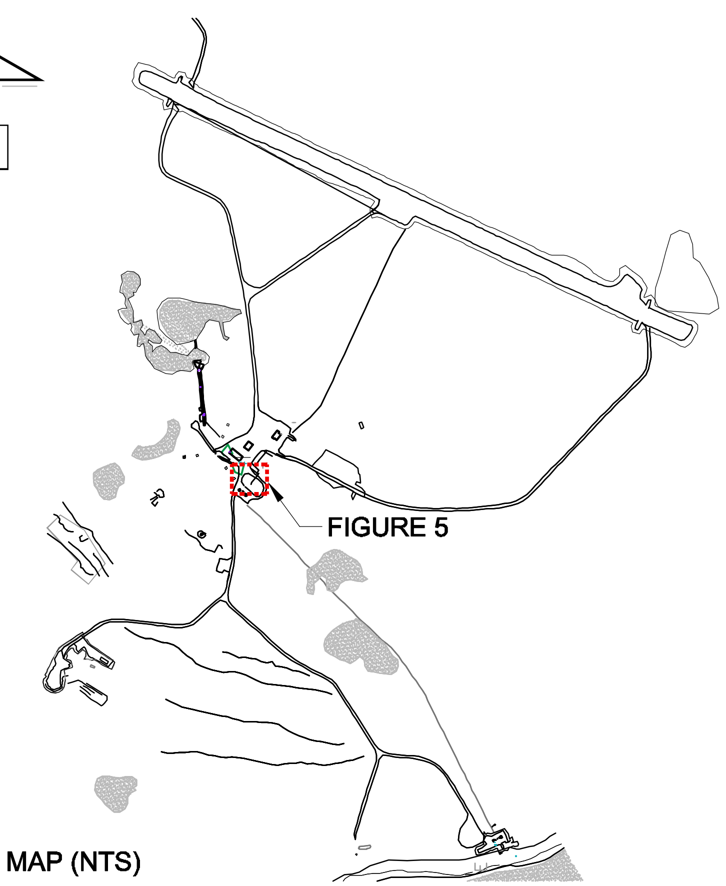
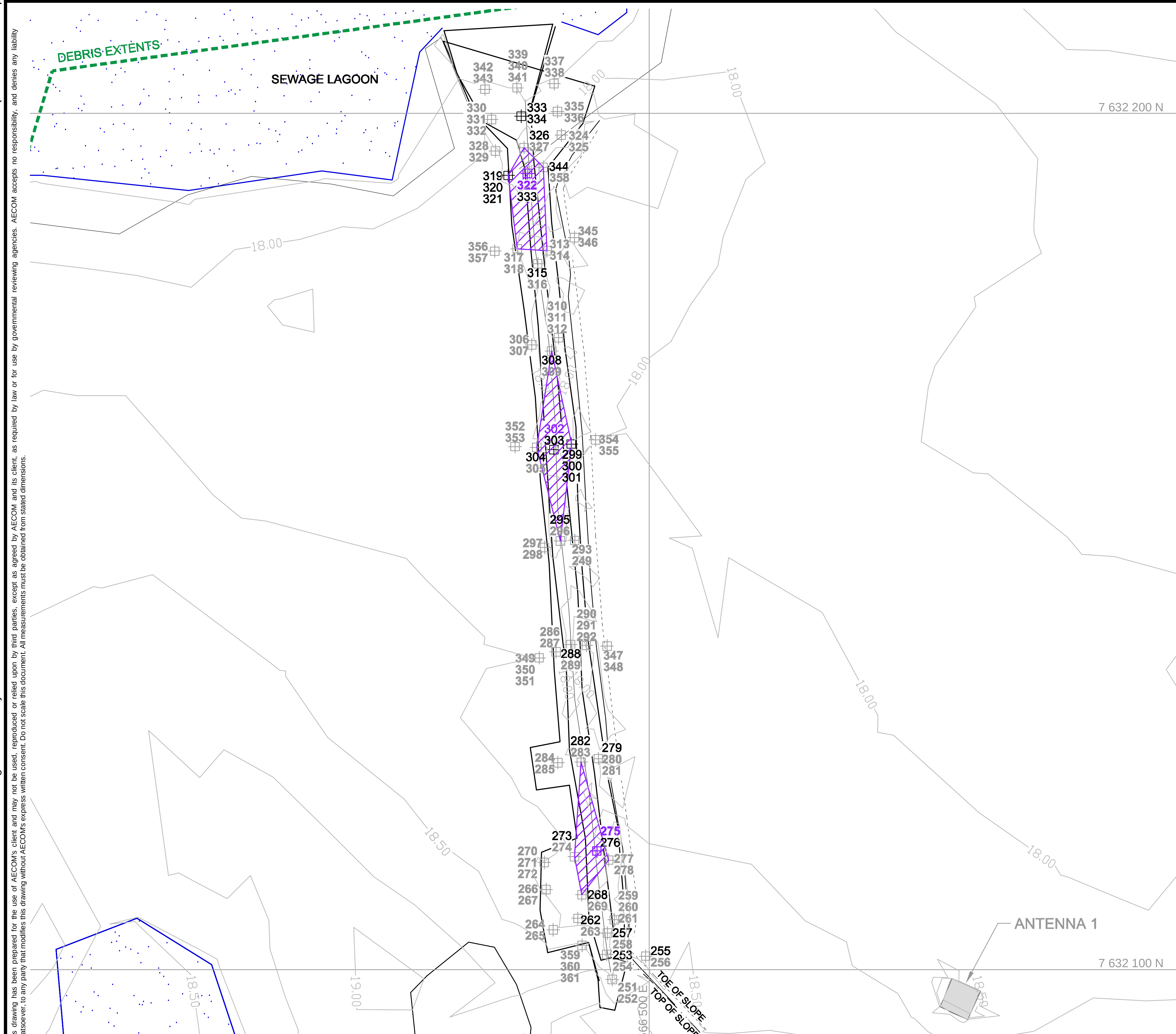


KEY MAP (NTS)

PWGSC
CAM-A Site Investigation

Station POL

Figure 5



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- #### SAMPLE NUMBER - HELD
- #### SAMPLE NUMBER - EXCEEDS TIER II
- #### SAMPLE NUMBER - EXCEEDS TIER I
- TIER I CONTAMINATED SOIL
- #### SAMPLE NUMBER - TYPE B PHC CONTAMINATION
- CONCRETE ANCHOR PAD
- PIPE

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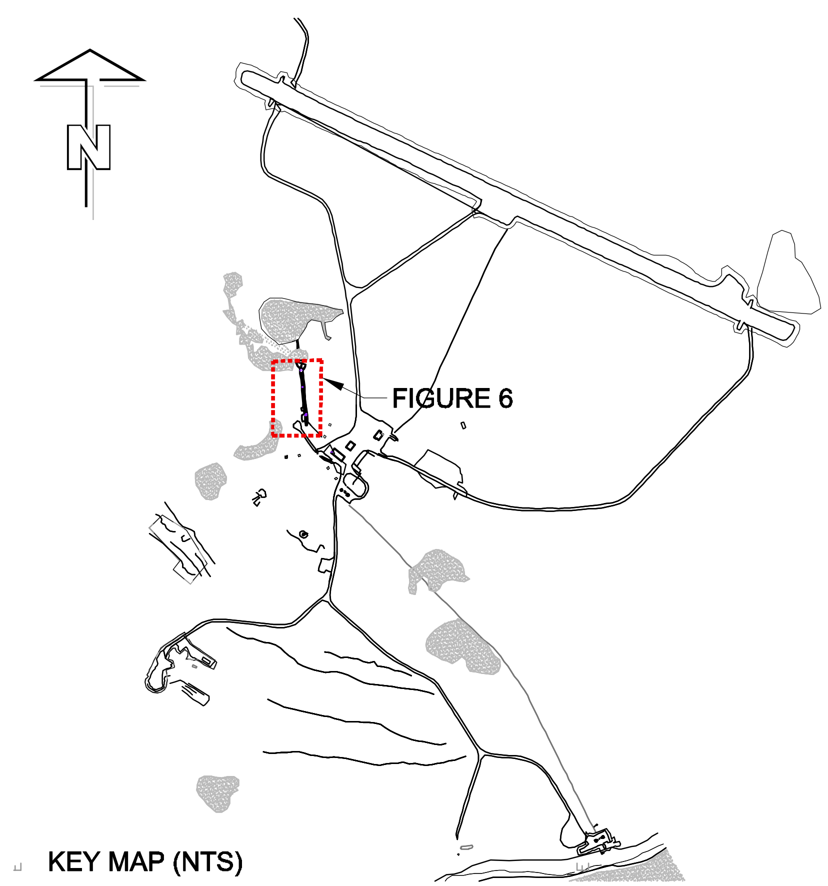

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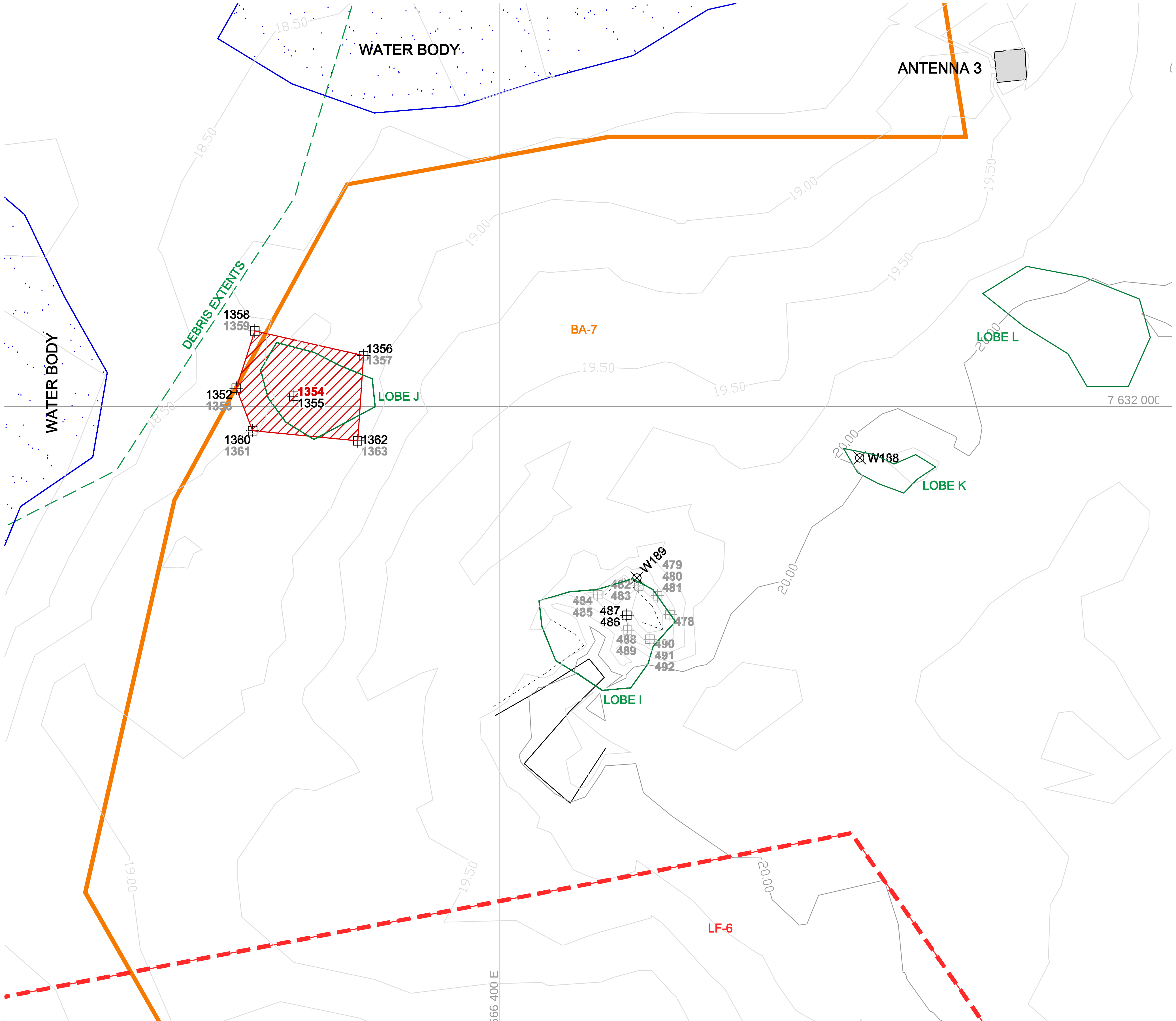
CAM-A Site Investigation

Outfall

Figure 6



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- #### SAMPLE NUMBER - HELD
- #### SAMPLE NUMBER - EXCEEDS TIER II
- #### SAMPLE NUMBER - EXCEEDS TIER I
- TIER II CONTAMINATED SOIL
- #### SAMPLE NUMBER - TYPE B PHC CONTAMINATION
- WATER BODY
- LANDFILL
- BORROW AREA
- TOE OF SLOPE

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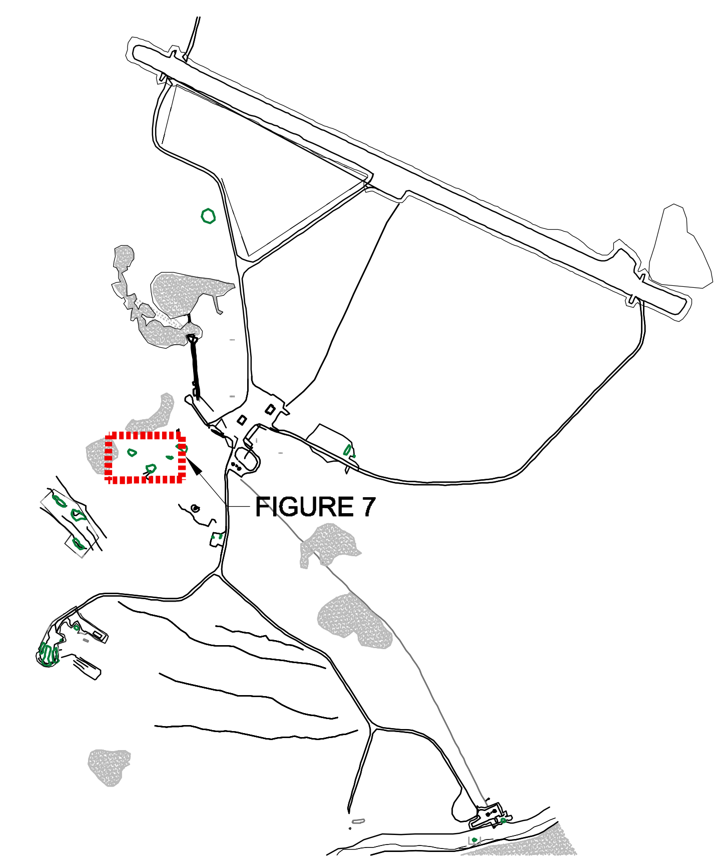

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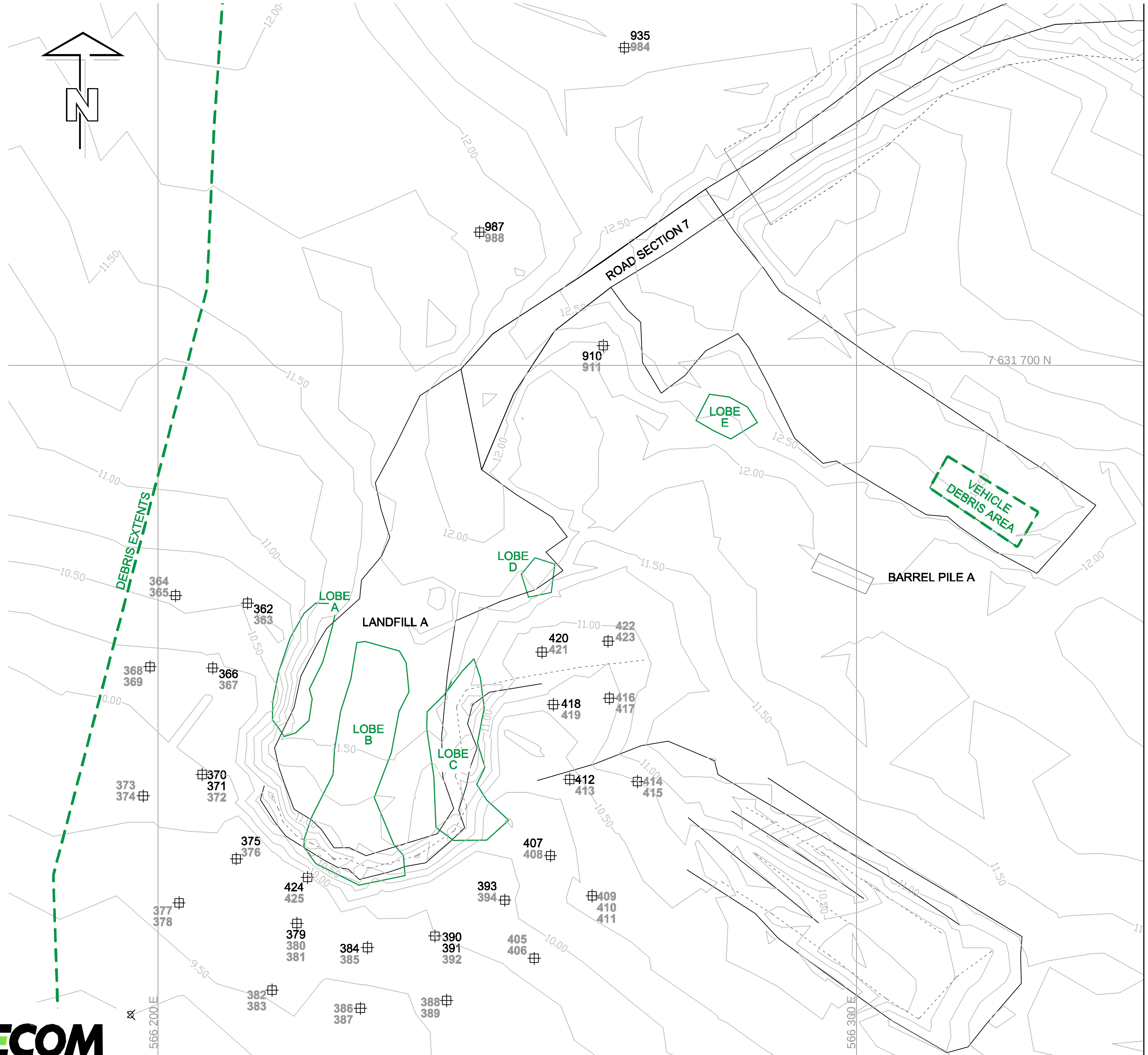
AECOM

PWGSC
CAM-A Site Investigation

Worked Area

Figure 7



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- - - -	TOE OF SLOPE

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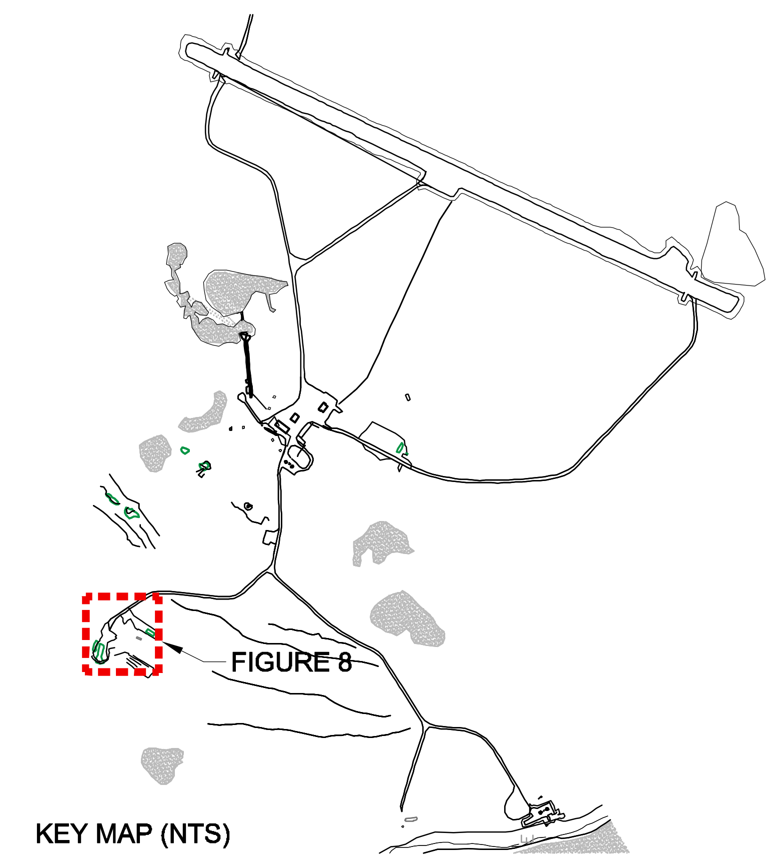

KEY MAP (NTS)

PWGSC
CAM-A Site Investigation

Landfill A & Barrel Pile A

Figure 8

AECOM

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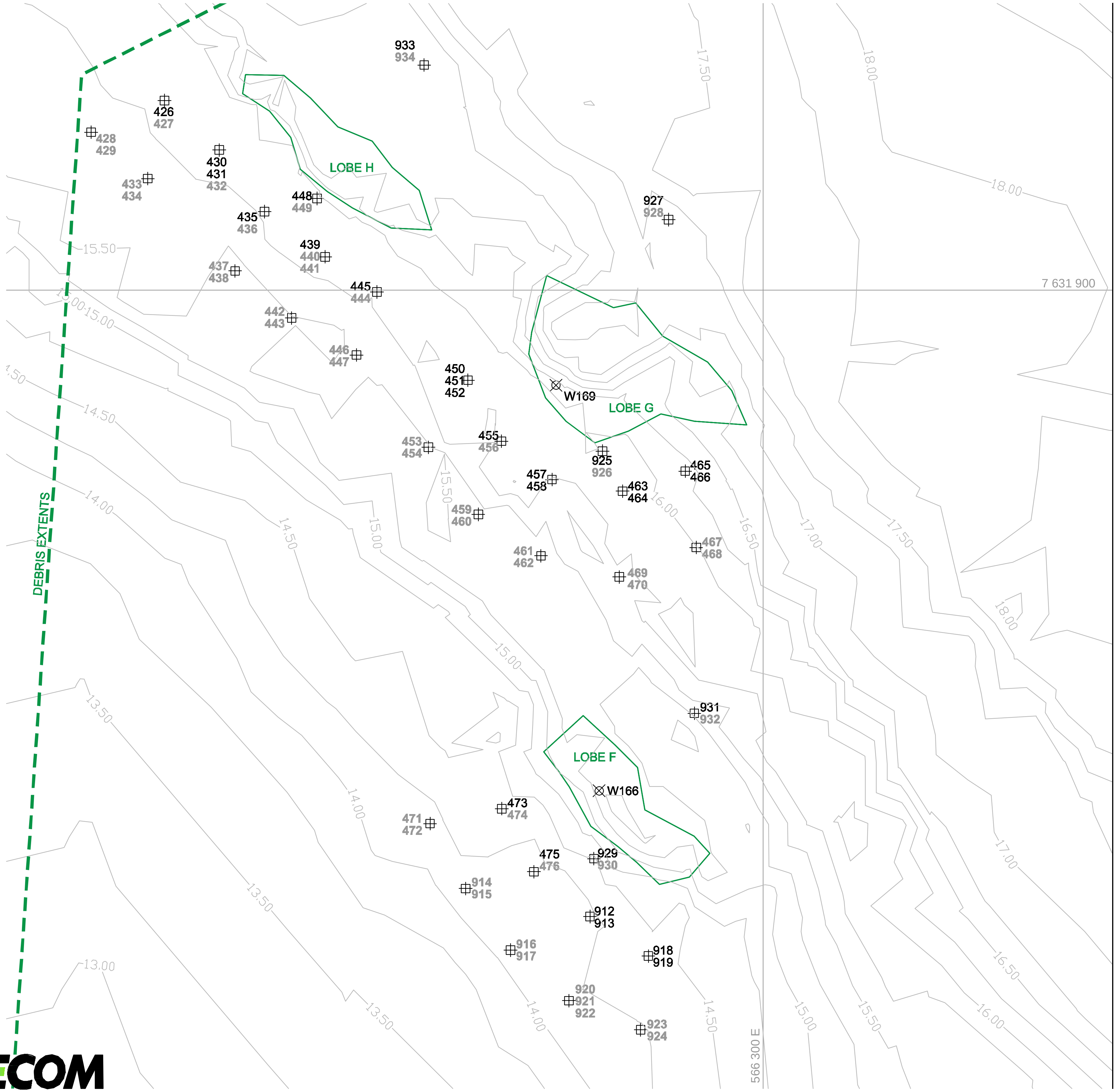

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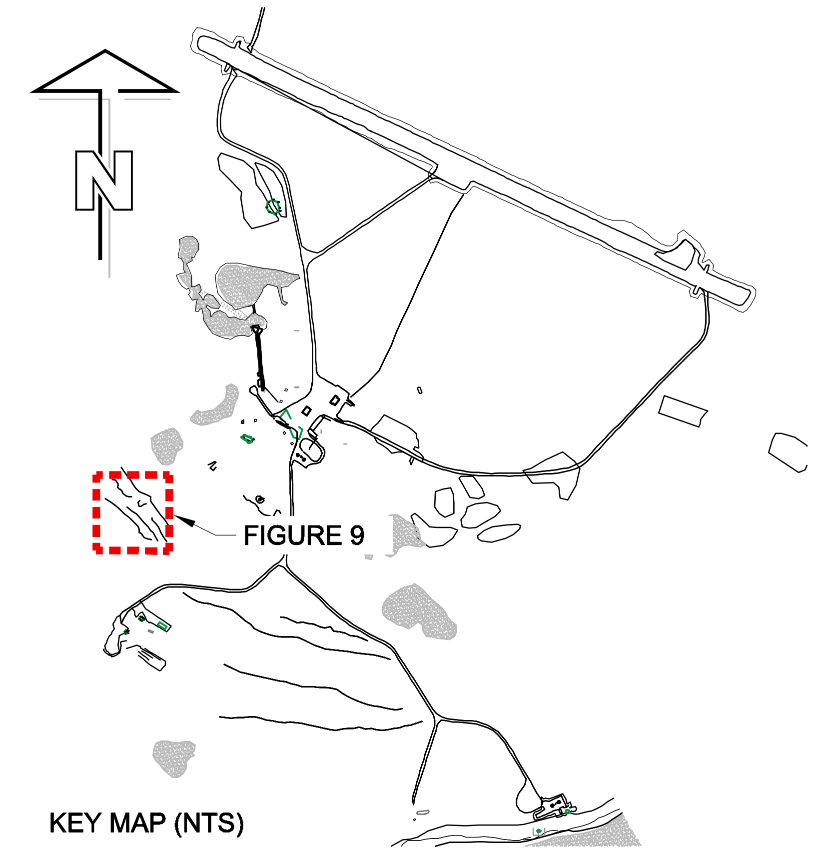

KEY MAP (NTS)

PWGSC
CAM-A Site Investigation

Landfill B

Figure 9

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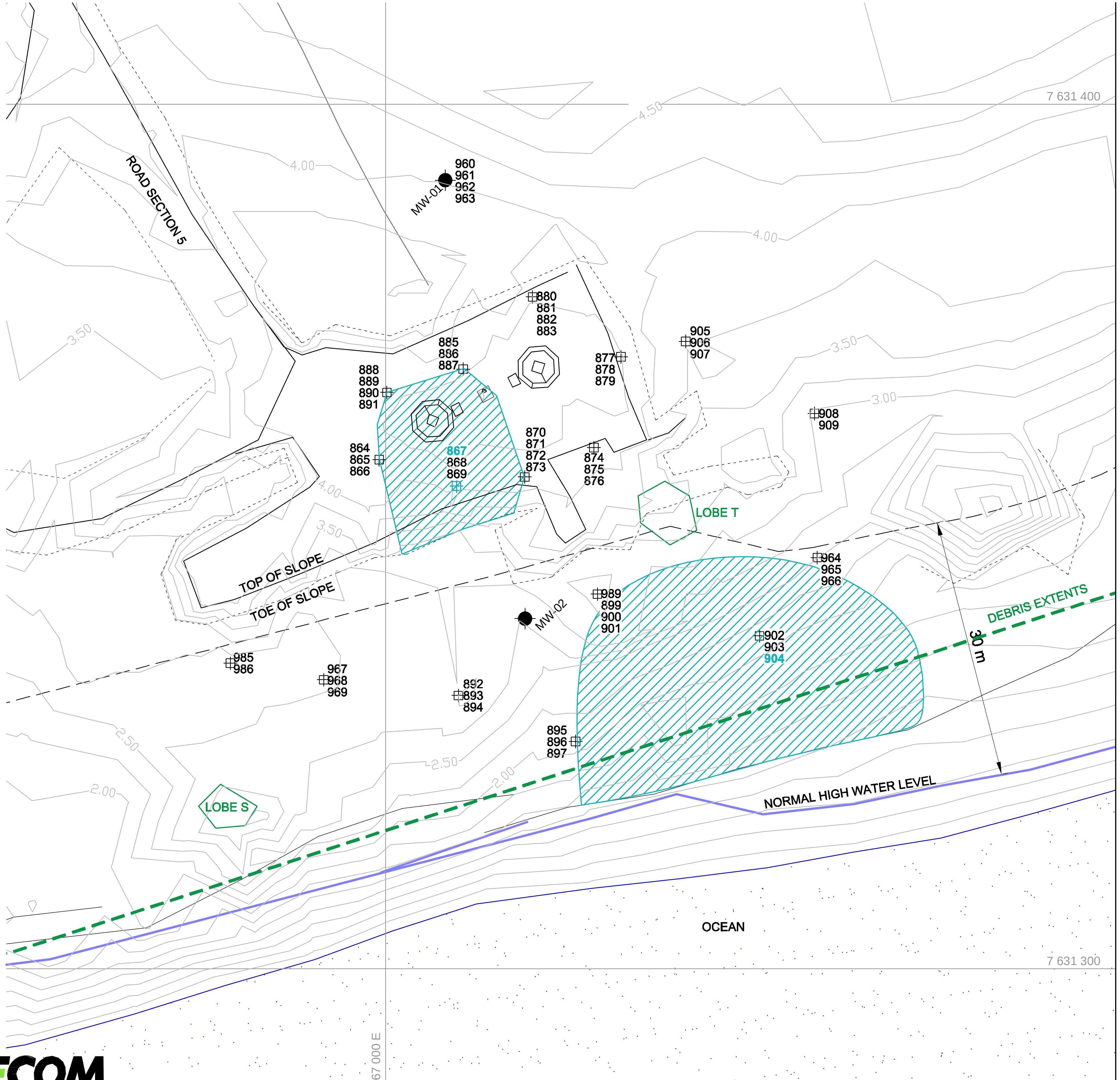

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- #### SAMPLE NUMBER - EXCEEDS TIER I
- #### SAMPLE NUMBER - TYPE B PHC CONTAMINATION
- TYPE B PHC CONTAMINATED SOIL
- TOE OF SLOPE
- MONITORING WELL

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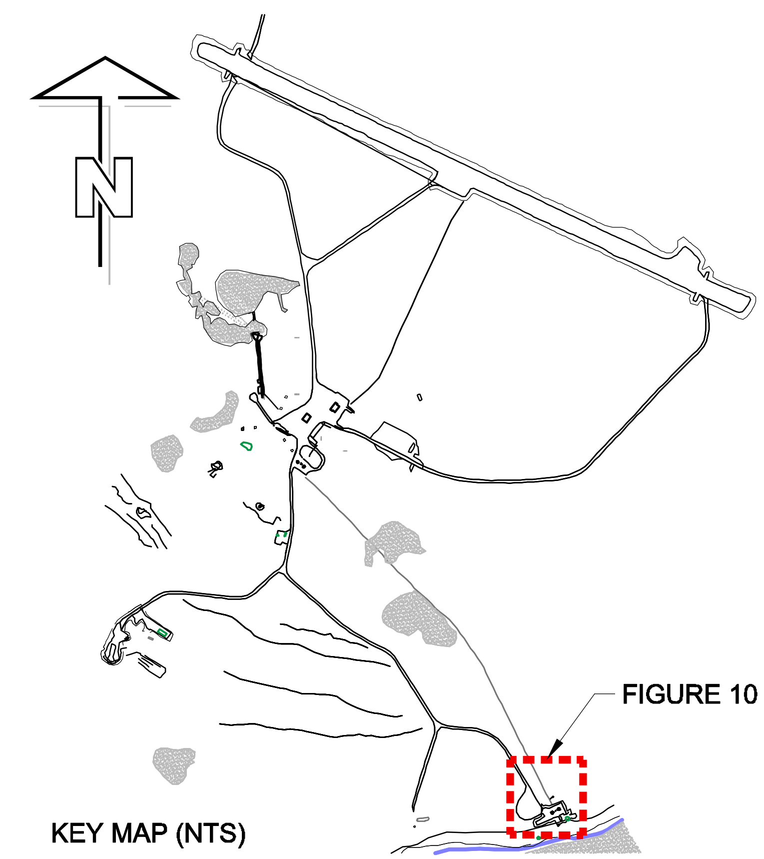


KEY MAP (NTS)

PWGSC
CAM-A Site Investigation

Beach POL

Figure 10

AECOM

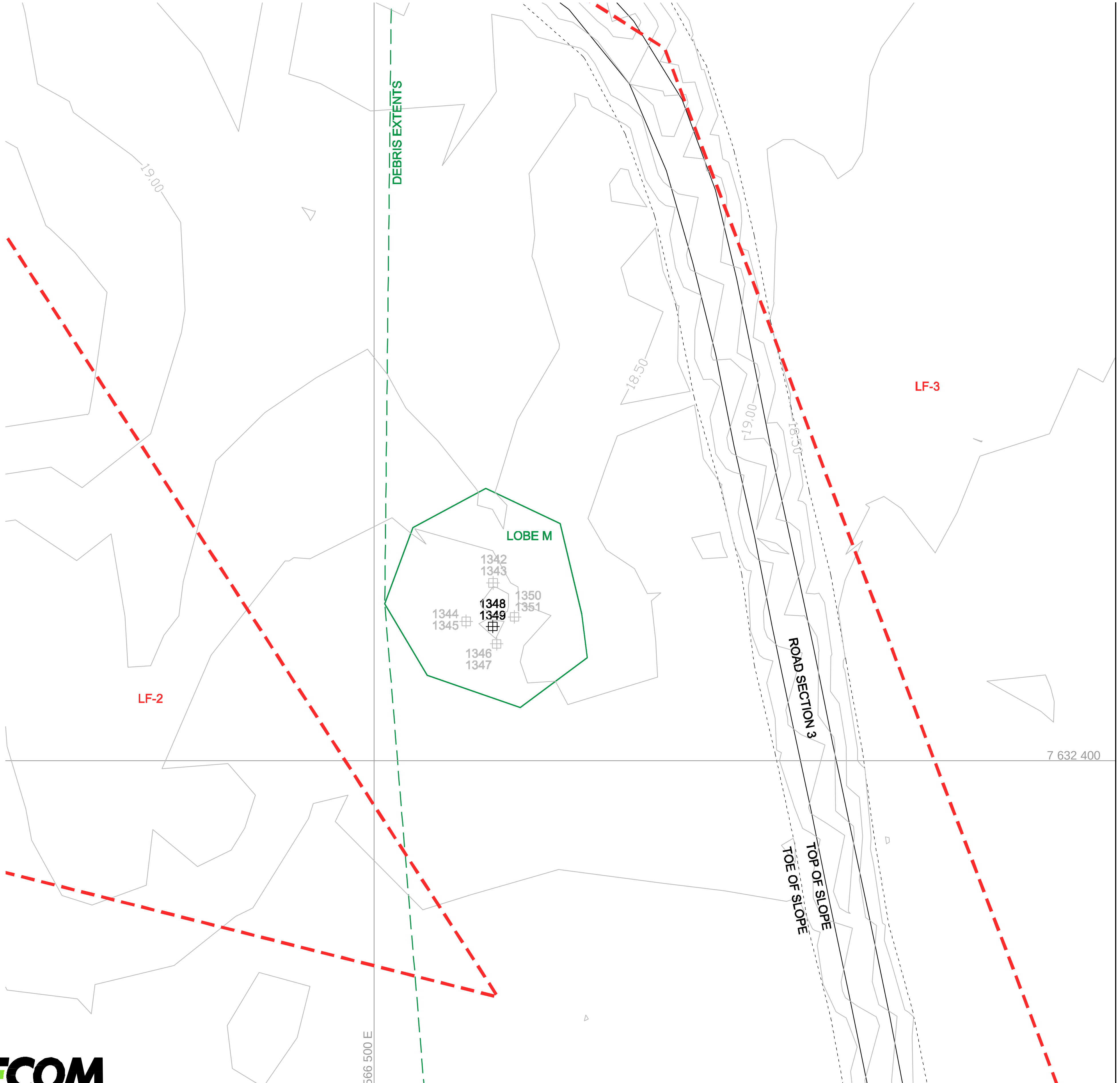
B SIZE 11" x 17" (279.4mm x 431.8mm)

PLOT: 09/12/2010 4:26:55 PM

Saved By: banea

AECOM FILE NAME: 60156118-00-B-F11-R0X.dwg

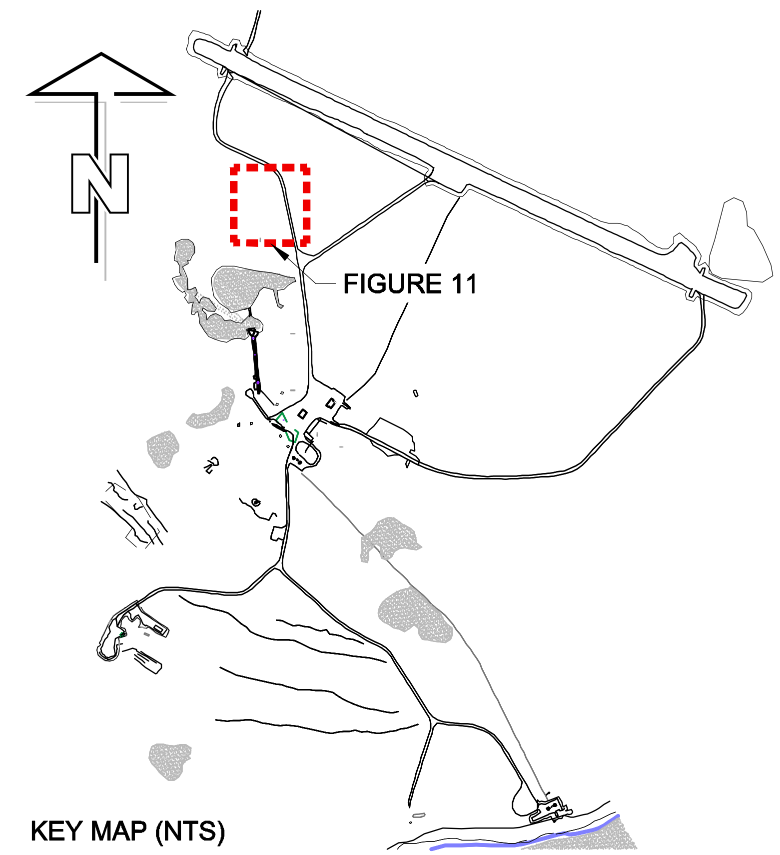
ISS/REV: 0A



LEGEND

⊠	DEBRIS WAY POINT
⊕	SAMPLE POINT
####	SAMPLE NUMBER - NO EXCEEDANCE
####	SAMPLE NUMBER - HELD
####	SAMPLE NUMBER - EXCEEDS TIER II
####	SAMPLE NUMBER - EXCEEDS TIER I
####	SAMPLE NUMBER - TYPE B PHC CONTAMINATION
- - - -	TOE OF SLOPE

0 5 10 m SCALE 1:500



KEY MAP (NTS)

PWGSC
CAM-A Site Investigation

Lobe M

Figure 11

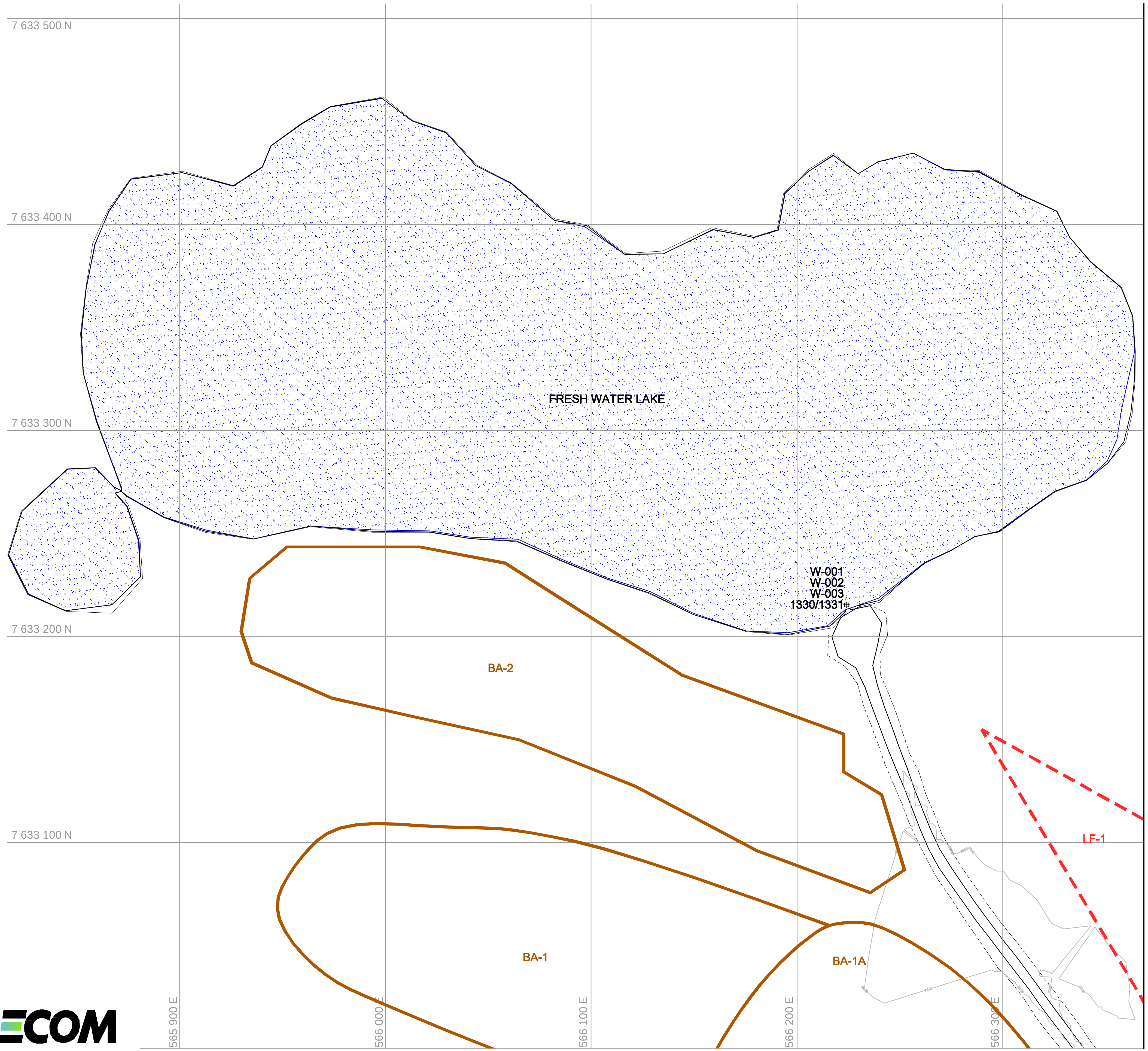
AECOM

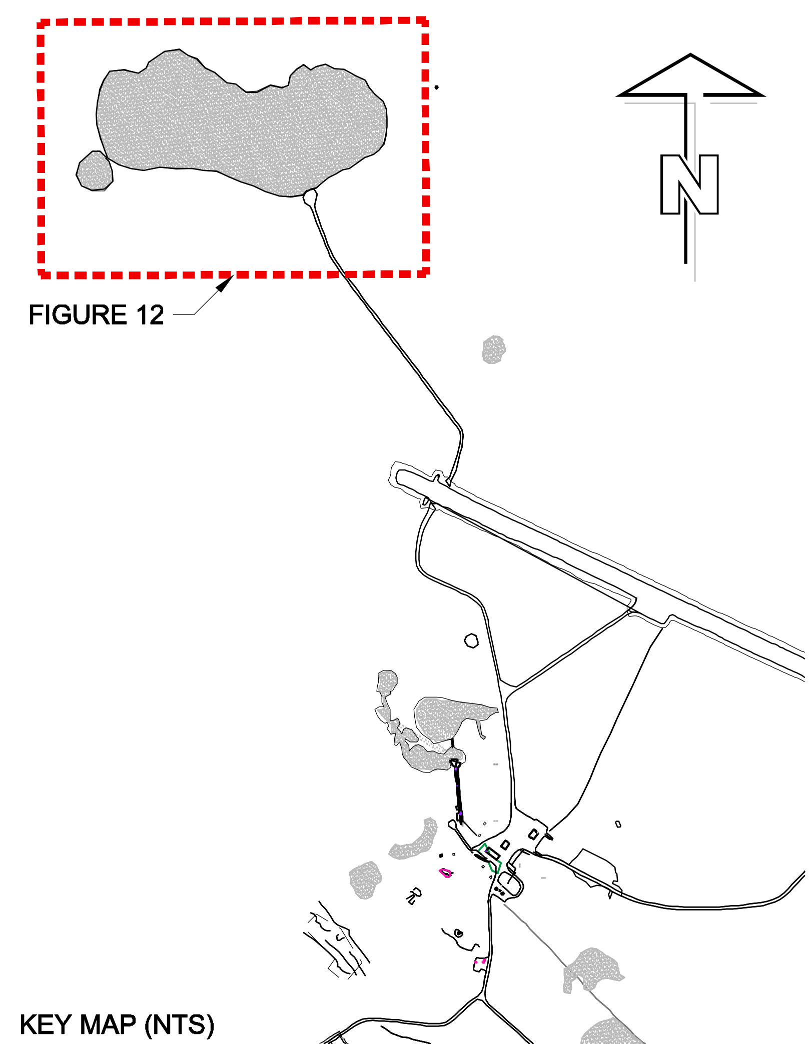
ISS/REV: 0A
AECOM FILE NAME: 60156118-00-B-F12-R0X.dwg
Saved By: banea
PLOT: 09/12/2010 3:55:09 PM
B SIZE 11" x 17" (279.4mm x 431.8mm)

LEGEND

- SAMPLE POINT
- #### SAMPLE NUMBER - NO EXCEEDANCE
- #### SAMPLE NUMBER - HELD
- #### SAMPLE NUMBER - EXCEEDS TIER II
- #### SAMPLE NUMBER - EXCEEDS TIER I
- #### SAMPLE NUMBER - TYPE B PHC CONTAMINATION
- TOE OF SLOPE

0 20 40 m SCALE 1:2000





KEY MAP (NTS)

B SIZE 11" x 17" (279.4mm x 431.8mm)

PLOT: 09/12/2010 4:25:00 PM

Saved By: banea

AECOM FILE NAME: 60156118-00-B-F13-R0X.dwg

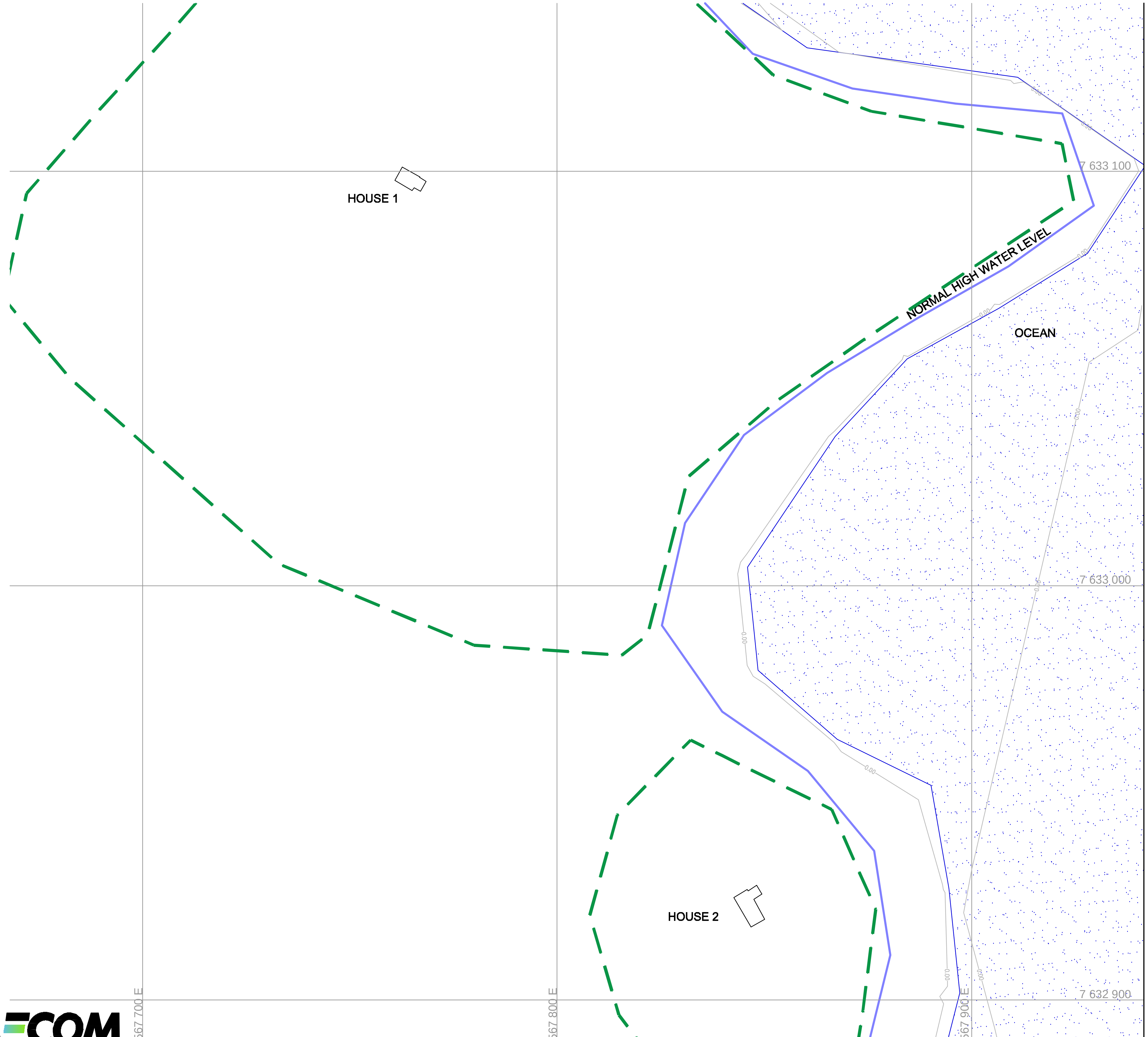
ISS/REV: 0A

AECOM

PWGSC
CAM-A Site Investigation

Fresh Water Lake

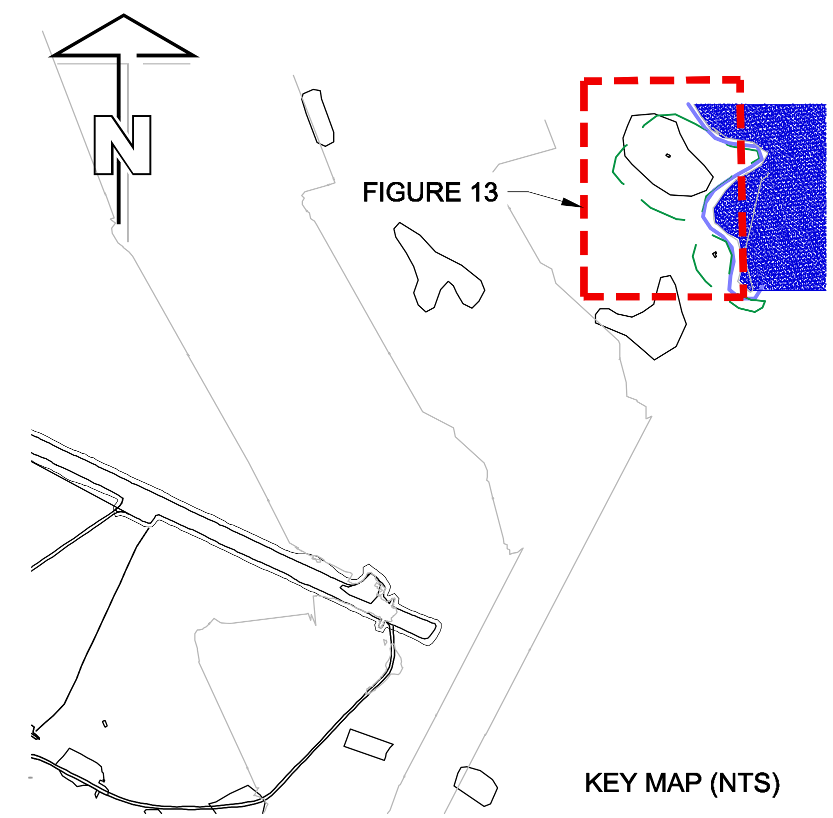
Figure 12



LEGEND

- SAMPLE POINT
- #### SAMPLE NUMBER - NO EXCEEDANCE
- #### SAMPLE NUMBER - HELD
- #### SAMPLE NUMBER - EXCEEDS TIER II
- #### SAMPLE NUMBER - EXCEEDS TIER I
- #### SAMPLE NUMBER - TYPE B PHC CONTAMINATION
- DEBRIS AREA

0 10 20 m SCALE 1:1000



KEY MAP (NTS)

B SIZE 11" x 17" (279.4mm x 431.8mm)

PLOT: 09/12/2010 4:23:17 PM

Saved By: banea

AECOM FILE NAME: 60156118-00-B-F15-R0X.dwg

ISS/REV: 0A

AECOM

PWGSC
CAM-A Site Investigation

Inuit Housing

Figure 13

Appendix B

Data Summary Tables

Table 1: Beach POL Analytical

Sample #	Area	Depth (m)	Purpose	Benzene	Toluene	Ethylbenzene	Xylene	F1 minus BTEX	F2 ppm	F3 ppm	F4 ppm	Total TPH			
												Dominant TPH Type	TYPE A ppm	TYPE B (0-0.5 m) ppm	TYPE B (>0.5 m) ppm
CEPA															
Tier II															
Tier I															
PHCs/TPH - Protection of Freshwater Aquatic Life (within 30 m of water body)								**1290**	**330**					**330**	
PHCs/TPH - Protection of Terrestrial Wildlife														**2,500**	
PHCs/TPH - Human Health									**11,000**	**20,000**			**20,000**		
PHCs/TPH - Management Limit															**5,000**
864	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
865	BEACH POL	0.4		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
866	BEACH POL	1		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
867	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	2250	288	<10	Type B	288	2538	-
868	BEACH POL	0.4		<0.005	<0.05	<0.01	<0.05	20	1830	214	<10	Type B	214	2064	-
869	BEACH POL	1		<0.005	<0.05	<0.01	<0.05	70	2470	474	<10	Type B	474	-	2944
870	BEACH POL	0.1	Duplicate	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
871	BEACH POL	0.1	Duplicate	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
872	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
873	BEACH POL	1		<0.005	<0.05	<0.01	<0.05	<10	1130	161	<10	Type B	161	-	1291
874	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	61	82	65	Type A	147	-	-
875	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	1270	333	40	Type B	373	1603	-
876	BEACH POL	1		<0.005	<0.05	<0.01	<0.05	<10	1360	223	24	Type B	247	-	1607
877	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	<10	35	24	Type A	59	-	-
878	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	<10	35	24	Type A	59	-	-
879	BEACH POL	1		<0.005	<0.05	<0.01	<0.05	10	1800	163	13	Type B	176	-	1976
880	BEACH POL	0.1	Duplicate	<0.005	<0.05	<0.01	<0.05	<10	<10	24	19	Type A	43	-	-
881	BEACH POL	0.1	Duplicate	<0.005	<0.05	<0.01	<0.05	<10	<10	24	19	Type A	43	-	-
882	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	10	67	33	Type A	100	-	-
883	BEACH POL	1		<0.005	<0.05	<0.01	<0.05	<10	19	13	22	Type B	35	-	54
885	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	27	44	18	Type B	62	71	-
886	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	148	188	32	Type B	220	336	-
887	BEACH POL	1		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
888	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	<10	36	24	Type A	60	-	-
889	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	<10	71	52	Type A	123	-	-
890	BEACH POL	1	Duplicate	<0.005	<0.05	<0.01	<0.05	<10	<10	21	15	Type A	36	-	-
891	BEACH POL	1	Duplicate	<0.005	<0.05	<0.01	<0.05	<10	<10	26	19	Type A	45	-	-
892	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	<10	15	<10	Type A	15	-	-
893	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	<10	19	11	Type A	30	-	-
894	BEACH POL	1		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
895	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	<10	30	<10	Type A	30	-	-
896	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
897	BEACH POL	1		<0.005	<0.05	<0.01	<0.05	<10	261	43	14	Type B	57	-	318
898	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
899	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	<10	26	16	Type A	42	-	-
900	BEACH POL	1	Duplicate	<0.005	<0.05	<0.01	<0.05	<10	<10	15	<10	Type A	15	-	-

Sample #	Area	Depth (m)	Purpose	Benzene	Toluene	Ethylbenzene	Xylene	F1 minus BTEX	F2 ppm	F3 ppm	F4 ppm	Total TPH			
CEPA												Dominant TPH Type	TYPE A ppm	TYPE B (0-0.5 m) ppm	TYPE B (>0.5 m) ppm
Tier II															
Tier I															
PHCs/TPH - Protection of Freshwater Aquatic Life (within 30 m of water body)								**1290**	**330**					**330**	
PHCs/TPH - Protection of Terrestrial Wildlife														**2,500**	
PHCs/TPH - Human Health									**11,000**	**20,000**			**20,000**		
PHCs/TPH - Management Limit															**5,000**
901	BEACH POL	1	Duplicate	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
902	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	<10	25	15	Type A	40	-	-
903	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	148	35	<10	Type B	35	183	-
904	BEACH POL	0.9		<0.005	<0.05	<0.01	<0.05	<10	1160	108	<10	Type B	108		1268
905	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
906	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	<10	10	<10	Type A	10	-	-
907	BEACH POL	1		<0.005	<0.05	<0.01	<0.05	<10	<10	24	<10	Type A	24	-	-
908	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	<10	10	<10	Type A	10	-	-
909	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	<10	11	<10	Type A	11	-	-
960	BEACH POL	0.1	Duplicate	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	10	-	-	-	-
961	BEACH POL	0.1	Duplicate	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
962	BEACH POL	0.5		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
963	BEACH POL	0.8		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
964	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
965	BEACH POL	0.4		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
966	BEACH POL	0.9		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
967	BEACH POL	0.1		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
968	BEACH POL	0.3		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-
969	BEACH POL	0.7		<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	-	-	-	-

Table 2: Outfall Analytical

Sample #	Area	Depth (m)	Purpose	As ppm	Cd ppm	Cr ppm	Co ppm	Cu ppm	Pb ppm	Hg ppm	Ni ppm	Zn ppm	Aroclor 1242	Aroclor 1254	Aroclor 1260	PCB Total ppm
CEPA																**50**
Tier II				**30**	**5**	**250**	**50**	**100**	**500**	**2**	**100**	**500**				**5**
Tier I									**200**							**1**
253	OUTFALL	0.1		<0.5	<0.5	1.2	<0.5	7.4	1.6	<0.5	0.9	3	<0.05	<0.05	<0.05	<0.05
255	OUTFALL	0.1											<0.05	<0.05	<0.05	<0.05
257	OUTFALL	0.1		<0.5	<0.5	1.5	<0.5	74	2.6	<0.5	0.9	16	<0.05	0.72	<0.05	0.72
262	OUTFALL	0.1		<0.5	<0.5	2.9	0.7	4.4	1.7	<0.5	2.3	4	<0.05	<0.05	<0.05	<0.05
268	OUTFALL	0.1		<0.5	<0.5	3.8	0.8	1.3	1.2	<0.5	1.8	4	<0.05	<0.05	<0.05	<0.05
273	OUTFALL	0.1											<0.05	<0.05	<0.05	<0.05
275	OUTFALL	0.1		<0.5	<0.5	1.8	0.9	1.8	1.8	<0.5	1.7	6	<0.05	1.92	<0.05	1.92
276	OUTFALL	0.3											<0.05	0.31	<0.05	0.31
277	OUTFALL	0.1											<0.05	<0.05	<0.05	<0.05
282	OUTFALL	0.1		0.5	<0.5	1.1	0.7	1.5	0.9	<0.5	1	5	<0.05	<0.05	<0.05	<0.05
288	OUTFALL	0.1		<0.5	<0.5	2.8	0.8	8.3	2	<0.5	2.2	15	<0.05	0.12	<0.05	0.12
295	OUTFALL	0.1		<0.5	<0.5	0.9	<0.5	0.9	0.6	<0.5	0.5	3	<0.05	0.06	<0.05	0.06
299	OUTFALL	0.1											<0.05	<0.05	<0.05	<0.05
302	OUTFALL	0.1		<0.5	<0.5	1	<0.5	6.6	1.4	<0.5	0.8	7	<0.05	2.86	<0.05	2.86
303	OUTFALL	0.3											<0.05	0.05	<0.05	0.05
304	OUTFALL	0.1											<0.05	<0.05	<0.05	<0.05
308	OUTFALL	0.1		<0.5	<0.5	0.9	<0.5	4	1.4	<0.5	<0.5	9	<0.05	0.29	<0.05	0.29
315	OUTFALL	0.1		<0.5	<0.5	1.1	<0.5	2	0.9	<0.5	0.6	3	<0.05	0.06	<0.05	0.06
319	OUTFALL	0.1											<0.05	<0.05	<0.05	<0.05
322	OUTFALL	0.1											<0.05	1.46	<0.05	1.46
323	OUTFALL	0.3											<0.05	0.09	<0.05	0.09
326	OUTFALL	0.1		<0.5	<0.5	1.2	<0.5	7.8	2.5	<0.5	0.9	14	<0.05	0.15	<0.05	0.15
333	OUTFALL	0.1		<0.5	<0.5	0.9	<0.5	2.5	0.6	<0.5	<0.5	6	<0.05	0.09	<0.05	0.09
334	OUTFALL	0.3		<0.5	<0.5	1.1	<0.5	2.3	0.6	<0.5	<0.5	5	<0.05	0.12	<0.05	0.12
344	OUTFALL	0.1											<0.05	<0.05	<0.05	<0.05

Table 3: Station Area Analytical

Sample #	Area	Depth (m)	Purpose	As ppm	Cd ppm	Cr ppm	Co ppm	Cu ppm	Pb ppm	Hg ppm	Ni ppm	Zn ppm	Aroclor 1242	Aroclor 1254	Aroclor 1260	PCB Total ppm	Benzene	Toluene	Ethylbenzene	Xylene	F1 ppm	F1 minus BTEX	F2 ppm	F3 ppm	F4 ppm	Total TPH			
																										Dominant TPH Type	TYPE A ppm	TYPE B (0-0.5 m) ppm	TYPE B (>0.5 m) ppm
CEPA																50													
Tier II				30	5	250	50	100	500	2	100	500				5													
Tier I									200							1													
PHCs/TPH - Protection of Freshwater Aquatic Life (within 30 m of water body)																						1290	330					330	
PHCs/TPH - Protection of Terrestrial Wildlife																												2,500	
PHCs/TPH - Human Health																							11,000	20,000			20,000		
PHCs/TPH - Management Limit																													5,000
792	GARAGE	0.1		0.7	<0.5	4.4	1.4	4.4	12.6	<0.5	4.7	9					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	11	<10	Type A	11	-	-
793	GARAGE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
794	GARAGE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	12	<10	Type A	12	-	-
795	GARAGE	0.1		0.7	<0.5	3.8	1.3	2.9	5	<0.5	4.9	5					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
796	GARAGE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
797	GARAGE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
798	GARAGE	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	15	<10	Type A	15	-	-
799	GARAGE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
800	GARAGE	1	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
801	GARAGE	1	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
802	GARAGE	0.1		0.8	<0.5	4.7	1.6	4.6	15.3	<0.5	5	13	<0.05	0.06	<0.05	0.06													
804	GARAGE	0.1		2.4	<0.5	3.9	1.4	5.6	8.5	<0.5	4.9	10	<0.05	<0.05	<0.05	<0.05													
805	GARAGE	0.3											<0.05	0.2	<0.05	0.2													
806	GARAGE	0.1		0.7	<0.5	2.9	1	3.8	5.8	<0.5	4.4	5	<0.05	17.7	<0.05	17.7													
807	GARAGE	0.4											<0.05	5.19	<0.05	5.19													
808	GARAGE	0.1											<0.05	0.17	<0.05	0.17													
809	GARAGE	0.3											<0.05	0.1	<0.05	0.1													
810	GARAGE	0.1	Duplicate										<0.05	0.42	<0.05	0.42													
811	GARAGE	0.1	Duplicate										<0.05	0.26	<0.05	0.26													
812	GARAGE	0.3											<0.05	0.51	<0.05	0.51													
813	GARAGE	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	14	<10	Type A	14	-	-
814	GARAGE	0.3															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	27	11	Type A	38	-	-
815	GARAGE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	39	13	Type A	52	-	-
816	GARAGE	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	35	46	<10	Type B	46	81	-
817	GARAGE	0.3															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	193	20	Type A	213	-	-
818	GARAGE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	46	<10	Type A	46	-	-
819	GARAGE	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
820	GARAGE	0.4	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
821	GARAGE	0.4	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
822	GARAGE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
823	GARAGE	0.1		0.8	<0.5	3.1	1.2	3.2	4.5	<0.5	4.4	6	<0.05	<0.05	<0.05	<0.05	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
824	GARAGE	0.4											<0.05	<0.05	<0.05	<0.05	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
825	GARAGE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
826	GARAGE	0.1		0.9	<0.5	4.2	1.4	3.3	8.9	<0.5	5.2	12					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	64	<10	Type A	64	-	-
827	GARAGE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
828	GARAGE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	133	128	<10	Type B	128	-	261
829	GARAGE	0.1		0.8	<0.5	4	1.5	2.5	3.8	<0.5	5.7	6					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	41	<10	Type A	41	-	-
830	GARAGE	0.4	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	35	<10	<10	Type B		35	-
831	GARAGE	0.4	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	118	59	<10	Type B	59	177	-
832	GARAGE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
833	GARAGE	0.1		0.8	<0.5	7.6	2	2.7	3	<0.5	4.4	8					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
834	GARAGE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	33	<10	Type A	33	-	-
835	GARAGE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	36	11	Type A	47	-	-
836	GARAGE	0.1		1.7	<0.5	4.3	2	4.1	2.7	<0.5	4	5					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
837	GARAGE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	37	<10	Type A	37	-	-
838	GARAGE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
839	GARAGE	0.1	SUMP MAT	22.3	8.4	85.6	10.6	90	840	<0.5	16.7	2870	<0.05	18.4	<0.05	18.4	<0.005	<0.05	<0.01	<0.05	<10	<10	41	4680	786	Type A	5466	-	-
1290	MOD TRAIN	0.1	Duplicate	0.9	<0.5	3.9	1.5	4.8	3.2		3.7	5					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	40	<10	Type A	40	-	-
1291	MOD TRAIN	0.1	Duplicate	1	<0.5	5.9	1.7	4.2	3.7		4.8	7					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	48	26	Type A	74	-	-

Sample #	Area	Depth (m)	Purpose	As ppm	Cd ppm	Cr ppm	Co ppm	Cu ppm	Pb ppm	Hg ppm	Ni ppm	Zn ppm	Aroclor 1242	Aroclor 1254	Aroclor 1260	PCB Total ppm	Benzene	Toluene	Ethylbenzene	Xylene	F1 ppm	F1 minus BTEX	F2 ppm	F3 ppm	F4 ppm		Total TPH		
CEPA																50												TYPE B	TYPE B
Tier II				30	5	250	50	100	500	2	100	500				5										Dominant	TYPE A	(0-0.5 m)	(>0.5 m)
Tier I									200							1										TPH Type	ppm	ppm	ppm
PHCs/TPH - Protection of Freshwater Aquatic Life (within 30 m of water body)																						1290	330					330	
PHCs/TPH - Protection of Terrestrial Wildlife																												2,500	
PHCs/TPH - Human Health																							11,000	20,000			20,000		
PHCs/TPH - Management Limit																													5,000
1292	MOD TRAIN	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	35	<10	Type A	35	-	-
1293	MOD TRAIN	1															<0.005	<0.05	<0.01	<0.05	<10	<10	105	135	11	Type B	146	-	251
1294	MOD TRAIN	0.1		1.3	<0.5	4.6	1.9	3.6	3.1		4.6	6					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	23	<10	Type A	23	-	-
1295	MOD TRAIN	0.5															<0.005	<0.05	<0.01	<0.05	120	120	3770	613	<10	Type B	613	4503	-
1296	MOD TRAIN	1															<0.005	<0.05	<0.01	<0.05	220	220	1660	356	10	Type B	366	-	2026
1297	MOD TRAIN	0.1		0.7	<0.5	3.3	1.4	2.6	1.6		3.1	3					<0.005	<0.05	<0.01	<0.05	160	160	4410	1100	15	Type B	1115	5670	-
1298	MOD TRAIN	0.5															<0.005	<0.05	0.02	0.06	360	360	5130	1140	<10	Type B	1140	6630	-
1299	MOD TRAIN	1															<0.005	<0.05	<0.01	0.18	290	290	3490	669	<10	Type B	669	-	4159
1300	MOD TRAIN	0.1	Duplicate	0.9	<0.5	4.1	2.2	4.2	2.9		4.9	4					<0.005	<0.05	<0.01	<0.05	<10	<10	118	86	<10	Type B	86	204	-
1301	MOD TRAIN	0.1	Duplicate	1.1	<0.5	4.2	2.2	4	3.4		4.8	7					<0.005	<0.05	<0.01	<0.05	<10	<10	131	82	<10	Type B	82	213	-
1302	MOD TRAIN	0.5															<0.005	<0.05	<0.01	<0.05	10	10	1070	109	<10	Type B	109	1189	-
1303	MOD TRAIN	1															<0.005	<0.05	<0.01	<0.05	150	150	2850	372	<10	Type B	372	-	3222
1304	MOD TRAIN	0.1		0.7	<0.5	3.5	1.3	3.8	2.8		3.1	5					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	11	<10	Type A	11	-	-
1305	MOD TRAIN	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	15	<10	<10	Type B	0	15	-
1306	MOD TRAIN	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1308	MOD TRAIN	0.1		1	<0.5	3.9	1.6	3.8	2.9		3.6	6	<0.05	0.13	<0.05	0.13													
1309	MOD TRAIN	0.3											<0.05	<0.05	<0.05	<0.05													
1310	MOD TRAIN	0.1	Duplicate	1	<0.5	7.2	1.8	6	19.8		3.6	82.4	<0.05	6.88	<0.05	6.88													
1311	MOD TRAIN	0.1	Duplicate	1.1	<0.5	6.1	1.6	6.1	11		4	149	<0.05	6.89	<0.05	6.89													
1312	MOD TRAIN	0.3											<0.05	2.26	<0.05	2.26													
1313	MOD TRAIN	0.1		0.6	<0.5	6.4	1.4	28.9	32.7		3.1	264	<0.05	8.21	<0.05	8.21													
1314	MOD TRAIN	0.3											<0.05	0.96	<0.05	0.96													
1315	MOD TRAIN	0.1											<0.05	<0.05	<0.05	<0.05													
1316	MOD TRAIN	0.3											<0.05	<0.05	<0.05	<0.05													
1317	MOD TRAIN	0.1											<0.05	<0.05	<0.05	<0.05	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	11	<10	Type A	11	-	-
1318	MOD TRAIN	0.4											<0.05	<0.05	<0.05	<0.05	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1319	MOD TRAIN	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1320	MOD TRAIN	0.1											<0.05	<0.05	<0.05	<0.05													
1321	MOD TRAIN	0.3											<0.05	<0.05	<0.05	<0.05													
1322	MOD TRAIN	0.1											<0.05	<0.05	<0.05	<0.05	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	20	<10	Type A	20	-	-
1323	MOD TRAIN	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1324	MOD TRAIN	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1325	MOD TRAIN	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1326	MOD TRAIN	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1327	MOD TRAIN	1															<0.005	<0.05	<0.01	<0.05	<10	<10	10	<10	12	Type B	12	-	22
1332	MOD TRAIN	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	183	126	Type A	309	-	-
1333	MOD TRAIN	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	36	12	Type A	48	-	-
1334	MOD TRAIN	0.6															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	18	<10	Type A	18	-	-
1335	MOD TRAIN	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	106	64	Type A	170	-	-
1336	MOD TRAIN	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	59	34	Type A	93	-	-
1337	MOD TRAIN	0.6															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	11	<10	Type A	11	-	-
1338	MOD TRAIN	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	18	<10	Type A	18	-	-
1339	MOD TRAIN	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	24	<10	Type A	24	-	-
1340	MOD TRAIN	0.9	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	1190	287	<10	Type B	287	-	1477
1341	MOD TRAIN	0.9	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	1060	247	<10	Type B	247	-	1307

Sample #	Area	Depth (m)	Purpose	As ppm	Cd ppm	Cr ppm	Co ppm	Cu ppm	Pb ppm	Hg ppm	Ni ppm	Zn ppm	Aroclor 1242	Aroclor 1254	Aroclor 1260	PCB Total ppm	Benzene	Toluene	Ethylbenzene	Xylene	F1 ppm	F1 minus BTEX	F2 ppm	F3 ppm	F4 ppm		Total TPH		
CEPA																50										Dominant TPH Type	TYPE A ppm	TYPE B (0-0.5 m) ppm	TYPE B (>0.5 m) ppm
Tier II				30	5	250	50	100	500	2	100	500				5													
Tier I									200							1													
PHCs/TPH - Protection of Freshwater Aquatic Life (within 30 m of water body)																						1290	330					330	
PHCs/TPH - Protection of Terrestrial Wildlife																												2,500	
PHCs/TPH - Human Health																							11,000	20,000			20,000		
PHCs/TPH - Management Limit																													5,000
970	STATION POL	0.1	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	10	<10	Type A	10	-	-
971	STATION POL	0.1	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
972	STATION POL	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	383	214	<10	Type B	214	597	-
973	STATION POL	1															<0.005	<0.05	<0.01	<0.05	10	10	3180	853	44	Type B	897	-	4077
974	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	35	<10	Type A	35	-	-
975	STATION POL	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	521	760	<10	Type B	760	1281	-
976	STATION POL	1															<0.005	<0.05	<0.01	<0.05	<10	<10	1900	420	<10	Type B	420	-	2320
977	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	14	<10	Type A	14	-	-
978	STATION POL	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	14	50	<10	Type A	50	-	-
979	STATION POL	1															<0.005	<0.05	<0.01	<0.05	<10	<10	444	464	<10	Type B	464	-	908
980	STATION POL	0.1	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	33	16	Type A	49	-	-
981	STATION POL	0.1	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	38	14	Type A	52	-	-
982	STATION POL	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
983	STATION POL	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	41	16	Type A	57	-	-
985	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	14	20	<10	Type B	20	34	-
986	STATION POL	0.6															<0.005	<0.05	<0.01	<0.05	<10	<10	15	<10	<10	Type B	0	15	-
989	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	17	<10	Type A	17	-	-
990	STATION POL	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	219	260	<10	Type B	260	479	-
991	STATION POL	1															<0.005	<0.05	<0.01	<0.05	<10	<10	886	364	<10	Type B	364	-	1250
992	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	179	236	<10	Type B	236	415	-
993	STATION POL	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	244	326	<10	Type B	326	570	-
994	STATION POL	1															<0.005	<0.05	<0.01	<0.05	<10	<10	734	592	<10	Type B	592	-	1326
995	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	56	44	<10	Type B	44	100	-
996	STATION POL	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	422	139	<10	Type B	139	561	-
997	STATION POL	1															<0.005	<0.05	<0.01	<0.05	<10	<10	4090	396	<10	Type B	396	-	4486
998	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	29	<10	Type A	29	-	-
999	STATION POL	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1252	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1253	STATION POL	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	29	<10	Type A	29	-	-
1254	STATION POL	1															<0.005	<0.05	<0.01	<0.05	<10	<10	20	25	<10	Type B	25	-	45
1255	STATION POL	0.75															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1256	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1257	STATION POL	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1258	STATION POL	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1259	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1260	STATION POL	0.5	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1261	STATION POL	0.5	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1262	STATION POL	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	10	<10	Type A	10	-	-
1263	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1264	STATION POL	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	15	10	Type A	25	-	-
1265	STATION POL	0.75															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	24	17	Type A	41	-	-
1266	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	63	37	Type A	100	-	-
1267	STATION POL	0.25															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	22	18	Type A	40	-	-
1268	STATION POL	0.55															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1269	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1270	STATION POL	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	20	15	Type A	35	-	-
1271	STATION POL	0.8															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	22	<10	Type A	22	-	-
1272	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	23	57	24	Type A	81	-	-
1273	STATION POL	0.25															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
1274	STATION POL	0.55															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-

Sample #	Area	Depth (m)	Purpose	As ppm	Cd ppm	Cr ppm	Co ppm	Cu ppm	Pb ppm	Hg ppm	Ni ppm	Zn ppm	Aroclor 1242	Aroclor 1254	Aroclor 1260	PCB Total ppm	Benzene	Toluene	Ethylbenzene	Xylene	F1 ppm	F1 minus BTEX	F2 ppm	F3 ppm	F4 ppm		Total TPH		
CEPA																50													
Tier II				30	5	250	50	100	500	2	100	500				5										Dominant TPH Type	TYPE A ppm	TYPE B (0-0.5 m) ppm	TYPE B (>0.5 m) ppm
Tier I									200							1													
PHCs/TPH - Protection of Freshwater Aquatic Life (within 30 m of water body)																						1290	330					330	
PHCs/TPH - Protection of Terrestrial Wildlife																												2,500	
PHCs/TPH - Human Health																							11,000	20,000			20,000		
PHCs/TPH - Management Limit																													5,000
1275	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	108	55	Type A	163	-	-
1276	STATION POL	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	14	<10	Type A	14	-	-
1277	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	19	10	Type A	29	-	-
1278	STATION POL	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	16	<10	Type A	16	-	-
1279	STATION POL	0.7															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	13	<10	Type A	13	-	-
1280	STATION POL	0.1	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	139	65	Type A	204	-	-
1281	STATION POL	0.1	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	216	94	Type A	310	-	-
1282	STATION POL	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	21	<10	Type A	21	-	-
1283	STATION POL	0.7															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	24	<10	Type A	24	-	-
1284	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	22	<10	Type A	22	-	-
1285	STATION POL	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	17	<10	Type A	17	-	-
1286	STATION POL	0.7															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	10	<10	Type A	10	-	-
1287	STATION POL	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	34	<10	Type A	34	-	-
1288	STATION POL	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	12	<10	Type A	12	-	-
1289	STATION POL	0.7															<0.005	<0.05	<0.01	<0.05	<10	<10	84	61	<10	Type B	61	145	-
840	WAREHOUSE	0.1	Duplicate	1.8	<0.5	4.3	2.1	3.7	3.5		4.7	6					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
841	WAREHOUSE	0.1	Duplicate	1.4	<0.5	5.1	2	4.2	4.2		5.1	6					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	13	<10	Type A	13	-	-
842	WAREHOUSE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	11	21	Type A	32	-	-
843	WAREHOUSE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	10	23	<10	Type B	23	-	33
844	WAREHOUSE	0.1		1.4	<0.5	4.3	2.1	5.1	3		5	9					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	17	<10	Type A	17	-	-
845	WAREHOUSE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	12	<10	Type A	12	-	-
846	WAREHOUSE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	12	<10	Type A	12	-	-
847	WAREHOUSE	0.1		1.4	<0.5	3.9	2.2	6.7	3.3		4.9	6					<0.005	<0.05	<0.01	<0.05	<10	<10	11	17	<10	Type B	17	28	-
848	WAREHOUSE	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	14	15	<10	Type B	15	29	-
849	WAREHOUSE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	14	24	<10	Type B	24	-	38
850	WAREHOUSE	0.1	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	14	26	<10	Type B	26	40	-
851	WAREHOUSE	0.1	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	16	18	<10	Type B	18	34	-
852	WAREHOUSE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	14	36	<10	Type A	36	-	-
853	WAREHOUSE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	15	23	<10	Type B	23	38	-
854	WAREHOUSE	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
855	WAREHOUSE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
856	WAREHOUSE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	11	<10	Type A	11	-	-
857	WAREHOUSE	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
858	WAREHOUSE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
859	WAREHOUSE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
860	WAREHOUSE	0.1	Duplicate	0.9	<0.5	2.6	1.2	2.1	1.4		2.9	4					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
861	WAREHOUSE	0.1	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
862	WAREHOUSE	0.4															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
863	WAREHOUSE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
936	WAREHOUSE	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	54	100	<10	Type B	100	154	-
937	WAREHOUSE	0.5															<0.005	<0.05	<0.01	<0.05	30	30	1730	505	13	Type B	518	2265	-
938	WAREHOUSE	1															<0.005	<0.05	<0.01	<0.05	40	40	1820	481	11	Type B	492	-	2312
939	WAREHOUSE	0.1		1.1	<0.5	2.8	1.5	3.1	2.3		3.3	4					<0.005	<0.05	<0.01	<0.05	<10	<10	<10	20	<10	Type A	20	-	-
940	WAREHOUSE	0.5	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
941	WAREHOUSE	0.5	Duplicate														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
942	WAREHOUSE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	11	<10	Type A	11	-	-
943	WAREHOUSE	0.1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
944	WAREHOUSE	0.5															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10	-	-	-	-
945	WAREHOUSE	1															<0.005	<0.05	<0.01	<0.05	<10	<10	<10	24	36	Type A	60	-	-

Table 4: Worked Area & Debris Areas Analytical

Sample #	Area	Depth (m)	As ppm	Cd ppm	Cr ppm	Co ppm	Cu ppm	Pb ppm	Hg ppm	Ni ppm	Zn ppm	Aroclor 1242	Aroclor 1254	Aroclor 1260	PCB Total ppm
CEPA															**50**
Tier II			**30**	**5**	**250**	**50**	**100**	**500**	**2**	**100**	**500**				**5**
Tier I								**200**							**1**
486	LOBE I	0.1	<0.5	0.8	2.5	1.1	2.1	1.4		2.6	3.4				
487	LOBE I	0.3	<0.5	0.8	3.3	0.8	1.8	1.3		2.6	2.7				
1348	LOBE M	0.1	1.4	<0.5	9.5	3	6.6	5		7.6	10.5	<0.05	<0.05	<0.05	<0.05
1349	LOBE M	0.3	1.5	<0.5	8.7	3.2	7.2	5.1		7.5	10.5	<0.05	<0.05	<0.05	<0.05
1352	LOBE J	0.1	<0.5	<0.5	1.4	<0.5	0.8	0.8		0.8	2				
1354	LOBE J	0.1	1	<0.5	26.4	3.4	33.9	543		2	177	<0.05	0.54	<0.05	0.54
1355	LOBE J	0.3	0.6	<0.5	4.5	0.9	27.9	94		2.2	27.8	<0.05	0.07	<0.05	0.07
1356	LOBE J	0.1	<0.5	<0.5	1.1	<0.5	1	3.1		0.9	3				
1358	LOBE J	0.1	0.5	<0.5	1.2	0.9	1	0.9		1.2	2				
1360	LOBE J	0.1	<0.5	<0.5	2.4	0.6	4.2	0.8		2.8	3				
1362	LOBE J	0.1	<0.5	<0.5	1.8	0.5	1	1.1		1	3				

Table 5: Landfill A & B Analytical

Sample #	Area	Depth (m)	Purpose	As ppm	Cd ppm	Cr ppm	Co ppm	Cu ppm	Pb ppm	Hg ppm	Ni ppm	Zn ppm	Aroclor 1242	Aroclor 1254	Aroclor 1260	PCB Total ppm
CEPA																**50**
Tier II				**30**	**5**	**250**	**50**	**100**	**500**	**2**	**100**	**500**				**5**
Tier I									**200**							**1**
362	LANDFILL A	0.1		<0.5	<0.5	0.9	<0.5	1.3	1.1	<0.5	0.7	2	<0.05	<0.05	<0.05	<0.05
366	LANDFILL A	0.1		<0.5	<0.5	0.6	<0.5	<0.5	0.5	<0.5	0.5	2	<0.05	<0.05	<0.05	<0.05
370	LANDFILL A	0.1	Duplicate	<0.5	<0.5	0.8	<0.5	0.7	0.6	<0.5	0.7	2	<0.05	<0.05	<0.05	<0.05
371	LANDFILL A	0.1	Duplicate	<0.5	<0.5	1.2	0.5	0.8	0.7	<0.5	1.3	3	<0.05	<0.05	<0.05	<0.05
375	LANDFILL A	0.1		<0.5	<0.5	1	<0.5	<0.5	0.5	<0.5	0.6	2	<0.05	<0.05	<0.05	<0.05
379	LANDFILL A	0.1		<0.5	<0.5	0.9	<0.5	<0.5	0.5	<0.5	0.5	1	<0.05	<0.05	<0.05	<0.05
384	LANDFILL A	0.1		<0.5	<0.5	0.7	<0.5	0.6	0.5	<0.5	0.7	2	<0.05	<0.05	<0.05	<0.05
390	LANDFILL A	0.1	Duplicate	<0.5	<0.5	1.1	<0.5	0.5	0.6	<0.5	0.9	6	<0.05	<0.05	<0.05	<0.05
391	LANDFILL A	0.1	Duplicate	<0.5	<0.5	2.2	0.6	1.7	0.6	<0.5	2.1	5	<0.05	<0.05	<0.05	<0.05
393	LANDFILL A	0.1		0.8	<0.5	5.8	1.7	2	2.1	<0.5	3.6	47	<0.05	<0.05	<0.05	<0.05
407	LANDFILL A	0.1		<0.5	<0.5	0.7	<0.5	0.6	<0.5	<0.5	0.7	2	<0.05	<0.05	<0.05	<0.05
412	LANDFILL A	0.1		<0.5	<0.5	1.1	<0.5	0.8	<0.5	<0.5	0.7	6	<0.05	<0.05	<0.05	<0.05
418	LANDFILL A	0.1		<0.5	<0.5	1	<0.5	0.9	0.7	<0.5	0.9	2	<0.05	<0.05	<0.05	<0.05
420	LANDFILL A	0.1		<0.5	<0.5	1.6	0.5	1.2	1.2	<0.5	1.1	2	<0.05	<0.05	<0.05	<0.05
424	LANDFILL A	0.1		<0.5	<0.5	0.7	<0.5	0.7	2.6	<0.5	0.6	4	<0.05	<0.05	<0.05	<0.05
910	LANDFILL A	0.1		<0.5	<0.5	1.8	0.5	1.1	1		1.1	2	<0.05	<0.05	<0.05	<0.05
935	LANDFILL A	0.1		0.7	<0.5	4.6	1.1	1.9	1.6		1.9	3.4	<0.05	<0.05	<0.05	<0.05
984	LANDFILL A	0.1		0.7	<0.5	6.7	2.1	2	1.8		4.3	8	<0.05	<0.05	<0.05	<0.05
987	LANDFILL A	0.1		<0.5	<0.5	1.3	0.7	3.4	0.6		1.4	2.6	<0.05	<0.05	<0.05	<0.05
426	LANDFILL B	0.1		<0.5	<0.5	1.5	<0.5	0.9	0.6		1	1.4	<0.05	<0.05	<0.05	<0.05
430	LANDFILL B	0.1	Duplicate	<0.5	<0.5	1.5	0.5	1	0.9		0.9	2.2	<0.05	<0.05	<0.05	<0.05
431	LANDFILL B	0.1	Duplicate	<0.5	<0.5	4.5	0.7	0.8	0.9		1.4	2.7	<0.05	<0.05	<0.05	<0.05
435	LANDFILL B	0.1		<0.5	<0.5	1.5	<0.5	1.3	1		0.9	1.6	<0.05	<0.05	<0.05	<0.05
439	LANDFILL B	0.1		<0.5	<0.5	1.3	0.7	0.8	1		1	1.6	<0.05	<0.05	<0.05	<0.05
444	LANDFILL B	0.1		<0.5	<0.5	1.7	<0.5	0.9	0.6		1.1	2.3	<0.05	<0.05	<0.05	<0.05
448	LANDFILL B	0.1		<0.5	<0.5	1.2	<0.5	4.5	0.5		2.3	1.9	<0.05	<0.05	<0.05	<0.05
450	LANDFILL B	0.1	Duplicate	<0.5	<0.5	2.1	1	2.3	1.8		1.9	3	<0.05	<0.05	<0.05	<0.05
451	LANDFILL B	0.1	Duplicate	0.7	<0.5	2.7	0.8	1.9	1.5		1.8	3	<0.05	0.2	<0.05	0.2
452	LANDFILL B	0.3		1.5	<0.5	37.3	8.1	15.9	7.8		23.8	31	<0.05	<0.05	<0.05	<0.05
455	LANDFILL B	0.1		0.6	<0.5	4.7	1.4	1.8	1.9		2.2	3.1	<0.05	<0.05	<0.05	<0.05
457	LANDFILL B	0.1		<0.5	<0.5	2	0.7	1.3	1		1.4	2.4	<0.05	<0.05	<0.05	<0.05
463	LANDFILL B	0.1		<0.5	<0.5	1.2	<0.5	2	0.9		1.3	2	<0.05	<0.05	<0.05	<0.05
464	LANDFILL B	0.3		0.6	<0.5	2.2	1.1	2.8	1.8		2.5	3	<0.05	<0.05	<0.05	<0.05
465	LANDFILL B	0.1		0.5	<0.5	1.2	0.8	1.5	1.1		1.6	2	<0.05	<0.05	<0.05	<0.05
466	LANDFILL B	0.3		1.1	<0.5	4.2	2	3.2	2		4.2	5	<0.05	<0.05	<0.05	<0.05
473	LANDFILL B	0.1		<0.5	<0.5	1.2	<0.5	0.6	0.6		0.6	1.7	<0.05	<0.05	<0.05	<0.05
475	LANDFILL B	0.1		<0.5	<0.5	1.9	0.6	0.6	0.7		0.8	1.6	<0.05	<0.05	<0.05	<0.05
912	LANDFILL B	0.1		<0.5	<0.5	0.6	<0.5	0.7	0.5		0.5	<1	<0.05	<0.05	<0.05	<0.05
913	LANDFILL B	0.3		<0.5	<0.5	<0.5	<0.5	1	0.5		0.6	2	<0.05	<0.05	<0.05	<0.05
918	LANDFILL B	0.1		<0.5	<0.5	4.8	0.6	0.6	0.7		1.2	2	<0.05	<0.05	<0.05	<0.05

Sample #	Area	Depth (m)	Purpose	As ppm	Cd ppm	Cr ppm	Co ppm	Cu ppm	Pb ppm	Hg ppm	Ni ppm	Zn ppm	Aroclor 1242	Aroclor 1254	Aroclor 1260	PCB Total ppm
CEPA																**50**
Tier II				**30**	**5**	**250**	**50**	**100**	**500**	**2**	**100**	**500**				**5**
Tier I									**200**							**1**
919	LANDFILL B	0.3		<0.5	<0.5	1.3	<0.5	0.7	0.7		0.9	2	<0.05	<0.05	<0.05	<0.05
925	LANDFILL B	0.1		0.8	<0.5	4.2	1.4	2.5	1.8		3	3.8	<0.05	<0.05	<0.05	<0.05
927	LANDFILL B	0.1		1.1	<0.5	2.1	1.4	1.5	1.4		2.1	4	<0.05	<0.05	<0.05	<0.05
929	LANDFILL B	0.1		<0.5	<0.5	1.3	<0.5	0.5	0.6		0.6	0.7	<0.05	<0.05	<0.05	<0.05
931	LANDFILL B	0.1		0.6	<0.5	1.6	0.7	1.2	1		1.5	1.5	<0.05	<0.05	<0.05	<0.05
933	LANDFILL B	0.1		<0.5	<0.5	1	<0.5	0.9	<0.5		0.7	1.2	<0.05	<0.05	<0.05	<0.05

Table 6: Water & Sediment Analytical

Sample #	Area	Aroclor 1242	Aroclor 1254	Aroclor 1260	PCB Total ppm	As ppm	Cd ppm	Cr ppm	Co ppm	Cu ppm	Pb ppm	Ni ppm	Zn ppm	Benzene	Toluene	Ethylbenzene	Xylene	F1 ppm	F1 minus BTEX	F2 ppm	F3 ppm	F4 ppm	pH	Aluminum	Antimony	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Iron	Lead
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (December, 2007)														**0.370**	**0.0020**	**0.090**							**6.5-9**	**0.1**[(1)]		**0.0050**			**0.000017**	**0.0089**[(2)]	**0.002**[(3)]	**0.300**	**0.001**[(4)]
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine (December, 2007)														**0.110**	**0.215**	**0.025**							**7.0-8.7**			**0.0125**			**0.00012**	**0.056**[(2)]			
Guidelines for Canadian Drinking Water Quality (May, 2008)														**5**	**24**	**2.4**	**300**						**6.5-8.5**		**0.006**	**0.010**	**1**	**5**	**0.005**	**0.05**	**1.0**	**0.3**	**0.01**
MW-01	BEACH POL	<0.01	<0.01	<0.01	<0.01									<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.1	<0.1	<0.1		64.4	0.002	0.081	0.38	0.14	0.00227	0.147	0.18	218	0.155
MW-02	BEACH POL	<0.01	<0.01	<0.01	<0.01									<0.0005	<0.0005	<0.0005	<0.0005	0.1	0.1	8.9	1	0.1		30.2	<0.001	0.029	0.2	0.13	0.00097	0.084	0.108	71	0.088
W-001	POTABLE WATER	<0.01	<0.01	<0.01	<0.01									<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.1	<0.1	<0.1	8.5	0.038	<0.001	0.002	<0.05	0.02	<0.000016	0.002	0.006	0.1	<0.001
W-002	POTABLE WATER	<0.01	<0.01	<0.01	<0.01									<0.0005	<0.0005	<0.0005	<0.0005	<0.1	<0.1	<0.1	<0.1	<0.1	8.5	0.065	<0.001	0.002	<0.05	0.03	<0.000016	0.002	0.004	0.1	<0.001
W-003	POTABLE WATER	<0.01	<0.01	<0.01	<0.01									<0.0005	0.0018	<0.0005	<0.0005	<0.1	<0.1	<0.1	<0.1	<0.1	7.1	0.002	<0.001	<0.001	<0.05	<0.01	<0.000016	<0.001	<0.002	<0.1	<0.001
W-004	WATER OUTFALL	<0.01	<0.01	<0.01	<0.01									<0.0005	<0.0005	<0.0005	<0.0005	0.1	0.1	19.6	6	0.7	8.6	0.24	<0.001	0.003	<0.05	0.12	0.000053	0.019	0.005	0.3	<0.001
JTP123	POL WATER	<0.01	<0.01	<0.01	<0.01									<0.0005	<0.0005	<0.0005	<0.0005	0.1	0.1	19.6	6	0.7		8.27	0.002	0.006	0.06	0.16	0.000544	0.025	0.041	13.8	0.016
1330	SEDIMENT	<0.05	<0.05	<0.05	<0.05	<0.5	<0.5	1.8	<0.5	1.1	0.8	1.4	4	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10											
1331	SEDIMENT	<0.05	<0.05	<0.05	<0.05	<0.5	<0.5	1.9	<0.5	1.4	0.7	1.7	2.2	<0.005	<0.05	<0.01	<0.05	<10	<10	<10	16	11											

[(1)] Aluminum guideline for pH at ≥6.5

chromium (Cr(III))

[(3)] Copper guideline based on hardness - most stringent guideline is applied

[(4)] Lead guideline based on hardness - most stringent guideline is applied

[(5)] Nickel guideline based on hardness - most stringent guideline is applied

Table 6: Water & Sediment Analytical

Sample #	Area	Manganese	Molybdenum	Nickel	Selenium	Silver	Sodium	Thallium	Uranium	Zinc	p - Alkalinity (as CaCO3)	T - Alkalinity (as CaCO3)	Bicarbonate	Carbonate	Hydroxide	Electrical Conductivity	Chloride	Fluoride	Nitrate	Sulfate	Dissolved Calcium	Dissolved Magnesium	Dissolved Sodium	Dissolved Potassium	Dissolved Iron	Dissolved Manganese	Hardness	Ion Balance	Calculated TDS	Nitrate + Nitrite-N	Nitrate-N	Nitrite-N
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (December, 2007)			**0.073**	**0.025**[5]	**0.0010**	**0.0001**				**0.030**																					**2.900**	**0.060**
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine (December, 2007)																															**3.600**	
Guidelines for Canadian Drinking Water Quality (May, 2008)		**0.05**			**0.01**					**5**							**250**			**500**									**500**		**10**	**3.2**
MW-01	BEACH POL	2.55	0.01	0.14	0.002	0.00122	25.6	0.0024	0.01	0.2																						
MW-02	BEACH POL	1.63	0.003	0.07	<0.001	0.00081	28.1	0.0015	0.006	0.102																						
W-001	POTABLE WATER	0.005	<0.003	<0.01	<0.001	<0.00005	117	<0.0005	<0.001	0.004	<5	106	120	<5	<5	1030	**256**	0.06	0.6	14	23.3	34.1	116	6.2	<0.1	<0.005	199	96.6	514	0.136	0.136	<0.015
W-002	POTABLE WATER	0.006	<0.003	<0.01	<0.001	<0.00005	117	<0.0005	<0.001	0.002	<5	105	121	<5	<5	1030	**260**	0.06	<0.5	11	22.7	33.3	115	6.1	<0.1	<0.005	194	94.6	511	<0.113	<0.113	<0.015
W-003	POTABLE WATER	<0.005	<0.003	<0.01	<0.001	<0.00005	<0.6	<0.0005	<0.001	<0.001	<5	<5	<5	<5	<5	<1	<1	<0.05	<0.5	<1	<0.3	<0.2	<0.6	<0.6	<0.1	<0.005	<1		<1	<0.113	<0.113	<0.015
W-004	WATER OUTFALL	0.028	<0.003	0.01	<0.001	<0.00005	106	<0.0005	<0.001	0.007	11	245	273	13	<5	1220	240	0.12	<0.5	31	56.2	53.5	104	4.5	<0.1	0.017	361	96.1	636	<0.113	<0.113	<0.015
JTP123	POL WATER	0.874	<0.003	0.02	<0.001	0.00023	8.7	<0.0005	0.003	0.037																						
1330	SEDIMENT																															
1331	SEDIMENT																															

(1) Aluminum guideline for pH at ≥6.5

chromium (Cr(III))

(3) Copper guideline based on hardness - most stringent guideline is applied

(4) Lead guideline based on hardness - most stringent guideline is applied

(5) Nickel guideline based on hardness - most stringent guideline is applied

Table 7: Debris & Materials Analytical

Sample #	Area	Purpose	% Coverage	Aroclor 1242	Aroclor 1254	Aroclor 1260	PCB Total ppm	Asbestos (bulk) %	Asbestos (bulk) % Phase I	Asbestos (bulk) % Phase II	Lead (Total)	Lead Leachable	Naphthalene	Methyl Naphthalenes	Dimethyl Naphthalenes	Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benzo[a]anthracene, Chrysene, Benzo(b+j)fluoranthene, Benzo(k)fluoranthene, Benzo[a]pyrene, Indeno[1,2,3-cd]pyrene, Dibenzofuran, Dibenz[ah]anthracene, Benzo[ghi]perylene, Pentachlorophenol, Carbazole, Methyl Anthracenes, 3-Methylcholanthrene
CEPA							50									
Tier II							5									
Tier I							1									
MAT01	MAIN STATION	Paint - Antenna (orange)	70	<0.05	<0.05	<0.05	<0.05				150000	1.4				
MAT02	MAIN STATION	Paint - Antenna (white)	60	<0.05	<0.05	<0.05	<0.05				18000	<0.5				
MAT03	MAIN STATION	Vinyl tile - Warehouse	-					ND								
MAT04	MAIN STATION	Cement board - Warehouse	-					15-30								
MAT05	MAIN STATION	Press board - Warehouse	-					ND								
MAT06	MAIN STATION	Boiler paper insulation - Garage	-					>75								
MAT07	MAIN STATION	Boiler trowel insulation - Garage	-	<0.05	0.28	<0.05	0.28	30-50								
MAT08	MAIN STATION	Paint - Warehouse (off-white)	60	<0.05	<0.05	1.85	1.89				410	<0.5				
MAT09	MAIN STATION	Paint/plywood - Warehouse (white)	100	<0.05	0.58	<0.05	0.58				615	<0.5				
MAT10	MAIN STATION	Cement board - Warehouse	-					15-30								
MAT11	MAIN STATION	Concrete - Warehouse	-	<0.05	0.49	<0.05	0.49									
MAT12	MAIN STATION	Concrete - Warehouse	-	<0.05	<0.05	<0.05	<0.05									
MAT13	MAIN STATION	Concrete - Garage Pad	-	<0.05	0.79	<0.05	0.79									
MAT14	MAIN STATION	Concrete - Garage Pad	-	<0.05	1.02	<0.05	1.02									
MAT15	MAIN STATION	Concrete - Garage Pad (stain)	-	<0.05	116	<0.05	116									
MAT16	MAIN STATION	Concrete - Garage Pad	-	<0.05	126	<0.05	126									
MAT17	MAIN STATION	Paint Interior (floor) - Module Train (grey)	100	<0.05	261000	<0.05	261000				2530					
MAT18	MAIN STATION	Paint Interior (generator) - Module Train (grey)	75	<0.05	1310	<0.05	1310				486	<0.5				
MAT19	MAIN STATION	Paint Interior (walls) - Module Train (grey)	90	<0.05	8750	2400	11100				2540					
MAT20	MAIN STATION	Paint Interior (fan blades) - Module Train (red)	60	<0.05	162	<0.05	162				10,000					
MAT21	MAIN STATION	Paint Interior (ASTs) - Module Train (grey)	60	<0.05	1280	<0.05	1280				2380	<0.5				
MAT22	MAIN STATION	Paint Interior (water tank) - Module Train (grey & red)	85	<0.05	11100	<0.05	11100				2000	<0.5				
MAT23	MAIN STATION	Paint Exterior - Module Train (off-white)	60	<0.05	<0.05	763	763				1300	<0.5				
MAT24	MAIN STATION	Paint Interior (entrance) - Module Train (red & white)	40	<0.05	190	<0.05	190				3560					
MAT25	MAIN STATION	Concrete - Module Train	-	<0.05	250	<0.05	250									
MAT26	MAIN STATION	Concrete - Module Train	-	<0.05	473	<0.05	473									
MAT27	MAIN STATION	Pipe insulation - Module Train	-					30-50								
MAT28	MAIN STATION	Pipe insulation - Module Train	-						ND	>75						
MAT29	MAIN STATION	Tank insulation - Module Train	-					15-30								
MAT30	MAIN STATION	Tank insulation - Module Train	-						50-75	30-50						
MAT31	MAIN STATION	Wood - Module Train Foundation	-	<0.05	0.17	<0.05	0.17					<0.5	0.02	0.089	0.065	<0.01

Table 8: Analytical QA/QC

Parameter		Metals									PCBs				BTEX, F1-F4 PHC								
		As	Cd	Co	Cr	Cu	Hg	Ni	Pb	Zn	Aroclor 1242	Aroclor 1254	Aroclor 1260	Total PCBs	Benzene	Toluene	Ethylbenzene	Xylenes	F1 ppm	F1-minus BTEX	F2 ppm	F3 ppm	F4 ppm
Method Detection Limit		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.05	0.05	0.05	0.05	0.005	0.05	0.01	0.05	10	10	10	10	10
Units		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Sample	Area																						
370	LANDFILL A	<0.5	<0.5	0.8	<0.5	0.7	0.6	<0.5	0.7	2	<0.05	<0.05	<0.05	<0.05									
371	LANDFILL A	<0.5	<0.5	1.2	0.5	0.8	0.7	<0.5	1.3	3	<0.05	<0.05	<0.05	<0.05									
	RPD	0	0	40*	0*	13*	15*	0	60*	40*	0	0	0	0									
390	LANDFILL A	<0.5	<0.5	1.1	<0.5	0.5	0.6	<0.5	0.9	6	<0.05	<0.05	<0.05	<0.05									
391	LANDFILL A	<0.5	<0.5	2.2	0.6	1.7	0.6	<0.5	2.1	5	<0.05	<0.05	<0.05	<0.05									
	RPD	0	0	67*	18*	109*	0	0	80*	18	0	0	0	0									
430	LANDFILL B	<0.5	<0.5	1.5	0.5	1	0.9		0.9	2.2	<0.05	<0.05	<0.05	<0.05									
431	LANDFILL B	<0.5	<0.5	4.5	0.7	0.8	0.9		1.4	2.7	<0.05	<0.05	<0.05	<0.05									
	RPD	0	0	100*	33*	22*	0*	--	43*	20*	0	0	0	0									
450	LANDFILL B	<0.5	<0.5	2.1	1	2.3	1.8		1.9	3	<0.05	<0.05	<0.05	<0.05									
451	LANDFILL B	0.7	<0.5	2.7	0.8	1.9	1.5		1.8	3	<0.05	0.2	<0.05	0.2									
	RPD	33	0	25*	22*	19*	18*	--	5*	0*	0	120*	0	120*									
800	GARAGE														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
801	GARAGE														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
	RPD														0	0	0	0	0	0	0	0	0
810	GARAGE										<0.05	0.42	<0.05	0.42									
811	GARAGE										<0.05	0.26	<0.05	0.26									
	RPD										0	47	0	47									
820	GARAGE														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
821	GARAGE														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
	RPD														0	0	0	0	0	0	0	0	0
830	GARAGE														<0.005	<0.05	<0.01	<0.05	<10	<10	35	<10	<10
831	GARAGE														<0.005	<0.05	<0.01	<0.05	<10	<10	118	59	<10
	RPD														0	0	0	0	0	0	108	142*	0
840	WAREHOUSE														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
841	WAREHOUSE														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	13	<10
	RPD														0	0	0	0	0	0	0	26*	0
850	WAREHOUSE														<0.005	<0.05	<0.01	<0.05	<10	<10	14	26	<10
851	WAREHOUSE														<0.005	<0.05	<0.01	<0.05	<10	<10	16	18	<10
	RPD														0	0	0	0	0	0	13*	36*	0
860	WAREHOUSE														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
861	WAREHOUSE														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
	RPD														0	0	0	0	0	0	0	0	0
870	BEACH POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
871	BEACH POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
	RPD														0	0	0	0	0	0	0	0	0
880	BEACH POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	24	19
881	BEACH POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	24	19
	RPD														0	0	0	0	0	0	0	0*	0*
890	BEACH POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	21	15
891	BEACH POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	26	19
	RPD														0	0	0	0	0	0	0	21*	24*
900	BEACH POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	15	<10
901	BEACH POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
	RPD														0	0	0	0	0	0	0	40*	0
940	WAREHOUSE														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
941	WAREHOUSE														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
	RPD														0	0	0	0	0	0	0	0	0
960	BEACH POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	10

Parameter		Metals									PCBs				BTEX, F1-F4 PHC								
		As	Cd	Co	Cr	Cu	Hg	Ni	Pb	Zn	Aroclor 1242	Aroclor 1254	Aroclor 1260	Total PCBs	Benzene	Toluene	Ethylbenzene	Xylenes	F1 ppm	F1-minus BTEX	F2 ppm	F3 ppm	F4 ppm
Method Detection Limit		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.05	0.05	0.05	0.05	0.005	0.05	0.01	0.05	10	10	10	10	10
Units		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Sample	**Area**																						
961	BEACH POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
	RPD														0	0	0	0	0	0	0	0	**0***
970	STATION POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	10	<10
971	STATION POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
	RPD														0	0	0	0	0	0	0	**0***	0
980	STATION POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	33	16
981	STATION POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	38	14
	RPD														0	0	0	0	0	0	0	**14***	**13***
1260	STATION POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
1261	STATION POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	<10	<10
	RPD														0	0	0	0	0	0	0	0	0
1280	STATION POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	139	65
1281	STATION POL														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	216	94
	RPD														0	0	0	0	0	0	0	43	**36***
1290	MOD TRAIN														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	40	<10
1291	MOD TRAIN														<0.005	<0.05	<0.01	<0.05	<10	<10	<10	48	26
	RPD														0	0	0	0	0	0	0	**18***	**89***
1300	MOD TRAIN														<0.005	<0.05	<0.01	<0.05	<10	<10	118	86	<10
1301	MOD TRAIN														<0.005	<0.05	<0.01	<0.05	<10	<10	131	82	<10
	RPD														0	0	0	0	0	0	10	**5***	0
1310	MOD TRAIN	1	<0.5	7.2	1.8	6	19.8		3.6	82.4	<0.05	6.88	<0.05	6.88									
1311	MOD TRAIN	1.1	<0.5	6.1	1.6	6.1	11		4	149	<0.05	6.89	<0.05	6.89									
	RPD	**10***	0	17	**12***	2	**57**	---	**11***	**58**	0	0	0	0									
1330	SEDIMENT	<0.5	<0.5	1.8	<0.5	1.1	0.8		1.4	4	<0.05	<0.05	<0.05	<0.05									
1331	SEDIMENT	<0.5	<0.5	1.9	<0.5	1.4	0.7		1.7	2.2	<0.05	<0.05	<0.05	<0.05									
	RPD	0	0	**1***	0	**6***	**3***	---	**5***	**15***	0	0	0	0									
1340	MOD TRAIN	<0.005	<0.05	<0.01	<0.05	<10	<10	1190	287	<10													
1341	MOD TRAIN	<0.005	<0.05	<0.01	<0.05	<10	<10	1060	247	<10													
	RPD	0	0	0	0	0	0	12	15	0													
	Average RPD for the site	2	0	**37**	3	25	13	4	**36**	25	0	8	0	8	0	0	0	0	0	0	7	19	9

Notes:

Acceptable RPD values vary based on the analytical parameters, the sample matrix, and the concentrations of analytes in the samples.

Acceptable RPD values below 35% for metals and 50% for PHCs and PCBs.

BOLD indicates the RDP exceeded the recommended alert criteria (only when the concentrations are at least ten times the method detection limit are RPD calculations considered valid.)

BOLD* indicates that concentrations are <10 times the detection limit, therefore the calculated RDP value is not strictly valid.

Appendix C

Photographs

- (E) Environmental Photos
- (G) Geotechnical Photos

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Site Overview	Project No. 60156118

Photo No.	Date:
E-1	9-Aug-10

Direction Photo Taken:

View north-northeast

Description:

Site overview
(taken from airplane)

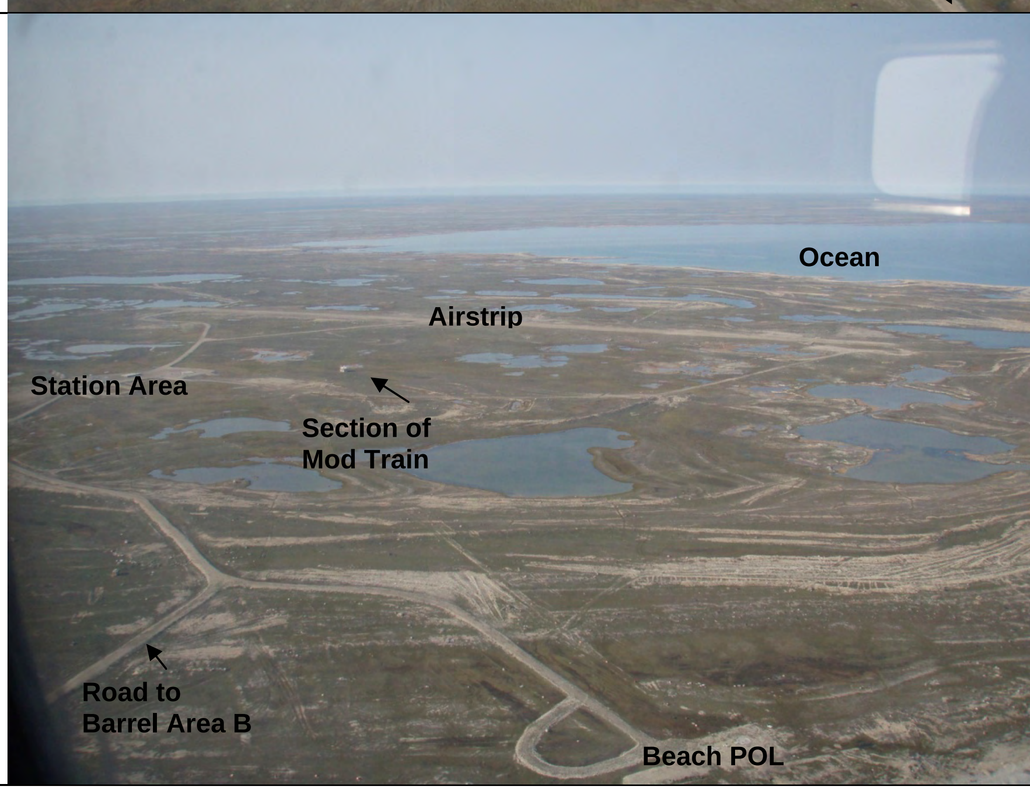
Photo No.	Date:
E-2	9-Aug-10

Direction Photo Taken:

View north-northeast

Description:

Site overview
(taken from airplane)



PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Sewage Outfall	Project No. 60156118

Photo No.	Date:
E-3	6-Aug-10

Direction Photo Taken:

View northwest

Description:

Sewage pipeline from main station pad towards outfall.

Fallen antenna noted to the south of the outfall

Photo No.	Date:
E-4	6-Aug-10

Direction Photo Taken:

View southeast

Description:

Sewage pipeline from main station.

Mod Train foundation noted in background.

PHOTOGRAPHIC LOG

AECOM

Site Name: CAM-A, Sturt Point	Site Location: Sewage Outfall	Project No. 60156118

Photo No.	Date:
E-5	6-Aug-10

Direction Photo Taken:

View southeast

Description:

Sewage pipeline towards main station.

Photo No.	Date:
E-6	6-Aug-10

Direction Photo Taken:

View northwest

Description:

Former sewage pipeline from main station to outfall.

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Sewage Outfall	Project No. 60156118

Photo No.	Date:
E-7	6-Aug-10

Direction Photo Taken:

View northeast

Description:

End of former sewage pipeline (south end of outfall channel).

Warehouse foundation is noted to the northeast.

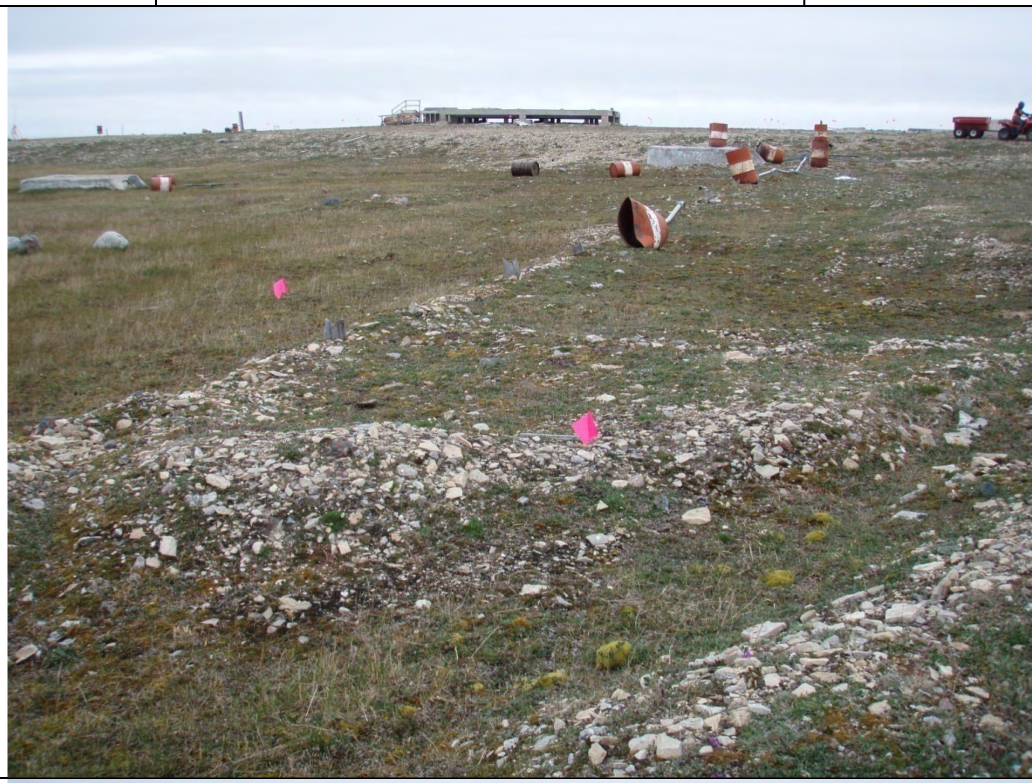


Photo No.	Date:
E-8	6-Aug-10

Direction Photo Taken:

View north

Description:

South end of sewage outfall channel.

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	**Site Location:** Sewage Outfall	**Project No.** 60156118

Photo No. E-9	**Date:** 6-Aug-10

Direction Photo Taken:

View south

Description:

North end of sewage outfall channel.

Fallen antenna noted south of the channel.

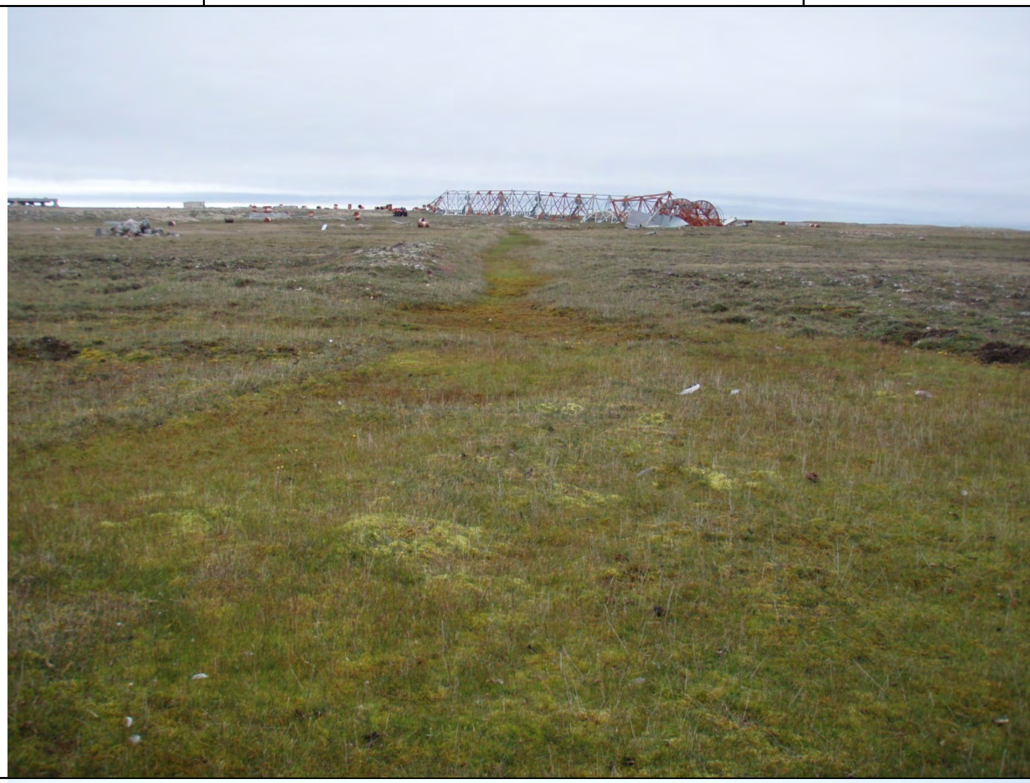


Photo No. E-10	**Date:** 6-Aug-10

Direction Photo Taken:

View north

Description:

North end of sewage outfall channel.

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No.	Date:
E-11	9-Aug-10

Direction Photo Taken:

View southeast

Description:

Mod train foundation.

Photo No.	Date:
E-12	9-Aug-10

Direction Photo Taken:

View west

Description:

Mod train foundation.

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No.	Date:
E-13	9-Aug-10

Direction Photo Taken:

View north

Description:

Garage foundation,

Photo No.	Date:
E-14	9-Aug-10

Direction Photo Taken:

View north

Description:

Garage foundation.

Two sumps noted on concrete pad.

Airstrip to the north.

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No.	Date:
E-15	9-Aug-10

Direction Photo Taken:

View southeast

Description:

Garage foundation.

Former boiler remaining on pad.

Photo No.	Date:
E-16	9-Aug-10

Direction Photo Taken:

View southwest

Description:

Warehouse foundation.

Wooden debris.

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No. E-17	Date: 9-Aug-10

Direction Photo Taken:

View east

Description:

Warehouse foundation.

Empty ASTs.

Photo No. E-18	Date: 9-Aug-10

Direction Photo Taken:

View southeast.

Description:

Warehouse foundation.

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No.	Date:
E-19	9-Aug-10

Direction Photo Taken:

View southwest

Description:

Wood & metal debris on station pad.

Warehouse foundation and fallen antenna noted in background.

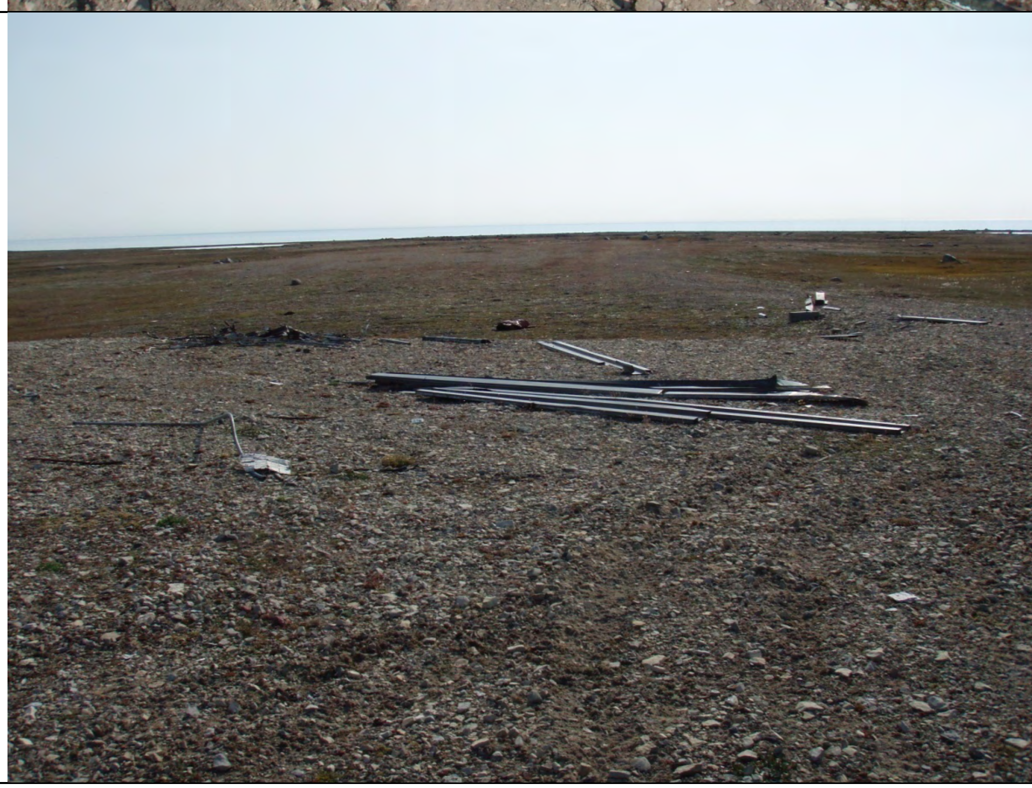
Photo No.	Date:
E-20	9-Aug-10

Direction Photo Taken:

View west

Description:

Metal debris on station pad.



PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No.	Date:
E-21	9-Aug-10

Direction Photo Taken:

View northeast

Description:

Metal debris on station pad.

Section of mod train noted in background.

Photo No.	Date:
E-22	9-Aug-10

Direction Photo Taken:

View northeast

Description:

Section of former mod train.

PHOTOGRAPHIC LOG

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

Photo No. E-23	Date: 9-Aug-10

Direction Photo Taken:

View northwest

Description:

Section of former mod train.

Photo No. E-24	Date: 9-Aug-10

Direction Photo Taken:

View southwest

Description:

Section of former mod train.

PHOTOGRAPHIC LOG

AECOM

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

Photo No.	Date:
E-25	9-Aug-10

Direction Photo Taken:

Inside module train section

Description:

North side of building

Photo No.	Date:
E-26	9-Aug-10

Direction Photo Taken:

Inside module train section

Description:

North side of building

PHOTOGRAPHIC LOG

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

Photo No. E-27	Date: 9-Aug-10
Direction Photo Taken: Inside module train section	
Description: Southwest corner of building	

Photo No. E-28	Date: 9-Aug-10
Direction Photo Taken: Inside module train section	
Description: Two (2) former diesel fuel ASTs	

PHOTOGRAPHIC LOG

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

Photo No. E-29	Date: 9-Aug-10
Direction Photo Taken: Inside module train section	
Description: Piping along ceiling.	

Photo No. E-30	Date: 7-Aug-10
Direction Photo Taken: Inside module train section	
Description: Location of material sample MAT-30	

PHOTOGRAPHIC LOG

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

Photo No.	Date:
E-31	7-Aug-10

Direction Photo Taken:

Inside module train section

Description:

Location of material sample MAT-30.

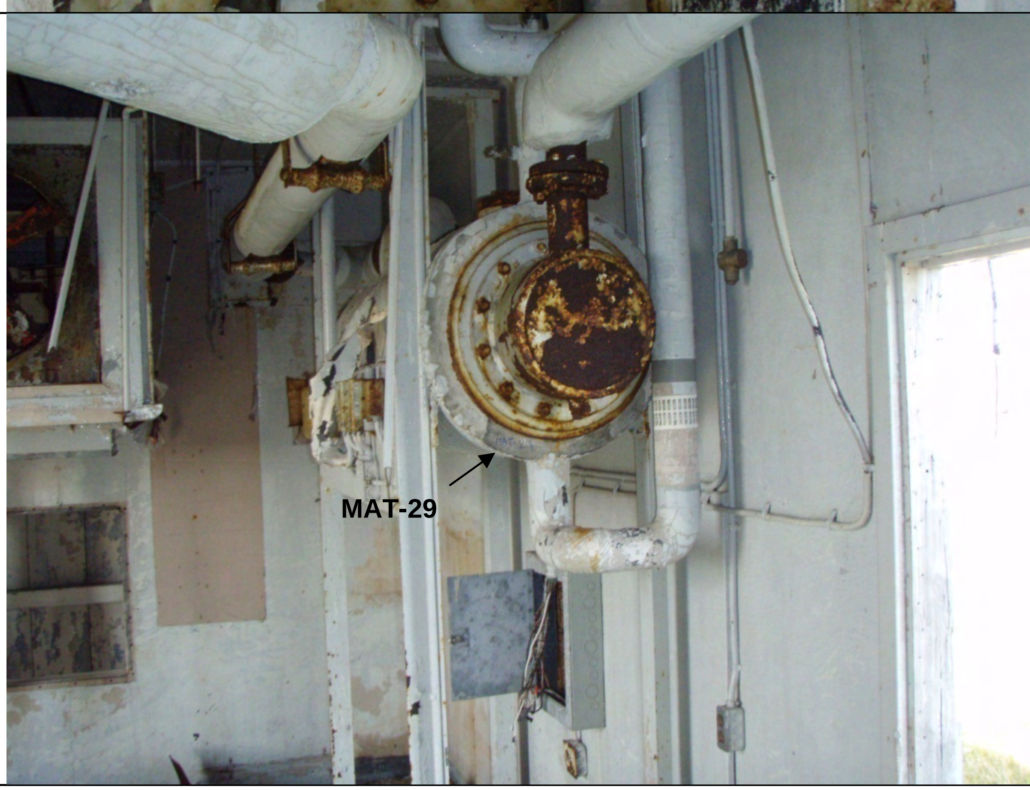
Photo No.	Date:
E-32	7-Aug-10

Direction Photo Taken:

Inside module train section

Description:

Location of material sample MAT-29.



PHOTOGRAPHIC LOG

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

Photo No.	Date:
E-33	7-Aug-10

Direction Photo Taken:

Inside module train section

Description:

Location of material sample MAT-29.

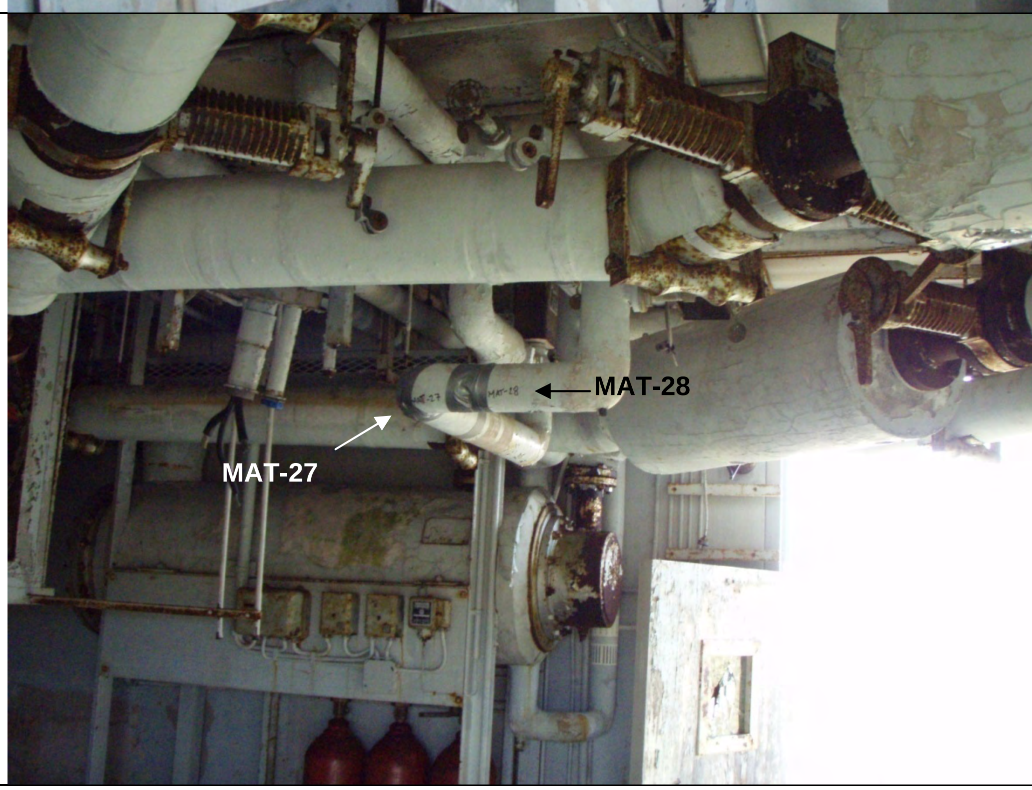
Photo No.	Date:
E-34	7-Aug-10

Direction Photo Taken:

Inside module train section

Description:

Location of material sample MAT-27 & MAT-28.



PHOTOGRAPHIC LOG

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

Photo No. E-35	Date: 7-Aug-10

Direction Photo Taken:

Inside module train section

Description:

Location of material sample MAT-26.

Photo No. E-36	Date: 7-Aug-10

Direction Photo Taken:

Inside module train section

Description:

Location of material sample MAT-25.

PHOTOGRAPHIC LOG

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

Photo No.	Date:
E-37	7-Aug-10

Direction Photo Taken:

Inside module train section

Description:

Location of material sample MAT-24.

Photo No.	Date:
E-38	7-Aug-10

Direction Photo Taken:

View south

Description:

Location of material sample MAT-23.

PHOTOGRAPHIC LOG

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

Photo No.	Date:	
E-39	7-Aug-10	
Direction Photo Taken: Inside module train section		
Description: Location of material sample MAT-21 and MAT-22.		

Photo No.	Date:	
E-40	7-Aug-10	
Direction Photo Taken: Inside module train section		
Description: Location of material sample MAT-20.		

PHOTOGRAPHIC LOG

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

Photo No.	Date:
E-41	7-Aug-10

Direction Photo Taken:

Inside module train section

Description:

Location of material sample MAT-19.

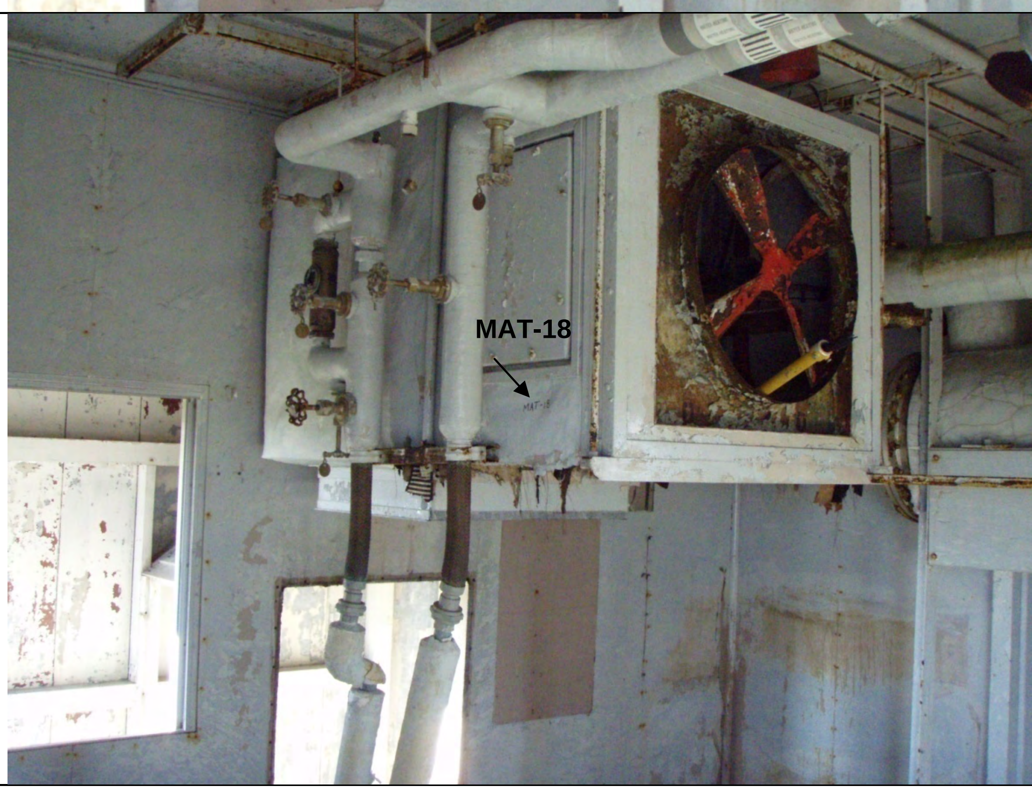
Photo No.	Date:
E-42	7-Aug-10

Direction Photo Taken:

Inside module train section

Description:

Location of material sample MAT-18.



PHOTOGRAPHIC LOG

AECOM

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No. E-43	Date: 7-Aug-10

Direction Photo Taken:

Inside module train section

Description:

Location of material sample MAT-17.

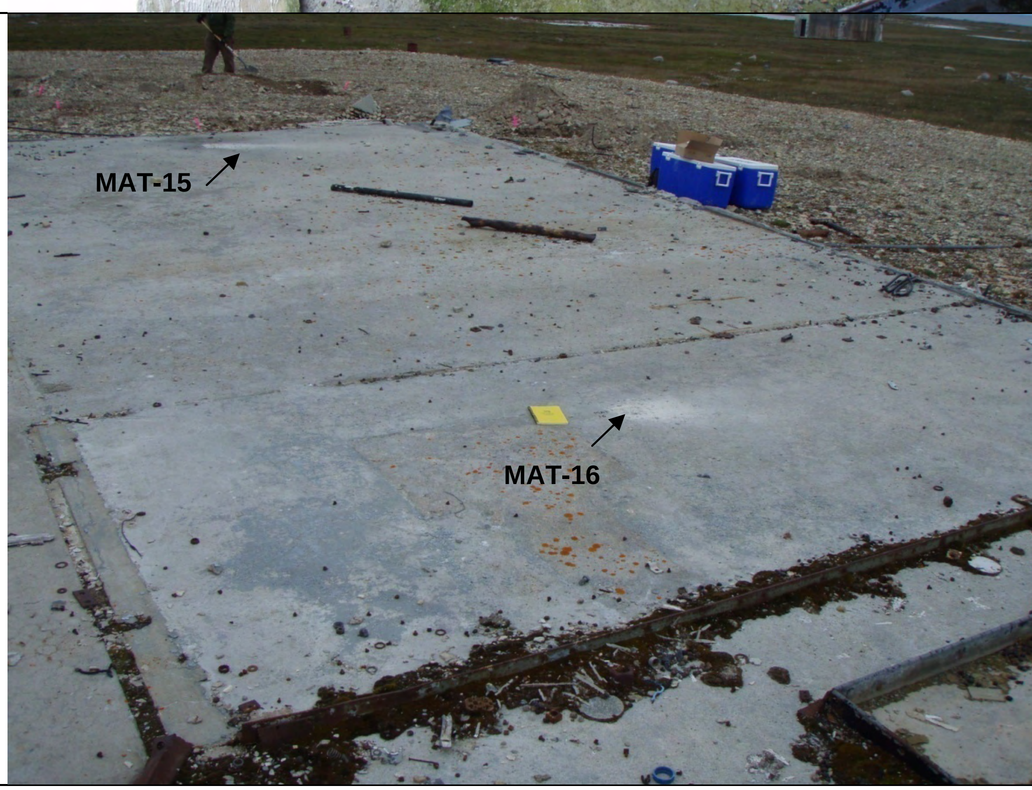
Photo No. E-44	Date: 7-Aug-10

Direction Photo Taken:

View northeast

Description:

Garage foundation. Location of material sample MAT-15 and MAT-16.



PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No.	Date:
E-45	7-Aug-10

Direction Photo Taken:

View north

Description:

Garage foundation. Location of material sample MAT-14.

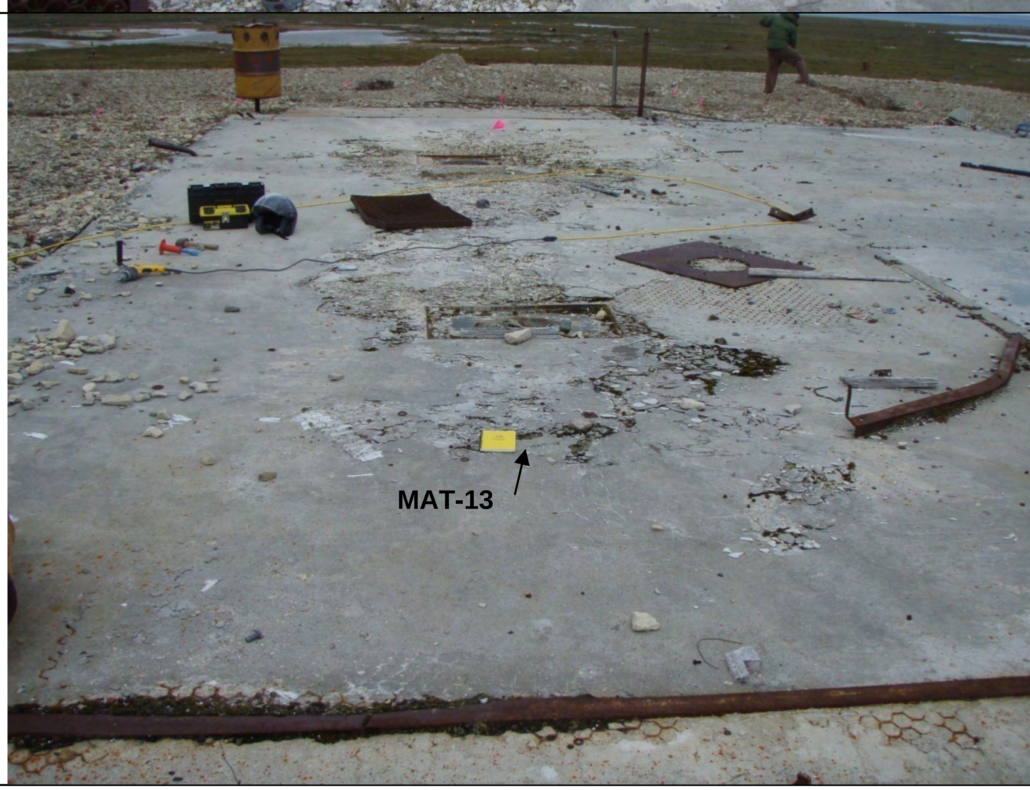
Photo No.	Date:
E-46	7-Aug-10

Direction Photo Taken:

View north

Description:

Garage foundation. Location of material sample MAT-13.



PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No.	Date:
E-47	7-Aug-10

Direction Photo Taken:

View northeast

Description:

Warehouse foundation. Location of material sample MAT-12.

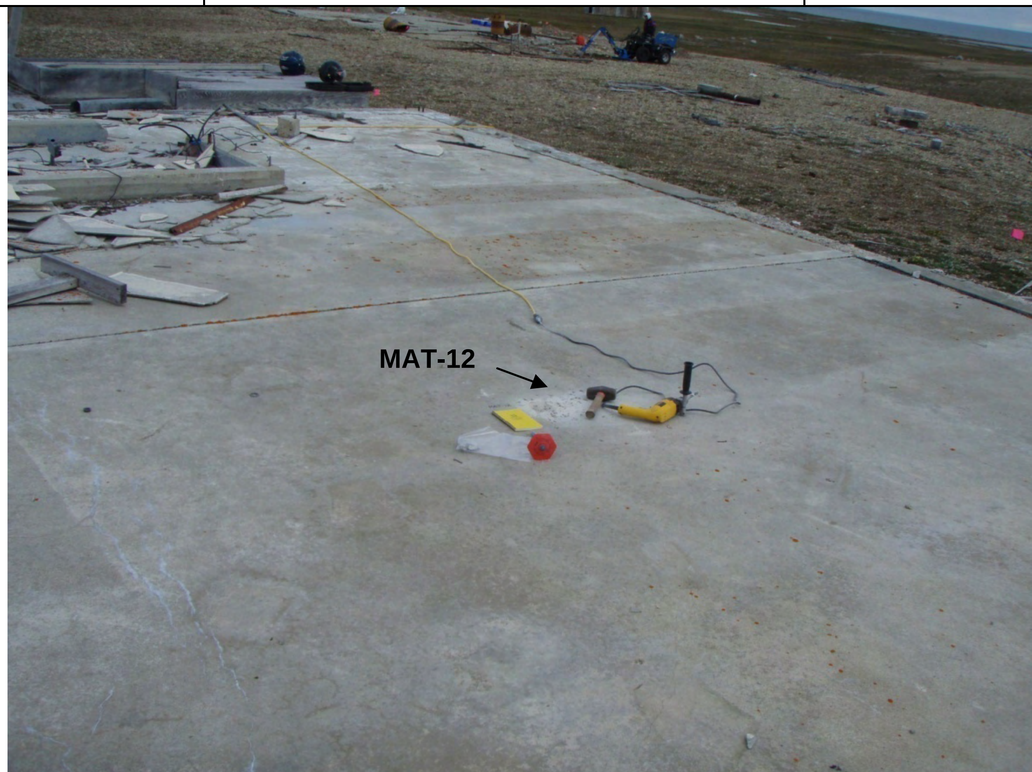


Photo No.	Date:
E-48	7-Aug-10

Direction Photo Taken:

View north

Description:

Warehouse foundation. Location of material sample MAT-11.

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No. E-49	Date: 6-Aug-10

Direction Photo Taken:

View southwest

Description:

Warehouse foundation. Location of material sample MAT-10.

Photo No. E-50	Date: 6-Aug-10

Direction Photo Taken:

View south

Description:

Warehouse foundation. Location of material sample MAT-9.

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No. E-51	Date: 6-Aug-10

Direction Photo Taken:

View west

Description:

Warehouse foundation. Location of material sample MAT-8.

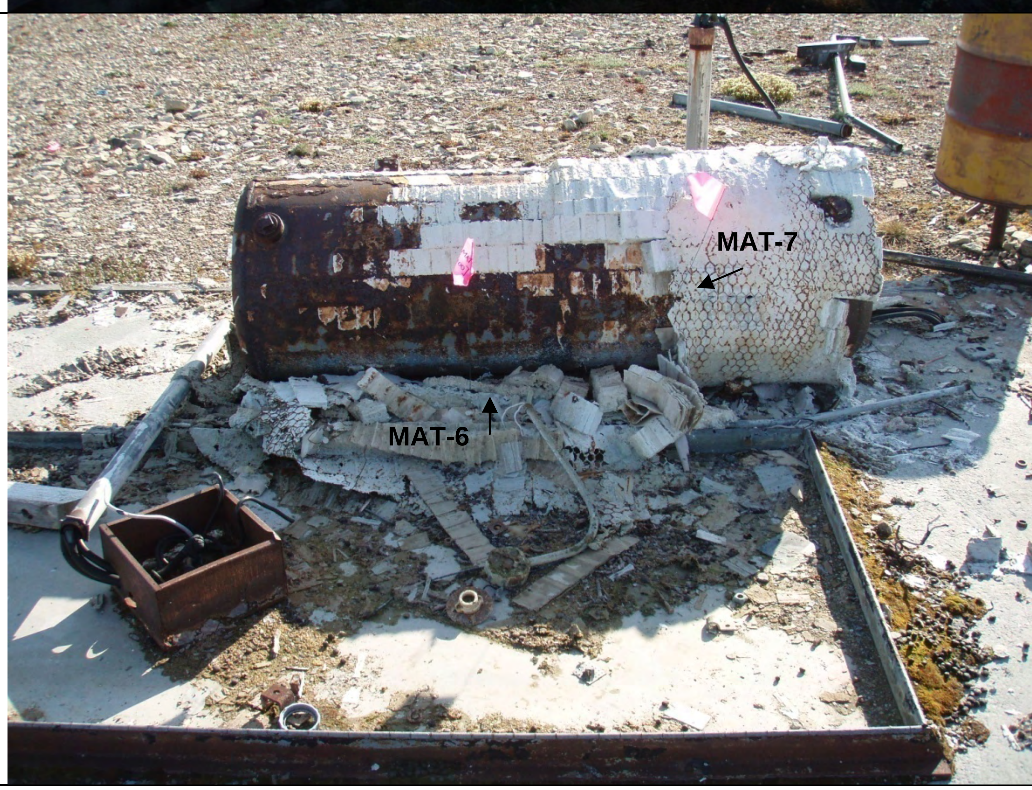
Photo No. E-52	Date: 6-Aug-10

Direction Photo Taken:

View north

Description:

Boiler on garage foundation. Location of material samples MAT-6 and MAT-7.



PHOTOGRAPHIC LOG

AECOM

Site Name:	Site Location:	Project No.
CAM-A, Sturt Point	Station Area	60156118

Photo No.	Date:
E-53	6-Aug-10

Direction Photo Taken:

View south

Description:

Debris adjacent to warehouse foundation. Location of material sample MAT-5.

Photo No.	Date:
E-54	6-Aug-10

Direction Photo Taken:

View southeast

Description:

Debris adjacent to warehouse foundation. Location of material sample MAT-4.

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No.	Date:
E-55	6-Aug-10

Direction Photo Taken:

View southeast

Description:

Debris adjacent to warehouse foundation. Location of material sample MAT-3.

Photo No.	Date:
E-56	6-Aug-10

Direction Photo Taken:

View north

Description:

Fallen antenna. Location of material sample MAT-2.

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No.	Date:
E-57	6-Aug-10

Direction Photo Taken:

View northeast

Description:

Fallen antenna.
Location of material sample MAT-1.

Photo No.	Date:
E-58	9-Aug-10

Direction Photo Taken:

View north

Description:

Debris southeast of module train foundation.

Waypoint W-195

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No. E-59	Date: 9-Aug-10

Direction Photo Taken:

View north

Description:

Debris adjacent to module train foundation.

Waypoint W-197

Photo No. E-60	Date: 9-Aug-10

Direction Photo Taken:

View west

Description:

Hollow entrance section of former module train. The section is open on one side. It appears as though it has been used as a cache or den for possibly a fox.

Waypoint W-197

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No. E-61	Date: 9-Aug-10

Direction Photo Taken:

View north

Description:

Debris adjacent to module train foundation.

Photo No. E-62	Date: 9-Aug-10

Direction Photo Taken:

View west

Description:

Debris adjacent to module train foundation.

Waypoint W-198

PHOTOGRAPHIC LOG

AECOM

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No. E-63 | **Date:** 9-Aug-10

Direction Photo Taken:

View south

Description:

Three wooden pallets.

Waypoint W-253

Photo No. E-64 | **Date:** 9-Aug-10

Direction Photo Taken:

View northwest.

Description:

Wood & scrap iron debris.

Waypoint W-255

PHOTOGRAPHIC LOG

AECOM

Site Name: CAM-A, Sturt Point	Site Location: Station Area to Airstrip Area	Project No. 60156118

Photo No. E-65	Date: 9-Aug-10

Direction Photo Taken:

View south

Description:

Concrete & metal cable debris.

Waypoint W-257

Photo No. E-66	Date: 9-Aug-10

Direction Photo Taken:

View southwest

Description:

Light stand for airstrip, concrete & metal debris.

Waypoint W-234

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No. E-67 | **Date:** 9-Aug-10

Direction Photo Taken:

View north

Description:

Marker barrels from station to airstrip; electrical lines (4 1/2" diameter) from station to airstrip.

Photo No. E-68 | **Date:** 8-Aug-10

Direction Photo Taken:

View north

Description:

Heritage point.

Waypoint W-193

PHOTOGRAPHIC LOG		
Site Name: **CAM-A, Sturt Point**	**Site Location:** Worked area	**Project No.** 60156118

Photo No. **E-69**	**Date:** 8-Aug-10
Direction Photo Taken: View north	
Description: Heritage point. Waypoint W-192	

Photo No. **E-70**	**Date:** 8-Aug-10
Direction Photo Taken: View north	
Description: Heritage point. Waypoint W-192	

PHOTOGRAPHIC LOG

AECOM

Site Name: CAM-A, Sturt Point	Site Location: Worked area	Project No. 60156118

Photo No. E-71	Date: 8-Aug-10

Direction Photo Taken:

View south

Description:

Lobe I with four (4) battery cells.

Waypoint W-189

Photo No. E-72	Date: 6-Aug-10

Direction Photo Taken:

View south

Description:

Lobe I with four (4) battery cells.

Waypoint W-189

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
CAM-A, Sturt Point	Worked area	60156118

Photo No.	Date:
E-73	6-Aug-10

Direction Photo Taken:

View east

Description:

Lobe I with four (4) battery cells.

Waypoint W-189

Photo No.	Date:
E-74	6-Aug-10

Direction Photo Taken:

View east

Description:

Lobe I with four (4) battery cells.

Waypoint W-189

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Worked area	Project No. 60156118

Photo No. E-75	Date: 8-Aug-10

Direction Photo Taken:

View southeast

Description:

Lobe K.
Metal piping debris.

Waypoint W-188

Photo No. E-76	Date:

Direction Photo Taken:

View southeast

Description:

Lobe K.
Metal piping debris.

Waypoint W-187

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Worked area	Project No. 60156118

Photo No.	Date:
E-77	8-Aug-10

Direction Photo Taken:

View east

Description:

Lobe J (Figure 7)

Photo No.	Date:
E-78	8-Aug-10

Direction Photo Taken:

View northeast

Description:

Concrete antenna anchor pad and marker empty barrels.

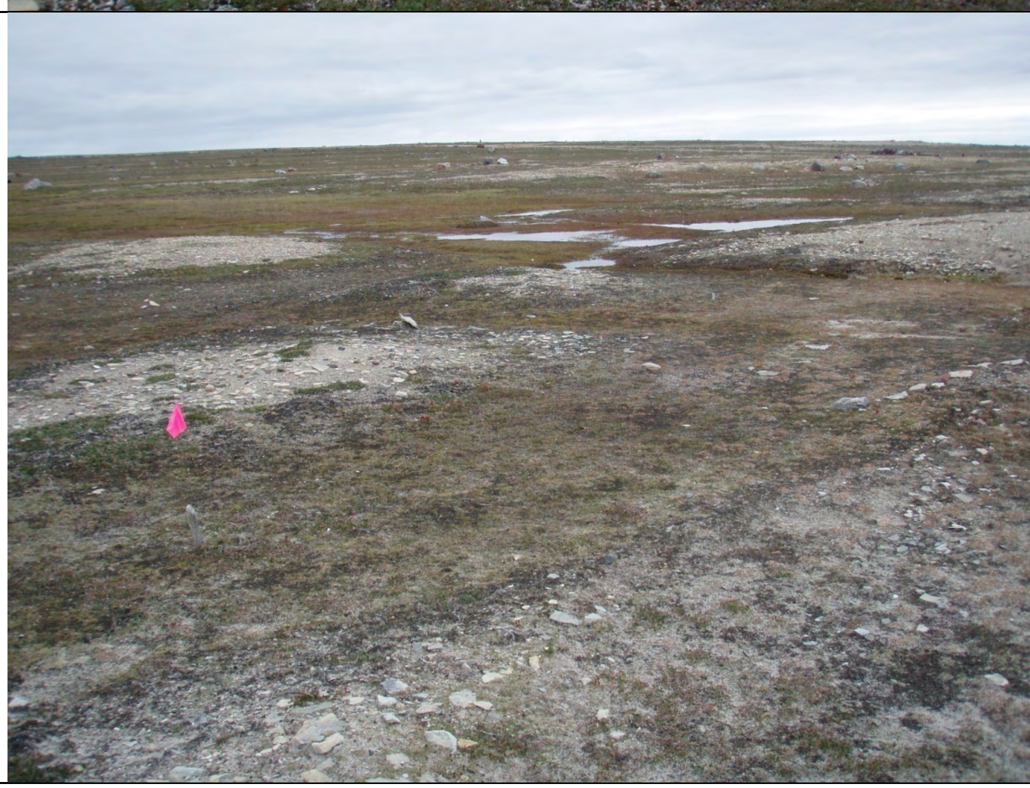
Waypoint W-179

PHOTOGRAPHIC LOG

<table>
<tr><td colspan="2">Site Name:
CAM-A, Sturt Point</td><td>Site Location:
Beach area</td><td>Project No.
60156118</td></tr>
</table>

Photo No. **E-79**	**Date:** 6-Aug-10
Direction Photo Taken: View east	
Description: Metal debris. Waypoint W-328	

Photo No. **E-80**	**Date:** 6-Aug-10
Direction Photo Taken: View north	
Description: Extend of debris on west beach, wooden stakes in ground. Waypoint W-301	



PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Beach area	Project No. 60156118

Photo No. E-81	Date: 6-Aug-10

Direction Photo Taken:

View south

Description:

Barrel & wood debris.

Waypoint W-303

Photo No. E-82	Date: 6-Aug-10

Direction Photo Taken:

View south

Description:

Barrel Area B

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Beach Area (Barrel Area A)	Project No. 60156118

Photo No.	Date:
E-83	6-Aug-10

Direction Photo Taken:

View south

Description:

Barrel Area B

Photo No.	Date:
E-84	6-Aug-10

Direction Photo Taken:

View northeast

Description:

Barrel Area B

Waypoint W-006

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Beach Area (Barrel Area B)	Project No. 60156118

Photo No. E-85	Date: 6-Aug-10

Direction Photo Taken:

View south

Description:

Small burn area south of Barrel Area B.

Waypoint W-007

Photo No. E-86	Date: 6-Aug-10

Direction Photo Taken:

View east

Description:

Northwestern extent of debris at beach area.

Barrel Area B is noted in the background.

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No. E-87	Date: 6-Aug-10

Direction Photo Taken:

View west

Description:

Submerged barrel (debris) adjacent to POL marker line.

Waypoint W-087

Photo No. E-88	Date: 6-Aug-10

Direction Photo Taken:

View southeast

Description:

Metal debris.

Waypoint W-089

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area	Project No. 60156118

Photo No.	Date:
E-89	6-Aug-10

Direction Photo Taken:

View northwest

Description:

Steel pipe debris.

Waypoint W-090

Photo No.	Date:
E-90	6-Aug-10

Direction Photo Taken:

View east

Description:

Steel pipe debris.

Waypoint W-098

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Station Area to Freshwater Lake	Project No. 60156118

Photo No. E-91	Date: 8-Aug-10

Direction Photo Taken:

View northeast

Description:

Wood & concrete board debris.

Waypoint W-158

Photo No. E-92	Date: 8-Aug-10

Direction Photo Taken:

View southeast

Description:

Access road to freshwater lake

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Freshwater Lake	Project No. 60156118

Photo No. E-93	Date: 8-Aug-10

Direction Photo Taken:

Northwest

Description:

Freshwater Lake, near access road

Photo No. E-94	Date: 8-Aug-10

Direction Photo Taken:

Northeast

Description:

Freshwater Lake, near access road

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Landfill B	Project No. 60156118

Photo No. E-95	Date: 7-Aug-10

Direction Photo Taken:

View southeast

Description:

Lobe F, debris

Waypoint W-166

Photo No. E-96	Date: 7-Aug-10

Direction Photo Taken:

View north

Description:

Three lobes are noted (down gradient noted in foreground)

PHOTOGRAPHIC LOG

AECOM

Site Name: CAM-A, Sturt Point	Site Location: Landfill B	Project No. 60156118

Photo No. E-97	Date: 7-Aug-10

Direction Photo Taken:

View northeast

Description:

Debris down gradient of Lobe G.

Photo No. E-98	Date: 7-Aug-10

Direction Photo Taken:

View south

Description:

Lobe H

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Landfill B	Project No. 60156118

Photo No. E-99	Date: 7-Aug-10

Direction Photo Taken:

View south

Description:

Lobe H

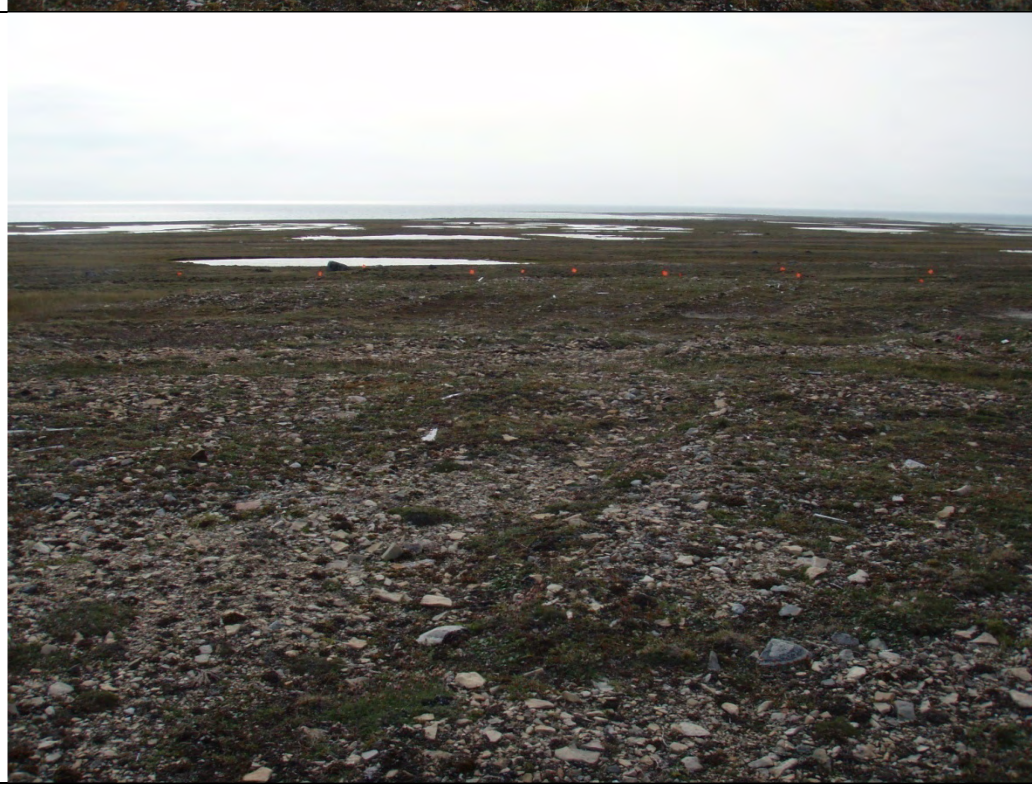
Photo No. E-100	Date: 7-Aug-10

Direction Photo Taken:

View west

Description:

Lobe H



PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Barrel Area A	Project No. 60156118

Photo No.	Date:
E-101	6-Aug-10

Direction Photo Taken:

View east

Description:

Barrel Area A

Photo No.	Date:
E-102	8-Aug-10

Direction Photo Taken:

View southwest

Description:

Barrel Area A

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Barrel Area A	Project No. 60156118

Photo No.	Date:
E-103	8-Aug-10

Direction Photo Taken:

View north

Description:

Barrel Area A

Photo No.	Date:
E-104	8-Aug-10

Direction Photo Taken:

View south

Description:

Barrel Area A

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Barrel Area A	Project No. 60156118

Photo No. E-105 | **Date:** 8-Aug-10

Direction Photo Taken:

View southeast

Description:

Barrel Area A (vehicle debris)

Photo No. E-106 | **Date:**

Direction Photo Taken:

View north

Description:

Barrel Area A

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Landfill A	Project No. 60156118

Photo No.	Date:
E-107	8-Aug-10

Direction Photo Taken:

View east

Description:

Landfill A

Photo No.	Date:
E-108	8-Aug-10

Direction Photo Taken:

View north east

Description:

Landfill A

Waypoint W-108

PHOTOGRAPHIC LOG

AECOM

Site Name: CAM-A, Sturt Point	Site Location: Landfill A and Beach POL	Project No. 60156118

Photo No. E-109 | **Date:**

Direction Photo Taken:

View northwest

Description:

Landfill A

Photo No. E-110 | **Date:** 9-Aug-10

Direction Photo Taken:

View west

Description:

Beach POL

PHOTOGRAPHIC LOG

Site Name: **CAM-A, Sturt Point**	Site Location: Beach POL and Inuit House Area	Project No. 60156118

Photo No. E-111	Date: 9-Aug-10	
Direction Photo Taken: View southwest		
Description: Beach POL		

Photo No. E-112	Date: 7-Aug-10	
Direction Photo Taken: View east		
Description: Two houses along beach (northeast of the CAM-A site)		

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Inuit Houses	Project No. 60156118

Photo No. E-113	Date: 7-Aug-10

Direction Photo Taken:

View east

Description:

House 1 (northern house)

Photo No. E-114	Date: 7-Aug-10

Direction Photo Taken:

View north east

Description:

Debris/barrels adjacent to House 1.

PHOTOGRAPHIC LOG

AECOM

Site Name: CAM-A, Sturt Point	Site Location: Inuit Houses	Project No. 60156118

Photo No. E-115	Date: 7-Aug-10
Direction Photo Taken: View north	
Description: House 1	

Photo No. E-116	Date: 7-Aug-10
Direction Photo Taken: View east	
Description: House 2	

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Inuit Houses	Project No. 60156118

Photo No.	Date:
E-117	7-Aug-10

Direction Photo Taken:

View north

Description:

House 2

Photo No.	Date:
E-118	7-Aug-10

Direction Photo Taken:

View west

Description:

House 2

PHOTOGRAPHIC LOG

Site Name: CAM-A, Sturt Point	Site Location: Inuit Houses	Project No. 60156118

Photo No.	Date:
E-119	7-Aug-10

Direction Photo Taken:

View north

Description:

Debris area adjacent to Inuit houses.

PHOTOGRAPHIC LOG

AECOM

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-1	Date: 4-Aug-10
Direction Photo Taken:	
Description: Borrow Area 1 (BA-1)	

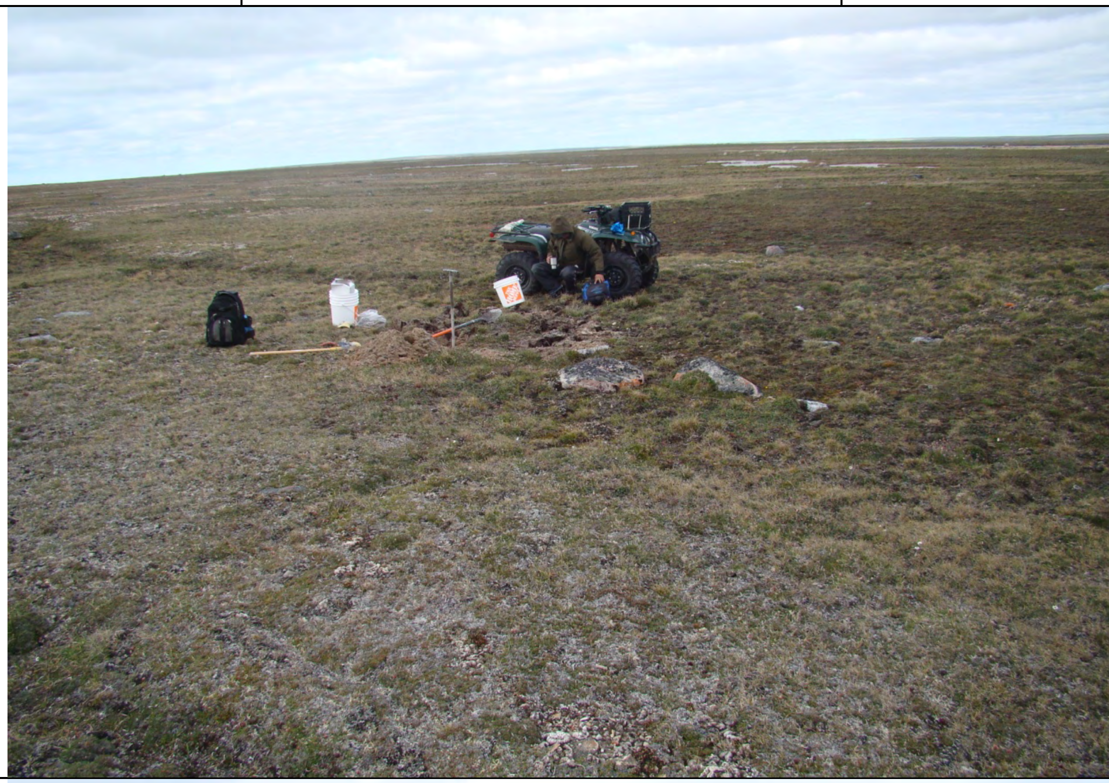
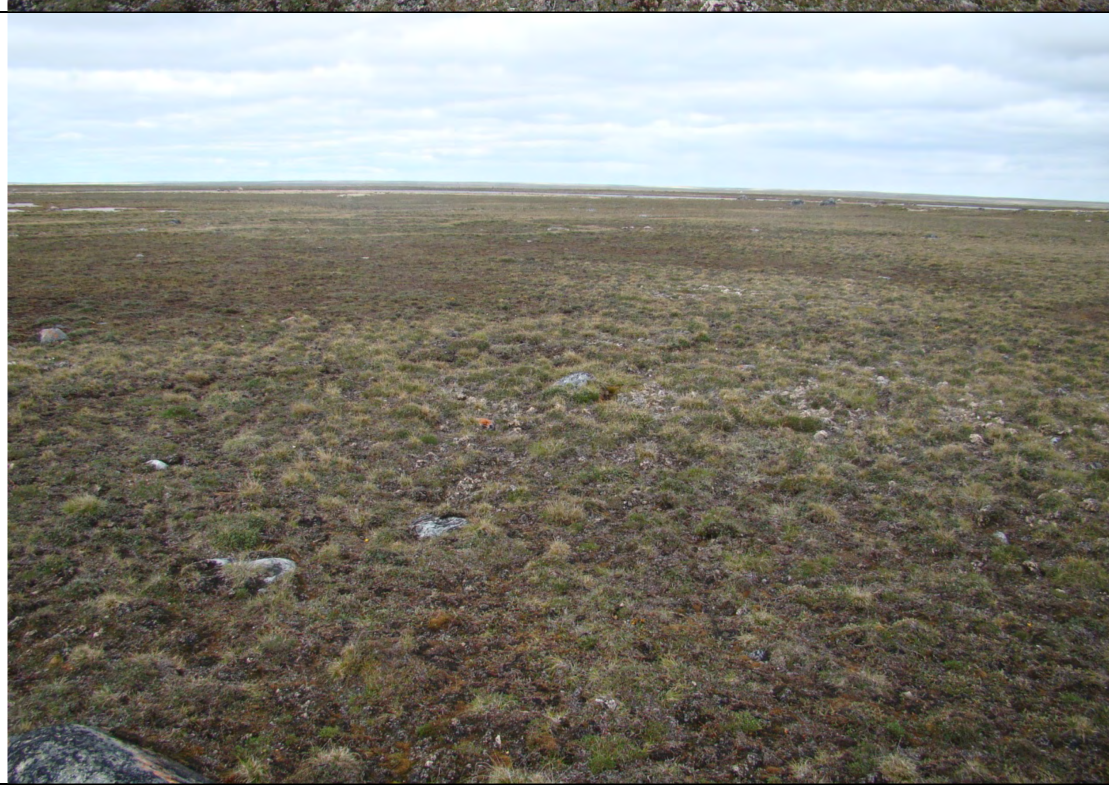


Photo No. G-2	Date: 4-Aug-10
Direction Photo Taken:	
Description: Borrow Area 1(BA-1)	



PHOTOGRAPHIC LOG

AECOM

Site Name: CAM A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-3	Date: 4-Aug-10

Direction Photo Taken:

Description:
Borrow Area 1 (BA-1)
TP10-05

Photo No. G-4	Date: 4-Aug-10

Direction Photo Taken:

Description:
Borrow Area 1 (BA-1)
TP10-05

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-5	Date: 4-Aug-10
Direction Photo Taken:	
Description: Borrow Area 1 (BA-1) TP10-06	

Photo No. G-6	Date: 4-Aug-10
Direction Photo Taken:	
Description: Borrow Area 1 (BA-1) TP10-06	

PHOTOGRAPHIC LOG

AECOM

Site Name: CAM - A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-7	Date: 4-Aug-10
Direction Photo Taken:	
Description: Borrow Area 1 (BA-1) TP10-06	

Photo No. G-8	Date: 4-Aug-10
Direction Photo Taken:	
Description: Borrow Area 1 (BA-1) TP10-06	

PHOTOGRAPHIC LOG

Site Name: CAM - A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-9	Date: 4-Aug-10

Direction Photo Taken:

Description:
Borrow Area 2 (BA-2)

Photo No. G-10	Date: 4-Aug-10

Direction Photo Taken:

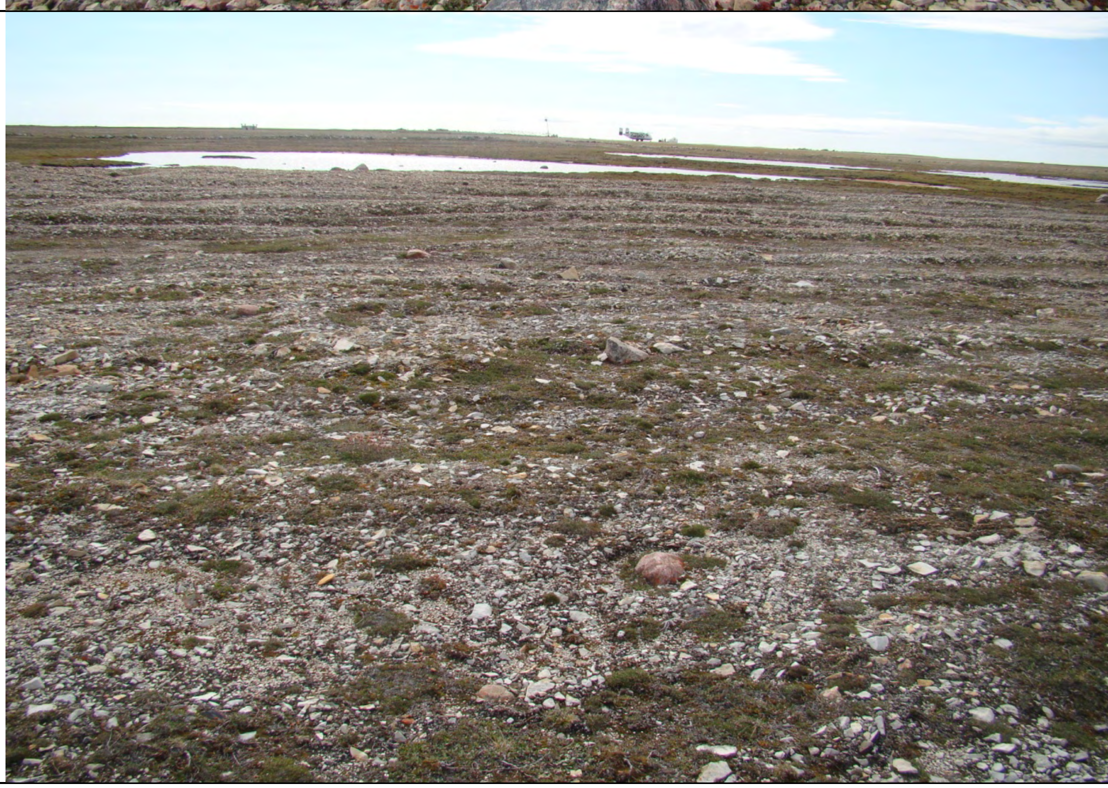
Description:
Borrow Area 2 (BA-2)

PHOTOGRAPHIC LOG

Site Name: CAM - A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-11	Date: 5-Aug-10
Direction Photo Taken:	
Description: Borrow Area 3 (BA-3)	

Photo No. G-12	Date: 4-Aug-10
Direction Photo Taken:	
Description: Borrow Area 3 (BA-3)	



PHOTOGRAPHIC LOG

Site Name: CAM - A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-13	Date: 5-Aug-10
Direction Photo Taken:	
Description: Borrow Area 3 (BA-3) TP10-18	

Photo No. G-14	Date: 6-Aug-10
Direction Photo Taken:	
Description: Borrow Area 3 (BA-3) TP10-31	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point	Project No. 60156118

Photo No. G-15	Date: 6-Aug-10
Direction Photo Taken:	
Description: Borrow Area 4A (BA-4A)	

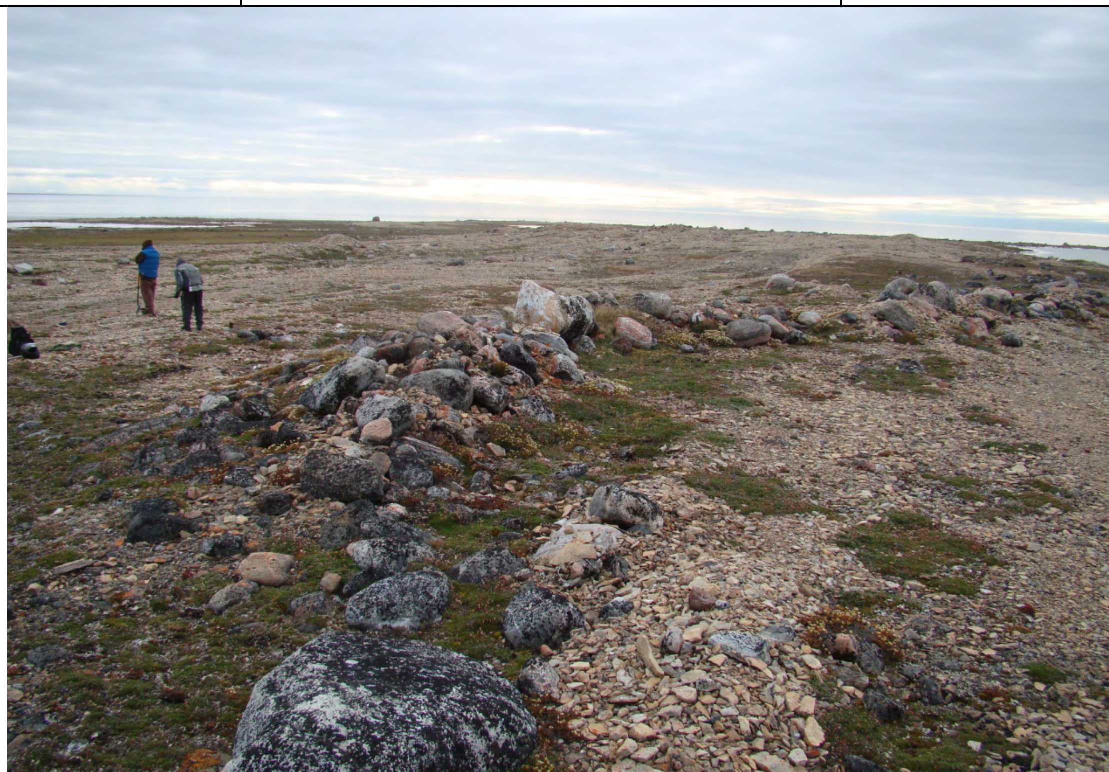


Photo No. G-16	Date: 6-Aug-10
Direction Photo Taken:	
Description: Borrow Area 4B (BA-4B) TP10-24	

PHOTOGRAPHIC LOG

Site Name: CAM - A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-17	Date: 6-Aug-10
Direction Photo Taken:	
Description: Borrow Area 4B (BA-4B) TP10-26	

Photo No. G-18	Date: 6-Aug-10
Direction Photo Taken:	
Description: Borrow Area 5 (BA-5) TP10-33	

PHOTOGRAPHIC LOG

Site Name: CAM - A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No.	Date:
G-19	6-Aug-10

Direction Photo Taken:

Description:
Borrow Area 5A (BA-5A)

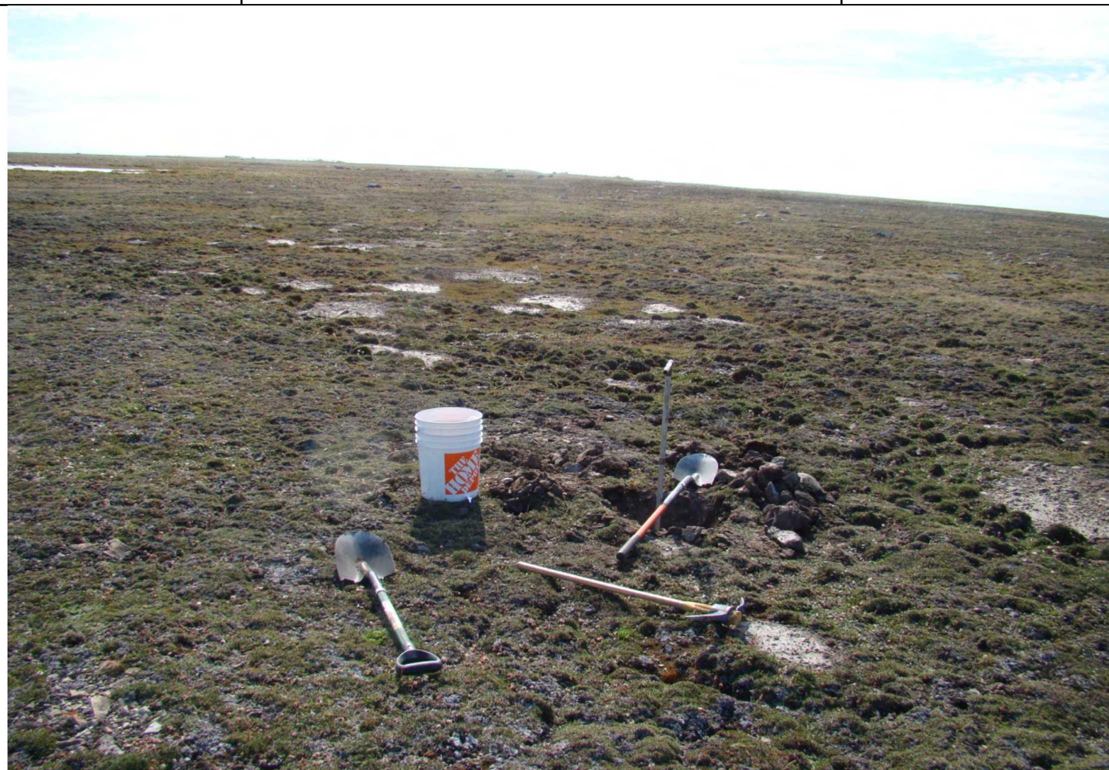


Photo No.	Date:
G-20	6-Aug-10

Direction Photo Taken:

Description:
Borrow Area 5A (BA-5A)
TP10- 28

PHOTOGRAPHIC LOG

Site Name: CAM - A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No.	Date:
G-21	6-Aug-10

Direction Photo Taken:

Description:
Borrow Area 5A (BA-5A)
TP10-30

Photo No.	Date:
G-22	6-Aug-10

Direction Photo Taken:

Description:
Borrow Area 6 (BA-6)

PHOTOGRAPHIC LOG

Site Name: CAM - A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No.	Date:
G-23	6-Aug-10

Direction Photo Taken:

Description:
Borrow Area 6 (BA-6)

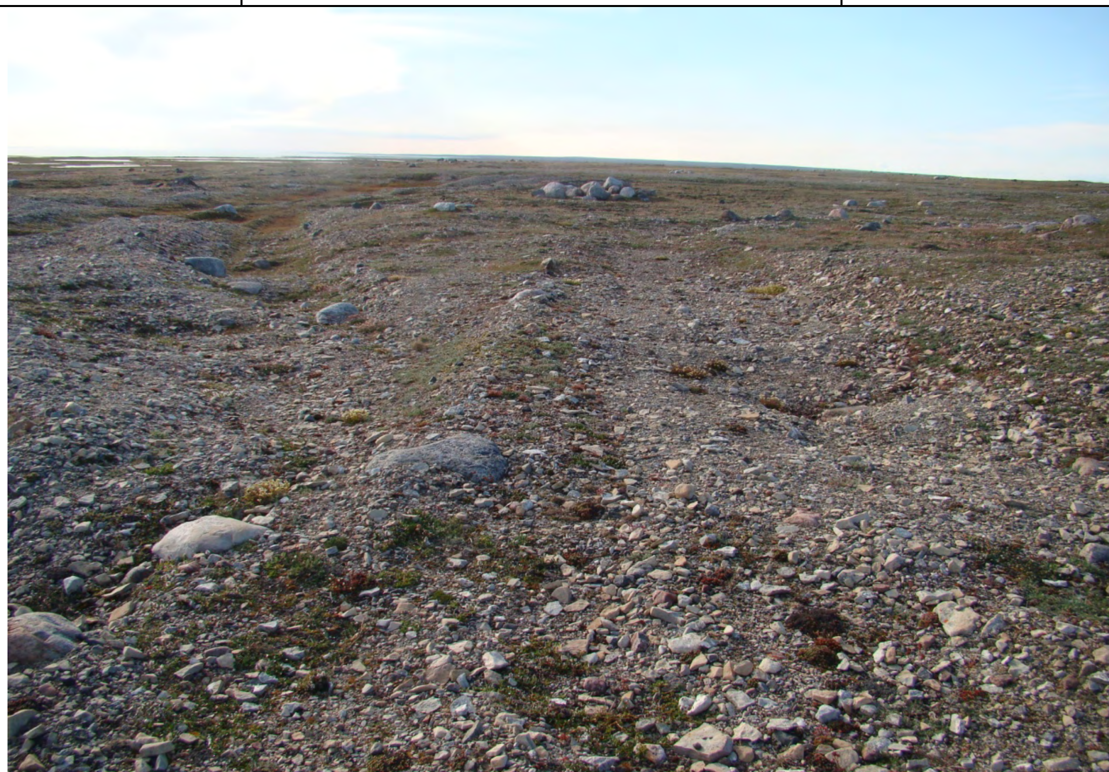


Photo No.	Date:
G-24	6-Aug-10

Direction Photo Taken:

Description:
Borrow Area 6 (BA-6)
TP10-35

PHOTOGRAPHIC LOG

Site Name: CAM - A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-25	Date: 7-Aug-10
Direction Photo Taken:	
Description: Borrow Area 6 (BA-6) TP10-36	

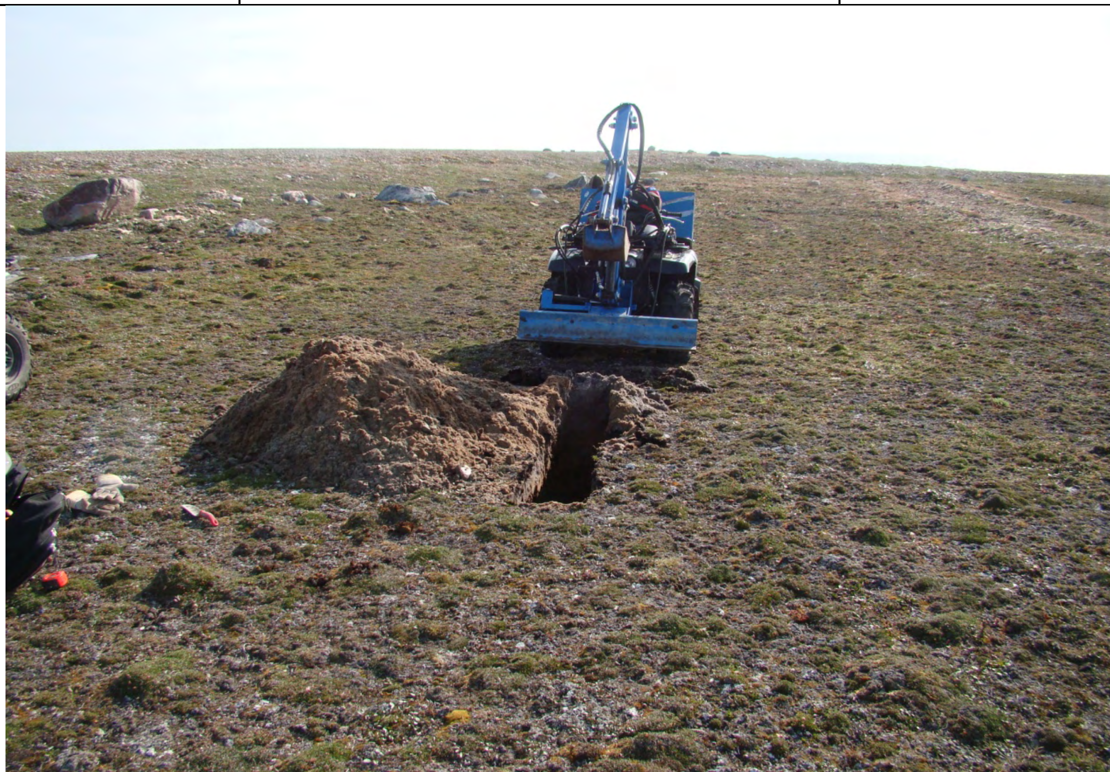


Photo No. G-26	Date: 6-Aug-10
Direction Photo Taken:	
Description: Borrow Area 6 (BA-6) TP10-36	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No.	Date:
G-27	7-Aug-10

Direction Photo Taken:

Description:
Borrow Area 6A (BA-6A)

Photo No.	Date:
G-28	7-Aug-10

Direction Photo Taken:

Description:
Borrow Area 6A (BA-6A)

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-29	Date: 7-Aug-10
Direction Photo Taken:	
Description: Borrow Area 6A (BA-6A) TP10-40	

Photo No. G-30	Date: 7-Aug-10
Direction Photo Taken:	
Description: Borrow Area 6A (BA-6A) TP10-40	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-31	Date: 7-Aug-10
Direction Photo Taken:	
Description: Borrow Area 7 (BA-7) TP10-41	

Photo No. G-32	Date: 7-Aug-10
Direction Photo Taken:	
Description: Borrow Area 7 (BA-7) TP10-41	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-33	Date: 8-Aug-10

Direction Photo Taken:

Description:
Borrow Area 8 (BA-8)

Photo No. G-34	Date: 8-Aug-10

Direction Photo Taken:

Description:
Borrow Area 8 (BA-8)

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-35	Date: 8-Aug-10
Direction Photo Taken:	
Description: Borrow Area 9 (BA-9) TP10-54	

Photo No. G-36	Date: 8-Aug-10
Direction Photo Taken:	
Description: Borrow Area 9 (BA-9) TP10-54	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-37	Date: 8-Aug-10

Direction Photo Taken:

Description:
Borrow Area 9 (BA-9)
TP10-55
Boulder at the bottom of testpit

Photo No. G-38	Date: 8-Aug-10

Direction Photo Taken:

Description:
Borrow Area 9 (BA-9)
TP10-57

PHOTOGRAPHIC LOG

AECOM

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-39	Date: 8-Aug-10
Direction Photo Taken:	
Description: Borrow Area 10 (BA-10)	

Photo No. G-40	Date: 8-Aug-10
Direction Photo Taken:	
Description: Borrow Area 10 (BA-10) TP10-58	

PHOTOGRAPHIC LOG

AECOM

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-41 | **Date:** 8-Aug-10

Direction Photo Taken:

Description:
Borrow Area 10 (BA-10)

Photo No. G-42 | **Date:** 8-Aug-10

Direction Photo Taken:

Description:
Borrow Area 10 (BA-10)
TP10-59

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-43	Date: 9-Aug-10

Direction Photo Taken:

Description:
Borrow Area 11 (BA-11)

Photo No. G-44	Date: 9-Aug-10

Direction Photo Taken:

Description:
Borrow Area 11 (BA-11)
TP10-60

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-44	Date: 4-Aug-10
Direction Photo Taken:	
Description: Landfill 1 (LF-1, BA-13)	

Photo No. G-45	Date: 4-Aug-10
Direction Photo Taken:	
Description: Landfill 1 (LF-1, BA-13) TP10-01	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-46	Date: 4-Aug-10
Direction Photo Taken:	
Description: Landfill 1 (LF-1, BA-13) TP10-02	

Photo No. G-47	Date: 6-Aug-10
Direction Photo Taken:	
Description: Landfill 1 (LF-1, BA-13) TP10-13	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-48	Date: 6-Aug-10
Direction Photo Taken:	
Description: Landfill 1 (LF-1, BA-13) TP10-29	

Photo No. G-49	Date: 7-Aug-10
Direction Photo Taken:	
Description: Landfill 2 (LF-2, BA-14)	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-50	Date: 7-Aug-10

Direction Photo Taken:

Description:
Landfill 2 (LF-2, BA-14)
TP10-43

Photo No. G-51	Date: 7-Aug-10

Direction Photo Taken:

Description:
Landfill 2 (LF-2, BA-14)
TP10-43 – excavated soil

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No.	Date:
G-52	7-Aug-10

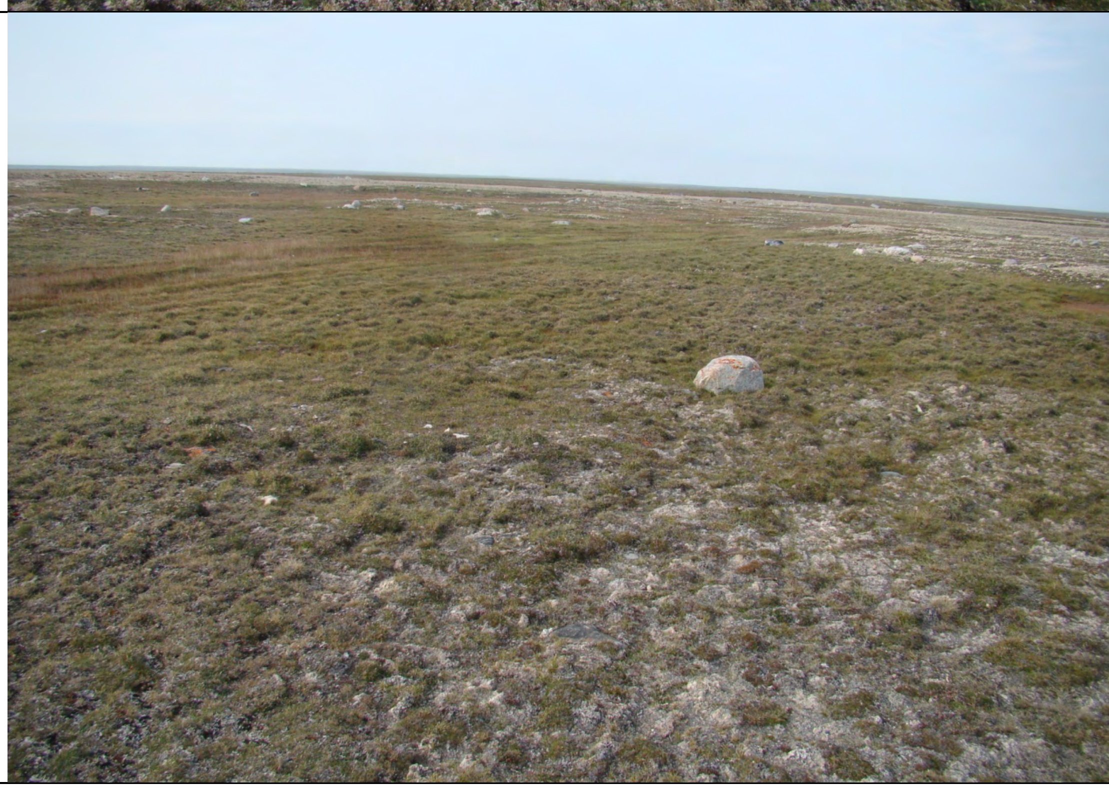
Direction Photo Taken:

Description:
Landfill 3 (LF-3)

Photo No.	Date:
G-53	7-Aug-10

Direction Photo Taken:

Description:
Landfill 3 (LF-3)



PHOTOGRAPHIC LOG

AECOM

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-54	Date: 7-Aug-10
Direction Photo Taken:	
Description: Landfill 3 (LF-3) TP10-47	

Photo No. G-55	Date: 7-Aug-10
Direction Photo Taken:	
Description: Landfill 3 (LF-3) TP10-48	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-56	Date: 7-Aug-10
Direction Photo Taken:	
Description: Landfill 4 (LF-4, BA-15)	

Photo No. G-57	Date: 7-Aug-10
Direction Photo Taken:	
Description: Landfill 4 (LF-4, BA-15) TP10- 49	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-58	Date: 7-Aug-10
Direction Photo Taken:	
Description: Landfill 4 (LF-4, BA-15) TP10-50	

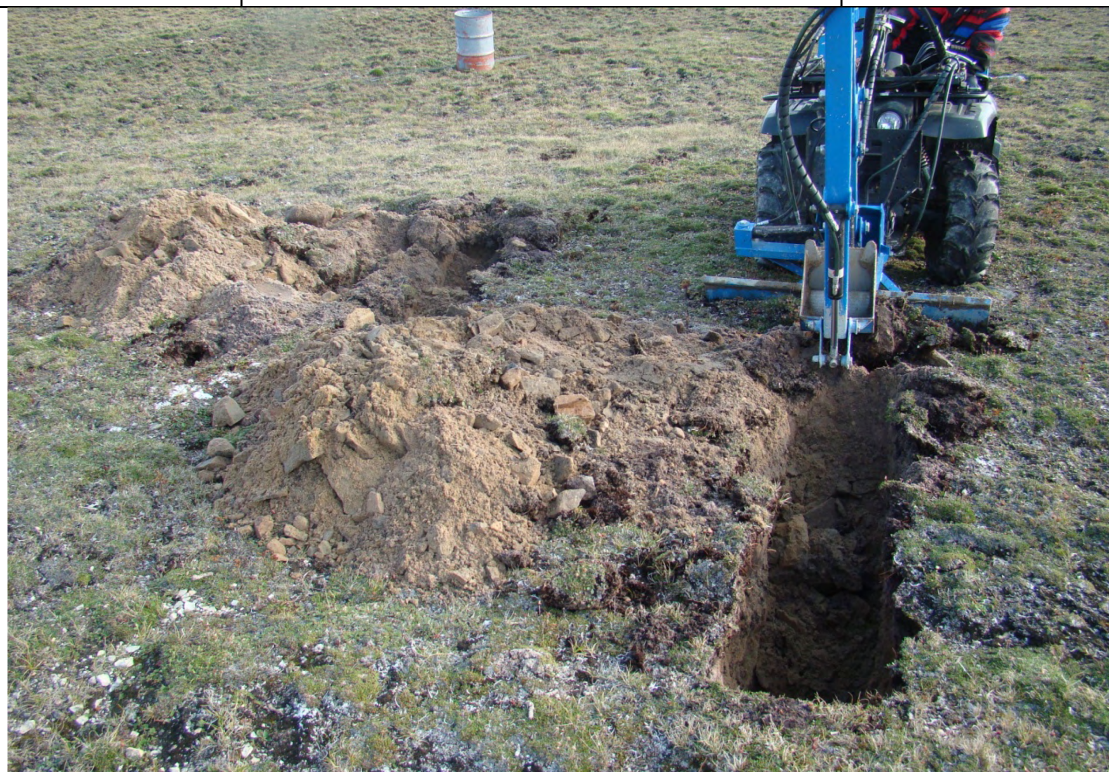


Photo No. G-59	Date: 8-Aug-10
Direction Photo Taken:	
Description: Landfill 4 (LF-4, BA-15) TP10-51	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-60	Date: 4-Aug-10
Direction Photo Taken:	
Description: Landfill 5 (LF-5)	

Photo No. G-60	Date: 4-Aug-10
Direction Photo Taken:	
Description: Landfill 5 (LF-5)	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-61	Date: 4-Aug-10
Direction Photo Taken:	
Description: Landfill 5 (LF-5)	

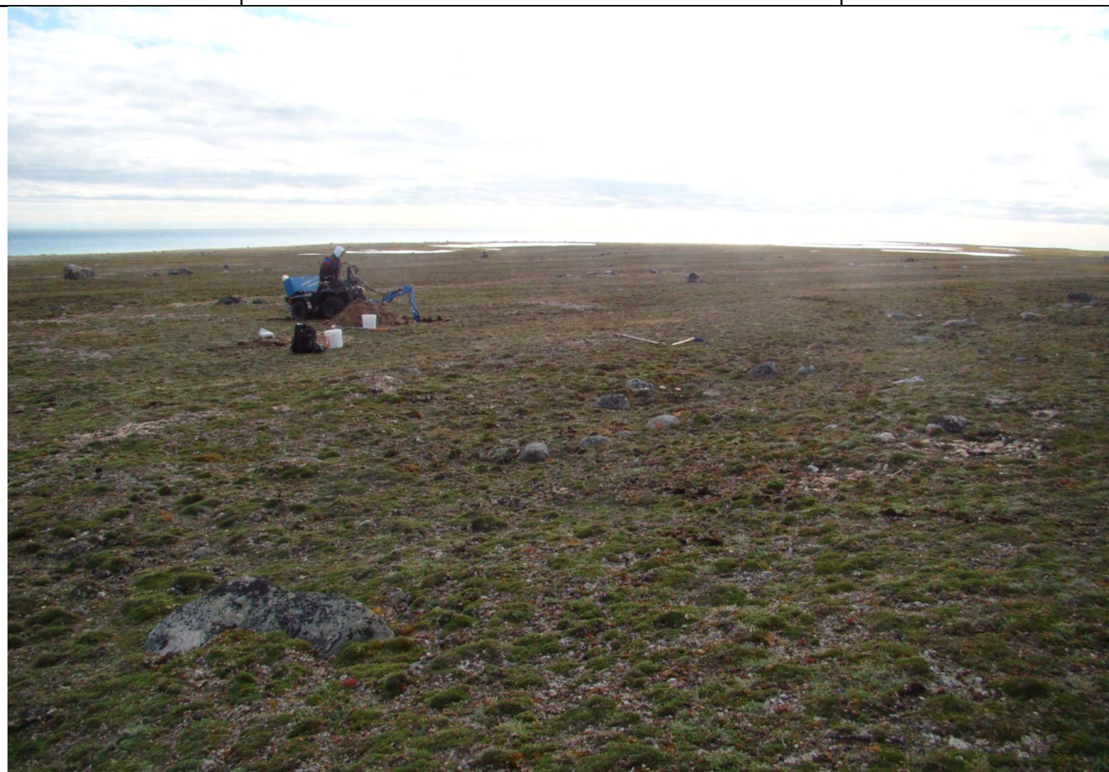


Photo No. G-62	Date: 4-Aug-10
Direction Photo Taken:	
Description: Landfill 5 (LF-5) TP10-09	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-63	Date: 4-Aug-10
Direction Photo Taken:	
Description: Landfill 5 (LF-5) TP10-12	

Photo No. G-64	Date: 4-Aug-10
Direction Photo Taken:	
Description: Landfill 5 (LF-5) TP10-12	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-65	Date: 4-Aug-10
Direction Photo Taken:	
Description: Landfill 5 (LF-5) TP10-11	

Photo No. G-66	Date: 5-Aug-10
Direction Photo Taken:	
Description: Landfill 5 (LF-5) TP10-22	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-67 **Date:** 5-Aug-10

Direction Photo Taken:

Description:
Landfill 6 (LF-6)

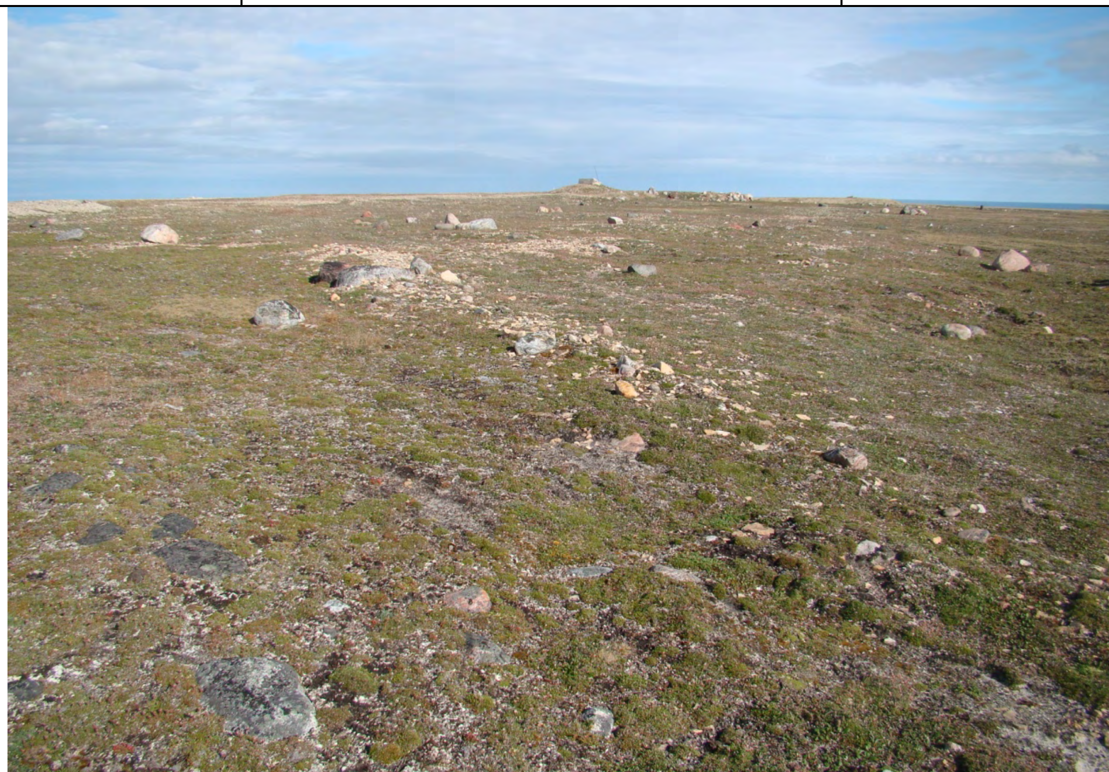


Photo No. G-68 **Date:** 5-Aug-10

Direction Photo Taken:

Description:
Landfill 6 (LF-6)

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-69	Date: 5-Aug-10
Direction Photo Taken:	
Description: Landfill 6 (LF-6) TP10-19	

Photo No. G-70	Date: 4-Aug-10
Direction Photo Taken:	
Description: Landfill 6 (LF-6) TP10-19	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-71	Date: 5-Aug-10
Direction Photo Taken:	
Description: Landfill 6 (LF-6) TP10-20	

Photo No. G-72	Date: 5-Aug-10
Direction Photo Taken:	
Description: Landfill 6 (LF-6) TP10-20	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-73	Date: 9-Aug-10

Direction Photo Taken:
Looking E from W end

Description:
Airstrip

Photo No. G-74	Date: 9-Aug-10

Direction Photo Taken:
Looking W

Description:
Airstrip – W End

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-75 | **Date:** 9-Aug-10

Direction Photo Taken:
Looking E from middle of the airstrip

Description:
Airstrip

Photo No. G-76 | **Date:** 9-Aug-10

Direction Photo Taken:
Looking W from E end

Description:
Airstrip Surface

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-77	Date: 8-Aug-10

Direction Photo Taken:

Description:
Road Section 1 - Starts from Airstrip

Photo No. G-78	Date: 8-Aug-10

Direction Photo Taken:
N side of airstrip

Description:
Road Section 1 - barrel culvert under airstrip at start of Section 1
See Figure 2 for culvert location
Culvert Entrance

PHOTOGRAPHIC LOG			AECOM
Site Name: CAM-A	**Site Location: Sturt Point, Nunavut**	**Project No.** 60156118	

Photo No. **G-79**	**Date:** 8-Aug-10	
Direction Photo Taken:		
Description: Road Section 1 settlement		
Photo No. **G-80**	**Date:** 8-Aug-10	
Direction Photo Taken: Looking towards airstrip		
Description: Road Section 1 - ends		

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-81	Date: 8-Aug-10

Direction Photo Taken:
Looking towards Drinking Water Lake

Description:
Road Section 1 - ends

Photo No. G-82	Date: 8-Aug-10

Direction Photo Taken:

Description:
Road Section 2 – starts from airstrip

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-83	Date: 8-Aug-10

Direction Photo Taken:
S side of airstrip

Description:
Road Section 3 – culvert under W end of airstrip at start of Road Section 3
See Figure 2 for culvert location
Culvert Egress

Photo No. G-84	Date: 8-Aug-10

Direction Photo Taken:
Looking towards airstrip

Description:
Road Section 2 - starts

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-85	Date: 8-Aug-10

Direction Photo Taken:
Looking S

Description:
Road Section 2 – barrel culvert under road midway from beginning of road
See Figure 2 for culvert location

Photo No. G-86	Date: 8-Aug-10

Direction Photo Taken:

Description:
Road Section 2 – culvert entrance
See Figure 2 for culvert location

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-87	Date: 8-Aug-10

Direction Photo Taken:

Description:
Road Section 2 – culvert egress
See Figure 2 for culvert location

Photo No. G-88	Date: 8-Aug-10

Direction Photo Taken:

Description:
Road Section 2 – ends at its intersection with Road Section 3

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-89	Date: 8-Aug-10
Direction Photo Taken: Looking S	
Description: Road Section 3 – starts from airstrip	

Photo No. G-90	Date: 8-Aug-10
Direction Photo Taken: Looking towards airstrip	
Description: Road Section 3 - start	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-91	Date: 8-Aug-10	
Direction Photo Taken: Looking N towards intersection of S-2 and S-3		
Description: Road Section 3 – culvert See Figure 2 for culvert location		

Photo No. G-92	Date: 8-Aug-10	
Direction Photo Taken: Looking W		
Description: Road Section 3 – culvert entrance See Figure 2 for culvert location		

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-93	Date: 8-Aug-10

Direction Photo Taken:
Looking E

Description:
Road Section 3 – culvert egress
See Figure 2 for culvert location

Photo No. G-94	Date: 8-Aug-10

Direction Photo Taken:
Looking N from Station Area

Description:
Road Section 3 – ends

Site Name: CAM-A	Site Location: Sturt Point, Nunavut

Site Name: CAM-A	**Site Location: Sturt Point, Nunavut**	**Project No.** 60156118

Photo No. **G-95**	**Date:** 8-Aug-10
Direction Photo Taken: Looking S towards Station Area	
Description: Road Section 3 - ends	

Photo No. **G-96**	**Date:** 8-Aug-10
Direction Photo Taken: Looking towards airstrip from culvert	
Description: Road Section 4 See Figure 2 for culvert location	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-97	Date: 8-Aug-10

Direction Photo Taken:
Looking S from culvert location

Description:
Road Section 4
See Figure 2 for culvert location

Photo No. G-98	Date: 8-Aug-10

Direction Photo Taken:
Road Surface

Description:
Road Section 4
See Figure 2 for culvert location
Culvert damaged in the middle of road, no soil cover

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-99	Date: 8-Aug-10

Direction Photo Taken:
Looking W from culvert location

Description:
Road Section 4
See Figure 2 for culvert location
Culvert entrance damaged

Photo No. G-100	Date: 8-Aug-10

Direction Photo Taken:
Culvert egress

Description:
Road Section 4
See Figure 2 for culvert location

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-101	Date: 8-Aug-10

Direction Photo Taken:
Looking towards station area

Description:
Road Section 4 - ends

Photo No. G-102	Date: 8-Aug-10

Direction Photo Taken:
Looking E from station area

Description:
Road Section 4 - ends

PHOTOGRAPHIC LOG		
Site Name: CAM-A	**Site Location: Sturt Point, Nunavut**	**Project No.** 60156118

Photo No. **G-103**	**Date:** 8-Aug-10
Direction Photo Taken: Looking S from station area	
Description: Road Section 5 - starts	

Photo No. **G-104**	**Date:** 8-Aug-10
Direction Photo Taken: Looking towards station area	
Description: Road Section 5 - starts	

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-105	Date: 8-Aug-10

Direction Photo Taken:
Looking S

Description:
Road Section 5 – intersection with Road Section 7

Photo No. G-106	Date: 8-Aug-10

Direction Photo Taken:
Looking N towards station area

Description:
Road Section 5 – intersection with Road Section 7

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-107	Date: 8-Aug-10

Direction Photo Taken:
Looking S from intersection

Description:
Road Section 5 – intersection with Road Section 6

Photo No. G-108	Date: 8-Aug-10

Direction Photo Taken:
Looking S towards Beach POL

Description:
Road Section 6 – at intersection with Road Section 5

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-109	Date: 8-Aug-10

Direction Photo Taken:
Looking W from intersection with Road Section 6

Description:
Road Section 5 – intersection with Road Section 6

Photo No. G-110	Date: 8-Aug-10

Direction Photo Taken:
Looking S

Description:
Road Section 5 – ends near Beach POL

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-111	Date: 8-Aug-10

Direction Photo Taken:
Looking S

Description:
Section 6 - starts

Photo No. G-112	Date: 8-Aug-10

Direction Photo Taken:
Looking S

Description:
Road Section 6 – ends near Barrel Pile B

PHOTOGRAPHIC LOG		
Site Name: CAM-A	**Site Location: Sturt Point, Nunavut**	**Project No.** 60156118

Photo No. G-113	**Date:** 8-Aug-10	
Direction Photo Taken: Looking approximately S		
Description: Section 7 - starts		

Photo No. G-114	**Date:** 8-Aug-10	
Direction Photo Taken: Looking S		
Description: Road Section 7 – ends near Landfill A		

PHOTOGRAPHIC LOG

Site Name: CAM-A	Site Location: Sturt Point, Nunavut	Project No. 60156118

Photo No. G-115	Date: 8-Aug-10
Direction Photo Taken: Looking approximately N from airstrip	
Description: Section 8 - starts	

Photo No. G-116	Date: 8-Aug-10
Direction Photo Taken: Looking S towards airstrip	
Description: Road Section 8 – ends	

Appendix D

Laboratory Reports

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FAX (403)735-2771
http://www.agatlabs.com

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EDMONTON, AB T6S1G9

ATTENTION TO: Dara Schmidt

PROJECT NO: CAM- A

AGAT WORK ORDER: 10E426723

OCCUPATIONAL HYGIENE REVIEWED BY: Elizabeth Polakowska, MSc (Animal Sci), PhD (Agri Sci), Inorganic Lab Supervisor

SOIL ANALYSIS REVIEWED BY: Loan Nguyen, Analyst

TRACE ORGANICS REVIEWED BY: Ron Brockbank, Trace Organics Supervisor

WATER ANALYSIS REVIEWED BY: Krystyna Krauze, Analyst

DATE REPORTED: Oct 27, 2010

PAGES (INCLUDING COVER): 48

VERSION*: 4

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005, or at 1-866-764-7554

*NOTES

VERSION 4:Aug 19 - BTEX/F1-F4 added to samples 840 to 853, 985 to 986
- PCB added to samples 984, MAT01 to MAT02, MAT07 to MAT09, MAT11 to MAT26, MAT314, 51 to 452
- Metals added to samples 984, 451 to 452
- Asbestos added to samples MAT03 to MAT07, MAT10, MAT27 to MAT30
- Leachable Lead added to samples MAT08 to MAT09, MAT17 to MAT24, MAT31
- Creosote added to MAT31

Aug 27 – PCB added to samples 1308, 1312, 1313, 1315, 1317, and 1320
- Metals added to samples 1352, 1356, 1358, 1360, and 1362
- Lead added to samples MAT08, MAT09, MAT17, MAT18

Sept 1 – Lead added to samples MAT19, MAT20, MAT24

Sept 16 – PCB added to samples 1309, 1314, 1316, 1318, 1321, and 1322

Sept 17 – PCB added to samples 450, 463, 464 to 466, 912, 913, 918, 919
- Metals added to samples 450, 463, 464 to 466, 912, 913, 918, 919

Oct 12 – Metals added to samples 840, 841, 844, 847, 860, 939, 1290, 1291, 1294, 1297, 1300, 1301, 1304, 1308, 1310, 1311, and 1313

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Asbestos (Bulk)

DATE SAMPLED: Aug 08, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Solid**

Parameter	Unit	G / S	RDL	MAT03 1925684	MAT04 1925685	MAT05 1925686	MAT06 1925687	MAT07 1925688	MAT10 1925691	MAT27 1925710	MAT29 1925712
Asbestos (Bulk)	%		0.5	ND	15-30	ND	>75	30-50	15-30	30-50	15-30

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1925684 Condition of sample was satisfactory at time of arrival in laboratory.
"ND" - Not Detected

1925685 Condition of sample was satisfactory at time of arrival in laboratory.
Asbestos present - Chrysotile 15-30 Amosite 5-15

1925686 Condition of sample was satisfactory at time of arrival in laboratory.
"ND" - Not Detected

1925687-1925712 Condition of sample was satisfactory at time of arrival in laboratory.
Asbestos present - Chrysotile

Certified By: Elizabeth Rolakowska

Certificate of Analysis

AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Asbestos (Bulk)

DATE SAMPLED: Aug 08, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Solid**

Parameter	Unit	G / S	RDL	MAT28 1925711	MAT30 1925718
Asbestos (Bulk) Phase 1	%		0.5	ND	50-75
Asbestos (Bulk) Phase 2	%		0.5	>75	30-50

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1925711 Condition of sample was satisfactory at time of arrival in laboratory.
Asbestos present - Chrysotile
"ND" - Not Detected
Phase 1 - Wrap Phase 2 - Insulation

1925718 Condition of sample was satisfactory at time of arrival in laboratory.
Asbestos present - Chrysotile
Phase 1 - Paper Phase 2 - Insulation

Certified By: Elizabeth Rolakowska

Results relate only to the items tested

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Lead in Paint

DATE SAMPLED: Aug 08, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Solid**

Parameter	Unit	G / S	RDL	MAT19 1925700	RDL	MAT20 1925701	MAT24 1925706
Lead in Paint	mg/kg		1	2540	10	10000	3560

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1925700-1925706 Result is based on the dry weight of the sample.

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Particle Size by Sieve

DATE SAMPLED: Aug 05, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	859 1925380	960 1925505	978 1925523
Sieve Analysis - 75 microns (wet)	%		N/A	95.3	98.8	87.5
Sieve Texture				Coarse	Coarse	Coarse

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1925380-1925523 Value reported is amount of sample retained on sieve after wash with water and represents proportion by weight particles larger than indicated sieve size.

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Soil Analysis - Metals

DATE SAMPLED: Aug 04, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	426 1925243	430 1925257	431 1925258	435 1925263	439 1925268	444 1925283	448 1925294	455 1925299
Arsenic	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	1.5	1.5	4.5	1.5	1.3	1.7	1.2	4.7
Cobalt	mg/kg		0.5	<0.5	0.5	0.7	<0.5	0.7	<0.5	<0.5	1.4
Copper	mg/kg		0.5	0.9	1.0	0.8	1.3	0.8	0.9	4.5	1.8
Lead	mg/kg		0.5	0.6	0.9	0.9	1.0	1.0	0.6	0.5	1.9
Nickel	mg/kg		0.5	1.0	0.9	1.4	0.9	1.0	1.1	2.3	2.2
Zinc	mg/kg		1	1.4	2.2	2.7	1.6	1.6	2.3	1.9	3.1

Parameter	Unit	G / S	RDL	457 1925325	473 1925337	475 1925340	486 1925352	487 1925353	860 1925381	910 1925462	925 1925466
Arsenic	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	0.8
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	0.8	0.8	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	2.0	1.2	1.9	2.5	3.3	2.6	1.8	4.2
Cobalt	mg/kg		0.5	0.7	<0.5	0.6	1.1	0.8	1.2	0.5	1.4
Copper	mg/kg		0.5	1.3	0.6	0.6	2.1	1.8	2.1	1.1	2.5
Lead	mg/kg		0.5	1.0	0.6	0.7	1.4	1.3	1.4	1.0	1.8
Nickel	mg/kg		0.5	1.4	0.6	0.8	2.6	2.6	2.9	1.1	3.0
Zinc	mg/kg		1	2.4	1.7	1.6	3.4	2.7	4	2.0	3.8

Parameter	Unit	G / S	RDL	927 1925468	929 1925470	931 1925472	933 1925487	935 1925493	939 1925497	984 1925529	987 1925530
Arsenic	mg/kg		0.5	1.1	<0.5	0.6	<0.5	0.7	1.1	0.7	<0.5
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	2.1	1.3	1.6	1.0	4.6	2.8	6.7	1.3
Cobalt	mg/kg		0.5	1.4	<0.5	0.7	<0.5	1.1	1.5	2.1	0.7
Copper	mg/kg		0.5	1.5	0.5	1.2	0.9	1.9	3.1	2.0	3.4
Lead	mg/kg		0.5	1.4	0.6	1.0	<0.5	1.6	2.3	1.8	0.6
Nickel	mg/kg		0.5	2.1	0.6	1.5	0.7	1.9	3.3	4.3	1.4
Zinc	mg/kg		1	4.0	1	1.5	1.2	3.4	4	8	2.6

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Soil Analysis - Metals

DATE SAMPLED: Aug 04, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	1290 1925594	1291 1925595	1294 1925598	1297 1925601	1300 1925604	1301 1925605	1304 1925608	1308 1925611
Arsenic	mg/kg		0.5	0.9	1.0	1.3	0.7	0.9	1.1	0.7	1.0
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	3.9	5.9	4.6	3.3	4.1	4.2	3.5	3.9
Cobalt	mg/kg		0.5	1.5	1.7	1.9	1.4	2.2	2.2	1.3	1.6
Copper	mg/kg		0.5	4.8	4.2	3.6	2.6	4.2	4.0	3.8	3.8
Lead	mg/kg		0.5	3.2	3.7	3.1	1.6	2.9	3.4	2.8	2.9
Nickel	mg/kg		0.5	3.7	4.8	4.6	3.1	4.9	4.8	3.1	3.6
Zinc	mg/kg		1	5	7	6	3	4	7	5	6

Parameter	Unit	G / S	RDL	1310 1925613	1311 1925614	1313 1925617	1330 1925637	1331 1925638	1348 1925655	1349 1925656	1352 1925659
Arsenic	mg/kg		0.5	1.0	1.1	0.6	<0.5	<0.5	1.4	1.5	<0.5
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	7.2	6.1	6.4	1.8	1.9	9.5	8.7	1.4
Cobalt	mg/kg		0.5	1.8	1.6	1.4	<0.5	<0.5	3.0	3.2	<0.5
Copper	mg/kg		0.5	6.0	6.1	28.9	1.1	1.4	6.6	7.2	0.8
Lead	mg/kg		0.5	19.8	11.0	32.7	0.8	0.7	5.0	5.1	0.8
Nickel	mg/kg		0.5	3.6	4.0	3.1	1.4	1.7	7.6	7.5	0.8
Zinc	mg/kg		1	82.4	149	264	4.0	2.2	10.5	10.5	2

Parameter	Unit	G / S	RDL	1354 1925661	1355 1925662	1356 1925663	1358 1925668	1360 1925670	1362 1925672	840 1927467	841 1927495
Arsenic	mg/kg		0.5	1.0	0.6	<0.5	0.5	<0.5	<0.5	1.8	1.4
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	26.4	4.5	1.1	1.2	2.4	1.8	4.3	5.1
Cobalt	mg/kg		0.5	3.4	0.9	<0.5	0.9	0.6	0.5	2.1	2.0
Copper	mg/kg		0.5	33.9	27.9	1.0	1.0	4.2	1.0	3.7	4.2
Lead	mg/kg		0.5	543	94	3.1	0.9	0.8	1.1	3.5	4.2
Nickel	mg/kg		0.5	2.0	2.2	0.9	1.2	2.8	1.0	4.7	5.1
Zinc	mg/kg		1	177	27.8	3	2	3	3	6	6

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Certificate of Analysis

AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Soil Analysis - Metals

DATE SAMPLED: Aug 04, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	844 1927499	847 1927503	451 1927513	452 1927514	450 1946794	463 1946799	464 1946800	465 1946801
Arsenic	mg/kg		0.5	1.4	1.4	0.7	1.5	<0.5	<0.5	0.6	0.5
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	4.3	3.9	2.7	37.3	2.1	1.2	2.2	1.2
Cobalt	mg/kg		0.5	2.1	2.2	0.8	8.1	1.0	<0.5	1.1	0.8
Copper	mg/kg		0.5	5.1	6.7	1.9	15.9	2.3	2.0	2.8	1.5
Lead	mg/kg		0.5	3.0	3.3	1.5	7.8	1.8	0.9	1.8	1.1
Nickel	mg/kg		0.5	5.0	4.9	1.8	23.8	1.9	1.3	2.5	1.6
Zinc	mg/kg		1	9	6	3	31	3	2	3	2

Parameter	Unit	G / S	RDL	466 1946802	912 1946806	913 1946809	918 1946812	919 1946825
Arsenic	mg/kg		0.5	1.1	<0.5	<0.5	<0.5	<0.5
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	4.2	0.6	<0.5	4.8	1.3
Cobalt	mg/kg		0.5	2.0	<0.5	<0.5	0.6	<0.5
Copper	mg/kg		0.5	3.2	0.7	1.0	0.6	0.7
Lead	mg/kg		0.5	2.0	0.5	0.5	0.7	0.7
Nickel	mg/kg		0.5	4.2	0.5	0.6	1.2	0.9
Zinc	mg/kg		1	5	<1	2	2	2

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1925529 Results are based on the dry weight of the sample.

1927513-1946825 Results are based on the dry weight of the sample.

Certified By:

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Soil Analysis - Pb

DATE SAMPLED: Aug 08, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Solid**

Parameter	Unit	G / S	RDL	MAT08 1925689	MAT09 1925690	MAT17 1925698	MAT18 1925699	MAT21 1925702
Lead	mg/kg		0.5	410	615	2530	486	2380

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Soil Analysis- Leachable Lead

DATE SAMPLED: Aug 08, 2010 | **DATE RECEIVED: Aug 12, 2010** | **DATE REPORTED: Oct 27, 2010** | **SAMPLE TYPE: Solid**

Parameter	Unit	G / S	RDL	MAT01 1925682	MAT02 1925683	MAT08 1925689	MAT09 1925690	MAT17 1925698	MAT18 1925699	MAT19 1925700	MAT20 1925701
Lead - Leachate	mg/L		0.5	NSQ	NSQ	<0.5	<0.5	NSQ	<0.5	NSQ	NSQ

Parameter	Unit	G / S	RDL	MAT21 1925702	MAT22 1925704	MAT23 1925705	MAT24 1925706	MAT31 1925722
Lead - Leachate	mg/L		0.5	<0.5	NSQ	NSQ	NSQ	<0.5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1925682 NSQ - Not Sufficient Quantity of sample for analysis.

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 05, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	854 1925375	855 1925376	856 1925377	857 1925378	858 1925379	859 1925380	860 1925381	861 1925382
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	<10	<10	11	<10	<10	<10	<10	<10
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	6.1	7.7	10	3.5	4.8	6.3	2.8	2.8
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		99	100	100	99	100	100	101	102
Ethylbenzene-d10 (BTEX)	%	50-150		86	82	87	85	90	85	84	84
o-Terphenyl (F2-F4)	%	50-150		107	104	108	103	110	106	107	108

Parameter	Unit	G / S	RDL	862 1925383	863 1925385	864 1925387	865 1925391	866 1925392	867 1925394	868 1925395	869 1925396
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	20	70
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	20	70
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	2250	1830	2470
C16 - C34 (F3)	mg/kg		10	<10	<10	<10	<10	<10	288	214	474
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	3.5	5.2	4.9	8.2	12	4.5	8	12
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		101	101	100	99	102	99	102	101
Ethylbenzene-d10 (BTEX)	%	50-150		85	84	83	86	90	85	85	84
o-Terphenyl (F2-F4)	%	50-150		114	111	107	104	102	109	106	108

Certified By:

Results relate only to the items tested

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 05, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	870 1925397	871 1925398	872 1925400	873 1925401	874 1925402	875 1925403	876 1925404	877 1925406
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	1130	61	1270	1360	<10
C16 - C34 (F3)	mg/kg		10	<10	<10	<10	161	82	333	223	35
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	65	40	24	24
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	2.7	2.8	6.1	6.7	6.7	4.4	11	4.3
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		100	102	103	100	99	99	99	100
Ethylbenzene-d10 (BTEX)	%	50-150		82	85	91	83	90	92	95	91
o-Terphenyl (F2-F4)	%	50-150		103	107	104	105	112	110	110	105

Parameter	Unit	G / S	RDL	878 1925412	879 1925425	880 1925426	881 1925427	882 1925428	883 1925429	885 1925430	886 1925431
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	1490	1800	<10	<10	10	19	27	148
C16 - C34 (F3)	mg/kg		10	325	163	24	31	67	13	44	188
C34 - C50 (F4)	mg/kg		10	30	13	19	19	33	22	18	32
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	8.5	5.9	7.3	5.4	24	16	6	7.9
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		99	101	102	98	100	102	102	99
Ethylbenzene-d10 (BTEX)	%	50-150		96	95	100	90	104	103	95	95
o-Terphenyl (F2-F4)	%	50-150		107	106	107	105	110	105	105	109

Certified By:

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 05, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	887 1925432	888 1925433	889 1925434	890 1925435	891 1925436	892 1925437	893 1925438	894 1925440
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	<10	36	71	21	26	15	19	<10
C34 - C50 (F4)	mg/kg		10	<10	24	52	15	19	<10	11	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	17	5.1	22	11	7.4	2.6	1.1	4.1
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		102	101	100	100	99	97	97	99
Ethylbenzene-d10 (BTEX)	%	50-150		104	95	110	94	90	87	91	95
o-Terphenyl (F2-F4)	%	50-150		107	109	108	108	109	116	110	108

Parameter	Unit	G / S	RDL	895 1925441	896 1925442	897 1925443	898 1925444	899 1925445	900 1925446	901 1925449	902 1925454
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	261	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	30	<10	43	<10	26	15	<10	25
C34 - C50 (F4)	mg/kg		10	<10	<10	14	<10	16	<10	<10	15
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	6.2	3.8	5.3	2.5	5.4	5	4.7	3.5
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		97	97	95	96	95	95	96	99
Ethylbenzene-d10 (BTEX)	%	50-150		77	77	78	81	81	82	80	83
o-Terphenyl (F2-F4)	%	50-150		97	100	96	100	99	98	98	99

Certified By:

Results relate only to the items tested

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 05, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	903 1925455	904 1925456	905 1925457	906 1925458	907 1925459	908 1925460	909 1925461	936 1925494
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	148	1160	<10	<10	<10	<10	<10	54
C16 - C34 (F3)	mg/kg		10	35	108	<10	10	24	10	11	100
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	6.8	16	3	4	16	13	16	4.2
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		95	96	97	96	97	96	96	97
Ethylbenzene-d10 (BTEX)	%	50-150		80	86	80	79	86	81	86	80
o-Terphenyl (F2-F4)	%	50-150		100	99	106	101	99	103	100	97

Parameter	Unit	G / S	RDL	937 1925495	938 1925496	939 1925497	940 1925498	941 1925499	942 1925501	943 1925502	944 1925503
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	40	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	40	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	1730	1820	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	505	481	20	<10	14	11	<10	<10
C34 - C50 (F4)	mg/kg		10	13	11	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	8.3	8.4	4.8	2.9	4.7	6.8	3.3	5.6
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		96	96	97	96	102	103	101	100
Ethylbenzene-d10 (BTEX)	%	50-150		80	85	80	78	84	82	83	101
o-Terphenyl (F2-F4)	%	50-150		98	99	99	110	101	98	108	108

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 05, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	945 1925504	960 1925505	961 1925506	962 1925507	963 1925508	964 1925509	965 1925510	966 1925511
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	24	<10	<10	<10	<10	<10	<10	<10
C34 - C50 (F4)	mg/kg		10	36	10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	12	5.1	5.7	14	14	6.3	9	12
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		102	101	100	103	100	101	100	102
Ethylbenzene-d10 (BTEX)	%	50-150		85	111	89	97	99	95	113	92
o-Terphenyl (F2-F4)	%	50-150		105	100	102	98	100	102	102	114

Parameter	Unit	G / S	RDL	967 1925512	968 1925513	969 1925514	970 1925515	971 1925516	972 1925517	973 1925518	974 1925519
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	383	3180	<10
C16 - C34 (F3)	mg/kg		10	<10	<10	<10	10	<10	214	853	35
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	44	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	3.8	12	12	8.1	7.4	9.6	19	12
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		101	100	100	101	102	102	100	101
Ethylbenzene-d10 (BTEX)	%	50-150		97	93	104	111	90	105	92	91
o-Terphenyl (F2-F4)	%	50-150		98	98	107	98	99	100	99	100

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 10E426723
PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 05, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	975 1925520	976 1925521	977 1925522	978 1925523	979 1925524	980 1925525	981 1925526	982 1925527
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	521	1900	<10	14	444	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	760	420	14	50	464	33	38	<10
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	16	14	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	16	9.8	6.4	7.7	14	8.5	8.9	17
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		101	100	100	102	100	101	100	101
Ethylbenzene-d10 (BTEX)	%	50-150		114	86	116	88	88	87	91	115
o-Terphenyl (F2-F4)	%	50-150		98	100	99	96	99	114	115	111

Parameter	Unit	G / S	RDL	983 1925528	989 1925532	990 1925533	991 1925534	992 1925535	993 1925536	994 1925537	995 1925538
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	219	886	179	244	734	56
C16 - C34 (F3)	mg/kg		10	41	17	260	364	236	326	592	44
C34 - C50 (F4)	mg/kg		10	16	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	11	4.1	7.6	7.6	3.6	9.4	6.4	3.3
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		99	99	101	100	101	101	101	101
Ethylbenzene-d10 (BTEX)	%	50-150		84	85	87	84	85	89	90	82
o-Terphenyl (F2-F4)	%	50-150		107	112	119	110	118	114	111	112

Certified By:

Results relate only to the items tested

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Certificate of Analysis

AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 05, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	996 1925539	997 1925540	998 1925541	999 1925542	1252 1925543	1253 1925544	1254 1925545	1255 1925546
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	422	4090	<10	<10	<10	<10	20	<10
C16 - C34 (F3)	mg/kg		10	139	396	29	<10	<10	29	25	<10
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	6.5	12	6	3.7	4.1	13	16	8.2
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		102	100	101	100	101	101	101	102
Ethylbenzene-d10 (BTEX)	%	50-150		88	87	88	81	105	81	80	105
o-Terphenyl (F2-F4)	%	50-150		122	116	110	110	108	122	111	116

Parameter	Unit	G / S	RDL	1256 1925547	1257 1925548	1258 1925549	1259 1925550	1260 1925551	1261 1925552	1262 1925553	1263 1925554
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	<10	<10	<10	<10	<10	<10	10	<10
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	3.8	4.3	14.1	2.7	5.1	3.7	15.3	3.2
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		100	94	96	97	95	96	96	98
Ethylbenzene-d10 (BTEX)	%	50-150		86	82	88	85	86	87	86	94
o-Terphenyl (F2-F4)	%	50-150		116	101	101	103	104	104	103	103

Certified By:

Results relate only to the items tested

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 05, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	1264 1925555	1265 1925556	1266 1925557	1267 1925558	1268 1925559	1269 1925560	1270 1925563	1271 1925565
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	15	24	63	22	<10	<10	20	22
C34 - C50 (F4)	mg/kg		10	10	17	37	18	<10	<10	15	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	3.6	14.6	16.6	4.8	17.5	5.2	3.3	11
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		97	96	97	97	97	97	96	96
Ethylbenzene-d10 (BTEX)	%	50-150		81	88	90	84	92	82	82	87
o-Terphenyl (F2-F4)	%	50-150		107	105	105	105	104	102	101	104

Parameter	Unit	G / S	RDL	1272 1925569	1273 1925570	1274 1925572	1275 1925573	1276 1925575	1277 1925576	1278 1925578	1279 1925579
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	23	<10	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	57	<10	<10	108	14	19	16	13
C34 - C50 (F4)	mg/kg		10	24	<10	<10	55	<10	10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	37.7	16	4.9	32.7	8.2	5.7	10	15
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		96	96	94	94	98	93	95	94
Ethylbenzene-d10 (BTEX)	%	50-150		97	88	82	98	88	83	80	81
o-Terphenyl (F2-F4)	%	50-150		101	105	103	106	104	83.7	79.9	84.1

Certified By:

Certificate of Analysis

AGAT Laboratories

AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 05, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	1280 1925582	1281 1925585	1282 1925586	1283 1925587	1284 1925588	1285 1925589	1286 1925590	1287 1925591
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	139	216	21	24	22	17	10	34
C34 - C50 (F4)	mg/kg		10	65	94	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	30	32	11	12	8.2	16	6.6	11
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		92	94	93	94	94	94	95	96
Ethylbenzene-d10 (BTEX)	%	50-150		87	90	83	82	84	81	79	121
o-Terphenyl (F2-F4)	%	50-150		79.2	84.9	81.5	86.0	96.9	96.0	94.6	93.2

Parameter	Unit	G / S	RDL	1288 1925592	1289 1925593	1290 1925594	1291 1925595	1292 1925596	1293 1925597	1294 1925598	1295 1925599
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	120
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	120
C10 - C16 (F2)	mg/kg		10	<10	84	<10	<10	<10	105	<10	3770
C16 - C34 (F3)	mg/kg		10	12	61	40	48	35	135	23	613
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	26	<10	11	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	11	5.3	3.8	4	3.3	18	3.1	3.8
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		95	95	96	95	94	95	97	95
Ethylbenzene-d10 (BTEX)	%	50-150		126	128	128	81	119	143	149	125
o-Terphenyl (F2-F4)	%	50-150		87.3	94.3	95.5	96.9	87.1	90.6	88.3	92.4

Certified By:

Results relate only to the items tested

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 05, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	1296 1925600	1297 1925601	1298 1925602	1299 1925603	1300 1925604	1301 1925605	1302 1925606	1303 1925607
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	0.06	0.18	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	220	160	360	290	<10	<10	10	150
C6 - C10 (F1 minus BTEX)	mg/kg		10	220	160	360	290	<10	<10	10	150
C10 - C16 (F2)	mg/kg		10	1660	4410	5130	3490	118	131	1070	2850
C16 - C34 (F3)	mg/kg		10	356	1100	1140	669	86	82	109	372
C34 - C50 (F4)	mg/kg		10	10	15	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	10	8.3	9.7	14	2.9	3.8	3.3	9.6
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		95	97	99	97	96	95	95	94
Ethylbenzene-d10 (BTEX)	%	50-150		137	88	102	98	84	82	84	83
o-Terphenyl (F2-F4)	%	50-150		89.3	116	106	115	99	99	98	105

Parameter	Unit	G / S	RDL	1304 1925608	1305 1925609	1306 1925610	1317 1925621	1318 1925622	1319 1925623	1322 1925631	1323 1925632
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	15	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	11	<10	<10	11	<10	<10	20	<10
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	3.8	4	14	2.8	9.2	4.7	3.2	5.2
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		104	96	96	95	95	96	95	95
Ethylbenzene-d10 (BTEX)	%	50-150		90	85	87	84	96	86	85	86
o-Terphenyl (F2-F4)	%	50-150		109	97	108	99	106	113	105	99

Certified By:

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Certificate of Analysis

AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 05, 2010 | **DATE RECEIVED: Aug 12, 2010** | **DATE REPORTED: Oct 27, 2010** | **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	1324 1925633	1325 1925634	1326 1925635	1327 1925636	1330 1925637	1331 1925638	1332 1925639	1333 1925640
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	<10	<10	<10	<10	<10	16	183	36
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	12	<10	11	126	12
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	11	2.3	3.3	2.5	15	15	31	16
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		95	96	97	96	94	92	103	94
Ethylbenzene-d10 (BTEX)	%	50-150		89	83	88	80	86	80	93	89
o-Terphenyl (F2-F4)	%	50-150		104	96	101	105	106	100	101	106

Parameter	Unit	G / S	RDL	1334 1925641	1335 1925642	1336 1925643	1337 1925644	1338 1925645	1339 1925646	1340 1925647	1341 1925648
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	1190	1060
C16 - C34 (F3)	mg/kg		10	18	106	59	11	18	24	287	247
C34 - C50 (F4)	mg/kg		10	<10	64	34	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	12	22	20	35	14	4.6	13	13
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		94	95	92	94	103	101	92	92
Ethylbenzene-d10 (BTEX)	%	50-150		86	85	85	96	92	85	79	87
o-Terphenyl (F2-F4)	%	50-150		104	106	104	109	102	103	109	105

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 05, 2010 | **DATE RECEIVED: Aug 12, 2010** | **DATE REPORTED: Oct 27, 2010** | **SAMPLE TYPE: Soil**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 (Ag,F)

1925375-1925648 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions (if requested).
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
Extraction and holding times were met for this sample.

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Certificate of Analysis

AGAT WORK ORDER: 10E426723
PROJECT NO: CAM- A

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS).

DATE SAMPLED: Aug 04, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	840 1927467	841 1927495	842 1927497	843 1927498	844 1927499	845 1927500	846 1927502	847 1927503
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	10	<10	<10	<10	11
C16 - C34 (F3)	mg/kg		10	<10	13	11	23	17	12	12	17
C34 - C50 (F4)	mg/kg		10	<10	<10	21	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	4.5	4.1	5.2	10	5.2	7.8	9.7	5.2
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		101	100	102	101	99	98	102	102
Ethylbenzene-d10 (BTEX)	%	50-150		103	109	107	124	87	97	103	104
o-Terphenyl (F2-F4)	%	50-150		99	92	97	94	97	98	96	95

Parameter	Unit	G / S	RDL	848 1927504	849 1927505	850 1927506	851 1927508	852 1927510	853 1927511	985 1927522	986 1927525
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	14	14	14	16	14	15	14	15
C16 - C34 (F3)	mg/kg		10	15	24	26	18	36	23	20	<10
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	5.1	17	6.4	5.4	7.6	5.8	21	14
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		101	101	100	100	100	102	100	99
Ethylbenzene-d10 (BTEX)	%	50-150		102	111	89	99	113	91	116	92
o-Terphenyl (F2-F4)	%	50-150		92	92	94	93	94	95	94	96

Certified By:

Results relate only to the items tested

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Certificate of Analysis

AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS).

DATE SAMPLED: Aug 04, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 (Ag,F)

1927467-1927525 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions (if requested).
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
Extraction and holding times were met for this sample.

Certified By:

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Petroleum Hydrocarbons (BTEX/F1-F4) in Water

DATE SAMPLED: Aug 08, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Water**

Parameter	Unit	G / S	RDL	MW01 1925676	MW02 1925677	W-001 1925678	W-002 1925679	W-003 1925680	JPT123 1925723
Benzene	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Toluene	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018	<0.0005
Ethylbenzene	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Xylenes	mg/L		0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
C6 - C10 (F1)	mg/L		0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.1
C6 - C10 (F1 minus BTEX)	mg/L		0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.1
C10 - C16 (F2)	mg/L		0.1	<0.1	8.9	<0.1	<0.1	<0.1	19.6
C16 - C34 (F3)	mg/L		0.1	<0.1	1.0	<0.1	<0.1	<0.1	6.0
C34 - C50 (F4)	mg/L		0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.7
Surrogate	**Unit**	**Acceptable Limits**							
Toluene-d8 (BTEX)	%	50-150		100	102	101	99	97	93
o-Terphenyl (F2-F4)	%	50-150		103	105	100	100	102	103

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1925676-1925723 The C>6 - C10 fraction is calculated using the toluene response factor.
The C10 - C16 fraction is calculated using the average response factor for nC10, nC16 and nC34.
BTEX has NOT been subtracted from Fraction 1.
Sample is blank corrected.

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PROJECT NO: CAM- A

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Polyaromatic Hydrocarbons in Soil Creasote PAHs (Extended List)

DATE SAMPLED: Aug 08, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Solid**

Parameter	Unit	G / S	RDL	MAT31 1925722
Naphthalene	mg/kg		0.01	0.020
Methyl Naphthalenes	mg/kg		0.01	0.089
Dimethyl Naphthalenes	mg/kg		0.01	0.065
Acenaphthylene	mg/kg		0.01	<0.01
Acenaphthene	mg/kg		0.01	<0.01
Fluorene	mg/kg		0.01	<0.01
Phenanthrene	mg/kg		0.01	<0.01
Anthracene	mg/kg		0.01	<0.01
Fluoranthene	mg/kg		0.01	<0.01
Pyrene	mg/kg		0.01	<0.01
Benzo[a]anthracene	mg/kg		0.01	<0.01
Chrysene	mg/kg		0.01	<0.01
Benzo(b+j)fluoranthene	mg/kg		0.01	<0.01
Benzo(k)fluoranthene	mg/kg		0.01	<0.01
Benzo[a]pyrene	mg/kg		0.01	<0.01
Indeno[1,2,3-cd]pyrene	mg/kg		0.01	<0.01
Dibenzofuran	mg/kg		0.01	<0.01
Dibenz[ah]anthracene	mg/kg		0.01	<0.01
Benzo[ghi]perylene	mg/kg		0.01	<0.01
Pentachlorophenol	mg/kg		0.01	<0.01
Carbazole	mg/kg		0.01	<0.01
Methyl Anthracenes	mg/kg		0.01	<0.01
3-Methylcholanthrene	mg/kg		0.01	<0.01

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1925722 Analysis was performed by subcontracted laboratory.
Nitrobenzene d5 surrogate recovery:%
2-Fluorobiphenyl surrogate recovery:%
2,4,6-Tribromophenol surrogate recovery: %
p-Terphenyl d14 surrogate recovery:%

Results are based on the dry weight of the sample.
Based on GC/MS target ion analysis.
Benzo(b+j)flouranthene are unresolved and reported based on Benzo(b)flouranthene calibration.

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AGAT WORK ORDER: 10E426723

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Polychlorinated Biphenyls Analysis - Soil

DATE SAMPLED: Aug 04, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	426 1925243	430 1925257	431 1925258	435 1925263	439 1925268	444 1925283	448 1925294	455 1925299
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**									
Decachlorobiphenyl	%	70-130		99	97	97	95	97	99	101	93

Parameter	Unit	G / S	RDL	457 1925325	473 1925337	475 1925340	910 1925462	925 1925466	927 1925468	929 1925470	931 1925472
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**									
Decachlorobiphenyl	%	70-130		91	98	95	95	96	99	98	97

Parameter	Unit	G / S	RDL	933 1925487	935 1925493	984 1925529	987 1925530	1308 1925611	1309 1925612	1310 1925613	1311 1925614
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	0.13	<0.05	6.88	6.89
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	0.13	<0.05	6.88	6.89
Surrogate	**Unit**	**Acceptable Limits**									
Decachlorobiphenyl	%	70-130		101	102	115	98	85	103	94	92

Parameter	Unit	G / S	RDL	1312 1925615	1313 1925617	1314 1925618	1315 1925619	1316 1925620	1317 1925621	1318 1925622	1320 1925624
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	2.26	8.21	0.96	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	2.26	8.21	0.96	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**									
Decachlorobiphenyl	%	70-130		86	78	100	84	102	70	99	110

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Polychlorinated Biphenyls Analysis - Soil

DATE SAMPLED: Aug 04, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

				1321	1322	1330	1331	1348	1349	1354	1355
Parameter	**Unit**	**G / S**	**RDL**	**1925630**	**1925631**	**1925637**	**1925638**	**1925655**	**1925656**	**1925661**	**1925662**
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.54	0.07
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.54	0.07
Surrogate	**Unit**	**Acceptable Limits**									
Decachlorobiphenyl	%	70-130		105	103	101	109	103	97	94	95

				MAT01	MAT02	MAT07	MAT08	MAT09	MAT11	MAT12	MAT13
Parameter	**Unit**	**G / S**	**RDL**	**1925682**	**1925683**	**1925688**	**1925689**	**1925690**	**1925692**	**1925693**	**1925694**
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	0.28	<0.05	0.58	0.49	<0.05	0.79
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	1.85	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	0.28	1.89	0.58	0.49	<0.05	0.79
Surrogate	**Unit**	**Acceptable Limits**									
Decachlorobiphenyl	%	70-130		101	94	101	105	100	89	93	84

				MAT14	MAT15	MAT16	MAT17	MAT18	MAT19	MAT20	MAT21
Parameter	**Unit**	**G / S**	**RDL**	**1925695**	**1925696**	**1925697**	**1925698**	**1925699**	**1925700**	**1925701**	**1925702**
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	1.02	116	123	261000	1310	8750	162	1280
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2400	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	1.02	116	123	261000	1310	11100	162	1280
Surrogate	**Unit**	**Acceptable Limits**									
Decachlorobiphenyl	%	70-130		81	70	118	100	92	96	122	100

				MAT22	MAT23	MAT24	MAT25	MAT26	MAT31	451	452
Parameter	**Unit**	**G / S**	**RDL**	**1925704**	**1925705**	**1925706**	**1925707**	**1925709**	**1925722**	**1927513**	**1927514**
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	11100	<0.05	190	250	473	0.17	0.2	<0.05
Aroclor 1260	mg/kg		0.05	<0.05	763	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	11100	763	190	250	473	0.17	0.2	<0.05
Surrogate	**Unit**	**Acceptable Limits**									
Decachlorobiphenyl	%	70-130		104	106	91	103	123	130	100	87

Certified By:

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Polychlorinated Biphenyls Analysis - Soil

DATE SAMPLED: Aug 04, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Soil**

Parameter	Unit	G / S	RDL	450 1946794	463 1946799	464 1946800	465 1946801	466 1946802	912 1946806	913 1946809	918 1946812
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**									
Decachlorobiphenyl	%	70-130		101	103	97	99	104	100	103	99

Parameter	Unit	G / S	RDL	919 1946825
Aroclor 1242	mg/kg		0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05
Surrogate	**Unit**	**Acceptable Limits**		
Decachlorobiphenyl	%	70-130		100

Certified By:

Results relate only to the items tested

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Polychlorinated Biphenyls Analysis - Soil

DATE SAMPLED: Aug 04, 2010	DATE RECEIVED: Aug 12, 2010	DATE REPORTED: Oct 27, 2010	SAMPLE TYPE: Soil

Comments:	RDL - Reported Detection Limit; G / S - Guideline / Standard
1925243-1925493	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1925529	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: % Arochlor Type:
1925530	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1925611	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: % Arochlor Type:
1925612	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1925613-1925614	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis. Arochlor Type:1254
1925615-1925617	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: % Arochlor Type:
1925618	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1925619	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: % Arochlor Type:
1925620	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1925621	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: % Arochlor Type:
1925622	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1925624	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: % Arochlor Type:
1925630-1925656	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1925661-1925662	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis. Arochlor Type:1254
1925682-1946825	Results are based on the dry weight of the sample.

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Polychlorinated Biphenyls Analysis - Soil

DATE SAMPLED: Aug 04, 2010 | **DATE RECEIVED: Aug 12, 2010** | **DATE REPORTED: Oct 27, 2010** | **SAMPLE TYPE: Soil**

Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: %
Arochlor Type:

Certified By:

Results relate only to the items tested

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AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Polychlorinated Biphenyls Analysis - Water

DATE SAMPLED: Aug 08, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Water**

Parameter	Unit	G / S	RDL	MW01 1925676	MW02 1925677	W-001 1925678	W-002 1925679	W-003 1925680	W-004 1925681	JPT123 1925723
Aroclor 1242	µg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1254	µg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aroclor 1260	µg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Polychlorinated Biphenyls	µg/L		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Surrogate	**Unit**	**Acceptable Limits**								
Decachlorobiphenyl	%	70-130		115	112	102	105	107	105	109

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1925676 Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: 115%

1925677 Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: 112%

1925678 Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: 102%

1925679 Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: 105%

1925680 Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: 107%

1925681 Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: 105%

1925723 Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: 109%

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Certificate of Analysis

AGAT WORK ORDER: 10E426723
PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

CCME / Alberta Tier 1 Metals (Total)

DATE SAMPLED: Aug 08, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Water**

Parameter	Unit	G / S	RDL	MW01 1925676	RDL	MW02 1925677	RDL	W-001 1925678	W-002 1925679	W-003 1925680	W-004 1925681
Total Aluminum	mg/L		0.020	64.4	0.020	30.2	0.002	0.038	0.065	0.002	0.240
Total Antimony	mg/L		0.001	0.002	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Total Arsenic	mg/L		0.001	0.081	0.001	0.029	0.001	0.002	0.002	<0.001	0.003
Total Barium	mg/L		0.05	0.38	0.05	0.20	0.05	<0.05	<0.05	<0.05	<0.05
Total Boron	mg/L		0.01	0.14	0.01	0.13	0.01	0.02	0.03	<0.01	0.12
Total Cadmium	mg/L		0.000016	0.00227	0.000016	0.000970	0.000016	<0.000016	<0.000016	<0.000016	0.000053
Total Chromium	mg/L		0.001	0.147	0.001	0.084	0.001	0.002	0.002	<0.001	0.019
Total Copper	mg/L		0.002	0.180	0.002	0.108	0.002	0.006	0.004	<0.002	0.005
Total Iron	mg/L		1.0	218	0.1	71.0	0.1	0.1	0.1	<0.1	0.3
Total Lead	mg/L		0.001	0.155	0.001	0.088	0.001	<0.001	<0.001	<0.001	<0.001
Total Manganese	mg/L		0.050	2.55	0.005	1.63	0.005	0.005	0.006	<0.005	0.028
Total Molybdenum	mg/L		0.003	0.010	0.003	0.003	0.003	<0.003	<0.003	<0.003	<0.003
Total Nickel	mg/L		0.01	0.14	0.01	0.07	0.01	<0.01	<0.01	<0.01	0.01
Total Selenium	mg/L		0.001	0.002	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Total Silver	mg/L		0.00005	0.00122	0.00005	0.00081	0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Total Sodium	mg/L		6.0	25.6	0.6	28.1	0.6	117	117	<0.6	106
Total Thallium	mg/L		0.0005	0.0024	0.0005	0.0015	0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Total Uranium	mg/L		0.001	0.010	0.001	0.006	0.001	<0.001	<0.001	<0.001	<0.001
Total Zinc	mg/L		0.001	0.200	0.001	0.102	0.001	0.004	0.002	<0.001	0.007

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Certificate of Analysis

AGAT WORK ORDER: 10E426723

PROJECT NO: CAM- A

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CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

CCME / Alberta Tier 1 Metals (Total)

DATE SAMPLED: Aug 08, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Water**

Parameter	Unit	G / S	RDL	JPT123 1925723
Total Aluminum	mg/L		0.020	8.27
Total Antimony	mg/L		0.001	0.002
Total Arsenic	mg/L		0.001	0.006
Total Barium	mg/L		0.05	0.06
Total Boron	mg/L		0.01	0.16
Total Cadmium	mg/L		0.000016	0.000544
Total Chromium	mg/L		0.001	0.025
Total Copper	mg/L		0.002	0.041
Total Iron	mg/L		1.0	13.8
Total Lead	mg/L		0.001	0.016
Total Manganese	mg/L		0.050	0.874
Total Molybdenum	mg/L		0.003	<0.003
Total Nickel	mg/L		0.01	0.02
Total Selenium	mg/L		0.001	<0.001
Total Silver	mg/L		0.00005	0.00023
Total Sodium	mg/L		6.0	8.7
Total Thallium	mg/L		0.0005	<0.0005
Total Uranium	mg/L		0.001	0.003
Total Zinc	mg/L		0.001	0.037

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1925676-1925723 < - Values refer to Report Detection Limit.

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AGAT WORK ORDER: 10E426723
PROJECT NO: CAM- A

CLIENT NAME: AECOM CANADA LTD **ATTENTION TO: Dara Schmidt**

Routine Chemistry Water Analysis

DATE SAMPLED: Aug 08, 2010 **DATE RECEIVED: Aug 12, 2010** **DATE REPORTED: Oct 27, 2010** **SAMPLE TYPE: Water**

Parameter	Unit	G / S	RDL	W-001 1925678	W-002 1925679	W-003 1925680	W-004 1925681
pH			NA	8.5	8.5	7.1	8.6
p - Alkalinity (as CaCO3)	mg/L		5	<5	<5	<5	11
T - Alkalinity (as CaCO3)	mg/L		5	106	105	<5	245
Bicarbonate	mg/L		5	120	121	<5	273
Carbonate	mg/L		5	<5	<5	<5	13
Hydroxide	mg/L		5	<5	<5	<5	<5
Electrical Conductivity	uS/cm		1	1030	1030	<1	1220
Chloride	mg/L		1	256	260	<1	240
Fluoride	mg/L		0.05	0.06	0.06	<0.05	0.12
Nitrate	mg/L		0.5	0.6	<0.5	<0.5	<0.5
Sulfate	mg/L		1	14	11	<1	31
Dissolved Calcium	mg/L		0.3	23.3	22.7	<0.3	56.2
Dissolved Magnesium	mg/L		0.2	34.1	33.3	<0.2	53.5
Dissolved Sodium	mg/L		0.6	116	115	<0.6	104
Dissolved Potassium	mg/L		0.6	6.2	6.1	<0.6	4.5
Dissolved Iron	mg/L		0.1	<0.1	<0.1	<0.1	<0.1
Dissolved Manganese	mg/L		0.005	<0.005	<0.005	<0.005	0.017
Calculated TDS	mg/L		1	514	511	<1	636
Hardness	mg CaCO3/L		1	199	194	<1	361
Ion Balance	%			96.6	94.6		96.1
Nitrate + Nitrite-N	mg/L		0.113	0.136	<0.113	<0.113	<0.113
Nitrate-N	mg/L		0.113	0.136	<0.113	<0.113	<0.113
Nitrite-N	mg/L		0.015	<0.015	<0.015	<0.015	<0.015

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
1925678-1925681 < - Values refer to Report Detection Limits.

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Quality Assurance

CLIENT NAME: AECOM CANADA LTD **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A **ATTENTION TO: Dara Schmidt**

Soil Analysis

RPT Date: Oct 27, 2010			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Soil Analysis - Metals															
Arsenic	253	1925493	0.75	0.66	12.8%	< 0.5	99%	90%	110%				102%	75%	125%
Cadmium	253	1925493	< 0.5	< 0.5	0.0%	< 0.5	96%	90%	110%				100%	75%	125%
Chromium	253	1925493	4.5	4.6	2.2%	< 0.5	95%	90%	110%				100%	75%	125%
Cobalt	253	1925493	1.1	1.1	0.0%	< 0.5	95%	90%	110%				101%	75%	125%
Copper	253	1925493	2.0	1.9	5.1%	< 0.5	100%	90%	110%				97%	75%	125%
Lead	253	1925493	83.9	79.3	5.6%	< 0.5	96%	90%	110%				95%	75%	125%
Nickel	253	1925493	2.1	1.9	10.0%	< 0.5	101%	90%	110%				98%	75%	125%
Zinc	253	1925493	3.96	3.40	15.2%	< 0.5	106%	90%	110%				102%	75%	125%
Soil Analysis - Metals															
Arsenic	1430	1925487	0.258	0.370		< 0.079	101%	90%	110%	97%	90%	110%	93%	75%	125%
Cadmium	1430	1925487	< 0.8	< 0.8	0.0%	< 0.8	103%	90%	110%	103%	90%	110%	103%	75%	125%
Chromium	1430	1925487	0.39	0.66		< 0.05	105%	90%	110%	108%	90%	110%	104%	75%	125%
Cobalt	1430	1925487	0.21	0.29		< 0.05	111%	80%	120%	105%	90%	110%	109%	75%	125%
Copper	1430	1925487	0.6	0.8	28.6%	< 0.4	100%	90%	110%	103%	90%	110%	99%	75%	125%
Lead	1430	1925487	< 0.4	0.5		< 0.4	88%	80%	120%	98%	90%	110%	97%	75%	125%
Nickel	1430	1925487	0.4	0.6		< 0.1	113%	80%	120%	103%	90%	110%	114%	75%	125%
Zinc	1430	1925487	< 1	1		< 1	116%	80%	120%	109%	90%	110%	109%	75%	125%
Particle Size by Sieve															
Sieve Analysis - 75 microns (wet)	1189	0222	87.5	86.4	1.3%	N/A	100%	90%	110%						
Soil Analysis - Metals															
Arsenic	256	1940568	8.20	7.94	3.2%	< 0.5	97%	90%	110%				99%	75%	125%
Cadmium	256	1940568	< 0.5	< 0.5	0.0%	< 0.5	95%	90%	110%				93%	75%	125%
Chromium	256	1940568	14.0	13.5	3.6%	< 0.5	95%	90%	110%				107%	75%	125%
Cobalt	256	1940568	8.2	8.2	0.0%	< 0.5	96%	90%	110%				96%	75%	125%
Copper	256	1940568	14.3	14.5	1.4%	< 0.5	97%	90%	110%				97%	75%	125%
Lead	256	1940568	13.4	12.5	6.9%	< 0.5	100%	90%	110%				99%	75%	125%
Nickel	256	1940568	21.5	20.8	3.3%	< 0.5	98%	90%	110%				96%	75%	125%
Zinc	256	1940568	69	70	1.4%	< 1	102%	90%	110%				98%	75%	125%
Soil Analysis- Leachable Lead															
Lead - Leachate	1265	464	<0.007	<0.007	0.0%	< 0.007	100%	90%	110%		0%	0%	100%	75%	125%
Soil Analysis - Metals															
Arsenic	1391	6849	2.87	2.71	5.7%	< 0.5	84%	80%	120%	90%	90%	110%	87%	75%	125%
Cadmium	1391	6849	< 0.5	< 0.5	0.0%	< 0.5	96%	90%	110%	90%	90%	110%	101%	75%	125%
Chromium	1391	6849	8.7	7.9	9.6%	< 0.5	105%	90%	110%	94%	90%	110%	118%	75%	125%
Cobalt	1391	6849	3.84	3.54	8.1%	< 0.5	98%	90%	110%	95%	90%	110%	102%	75%	125%
Copper	1391	6849	6.40	5.81	9.7%	< 0.5	95%	90%	110%	94%	90%	110%	99%	75%	125%
Lead	1391	6849	4.4	4.4	0.0%	< 0.5	102%	90%	110%	100%	90%	110%	124%	75%	125%

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CLIENT NAME: AECOM CANADA LTD — **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A — **ATTENTION TO: Dara Schmidt**

Soil Analysis (Continued)

RPT Date: Oct 27, 2010			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Nickel	1391	6849	10.4	9.5	9.0%	< 0.5	102%	90%	110%	91%	90%	110%	108%	75%	125%
Zinc	1391	6849	24	21	13.3%	< 1	95%	90%	110%	98%	90%	110%	102%	75%	125%
Lead in Paint															
Lead in Paint	6658		741	707	4.7%	< 1.0	101%	90%	110%				100%	75%	125%
Soil Analysis - Metals															
Arsenic	277	2000601	3.9	4.2	7.4%	< 0.5	91%	90%	110%	101%	90%	110%	99%	75%	125%
Cadmium	277	2000601	< 0.5	< 0.5	0.0%	< 0.5	104%	90%	110%	102%	90%	110%	100%	75%	125%
Chromium	277	2000601	4.8	4.6	4.3%	< 0.5	103%	90%	110%	99%	90%	110%	98%	75%	125%
Cobalt	277	2000601	3.2	3.1	3.2%	< 0.5	101%	90%	110%	100%	90%	110%	103%	75%	125%
Copper	277	2000601	2.3	2.4	4.3%	< 0.5	96%	90%	110%	102%	90%	110%	104%	75%	125%
Lead	277	2000601	2.8	2.9	3.5%	< 0.5	103%	90%	110%	108%	90%	110%	121%	75%	125%
Nickel	277	2000601	7.8	7.8	0.0%	< 0.5	107%	90%	110%	100%	90%	110%	106%	75%	125%
Zinc	277	2000601	17	17	0.0%	< 1	105%	90%	110%	101%	90%	110%	101%	75%	125%
Soil Analysis - Pb															
Lead	280		13.0	12.1	7.2%	< 0.5	99%	90%	110%				97%	75%	125%
Soil Analysis - Metals															
Arsenic	297	2050964	5.84	5.86	0.3%	< 0.5	93%	90%	110%				96%	75%	125%
Cadmium	297	2050964	< 0.5	< 0.5	0.0%	< 0.5	95%	90%	110%				100%	75%	125%
Chromium	297	2050964	20.7	20.9	1.0%	< 0.5	96%	90%	110%				117%	75%	125%
Cobalt	297	2050964	7.6	7.7	1.3%	< 0.5	94%	90%	110%				106%	75%	125%
Copper	297	2050964	14.6	14.5	0.7%	< 0.5	93%	90%	110%				104%	75%	125%
Lead	297	2050964	8.66	8.52	1.6%	< 0.5	103%	90%	110%				98%	75%	125%
Nickel	297	2050964	22.2	22.0	0.9%	< 0.5	96%	90%	110%				100%	75%	125%
Zinc	297	2050964	53	53	0.0%	< 1	101%	90%	110%				107%	75%	125%
Soil Analysis - Metals															
Arsenic	1430	1925487	< 0.5	< 0.5	0.0%	< 0.5	101%	90%	110%	97%	90%	110%	93%	75%	125%
Cadmium	1430	1925487	< 0.5	< 0.5	0.0%	< 0.5	103%	90%	110%	103%	90%	110%	103%	75%	125%
Chromium	1430	1925487	< 0.5	<0.5	0.0%	< 0.5	105%	90%	110%	108%	90%	110%	104%	75%	125%
Cobalt	1430	1925487	< 0.5	< 0.5	0.0%	< 0.5	111%	80%	120%	105%	90%	110%	109%	75%	125%
Copper	1430	1925487	57.3	57.5	0.3%	< 0.5	100%	90%	110%	103%	90%	110%	99%	75%	125%
Lead	1430	1925487	< 0.5	< 0.5	0.0%	< 0.5	88%	80%	120%	98%	90%	110%	97%	75%	125%
Nickel	1430	1925487	< 0.5	<0.5	0.0%	< 0.5	113%	80%	120%	103%	90%	110%	114%	75%	125%
Zinc	1430	1925487	< 1	<1	0.0%	< 1	116%	80%	120%	109%	90%	110%	109%	75%	125%

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CLIENT NAME: AECOM CANADA LTD **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A **ATTENTION TO: Dara Schmidt**

Trace Organics Analysis

RPT Date: Oct 27, 2010			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	75	1925257	< 0.05	< 0.05	NA	< 0.05	102%	80%	120%	106%	70%	130%	116%	50%	150%
Aroclor 1254	75	1925257	< 0.05	< 0.05	NA	< 0.05	104%	80%	120%	130%	70%	130%	126%	50%	150%
Aroclor 1260	75	1925257	< 0.05	< 0.05	NA	< 0.05	104%	80%	120%	114%	70%	130%	102%	50%	150%
Total Polychlorinated Biphenyls	75	1925257	< 0.05	< 0.05	NA	< 0.05	103%	80%	120%	117%	70%	130%	115%	50%	150%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	450	1925383	< 0.005	< 0.005	NA	< 0.005	101%	80%	120%	93%	80%	120%	102%	60%	140%
Toluene	450	1925383	< 0.05	< 0.05	NA	< 0.05	104%	80%	120%	94%	80%	120%	108%	60%	140%
Ethylbenzene	450	1925383	< 0.01	< 0.01	NA	< 0.01	105%	80%	120%	91%	80%	120%	108%	60%	140%
Xylenes	450	1925383	< 0.05	< 0.05	NA	< 0.05	97%	80%	120%	84%	80%	120%	99%	60%	140%
C6 - C10 (F1)	450	1925383	< 10	< 10	NA	< 10	91%	80%	120%	89%	80%	120%	88%	60%	140%
C6 - C10 (F1 minus BTEX)	450	1925383	< 10	< 10	NA	< 10	91%	80%	120%	89%	80%	120%	88%	60%	140%
C10 - C16 (F2)	501	1925383	<10	<10	NA	< 10	111%	80%	120%	100%	80%	120%	100%	60%	140%
C16 - C34 (F3)	501	1925383	<10	<10	NA	< 10	111%	80%	120%	98%	80%	120%	99%	60%	140%
C34 - C50 (F4)	501	1925383	<10	<10	NA	< 10	111%	80%	120%	96%	80%	120%	99%	60%	140%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	449	1925432	< 0.005	< 0.005	NA	< 0.005	101%	80%	120%	101%	80%	120%	115%	60%	140%
Toluene	449	1925432	< 0.05	< 0.05	NA	< 0.05	104%	80%	120%	106%	80%	120%	124%	60%	140%
Ethylbenzene	449	1925432	< 0.01	< 0.01	NA	< 0.01	102%	80%	120%	107%	80%	120%	129%	60%	140%
Xylenes	449	1925432	< 0.05	< 0.05	NA	< 0.05	94%	80%	120%	98%	80%	120%	119%	60%	140%
C6 - C10 (F1)	449	1925432	< 10	< 10	NA	< 10	97%	80%	120%	80%	80%	120%	74%	60%	140%
C6 - C10 (F1 minus BTEX)	449	1925432	< 10	< 10	NA	< 10	97%	80%	120%	80%	80%	120%	74%	60%	140%
C10 - C16 (F2)	501	1925432	<10	<10	NA	< 10	110%	80%	120%	100%	80%	120%	100%	60%	140%
C16 - C34 (F3)	501	1925432	<10	<10	NA	< 10	110%	80%	120%	101%	80%	120%	100%	60%	140%
C34 - C50 (F4)	501	1925432	<10	<10	NA	< 10	110%	80%	120%	96%	80%	120%	98%	60%	140%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	2475	1925454	< 0.005	< 0.005	NA	< 0.005	90%	80%	120%	84%	80%	120%	87%	60%	140%
Toluene	2475	1925454	< 0.05	< 0.05	NA	< 0.05	95%	80%	120%	93%	80%	120%	90%	60%	140%
Ethylbenzene	2475	1925454	< 0.01	< 0.01	NA	< 0.01	97%	80%	120%	97%	80%	120%	95%	60%	140%
Xylenes	2475	1925454	< 0.05	< 0.05	NA	< 0.05	100%	80%	120%	100%	80%	120%	97%	60%	140%
C6 - C10 (F1)	2475	1925454	< 10	< 10	NA	< 10	100%	80%	120%	119%	80%	120%	105%	60%	140%
C10 - C16 (F2)	501	1925454	<10	<10	NA	< 10	110%	80%	120%	92%	80%	120%	90%	60%	140%
C16 - C34 (F3)	501	1925454	25	<10	NA	< 10	110%	80%	120%	90%	80%	120%	89%	60%	140%
C34 - C50 (F4)	501	1925454	15	15	NA	< 10	110%	80%	120%	86%	80%	120%	84%	60%	140%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
C10 - C16 (F2)	501	1925498	<10	<10	NA	< 10	111%	80%	120%	98%	80%	120%	87%	60%	140%
C16 - C34 (F3)	501	1925498	<10	<10	NA	< 10	111%	80%	120%	91%	80%	120%	82%	60%	140%
C34 - C50 (F4)	501	1925498	<10	<10	NA	< 10	111%	80%	120%	88%	80%	120%	82%	60%	140%

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Quality Assurance

CLIENT NAME: AECOM CANADA LTD **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A **ATTENTION TO: Dara Schmidt**

Trace Organics Analysis (Continued)

RPT Date: Oct 27, 2010			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	795	1924737	<0.005	<0.005	NA	< 0.005	103%	80%	120%	103%	80%	120%	109%	60%	140%
Toluene	795	1924737	<0.05	<0.05	NA	< 0.05	103%	80%	120%	104%	80%	120%	111%	60%	140%
Ethylbenzene	795	1924737	<0.01	<0.01	NA	< 0.01	101%	80%	120%	103%	80%	120%	111%	60%	140%
Xylenes	795	1924737	<0.05	<0.05	NA	< 0.05	102%	80%	120%	106%	80%	120%	115%	60%	140%
C6 - C10 (F1)	795	1924737	<10	<10	NA	< 10	106%	80%	120%	94%	80%	120%	95%	60%	140%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	796	1925506	<0.005	<0.005	NA	< 0.005	104%	80%	120%	105%	80%	120%	90%	60%	140%
Toluene	796	1925506	<0.05	<0.05	NA	< 0.05	107%	80%	120%	108%	80%	120%	93%	60%	140%
Ethylbenzene	796	1925506	<0.01	<0.01	NA	< 0.01	104%	80%	120%	108%	80%	120%	94%	60%	140%
Xylenes	796	1925506	<0.05	<0.05	NA	< 0.05	106%	80%	120%	113%	80%	120%	98%	60%	140%
C6 - C10 (F1)	796	1925506	<10	<10	NA	< 10	107%	80%	120%	109%	80%	120%	111%	60%	140%
C10 - C16 (F2)	502	1925506	<10	<10	NA	< 10	97%	80%	120%	93%	80%	120%	92%	60%	140%
C16 - C34 (F3)	502	1925506	<10	<10	NA	< 10	97%	80%	120%	92%	80%	120%	92%	60%	140%
C34 - C50 (F4)	502	1925506	<10	<10	NA	< 10	97%	80%	120%	91%	80%	120%	94%	60%	140%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	797	1925545	<0.005	<0.005	NA	< 0.005	102%	80%	120%	96%	80%	120%	100%	60%	140%
Toluene	797	1925545	<0.05	<0.05	NA	< 0.05	104%	80%	120%	100%	80%	120%	101%	60%	140%
Ethylbenzene	797	1925545	<0.01	<0.01	NA	< 0.01	103%	80%	120%	100%	80%	120%	103%	60%	140%
Xylenes	797	1925545	<0.05	<0.05	NA	< 0.05	104%	80%	120%	104%	80%	120%	109%	60%	140%
C6 - C10 (F1)	797	1925545	<10	<10	NA	< 10	105%	80%	120%	103%	80%	120%	98%	60%	140%
C10 - C16 (F2)	649	1925545	20	18	11.0%	< 10	104%	80%	120%	101%	80%	120%	114%	60%	140%
C16 - C34 (F3)	649	1925545	25	27	8.0%	< 10	104%	80%	120%	100%	80%	120%	115%	60%	140%
C34 - C50 (F4)	649	1925545	<10	<10	NA	< 10	104%	80%	120%	91%	80%	120%	104%	60%	140%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	2476	1925554	< 0.005	< 0.005	NA	< 0.005	94%	80%	120%	96%	80%	120%	96%	60%	140%
Toluene	2476	1925554	< 0.05	< 0.05	NA	< 0.05	98%	80%	120%	101%	80%	120%	105%	60%	140%
Ethylbenzene	2476	1925554	< 0.01	< 0.01	NA	< 0.01	100%	80%	120%	106%	80%	120%	110%	60%	140%
Xylenes	2476	1925554	< 0.05	< 0.05	NA	< 0.05	103%	80%	120%	106%	80%	120%	114%	60%	140%
C6 - C10 (F1)	2476	1925554	< 10	< 10	NA	< 10	103%	80%	120%	93%	80%	120%	114%	60%	140%
C10 - C16 (F2)	502	1925554	<10	<10	NA	< 10	101%	80%	120%	84%	80%	120%	87%	60%	140%
C16 - C34 (F3)	502	1925554	<10	12	NA	< 10	101%	80%	120%	83%	80%	120%	86%	60%	140%
C34 - C50 (F4)	502	1925554	<10	<10	NA	< 10	101%	80%	120%	82%	80%	120%	89%	60%	140%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	2480	1925595	< 0.005	< 0.005	NA	< 0.005	88%	80%	120%	91%	80%	120%	103%	60%	140%
Toluene	2480	1925595	< 0.05	< 0.05	0.0%	< 0.05	96%	80%	120%	98%	80%	120%	113%	60%	140%
Ethylbenzene	2480	1925595	< 0.01	< 0.01	0.0%	< 0.01	97%	80%	120%	102%	80%	120%	117%	60%	140%
Xylenes	2480	1925595	< 0.05	< 0.05	0.0%	< 0.05	98%	80%	120%	103%	80%	120%	119%	60%	140%
C6 - C10 (F1)	2480	1925595	< 10	< 10	0.0%	< 10	100%	80%	120%	119%	80%	120%	97%	60%	140%

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CLIENT NAME: AECOM CANADA LTD **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A **ATTENTION TO: Dara Schmidt**

Trace Organics Analysis (Continued)

RPT Date: Oct 27, 2010			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
C10 - C16 (F2)	1093	1925595	<10	10	NA	< 10	84%	80%	120%	82%	80%	120%	82%	60%	140%
C16 - C34 (F3)	1093	1925595	48	58	19.0%	< 10	84%	80%	120%	90%	80%	120%	89%	60%	140%
C34 - C50 (F4)	1093	1925595	26	28	7.0%	< 10	84%	80%	120%	91%	80%	120%	92%	60%	140%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	2477	1925635	< 0.005	< 0.005	NA	< 0.005	98%	80%	120%	85%	80%	120%	90%	60%	140%
Toluene	2477	1925635	< 0.05	< 0.05	NA	< 0.05	99%	80%	120%	88%	80%	120%	93%	60%	140%
Ethylbenzene	2477	1925635	< 0.01	< 0.01	NA	< 0.01	104%	80%	120%	94%	80%	120%	100%	60%	140%
Xylenes	2477	1925635	< 0.05	< 0.05	NA	< 0.05	106%	80%	120%	95%	80%	120%	102%	60%	140%
C6 - C10 (F1)	2477	1925635	< 10	< 10	NA	< 10	99%	80%	120%	98%	80%	120%	122%	60%	140%
C10 - C16 (F2)	649	1925635	<10	<10	NA	< 10	99%	80%	120%	100%	80%	120%	103%	60%	140%
C16 - C34 (F3)	649	1925635	<10	<10	NA	< 10	99%	80%	120%	102%	80%	120%	103%	60%	140%
C34 - C50 (F4)	649	1925635	<10	<10	NA	< 10	99%	80%	120%	108%	80%	120%	109%	60%	140%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	2479	1925646	< 0.005	< 0.005	NA	< 0.005	84%	80%	120%	91%	80%	120%	89%	60%	140%
Toluene	2479	1925646	< 0.05	< 0.05	NA	< 0.05	89%	80%	120%	98%	80%	120%	97%	60%	140%
Ethylbenzene	2479	1925646	< 0.01	< 0.01	NA	< 0.01	93%	80%	120%	102%	80%	120%	105%	60%	140%
Xylenes	2479	1925646	< 0.05	< 0.05	NA	< 0.05	90%	80%	120%	103%	80%	120%	105%	60%	140%
C6 - C10 (F1)	2479	1925646	< 10	< 10	NA	< 10	99%	80%	120%	118%	80%	120%	105%	60%	140%
C10 - C16 (F2)	1093	1925646	<10	<10	0.0%	< 10	100%	80%	120%	97%	80%	120%	108%	60%	140%
C16 - C34 (F3)	1093	1925646	24	22	9.0%	< 10	100%	80%	120%	104%	80%	120%	115%	60%	140%
C34 - C50 (F4)	1093	1925646	<10	<10	0.0%	< 10	100%	80%	120%	100%	80%	120%	111%	60%	140%
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	75	1925662	< 0.05	< 0.05	NA	< 0.05	108%	80%	120%	112%	70%	130%	105%	50%	150%
Aroclor 1254	75	1925662	0.07	0.06	15.4%	< 0.05	98%	80%	120%	117%	70%	130%	139%	50%	150%
Aroclor 1260	75	1925662	< 0.05	< 0.05	NA	< 0.05	98%	80%	120%	115%	70%	130%	100%	50%	150%
Total Polychlorinated Biphenyls	75	1925662	0.07	0.06	15.4%	< 0.05	101%	80%	120%	115%	70%	130%	115%	50%	150%
Petroleum Hydrocarbons (BTEX/F1-F4) in Water															
Benzene	569	1925409	< 0.0005	< 0.0005	NA	< 0.0005	100%	80%	120%	90%	80%	120%	94%	70%	130%
Toluene	569	1925409	< 0.0005	< 0.0005	NA	< 0.0005	109%	80%	120%	93%	80%	120%	100%	70%	130%
Ethylbenzene	569	1925409	< 0.0005	< 0.0005	NA	< 0.0005	111%	80%	120%	93%	80%	120%	98%	70%	130%
Xylenes	569	1925409	< 0.0005	< 0.0005	NA	< 0.0005	116%	80%	120%	97%	80%	120%	102%	70%	130%
C6 - C10 (F1)	569	1925409	< 0.1	< 0.1	NA	< 0.1	102%	80%	120%	90%	80%	120%	102%	70%	130%
C10 - C16 (F2)	139	1925680	<0.1	<0.1	NA	< 0.1	101%	80%	120%	109%	80%	120%	105%	70%	130%
C16 - C34 (F3)	139	1925680	<0.1	<0.1	NA	< 0.1	101%	80%	120%	106%	80%	120%	102%	70%	130%
C34 - C50 (F4)	139	1925680	<0.1	<0.1	NA	< 0.1	101%	80%	120%	106%	80%	120%	102%	70%	130%
Polychlorinated Biphenyls Analysis - Water															
Aroclor 1242	75	1925677	< 0.01	< 0.01	NA	< 0.01	108%	80%	120%	103%	70%	130%	116%	50%	150%
Aroclor 1254	75	1925677	< 0.01	< 0.01	NA	< 0.01	110%	80%	120%	130%	70%	130%	126%	50%	150%

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CLIENT NAME: AECOM CANADA LTD | **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A | **ATTENTION TO: Dara Schmidt**

Trace Organics Analysis (Continued)

RPT Date: Oct 27, 2010			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Aroclor 1260	75	1925677	< 0.01	< 0.01	NA	< 0.01	114%	80%	120%	101%	70%	130%	102%	50%	150%
Polychlorinated Biphenyls	75	1925677	< 0.01	< 0.01	NA	< 0.01	111%	80%	120%	111%	70%	130%	115%	50%	150%
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	80	1914640	< 0.05	< 0.05	0.0%	< 0.05	106%	80%	120%	109%	70%	130%	128%	50%	150%
Aroclor 1254	80	1914640	< 0.05	< 0.05	0.0%	< 0.05	120%	80%	120%	88%	70%	130%	119%	50%	150%
Aroclor 1260	80	1914640	< 0.05	< 0.05	0.0%	< 0.05	118%	80%	120%	77%	70%	130%	99%	50%	150%
Total Polychlorinated Biphenyls	80	1914640	< 0.05	< 0.05	0.0%	< 0.05	115%	80%	120%	91%	70%	130%	115%	50%	150%
Polyaromatic Hydrocarbons in Soil Creasote PAHs (Extended List)															
Naphthalene	142	1925722	0.018	0.020	10.5%	< 0.01	105%	70%	130%	88%	70%	130%	89%	70%	130%
Methyl Naphthalenes	142	1925722	0.080	0.089	10.7%	< 0.01	105%	70%	130%	89%	70%	130%	85%	70%	130%
Dimethyl Naphthalenes	142	1925722	0.0527	0.0653	21.4%	< 0.01	101%	70%	130%	99%	70%	130%			
Acenaphthylene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	118%	70%	130%	97%	70%	130%	78%	70%	130%
Acenaphthene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	98%	70%	130%	85%	70%	130%	81%	70%	130%
Fluorene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	113%	70%	130%	94%	70%	130%	86%	70%	130%
Phenanthrene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	96%	70%	130%	84%	70%	130%	81%	70%	130%
Anthracene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	120%	70%	130%	77%	70%	130%	78%	70%	130%
Fluoranthene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	113%	70%	130%	94%	70%	130%	83%	70%	130%
Pyrene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	107%	70%	130%	83%	70%	130%	84%	70%	130%
Benzo[a]anthracene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	112%	70%	130%	94%	70%	130%	85%	70%	130%
Chrysene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	99%	70%	130%	89%	70%	130%	84%	70%	130%
Benzo(b+j)fluoranthene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	107%	70%	130%	94%	70%	130%	81%	70%	130%
Benzo(k)fluoranthene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	99%	70%	130%	86%	70%	130%	85%	70%	130%
Benzo[a]pyrene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	120%	70%	130%	96%	70%	130%	100%	70%	130%
Indeno[1,2,3-cd]pyrene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	94%	70%	130%	78%	70%	130%	85%	70%	130%
Dibenzofuran	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	95%	70%	130%	96%	70%	130%			
Dibenz[ah]anthracene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	98%	70%	130%	79%	70%	130%	86%	70%	130%
Benzo[ghi]perylene	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	86%	70%	130%	70%	70%	130%	77%	70%	130%
Carbazole	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	91%	70%	130%	97%	70%	130%			
Methyl Anthracenes	142	1925722	< 0.01	< 0.01	0.0%	< 0.01	97%	70%	130%	98%	70%	130%		70%	130%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS).															
Benzene	807	1927503	< 0.005	< 0.005	NA	< 0.005	86%	80%	120%	106%	80%	120%	99%	60%	140%
Toluene	807	1927503	< 0.05	< 0.05	NA	< 0.05	84%	80%	120%	104%	80%	120%	98%	60%	140%
Ethylbenzene	807	1927503	< 0.01	< 0.01	NA	< 0.01	81%	80%	120%	101%	80%	120%	98%	60%	140%
Xylenes	807	1927503	< 0.05	< 0.05	NA	< 0.05	83%	80%	120%	107%	80%	120%	100%	60%	140%
C6 - C10 (F1)	807	1927503	< 10	< 10	NA	< 10	102%	80%	120%	108%	80%	120%	102%	60%	140%
C6 - C10 (F1 minus BTEX)	807	1927503	< 10	< 10	NA	< 10	102%	80%	120%	108%	80%	120%	102%	60%	140%
C10 - C16 (F2)	510	1927503	< 10	11	NA	< 10	94%	80%	120%	83%	80%	120%	84%	60%	140%
C16 - C34 (F3)	510	1927503	12	17	34.5%	< 10	94%	80%	120%	81%	80%	120%	84%	60%	140%
C34 - C50 (F4)	510	1927503	< 10	< 10	NA	< 10	94%	80%	120%	80%	80%	120%	82%	60%	140%

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CLIENT NAME: AECOM CANADA LTD **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A **ATTENTION TO: Dara Schmidt**

Trace Organics Analysis (Continued)

RPT Date: Oct 27, 2010			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	84	1925615	< 0.05	< 0.05	NA	< 0.05	104%	80%	120%	107%	70%	130%	123%	50%	150%
Aroclor 1254	84	1925615	2.26	2.17	4.1%	< 0.05	92%	80%	120%	81%	70%	130%	80%	50%	150%
Aroclor 1260	84	1925615	< 0.05	< 0.05	NA	< 0.05	98%	80%	120%	97%	70%	130%	120%	50%	150%
Total Polychlorinated Biphenyls	84	1925615	2.26	2.17	4.1%	< 0.05	98%	80%	120%	95%	70%	130%	108%	50%	150%
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	88	1946809	< 0.05	< 0.05	NA	< 0.05	96%	80%	120%	106%	70%	130%	135%	50%	150%
Aroclor 1254	88	1946809	< 0.05	< 0.05	NA	< 0.05	104%	80%	120%	87%	70%	130%	96%	50%	150%
Aroclor 1260	88	1946809	< 0.05	< 0.05	NA	< 0.05	110%	80%	120%	94%	70%	130%	108%	50%	150%
Total Polychlorinated Biphenyls	88	1946809	< 0.05	< 0.05	NA	< 0.05	103%	80%	120%	96%	70%	130%	113%	50%	150%

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Quality Assurance

CLIENT NAME: AECOM CANADA LTD | **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A | **ATTENTION TO: Dara Schmidt**

Water Analysis

RPT Date: Oct 27, 2010			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Routine Chemistry Water Analysis															
pH	1894	5106	7.6	7.6	0.0%		101%	90%	110%						
T - Alkalinity (as CaCO3)	1894	5106	612	612	0.0%	< 5	103%	90%	110%						
Electrical Conductivity	1894	5106	1010	1010	0.0%	< 1	104%	90%	110%						
Chloride	724	208	10	10	0.0%	< 1	99%	90%	110%				101%	90%	110%
Fluoride	724	208	0.10	0.10	0.0%	< 0.05	95%	90%	110%				92%	90%	110%
Nitrate	724	208	< 0.5	< 0.5	0.0%	< 0.5	99%	90%	110%				100%	90%	110%
Nitrite	724	208	0.05	0.05	0.0%	< 0.05	97%	90%	110%				96%	90%	110%
Sulfate	724	208	16	16	0.0%	< 1	100%	90%	110%				101%	90%	110%
Dissolved Calcium	6644	0	158	156	1.3%	< 0.3	100%	90%	110%				101%	75%	125%
Dissolved Magnesium	6644	0	51.0	50.9	0.1%	< 0.2	99%	90%	110%				100%	75%	125%
Dissolved Sodium	6644	0	41.0	40.7	0.8%	< 0.6	98%	90%	110%				101%	75%	125%
Dissolved Potassium	6644	0	4.3	4.2	0.6%	< 0.6	97%	90%	110%				101%	75%	125%
Dissolved Iron	6644	0	0.3	0.3	1.7%	< 0.1	102%	90%	110%				101%	75%	125%
Dissolved Manganese	6644	0	0.044	0.045	1.6%	< 0.005	103%	90%	110%				102%	75%	125%

Comments: N/A - Not Available.

PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
CCME / Alberta Tier 1 Metals (Total)															
Total Aluminum	251	761	0.78617	0.75879	3.5%	< 0.002	117%	80%	120%				109%	75%	125%
Total Antimony	251	761	< 0.001	< 0.001	0.0%	< 0.001	101%	80%	120%				101%	75%	125%
Total Arsenic	251	761	0.002	0.002	0.0%	< 0.001	103%	80%	120%				101%	75%	125%
Total Barium	251	761	0.13	0.13	0.0%	< 0.05	105%	90%	110%				96%	75%	125%
Total Boron	251	761	0.04082	0.04095	0.3%	< 0.01	116%	80%	120%				101%	75%	125%
Total Cadmium	251	761	< 0.000025	< 0.000025	0.0%	< 0.000016	104%	80%	120%				104%	75%	125%
Total Chromium	251	761	0.002	0.002	0.0%	< 0.001	119%	80%	120%				112%	75%	125%
Total Copper	251	761	0.002	0.002	0.0%	< 0.002	111%	80%	120%				108%	75%	125%
Total Iron	6645	761	0.4	0.4	0.1%	< 0.1	101%	90%	110%				101%	75%	125%
Total Lead	251	761	< 0.001	< 0.001	0.0%	< 0.001	106%	80%	120%				108%	75%	125%
Total Manganese	6645	761	0.015	0.015	1.3%	< 0.005	103%	90%	110%				102%	75%	125%
Total Molybdenum	251	761	< 0.003	< 0.003	0.0%	< 0.003	104%	90%	110%				104%	75%	125%
Total Nickel	251	761	< 0.003	< 0.003	0.0%	< 0.01	118%	80%	120%				110%	75%	125%
Total Selenium	251	761	< 0.001	< 0.001	0.0%	< 0.001	88%	80%	120%				94%	75%	125%
Total Silver	251	761	< 0.0001	< 0.0001	0.0%	< 0.00005	106%	80%	120%				105%	75%	125%
Total Sodium	6645	761	1.4	1.4	1.2%	< 0.6	100%	90%	110%				100%	75%	125%
Total Thallium	251	761	< 0.0001	< 0.0001	0.0%	< 0.0005	104%	90%	110%				107%	75%	125%
Total Uranium	251	761	0.00046	0.00044	4.4%	< 0.001	109%	90%	110%				108%	75%	125%
Total Zinc	251	761	0.0048	0.00431	10.8%	< 0.001	103%	90%	110%				103%	75%	125%

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Quality Assurance

CLIENT NAME: AECOM CANADA LTD | **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A | **ATTENTION TO: Dara Schmidt**

Water Analysis (Continued)

RPT Date: Oct 27, 2010			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

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Method Summary

CLIENT NAME: AECOM CANADA LTD **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A **ATTENTION TO: Dara Schmidt**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Occupational Hygiene Analysis			
Asbestos (Bulk)	INORG 93-6010	EPA 600/R-93/116 & NIOSH 9002	PLM
Asbestos (Bulk) Phase 1	INORG 93-6010	EPA 600/R-93/116 & NIOSH 9002	PLM
Asbestos (Bulk) Phase 2	INORG 93-6010	EPA 600/R-93/116 & NIOSH 9002	PLM
Soil Analysis			
Lead in Paint	SOIL 0280 & INST 0140	LEAD IN PAINT 1995	ICP/OES
Sieve Analysis - 75 microns (wet)	SOIL 0540; SOIL 0110	KROETSCH 2007; SHEPPARD 2007	SIEVE
Arsenic	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Arsenic	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Cadmium	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Chromium	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/OES
Cobalt	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Copper	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Cadmium	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Lead	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Chromium	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010, SHEPPARD	ICP/MS
Nickel	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Zinc	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Cobalt	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Copper	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Lead	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Nickel	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Zinc	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Lead	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP-MS
Lead - Leachate	SOIL 0420; INST 0140	EPA SW 846-1311; EATON 2005	ICP/OES

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Method Summary

CLIENT NAME: AECOM CANADA LTD **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A **ATTENTION TO: Dara Schmidt**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	TO 0570	EPA SW-846 8260	GC/MS
Toluene	TO 0570	EPA SW-846 8260	GC/MS
Ethylbenzene	TO 0570	EPA SW-846 8260	GC/MS
Xylenes	TO 0570	EPA SW-846 8260	GC/MS
C6 - C10 (F1)	TO 0570	CCME Tier 1 Method	GC/FID
C6 - C10 (F1 minus BTEX)	TO 0570	CCME Tier 1 Method	GC/FID
C10 - C16 (F2)	TO-0560	CCME Tier 1 Method	GC/FID
C16 - C34 (F3)	TO-0560	CCME Tier 1 Method	GC/FID
C34 - C50 (F4)	TO 0560	CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	TO 0560	CCME Tier 1 Method	GC/FID
Moisture Content	TO 0560	CCME Tier 1 Method	GRAVIMETRIC
Toluene-d8 (BTEX)	TO 0570	EPA SW-846 8260	GC/MS
Ethylbenzene-d10 (BTEX)	TO 0570	EPA SW-846 8260	GC/MS
o-Terphenyl (F2-F4)	TO 0560	CCME Tier 1 Method	GC/FID
Benzene	TO 0570	EPA SW-846 8260	GC/MS
Toluene	TO 0570	EPA SW-846 8260	GC/MS
Ethylbenzene	TO 0570	EPA SW-846 8260	GC/MS
Xylenes	TO 0570	EPA SW-846 8260	GC/MS
C6 - C10 (F1)	TO 0570	CCME Tier 1 Method	GC/FID
C6 - C10 (F1 minus BTEX)	TO 0570	CCME Tier 1 Method	GC/FID
C10 - C16 (F2)	TO-0560	CCME Tier 1 Method	GC/FID
C16 - C34 (F3)	TO-0560	CCME Tier 1 Method	GC/FID
C34 - C50 (F4)	TO 0560	CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	TO 0560	CCME Tier 1 Method	GC/FID
Moisture Content	TO 0560	CCME Tier 1 Method	GRAVIMETRIC
Toluene-d8 (BTEX)	TO 0570	EPA SW-846 8260	GC/MS
Ethylbenzene-d10 (BTEX)	TO 0570	EPA SW-846 8260	GC/MS
o-Terphenyl (F2-F4)	TO 0560	CCME Tier 1 Method	GC/FID
Benzene	TO 0540	EPA SW846 8260	GC/MS
Toluene	TO 0540	EPA SW846 8260	GC/MS
Ethylbenzene	TO 0540	EPA SW846 8260	GC/MS
Xylenes	TO 0540	EPA SW846 8260	GC/MS
C6 - C10 (F1)	TO 0540	CCME Tier 1 Method	GC/FID
C6 - C10 (F1 minus BTEX)	TO 0540	CCME Tier 1 Method	GC/FID
C10 - C16 (F2)	TO 0511	CCME Tier 1 Method	GC/FID
C16 - C34 (F3)	TO-0511	CCME Tier 1 Method	GC/FID
C34 - C50 (F4)	TO-0511	CCME Tier 1 Method	GC/FID
Toluene-d8 (BTEX)	TO 0340	EPA SW846 8260	GC/FID
o-Terphenyl (F2-F4)	TO 0511	CCME Tier 1 Method	GC/FID
Naphthalene			
Methyl Naphthalenes			
Dimethyl Naphthalenes			
Acenaphthylene			
Acenaphthene			
Fluorene			
Phenanthrene			
Anthracene			
Fluoranthene			
Pyrene			

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Method Summary

CLIENT NAME: AECOM CANADA LTD **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A **ATTENTION TO: Dara Schmidt**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Benzo[a]anthracene			
Chrysene			
Benzo(b+j)fluoranthene			
Benzo(k)fluoranthene			
Benzo[a]pyrene			
Indeno[1,2,3-cd]pyrene			
Dibenzofuran			
Dibenz[ah]anthracene			
Benzo[ghi]perylene			
Pentachlorophenol			
Carbazole			
Methyl Anthracenes			
3-Methylcholanthrene			
Aroclor 1242	TO 0410	EPA SW-846 3550 & 8080	GC/ECD
Aroclor 1254	TO 0410	EPA SW-846 3550 & 8080	GC/ECD
Aroclor 1260	TO 0410	EPA SW-846 3550 & 8080	GC/ECD
Total Polychlorinated Biphenyls	TO 0410	EPA SW-846 3550 & 8080	GC/ECD
Decachlorobiphenyl	TO 0410		GC/ECD
Decachlorobiphenyl	TO 0410	EPA SW-846 3550 & 8080	GC/ECD
Aroclor 1242	TO 0400	EPA 608, AEC A106.0	GC/ECD
Aroclor 1254	TO 0400	EPA 608, AEC A106.0	GC/ECD
Aroclor 1260	TO 0400	EPA 608, AEC A106.0	GC/ECD
Polychlorinated Biphenyls	TO 0400	EPA 608, AEC A106.0	GC/ECD
Decachlorobiphenyl	TO 0400		GC/ECD

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Method Summary

CLIENT NAME: AECOM CANADA LTD **AGAT WORK ORDER: 10E426723**

PROJECT NO: CAM- A **ATTENTION TO: Dara Schmidt**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Aluminum	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Antimony	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP-MS
Total Arsenic	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP-MS
Total Barium	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Boron	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Cadmium	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Chromium	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Copper	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Iron	WATR 0200; INST 0140	SM 3030 E; SM 3120 B	ICP/OES
Total Lead	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP-MS
Total Manganese	WATR 0200; INST 0140	SM 3030 E; SM 3120 B	ICP/OES
Total Molybdenum	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Nickel	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Selenium	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP-MS
Total Silver	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Sodium	WATR 0200; INST 0140	SM 3030 E; SM 3120 B	ICP/OES
Total Thallium	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Uranium	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
Total Zinc	WATR 0200; INST 0141	SM 3030 E; SM 3125 B	ICP/MS
pH	INST 0101	SM 4500 H+	pH METER
p - Alkalinity (as CaCO3)	INST 0101	SM 2320 B	TITRATION
T - Alkalinity (as CaCO3)	INST 0101	SM 2320 B	TITRATION
Bicarbonate	INST 0101	SM 2320 B	TITRATION
Carbonate	INST 0101	SM 2320 B	TITRATION
Hydroxide	INST 0101	SM 2320 B	TITRATION
Electrical Conductivity	INST 0101	SM 2510 B	CONDUCTIVITY METER
Chloride	INST 0150	SM 4110 B	ION CHROMATOGRAPH
Fluoride	INST 0150	SM 4110 B	ION CHROMATOGRAPH
Nitrate	INST 0150	SM 4110 B	ION CHROMATOGRAPH
Sulfate	INST 0150	SM 4110 B	ION CHROMATOGRAPH
Dissolved Calcium	INST 0140	SM 3120 B	ICP/OES
Dissolved Magnesium	INST 0140	SM 3120 B	ICP/OES
Dissolved Sodium	INST 0140	SM 3120 B	ICP/OES
Dissolved Potassium	INST 0140	SM 3120 B	ICP/OES
Dissolved Iron	INST 0140	SM 3120 B	ICP/OES
Dissolved Manganese	INST 0140	SM 3120 B	ICP/OES

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CLIENT NAME: AECOM CANADA LTD
2540 KENSINGTON ROAD NW
Calgary, AB 403270

ATTENTION TO: Dara Schmidt

PROJECT NO: CAM-A

AGAT WORK ORDER: 10E425435

SOIL ANALYSIS REVIEWED BY: Irina Gankovsky, Analyst

TRACE ORGANICS REVIEWED BY: Ron Brockbank, Trace Organics Supervisor

DATE REPORTED: Oct 27, 2010

PAGES (INCLUDING COVER): 16

VERSION*: 4

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005, or at 1-866-764-7554

*NOTES

VERSION 4:Aug 19 – PCB added to samples 255, 333 to 334
- Metals added to samples 333 to 334
- Sieve added to samples 348 and 378

Aug 20 – PCB added to samples 268, 273, 276, 277, 299, 303, 304, 319, 323, 344, 807, 810, and 811

Aug 30 – PCB added to samples 805, 809, and 812

Sept 16 – PCB added to samples 823 and 824

Sept 17 – PCB added to sample 839
- Metals added to sample 839

Oct 12 - Metals added to samples 253, 257, 262, 268, 275, 282, 288, 295, 302, 308, 315, 326, 792, 795, 802, 804, 806, 823, 826, 829, 833, and 836

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 10E425435
PROJECT NO: CAM-A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Particle Size by Sieve

DATE SAMPLED: Aug 02, 2010 | DATE RECEIVED: Aug 07, 2010 | DATE REPORTED: Oct 27, 2010 | SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	348 1914715	378 1914744
Sieve Analysis - 75 microns (wet)	%		N/A	96.2	99.3
Sieve Texture				Coarse	Coarse

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1914715-1914744 Value reported is amount of sample retained on sieve after wash with water and represents proportion by weight particles larger than indicated sieve size.

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Certificate of Analysis

AGAT WORK ORDER: 10E425435

PROJECT NO: CAM-A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Soil Analysis - Metals

DATE SAMPLED: Aug 02, 2010 | DATE RECEIVED: Aug 07, 2010 | DATE REPORTED: Oct 27, 2010 | SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	253 1914624	257 1914626	262 1914628	268 1914634	275 1914642	282 1914649	288 1914656	295 1914663
Arsenic	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	1.2	1.5	2.9	3.8	1.8	1.1	2.8	0.9
Cobalt	mg/kg		0.5	<0.5	<0.5	0.7	0.8	0.9	0.7	0.8	<0.5
Copper	mg/kg		0.5	7.4	74.0	4.4	1.3	1.8	1.5	8.3	0.9
Lead	mg/kg		0.5	1.6	2.6	1.7	1.2	1.8	0.9	2.0	0.6
Mercury	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	mg/kg		0.5	0.9	0.9	2.3	1.8	1.7	1.0	2.2	0.5
Zinc	mg/kg		1	3	16	4	4	6	5	15	3

Parameter	Unit	G / S	RDL	302 1914670	308 1914676	315 1914683	326 1914695	362 1914728	366 1914732	370 1914736	371 1914737
Arsenic	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	1.0	0.9	1.1	1.2	0.9	0.6	0.8	1.2
Cobalt	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
Copper	mg/kg		0.5	6.6	4.0	2.0	7.8	1.3	<0.5	0.7	0.8
Lead	mg/kg		0.5	1.4	1.4	0.9	2.5	1.1	0.5	0.6	0.7
Mercury	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	mg/kg		0.5	0.8	<0.5	0.6	0.9	0.7	0.5	0.7	1.3
Zinc	mg/kg		1	7	9	3	14	2	2	2	3

Parameter	Unit	G / S	RDL	375 1914741	379 1914745	384 1914750	390 1914756	391 1914757	393 1914759	407 1914763	412 1914768
Arsenic	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	1.0	0.9	0.7	1.1	2.2	5.8	0.7	1.1
Cobalt	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.7	<0.5	<0.5
Copper	mg/kg		0.5	<0.5	<0.5	0.6	0.5	1.7	2.0	0.6	0.8
Lead	mg/kg		0.5	0.5	0.5	0.5	0.6	0.6	2.1	<0.5	<0.5
Mercury	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	mg/kg		0.5	0.6	0.5	0.7	0.9	2.1	3.6	0.7	0.7
Zinc	mg/kg		1	2	1	2	6	5	47	2	6

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AGAT WORK ORDER: 10E425435
PROJECT NO: CAM-A

CLIENT NAME: AECOM CANADA LTD
ATTENTION TO: Dara Schmidt

Soil Analysis - Metals

DATE SAMPLED: Aug 02, 2010 DATE RECEIVED: Aug 07, 2010 DATE REPORTED: Oct 27, 2010 SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	418 1914774	420 1914776	424 1914780	792 1914782	795 1914785	802 1914793	804 1914795	806 1914797
Arsenic	mg/kg		0.5	<0.5	<0.5	<0.5	0.7	0.7	0.8	2.4	0.7
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg		0.5	1.0	1.6	0.7	4.4	3.8	4.7	3.9	2.9
Cobalt	mg/kg		0.5	<0.5	0.5	<0.5	1.4	1.3	1.6	1.4	1.0
Copper	mg/kg		0.5	0.9	1.2	0.7	4.4	2.9	4.6	5.6	3.8
Lead	mg/kg		0.5	0.7	1.2	2.6	12.6	5.0	15.3	8.5	5.8
Mercury	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	mg/kg		0.5	0.9	1.1	0.6	4.7	4.9	5.0	4.9	4.4
Zinc	mg/kg		1	2	2	4	9	5	13	10	5

Parameter	Unit	G / S	RDL	823 1914814	826 1914817	829 1914820	833 1914826	836 1914829	839 1914832	333 1914951	334 1914952
Arsenic	mg/kg		0.5	0.8	0.9	0.8	0.8	1.7	22.3	<0.5	<0.5
Cadmium	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	8.4	<0.5	<0.5
Chromium	mg/kg		0.5	3.1	4.2	4.0	7.6	4.3	85.6	0.9	1.1
Cobalt	mg/kg		0.5	1.2	1.4	1.5	2.0	2.0	10.6	<0.5	<0.5
Copper	mg/kg		0.5	3.2	3.3	2.5	2.7	4.1	90.0	2.5	2.3
Lead	mg/kg		0.5	4.5	8.9	3.8	3.0	2.7	840	0.6	0.6
Mercury	mg/kg		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel	mg/kg		0.5	4.4	5.2	5.7	4.4	4.0	16.7	<0.5	<0.5
Zinc	mg/kg		1	6	12	6	8	5	2870	6	5

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
1914624-1914952 Results are based on the dry weight of the sample.

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AGAT WORK ORDER: 10E425435
PROJECT NO: CAM-A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 04, 2010 | DATE RECEIVED: Aug 07, 2010 | DATE REPORTED: Oct 27, 2010 | SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	792 1914782	793 1914783	794 1914784	795 1914785	796 1914786	797 1914787	798 1914788	799 1914789
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	11	<10	12	<10	<10	<10	15	<10
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	7	2.9	3.5	3.4	4.7	2.6	3.1	3.6
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		86	88	88	86	104	98	90	89
Ethylbenzene-d10 (BTEX)	%	50-150		74	77	85	83	95	96	89	84
o-Terphenyl (F2-F4)	%	50-150		96.2	99.8	95.0	92.4	93.2	95.0	95.6	94.4

Parameter	Unit	G / S	RDL	800 1914790	801 1914792	813 1914804	814 1914805	815 1914806	816 1914807	817 1914808	818 1914809
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	35	<10	<10
C16 - C34 (F3)	mg/kg		10	<10	<10	14	27	39	46	193	46
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	11	13	<10	20	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	2.7	2.8	2.7	2.7	2.6	3.2	4.3	2.9
Surrogate	Unit	Acceptable Limits									
Toluene-d8 (BTEX)	%	50-150		100	80	87	90	94	99	92	100
Ethylbenzene-d10 (BTEX)	%	50-150		75	72	82	76	78	75	90	78
o-Terphenyl (F2-F4)	%	50-150		98.0	93.1	98.9	98.2	97.6	93.6	96.4	92.8

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AGAT WORK ORDER: 10E425435
PROJECT NO: CAM-A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 04, 2010 | DATE RECEIVED: Aug 07, 2010 | DATE REPORTED: Oct 27, 2010 | SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	819 1914810	820 1914811	821 1914812	822 1914813	823 1914814	824 1914815	825 1914816	826 1914817
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	64
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	9.5	3	3.2	1.9	2.9	2.8	3.1	5.7
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		99	100	85	94	98	90	95	100
Ethylbenzene-d10 (BTEX)	%	50-150		88	84	68	77	87	76	87	78
o-Terphenyl (F2-F4)	%	50-150		89.2	89.6	94.0	97.9	106	103	104	103

Parameter	Unit	G / S	RDL	827 1914818	828 1914819	829 1914820	830 1914821	831 1914824	832 1914825	833 1914826	834 1914827
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	133	<10	35	118	<10	<10	<10
C16 - C34 (F3)	mg/kg		10	<10	128	41	<10	59	<10	<10	33
C34 - C50 (F4)	mg/kg		10	<10	<10	<10	<10	<10	<10	<10	<10
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	4.4	4.5	5	4.1	5.4	2.5	3.1	5
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8 (BTEX)	%	50-150		94	101	97	104	94	103	97	102
Ethylbenzene-d10 (BTEX)	%	50-150		84	84	76	87	85	100	71	86
o-Terphenyl (F2-F4)	%	50-150		97.2	103	99.9	104	102	99.8	97.7	91.5

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AGAT WORK ORDER: 10E425435
PROJECT NO: CAM-A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)

DATE SAMPLED: Aug 04, 2010 | DATE RECEIVED: Aug 07, 2010 | DATE REPORTED: Oct 27, 2010 | SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	835 1914828	836 1914829	837 1914830	838 1914831	839 1914832
Benzene	mg/kg		0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Toluene	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	mg/kg		0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenes	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
C6 - C10 (F1)	mg/kg		10	<10	<10	<10	<10	<10
C6 - C10 (F1 minus BTEX)	mg/kg		10	<10	<10	<10	<10	<10
C10 - C16 (F2)	mg/kg		10	<10	<10	<10	<10	41
C16 - C34 (F3)	mg/kg		10	36	<10	37	<10	4680
C34 - C50 (F4)	mg/kg		10	11	<10	<10	<10	786
Gravimetric Heavy Hydrocarbons	mg/kg		1000	N/A	N/A	N/A	N/A	N/A
Moisture Content	%		1	5	4	6	4	39
Surrogate	**Unit**	**Acceptable Limits**						
Toluene-d8 (BTEX)	%	50-150		97	99	99	98	99
Ethylbenzene-d10 (BTEX)	%	50-150		85	98	104	86	100
o-Terphenyl (F2-F4)	%	50-150		100	91.5	105	96.6	102

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ABTier1 (Ag,F)

1914782-1914832 Results are based on the dry weight of the sample.
The C6-C10 (F1) fraction is calculated using toluene response factor.
The C10 - C16 (F2), C16 - C34 (F3), and C34 - C50 (F4) fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons (F4g) are not included in and cannot be added to the Total C6-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
Total C6 - C50 results are corrected for BTEX and PAH contributions (if requested).
Quality control data is available upon request.
Assistance in the interpretation of data is available upon request.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
The chromatogram returned to baseline by the retention time of nC50.
Extraction and holding times were met for this sample.

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AGAT WORK ORDER: 10E425435
PROJECT NO: CAM-A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Polychlorinated Biphenyls Analysis - Soil

DATE SAMPLED: Aug 02, 2010 | DATE RECEIVED: Aug 07, 2010 | DATE REPORTED: Oct 27, 2010 | SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	253 1914624	257 1914626	262 1914628	268 1914634	273 1914640	275 1914642	276 1914643	277 1914644
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	0.72	<0.05	<0.05	<0.05	1.92	0.31	<0.05
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	0.72	<0.05	<0.05	<0.05	1.92	0.31	<0.05
Surrogate	Unit	Acceptable Limits									
Decachlorobiphenyl	%	70-130		88	86	91	106	105	96	106	109

Parameter	Unit	G / S	RDL	282 1914649	288 1914656	295 1914663	299 1914667	302 1914670	303 1914671	304 1914672	308 1914676
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	0.12	0.06	<0.05	2.86	0.05	<0.05	0.29
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	0.12	0.06	<0.05	2.86	0.05	<0.05	0.29
Surrogate	Unit	Acceptable Limits									
Decachlorobiphenyl	%	70-130		94	85	88	103	97	111	113	91

Parameter	Unit	G / S	RDL	315 1914683	319 1914688	322 1914691	323 1914692	326 1914695	344 1914711	362 1914728	366 1914732
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	0.06	<0.05	1.46	0.09	0.15	<0.05	<0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	0.06	<0.05	1.46	0.09	0.15	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits									
Decachlorobiphenyl	%	70-130		89	94	95	99	89	95	91	93

Parameter	Unit	G / S	RDL	370 1914736	371 1914737	375 1914741	379 1914745	384 1914750	390 1914756	391 1914757	393 1914759
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate	Unit	Acceptable Limits									
Decachlorobiphenyl	%	70-130		88	91	91	94	95	93	96	95

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AGAT WORK ORDER: 10E425435
PROJECT NO: CAM-A

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Polychlorinated Biphenyls Analysis - Soil

DATE SAMPLED: Aug 02, 2010 DATE RECEIVED: Aug 07, 2010 DATE REPORTED: Oct 27, 2010 SAMPLE TYPE: Soil

Parameter	Unit	G / S	RDL	407 1914763	412 1914768	418 1914774	420 1914776	424 1914780	802 1914793	804 1914795	805 1914796
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.2
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.2
Surrogate	Unit	Acceptable Limits									
Decachlorobiphenyl	%	70-130		91	96	93	93	90	92	85	83

Parameter	Unit	G / S	RDL	806 1914797	807 1914798	808 1914799	809 1914800	810 1914801	811 1914802	812 1914803	823 1914814
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	17.7	5.19	0.17	0.1	0.42	0.26	0.51	<0.05
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	17.7	5.19	0.17	0.1	0.42	0.26	0.51	<0.05
Surrogate	Unit	Acceptable Limits									
Decachlorobiphenyl	%	70-130		89	98	90	85	96	104	87	89

Parameter	Unit	G / S	RDL	824 1914815	839 1914832	255 1914946	333 1914951	334 1914952
Aroclor 1242	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Aroclor 1254	mg/kg		0.05	<0.05	18.4	<0.05	0.09	0.12
Aroclor 1260	mg/kg		0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Polychlorinated Biphenyls	mg/kg		0.05	<0.05	18.4	<0.05	0.09	0.12
Surrogate	Unit	Acceptable Limits						
Decachlorobiphenyl	%	70-130		91	100	97	93	98

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CLIENT NAME: AECOM CANADA LTD ATTENTION TO: Dara Schmidt

Polychlorinated Biphenyls Analysis - Soil

DATE SAMPLED: Aug 02, 2010 DATE RECEIVED: Aug 07, 2010 DATE REPORTED: Oct 27, 2010 SAMPLE TYPE: Soil

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1914624-1914643	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis. Arochlor Type:1254
1914644	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1914649-1914663	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis. Arochlor Type:1254
1914667	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1914670-1914671	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis. Arochlor Type:1254
1914672	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1914676-1914683	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis. Arochlor Type:1254
1914688	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1914691-1914695	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis. Arochlor Type:1254
1914711	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1914728-1914774	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1914776-1914793	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis. Arochlor Type:1254
1914795-1914796	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1914797-1914799	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis. Arochlor Type:1254
1914800	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1914801-1914802	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.

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CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dara Schmidt

Polychlorinated Biphenyls Analysis - Soil

DATE SAMPLED: Aug 02, 2010 | DATE RECEIVED: Aug 07, 2010 | DATE REPORTED: Oct 27, 2010 | SAMPLE TYPE: Soil

	Arochlor Type:1254
1914803	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis.
1914814-1914832	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis: % Arochlor Type:
1914946-1914952	Results are based on the dry weight of the sample. Recovery of decachlorobiphenyl surrogate added to sample prior to analysis. Arochlor Type:

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Quality Assurance

CLIENT NAME: AECOM CANADA LTD | AGAT WORK ORDER: 10E425435

PROJECT NO: CAM-A | ATTENTION TO: Dara Schmidt

Soil Analysis

RPT Date: Oct 27, 2010

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	Dup #2	RPD	Method Blank	REFERENCE MATERIAL Measured Value	Acceptable Limits Lower	Upper	METHOD BLANK SPIKE Recovery	Acceptable Limits Lower	Upper	MATRIX SPIKE Recovery	Acceptable Limits Lower	Upper
Soil Analysis - Metals															
Arsenic	249	1854714	5.6	5.6	0.0%	< 0.5	96%	90%	110%				102%	75%	125%
Cadmium	249	1854714	< 0.5	< 0.5	0.0%	< 0.5	97%	90%	110%				109%	75%	125%
Chromium	249	1854714	13.7	13.7	0.0%	< 0.5	94%	90%	110%				115%	75%	125%
Cobalt	249	1854714	7.4	6.5	12.9%	< 0.5	97%	90%	110%				97%	75%	125%
Copper	249	1854714	13.7	13.9	1.4%	< 0.5	97%	90%	110%				98%	75%	125%
Lead	249	1854714	11.0	10.3	6.6%	< 0.5	102%	90%	110%				99%	75%	125%
Mercury	249	1854714	< 0.5	< 0.5	0.0%	< 0.5	99%	90%	110%				102%	75%	125%
Nickel	249	1854714	18.1	18.0	0.6%	< 0.5	100%	90%	110%				100%	75%	125%
Zinc	249	1854714	56	54	3.6%	< 1	104%	90%	110%				104%	75%	125%
Soil Analysis - Metals															
Arsenic	1385	1945914	10.2	10.3	1.0%	< 0.5	99%	90%	110%				109%	75%	125%
Cadmium	1385	1945914	0.6	0.6	0.0%	< 0.5	97%	90%	110%				101%	75%	125%
Chromium	1385	1945914	28.8	27.4	5.0%	< 0.5	98%	90%	110%				97%	75%	125%
Cobalt	1385	1945914	19.0	18.1	4.9%	< 0.5	104%	90%	110%				119%	75%	125%
Copper	1385	1945914	34.9	34.5	1.2%	< 0.5	95%	90%	110%				101%	75%	125%
Lead	1385	1945914	21.6	21.3	1.4%	< 0.5	109%	90%	110%				105%	75%	125%
Mercury	1385	1945914	< 0.5	< 0.5	0.0%	< 0.5	117%	80%	120%		90%	110%	108%	75%	125%
Nickel	1385	1945914	47.4	45.4	4.3%	< 0.5	96%	90%	110%				108%	75%	125%
Zinc	1385	1945914	145	143	1.4%	< 1	116%	80%	120%				111%	75%	125%
Particle Size by Sieve															
Sieve Analysis - 75 microns (wet)	1202	5783	29.3	30.6	4.3%	N/A	100%	90%	110%						
Soil Analysis - Metals															
Arsenic	277	2000601	3.9	4.2	7.4%	< 0.5	91%	90%	110%	101%	90%	110%	99%	75%	125%
Cadmium	277	2000601	< 0.5	< 0.5	0.0%	< 0.5	104%	90%	110%	102%	90%	110%	100%	75%	125%
Chromium	277	2000601	4.8	4.6	4.3%	< 0.5	103%	90%	110%	99%	90%	110%	98%	75%	125%
Cobalt	277	2000601	3.2	3.1	3.2%	< 0.5	101%	90%	110%	100%	90%	110%	103%	75%	125%
Copper	277	2000601	2.3	2.4	4.3%	< 0.5	96%	90%	110%	102%	90%	110%	104%	75%	125%
Lead	277	2000601	2.8	2.9	3.5%	< 0.5	103%	90%	110%	108%	90%	110%	121%	75%	125%
Mercury	277	2000601	< 0.5	< 0.5	0.0%	< 0.5	101%	90%	110%	104%	90%	110%	106%	75%	125%
Nickel	277	2000601	7.8	7.8	0.0%	< 0.5	107%	90%	110%	100%	90%	110%	106%	75%	125%
Zinc	277	2000601	17	17	0.0%	< 1	105%	90%	110%	101%	90%	110%	101%	75%	125%
Soil Analysis - Metals															
Arsenic	1429	1914826	1.1	1.4	24.0%	< 0.5	95%	90%	110%				80%	75%	125%
Cadmium	1429	1914826	< 0.5	< 0.5	0.0%	< 0.5	96%	90%	110%				96%	75%	125%
Chromium	1429	1914826	8.0	10.2	24.2%	< 0.5	92%	90%	110%				94%	75%	125%
Cobalt	1429	1914826	50.2	48.3	3.9%	< 0.5	92%	90%	110%				102%	75%	125%
Copper	1429	1914826	53.8	52.4	2.6%	< 0.5	93%	90%	110%				93%	75%	125%
Lead	1429	1914826	93.8	95.8	2.1%	< 0.5	93%	90%	110%				102%	60%	140%

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Quality Assurance

CLIENT NAME: AECOM CANADA LTD | AGAT WORK ORDER: 10E425435

PROJECT NO: CAM-A | ATTENTION TO: Dara Schmidt

Soil Analysis (Continued)

RPT Date: Oct 27, 2010			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Mercury	1429	1914826	<0.5	<0.5	0.0%	< 0.5	113%	70%	130%		70%	130%	111%	70%	130%
Nickel	1429	1914826	89.8	87.9	2.1%	< 0.5	92%	90%	110%				106%	75%	125%
Zinc	1429	1914826	8	8	0.0%	< 1	108%	90%	110%				103%	75%	125%

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Quality Assurance

CLIENT NAME: AECOM CANADA LTD — AGAT WORK ORDER: 10E425435

PROJECT NO: CAM-A — ATTENTION TO: Dara Schmidt

Trace Organics Analysis

RPT Date: Oct 27, 2010			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	566	1914811	< 0.005	< 0.005	NA	< 0.005	88%	80%	120%	86%	80%	120%	89%	60%	140%
Toluene	566	1914811	< 0.05	< 0.05	NA	< 0.05	88%	80%	120%	82%	80%	120%	77%	60%	140%
Ethylbenzene	566	1914811	< 0.01	< 0.01	NA	< 0.01	86%	80%	120%	84%	80%	120%	72%	60%	140%
Xylenes	566	1914811	< 0.05	< 0.05	NA	< 0.05	83%	80%	120%	86%	80%	120%	72%	60%	140%
C6 - C10 (F1)	566	1914811	< 10	< 10	NA	< 10	109%	80%	120%	111%	80%	120%	106%	60%	140%
C6 - C10 (F1 minus BTEX)	566	1914811	< 10	< 10	NA	< 10	109%	80%	120%	111%	80%	120%	106%	60%	140%
C10 - C16 (F2)	1089	1914811	<10	<10	NA	< 10	88%	80%	120%	82%	80%	120%	85%	60%	140%
C16 - C34 (F3)	1089	1914811	<10	<10	NA	< 10	88%	80%	120%	86%	80%	120%	90%	60%	140%
C34 - C50 (F4)	1089	1914811	<10	<10	NA	< 10	88%	80%	120%	86%	80%	120%	90%	60%	140%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	566				0.0%	< 0.005	88%	80%	120%	86%	80%	120%	89%	60%	140%
Toluene	566				0.0%	< 0.05	88%	80%	120%	82%	80%	120%	77%	60%	140%
Ethylbenzene	566				0.0%	< 0.01	86%	80%	120%	84%	80%	120%	72%	60%	140%
Xylenes	566				0.0%	< 0.05	83%	80%	120%	86%	80%	120%	72%	60%	140%
C6 - C10 (F1)	566				0.0%	< 10	109%	80%	120%	111%	80%	120%	106%	60%	140%
C6 - C10 (F1 minus BTEX)	566				0.0%	< 10	109%	80%	120%	111%	80%	120%	106%	60%	140%
Toluene-d8 (BTEX)	566				96.0%	< 0.05	97%	50%	150%	99%	50%	150%	99%	50%	150%
Ethylbenzene-d10 (BTEX)	566				83.0%	< 0.03	84%	50%	150%	101%	50%	150%	97%	50%	150%
Petroleum Hydrocarbons (BTEX/F1-F4) in Soil (CWS)															
Benzene	567	1914826	< 0.005	< 0.005	NA	< 0.005	88%	80%	120%	95%	80%	120%	85%	60%	140%
Toluene	567	1914826	< 0.05	< 0.05	NA	< 0.05	91%	80%	120%	88%	80%	120%	80%	60%	140%
Ethylbenzene	567	1914826	< 0.01	< 0.01	NA	< 0.01	93%	80%	120%	91%	80%	120%	78%	60%	140%
Xylenes	567	1914826	< 0.05	< 0.05	NA	< 0.05	90%	80%	120%	90%	80%	120%	75%	60%	140%
C6 - C10 (F1)	567	1914826	< 10	< 10	NA	< 10	89%	80%	120%	111%	80%	120%	72%	60%	140%
C6 - C10 (F1 minus BTEX)	567	1914826	< 10	< 10	NA	< 10	89%	80%	120%	111%	80%	120%	72%	60%	140%
C10 - C16 (F2)	1089	1914826	<10	<10	NA	< 10	109%	80%	120%	109%	80%	120%	110%	60%	140%
C16 - C34 (F3)	1089	1914826	<10	<10	NA	< 10	109%	80%	120%	120%	80%	120%	121%	60%	140%
C34 - C50 (F4)	1089	1914826	<10	<10	NA	< 10	109%	80%	120%	113%	80%	120%	116%	60%	140%
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	73	1914626	< 0.05	< 0.05	NA	< 0.05	112%	80%	120%	103%	70%	130%	95%	50%	150%
Aroclor 1254	73	1914626	0.52	0.72	32.3%	< 0.05	100%	80%	120%	105%	70%	130%	87%	50%	150%
Aroclor 1260	73	1914626	< 0.05	< 0.05	NA	< 0.05	94%	80%	120%	109%	70%	130%	106%	50%	150%
Total Polychlorinated Biphenyls	73	1914626	0.52	0.72	32.3%	< 0.05	102%	80%	120%	106%	70%	130%	96%	50%	150%
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	73	1914759	< 0.05	< 0.05	NA	< 0.05	108%	80%	120%	130%	70%	130%	84%	50%	150%
Aroclor 1254	73	1914759	< 0.05	< 0.05	NA	< 0.05	98%	80%	120%	130%	70%	130%	99%	50%	150%
Aroclor 1260	73	1914759	< 0.05	< 0.05	NA	< 0.05	96%	80%	120%	108%	70%	130%	95%	50%	150%
Total Polychlorinated Biphenyls	73	1914759	< 0.05	< 0.05	NA	< 0.05	101%	80%	120%	124%	70%	130%	93%	50%	150%

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CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 10E425435

PROJECT NO: CAM-A

ATTENTION TO: Dara Schmidt

Trace Organics Analysis (Continued)

RPT Date: Oct 27, 2010			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	79	1914640	< 0.05	< 0.05	NA	< 0.05	110%	80%	120%	125%	70%	130%	118%	50%	150%
Aroclor 1254	79	1914640	< 0.05	< 0.05	NA	< 0.05	96%	80%	120%	94%	70%	130%	125%	50%	150%
Aroclor 1260	79	1914640	< 0.05	< 0.05	NA	< 0.05	96%	80%	120%	83%	70%	130%	100%	50%	150%
Total Polychlorinated Biphenyls	79	1914640	< 0.05	< 0.05	NA	< 0.05	101%	80%	120%	101%	70%	130%	114%	50%	150%
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	80	1914640	< 0.05	< 0.05	NA	< 0.05	106%	80%	120%	109%	70%	130%	128%	50%	150%
Aroclor 1254	80	1914640	< 0.05	< 0.05	NA	< 0.05	120%	80%	120%	88%	70%	130%	119%	50%	150%
Aroclor 1260	80	1914640	< 0.05	< 0.05	NA	< 0.05	118%	80%	120%	77%	70%	130%	99%	50%	150%
Total Polychlorinated Biphenyls	80	1914640	< 0.05	< 0.05	NA	< 0.05	115%	80%	120%	91%	70%	130%	115%	50%	150%
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	84	1925615	< 0.05	< 0.05	NA	< 0.05	104%	80%	120%	107%	70%	130%	123%	50%	150%
Aroclor 1254	84	1925615	2.26	2.17	4.1%	< 0.05	92%	80%	120%	81%	70%	130%	80%	50%	150%
Aroclor 1260	84	1925615	< 0.05	< 0.05	NA	< 0.05	98%	80%	120%	97%	70%	130%	120%	50%	150%
Total Polychlorinated Biphenyls	84	1925615	2.26	2.17	4.1%	< 0.05	98%	80%	120%	95%	70%	130%	108%	50%	150%
Polychlorinated Biphenyls Analysis - Soil															
Aroclor 1242	88	1946809	< 0.05	< 0.05	NA	< 0.05	96%	80%	120%	106%	70%	130%	135%	50%	150%
Aroclor 1254	88	1946809	< 0.05	< 0.05	NA	< 0.05	104%	80%	120%	87%	70%	130%	96%	50%	150%
Aroclor 1260	88	1946809	< 0.05	< 0.05	NA	< 0.05	110%	80%	120%	94%	70%	130%	108%	50%	150%
Total Polychlorinated Biphenyls	88	1946809	< 0.05	< 0.05	NA	< 0.05	103%	80%	120%	96%	70%	130%	113%	50%	150%

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Method Summary

CLIENT NAME: AECOM CANADA LTD
AGAT WORK ORDER: 10E425435
PROJECT NO: CAM-A
ATTENTION TO: Dara Schmidt

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Sieve Analysis - 75 microns (wet)	SOIL 0540; SOIL 0110	KROETSCH 2007; SHEPPARD 2007	SIEVE
Arsenic	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Cadmium	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Chromium	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Cobalt	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Copper	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Cadmium	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Lead	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Chromium	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Mercury	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Cobalt	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010;SHEPPARD	ICP/MS
Nickel	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Zinc	SOIL 0390; SOIL 0110; SOIL 0120; INST 0141	EPA SW 846-3050/6010; SHEPPARD	ICP/MS
Trace Organics Analysis			
Benzene	TO 0570	EPA SW-846 8260	GC/MS
Toluene	TO 0570	EPA SW-846 8260	GC/MS
Ethylbenzene	TO 0570	EPA SW-846 8260	GC/MS
Xylenes	TO 0570	EPA SW-846 8260	GC/MS
C6 - C10 (F1)	TO 0570	CCME Tier 1 Method	GC/FID
C6 - C10 (F1 minus BTEX)	TO 0570	CCME Tier 1 Method	GC/FID
C10 - C16 (F2)	TO-0560	CCME Tier 1 Method	GC/FID
C16 - C34 (F3)	TO-0560	CCME Tier 1 Method	GC/FID
C34 - C50 (F4)	TO 0560	CCME Tier 1 Method	GC/FID
Gravimetric Heavy Hydrocarbons	TO 0560	CCME Tier 1 Method	GC/FID
Moisture Content	TO 0560	CCME Tier 1 Method	GRAVIMETRIC
Toluene-d8 (BTEX)	TO 0570	EPA SW-846 8260	GC/MS
Ethylbenzene-d10 (BTEX)	TO 0570	EPA SW-846 8260	GC/MS
o-Terphenyl (F2-F4)	TO 0560	CCME Tier 1 Method	GC/FID
Aroclor 1242	TO 0410	EPA SW-846 3550 & 8080	GC/ECD
Aroclor 1254	TO 0410	EPA SW-846 3550 & 8080	GC/ECD
Aroclor 1260	TO 0410	EPA SW-846 3550 & 8080	GC/ECD
Total Polychlorinated Biphenyls	TO 0410	EPA SW-846 3550 & 8080	GC/ECD
Decachlorobiphenyl	TO 0410		GC/ECD
Decachlorobiphenyl	TO 0410	EPA SW-846 3550 & 8080	GC/ECD

Attention: DARA SCHMIDT
AECOM
2540 KENSINGTON RD N.W.
CALGARY, AB
CANADA T2N 3S3

Report Date: 2010/09/14

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B081380
Received: 2010/09/03, 14:40

Sample Matrix: Leachate
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
ICPMS Metals on TCLP Leachate	4	2010/09/13	2010/09/13	AB SOP-00043	EPA 200.8

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Elements by ICPMS - Soils	4	2010/09/12	2010/09/13	AB SOP-00043	EPA 200.8

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

LINSAY DAME, Project Manager
Email: linsay.dame@maxxamanalytics.com
Phone# (403) 735-2237 Ext:2237

==
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Total cover pages: 1

AECOM

Maxxam Job #: B081380
Report Date: 2010/09/14

ELEMENTS BY ATOMIC SPECTROSCOPY (LEACHATE)

Maxxam ID		W77715	W77717	W77718	W77719		
Sampling Date		2010/08/08	2010/08/08	2010/08/08	2010/08/08		
	Units	**MAT 01**	**MAT 02**	**MAT 22**	**MAT 23**	**RDL**	**QC Batch**
Elements							
Leachable Lead (Pb)	mg/L	1.4	<0.5	<0.5	<0.5	0.5	4253799

RDL = Reportable Detection Limit

AECOM

Maxxam Job #: B081380
Report Date: 2010/09/14

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		W77715		W77717		W77718	W77719		
Sampling Date		2010/08/08		2010/08/08		2010/08/08	2010/08/08		
	Units	**MAT 01**	**RDL**	**MAT 02**	**RDL**	**MAT 22**	**MAT 23**	**RDL**	**QC Batch**
Elements									
Total Lead (Pb)	mg/kg	150000 (1)	1000	18000 (1)	100	2000	1300	20	4253230

RDL = Reportable Detection Limit
(1) Detection limits raised due to dilution to bring analyte within the calibrated range.

Package 1	22.7°C

Each temperature is the average of up to three cooler temperatures taken at receipt

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL) Comments

Sample W77715-01 Elements by ICPMS - Soils: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly

Sample W77717-01 Elements by ICPMS - Soils: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly

Sample W77718-01 Elements by ICPMS - Soils: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly

Sample W77719-01 Elements by ICPMS - Soils: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly

Results relate only to the items tested.

AECOM
Attention: DARA SCHMIDT
Client Project #:
P.O. #:
Site Reference:

Quality Assurance Report

Maxxam Job Number: CB081380

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
4253230 TDB	Matrix Spike	Total Lead (Pb)	2010/09/13		100	%	75 - 125
	QC Standard	Total Lead (Pb)	2010/09/12		89	%	54 - 146
	Spiked Blank	Total Lead (Pb)	2010/09/13		104	%	75 - 125
	Method Blank	Total Lead (Pb)	2010/09/13	<1		mg/kg	
	RPD	Total Lead (Pb)	2010/09/13	1.6		%	35
4253799 ST4	Matrix Spike	Leachable Lead (Pb)	2010/09/13		106	%	75 - 125
	Spiked Blank	Leachable Lead (Pb)	2010/09/13		104	%	84 - 113
	Method Blank	Leachable Lead (Pb)	2010/09/13	<0.5		mg/L	
	RPD	Leachable Lead (Pb)	2010/09/13	NC		%	35

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.
QC Standard: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (RPD): The RPD was not calculated. The level of analyte detected in the parent sample and its duplicate was not sufficiently significant to permit a reliable calculation.

Validation Signature Page

Maxxam Job #: B081380

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

RON VENZI, Scientific Specialist

==
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AGAT Laboratories

2910 - 12 Street N.E.
Calgary, Alberta, T2E 7P7
http://webearth.agatlabs.com

Phone: 403-735-2005
Fax: 403-735-2771
Toll free: 1-866-764-7554
www.agatlabs.com

Laboratory use Only
Arrival Condition: ☐ Good ☐ Poor (complete 'notes')
Arrival Temperature: ______ AGAT Job Number: ______
Notes: ______

Report To:
Company: **AECOM**
Contact: **Dara Schmidt**
Address: **2540 Kensington Road NW**
Calgary, Alberta T2N 3S3
Phone: (403)270-4822 FAX:
PO#:
Client Project #:

Invoice to: Same (**Y**/N) - Circle
Company:
Contact:
Address:
Phone: Fax:
PO#:

Report Information
1. Name: Dara Schmidt
Email: dara.schmidt@aecom.com
2. Name:
Email:

Regulatory Requirements (Check):
☐ Alberta Tier 1 ☐ Canadian Drinking Water
☐ PST (1994) ☐ PST (2001) ☐ Upstream Oil & Gas
☐ G - 50 ☐ B.C. CSR
☐ CCME (Indicate one)
☐ *Industrial*
☐ *Commercial*
☐ *Res/Park*
☐ *Ag*
☐ *FWAL*

Report Format
☐ Single Sample per Page
☐ Multiple Samples per Page
☐ Excel Format Included

Turnaround Time (TAT) Required
Regular TAT:
☐ 5 to 7 working days
Rush TAT:
☐ 24 to 48 hours
☐ 48 to 72 hours
Date Required:
Time Required:

SAMPLE IDENTIFICATION	DATE / TIME SAMPLED	SAMPLE MATRIX	# OF CONTAINERS	COMMENTS - Site/Sample Info, Sample Containment	Leachable Lead	Total Lead	Hazardous (Y/N)	Lab Sample #
MAT 01	8-Aug-10	solid	1	Paint	X	X		
MAT 02	8-Aug-10	solid	1	Paint	X	X		
MAT 22	8-Aug-10	solid	1	Paint	X	X		
MAT 23	8-Aug-10	solid	1	Paint	X	X		

RECEIVED
SEP 0 3 2010
1440 13, 23, 22

Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time	Special Instructions
	Date/Time	Samples Received By (print name and sign)	Date/Time	

Page ___ of ___

Appendix E

Geophysics Report

Geophysical Investigation at CAM-A Nunavut

Prepared for
AECOM
Edmonton, Alberta

Submitted by
Associated Geosciences Ltd.
Calgary, Alberta

Associated Geosciences

Associated Geosciences Ltd.
Suite 415, 708 – 11th Avenue S.W.
Calgary, Alberta, Canada T2R 0E4

TEL: 1.403.264.9496
FAX: 1.403.263.7641
www.associatedgeosciences.ca

File: 2010-CGAA.056

November 15, 2010

AECOM
17007 107th Avenue
Edmonton, Alberta
T5S 1G3

Attention: Nick Oke

Dear Nick;

Associated Geosciences Ltd. (AGL) is pleased to submit the following revised report entitled:

Geophysical Investigation at CAM-A
Nunavut

We would like to express our thanks to AECOM for the opportunity to provide our services in relation to this project.

If you have any questions, or require any additional information, please do not hesitate to contact our office.

Yours sincerely,

ASSOCIATED GEOSCIENCES LTD.

PERMIT No. P9454

PROFESSIONAL GEOPHYSICIST
JAMES D. HENDERSON
ALBERTA

Jim Henderson, Ph.D., P.Geoph., FEC(H)
Vice President, Geophysical Services

Jeff Unich
Junior Geophysicist

1.0 INTRODUCTION

This report presents the results of a geophysical investigation conducted at former DEW Line Station CAM-A in Nunavut, Canada, between August 1st and 8th, 2010. This survey formed one component of environmental assessments being done on the site during the same time. The objective of the survey was to delineate the extent of buried landfills at the site.

All work was done in accordance with Associated Geosciences Ltd. (AGL) proposal AMP476.

1.1 Site Description

CAM-A is located approximately 75 km southeast of Cambridge Bay, on the southern coast of Victoria Island, Nunavut. The remains of the DEW line station are on a plateau.

There were several areas identified as potential landfills and were primary areas for geophysical investigation. These included the Landfill A, Landfill B, Airstrip Borrow Area, Worked Area and Mod Train Area. Other areas for investigation were determined on-site and included the Beach POL, Inuit House and Borrow Area 1.

2.0 OVERHAUSER MAGNETIC GRADIOMETER METHOD

Total field magnetic intensity is a scalar measurement of the Earth's magnetic field. Anomalies within this field are due to two types of magnetism: induced and remnant. Induced magnetism results in the enhancement of the ambient field causing it to act as a magnet. Resulting magnetism is directly proportional to the intensity of the ambient field, and the ability of the material to enhance the local field (magnetic susceptibility). Remnant magnetism is a permanent magnetism of the material that depends on the metallurgical properties, and the thermal, mechanical and magnetic history of the material. It is independent of the field in which it is measured.

In an Overhauser effect magnetometer, the hydrogen-rich fluid in the magnetometer sensor is mixed with an electron-bearing fluid and is subjected to a strong radio-frequency current that polarizes the protons. Protons are then deflected into their plane of precession by a short duration pulse. After a brief pause to allow transient currents to subside, the slowly decaying proton precession signal remains. The precession frequency is measured and transformed to magnetic field units, i.e. nanoTesla (nT). For each measurement, the time, position and magnetic field values are digitally stored. The Overhauser effect results in a greater polarization of the proton-rich fluid, translating to stronger signals with less power consumption than proton precession instruments.

Vertical gradiometer data are the result of the differential total field response of two vertically displaced magnetometer sensors. As such, diurnal drift corrections are generally not required. The sensor separation distance for the present survey was 0.50 m.

In regions where anomalies are separated laterally (i.e. the magnetic response from the buried objects do not overlap) vertical gradient data is generally more sensitive to the boundaries of buried magnetic objects, offer greater information regarding object orientation, and emphasize shallow-occurring objects in comparison to total field data. These differences are somewhat less evident at landfill sites where an assortment of buried metal generally exists. Magnetic gradiometers tend to enhance signal from near-surface sources by reducing that portion of the signal from deeper, likely geologically-sourced, material.

Variations in the Earth's total magnetic field were measured using the GSM-19 Overhauser Effect Gradiometer with integrated GPS. The internal GPS receiver utilized Canadian Differential GPS (CDGPS) corrections to provide sub-meter accuracy.

The total field and vertical magnetic gradient survey data were collected at 1 second intervals as the operator walked over areas suspected of containing buried metallic debris. These areas were either deemed suspicious ahead of time, or deemed suspicious by their appearance or by the presence of debris sticking out of the ground. Within these areas, only disturbed ground was surveyed, and ground with no grading, piling, or vegetation disturbance was assumed to be free of landfills. In areas where magnetic anomalies were identified, the operator surveyed their extents and subsequently flagged their boundaries so that soil sampling could be done.

Part of the output data from the GSM-19 gradiometer is a two-digit QC measure based on the repeatability of each point measured and the length of time each point took to measure. A QC measure of 99 is the highest quality value in this case, and for these data sets, over 95% of the points collected had a QC measure of 99.

The GPS data collected with the magnetic data was also of high quality; there were very few spikes in the locations, which are normally due to moving into areas with less satellite coverage. As a result, very few of the positions had to be re-referenced or removed during processing.

3.0 INTERPRETATION AND DISCUSSION

For this survey, the background gradient was moderate, so the threshold criterion for determining the boundary of potential landfills was chosen to be approximately +/- 50 nT. In many cases, the potential landfill lobes also had surface debris which affected the apparent lobes in the data. Care was taken to note the location of most of the scattered debris, so that the landfill lobes could more easily be identified. The boundaries of all identified lobes were pinned out and surveyed by AECOM personnel as they were surveyed with the gradiometer.

The main areas covered were Landfill A, Landfill B, Airstrip Borrow Area, Worked Area and Mod Train Area. Within these areas, only disturbed ground was surveyed, and ground with no grading, piling, or vegetation disturbance was assumed to be free of landfills. A few other areas were visually identified as potential landfills and were surveyed with the gradiometer.

3.1 Landfill A

The results for the survey from Landfill A are shown in Figure 1. Two (2) areas with significant surface debris were found in this area. Multiple anomalies were found throughout Landfill A. Four (4) lobes were identified for sampling on location. These lobes were labeled Lobe A through Lobe D; each lobe contained multiple anomalies. The lobes identified are likely due to the presence of metallic objects in the subsurface. Other lobes were found in this area but were not flagged for sampling. The lobes were clustered in a central area, which leads to the possibility of this area being a metallic landfill. Lobes A and C show a series of anomalies in a band possibly representing a row of buried metallic objects. Lobe B represents a number of anomalies centralized in a large area, which may represent a landfill site. Lobe D is similar to Lobe B as it appears to be a cluster of anomalies in a central area, possibly due to burial of metallic objects.

3.2 Landfill B

The results for the survey in Landfill B are shown in Figure 2. Much like Landfill A there is multiple anomalies found in two concentrated areas. Two (2) lobes were identified in this area, Lobe E and Lobe F. Lobe E represents a large anomalous body, which may correspond to metallic debris in the subsurface. Lobe F represents an anomalous structure, in relation to Lobe E, which may represent multiple smaller metallic structures in the subsurface. With multiple lobes present, this area might be a possible landfill location.

3.3 Airstrip Borrow Area

The results from the survey at the Airstrip Borrow Area are shown in Figure 3. This area has several smaller lobes labeled as a mass as Lobe G; this lobe was not identified on location. The lobes are clustered in an area in the southeast corner of the survey grid. There is the possibility of this being a deposit site for metallic debris.

3.4 Worked Area

The results from the survey at the Worked Area are shown in Figure 4. The Worked Area has four (4) lobes in total. Three (3) lobes in the area were identified on location, labeled Lobe H, Lobe I and Lobe J. An additional lobe, Lobe K, was not identified on location. Lobe H can be identified as a single anomalous object that may be the result of a small metallic object. Lobe I can be identified as a centre point to an area comprised of small anomalous bodies. The anomalous bodies might be small metallic objects buried in the subsurface and piled in a central location. Lobe J was identified on location and has no significant anomalous structure in the immediate area. Lobe K was not identified on location, but has similar traits to Lobe I. Lobe K can be identified as a central point to a large cluster of anomalous bodies. These anomalous bodies are possibly the results of buried metallic objects centralized in a common area.

3.5 MOD Train Area

The results from the survey at the MOD Train Area are shown in Figure 5. The MOD Train Area has two (2) lobes identified on location, Lobe L and Lobe M. The two lobes are located in the southeast corner of the surveyed area. Lobe L can be identified as an anomalous body approximately 10 m x 10 m. This anomaly can possibly be attributed to buried metallic debris in the subsurface. Lobe M is a smaller anomalous body approximately 5 m x 5 m in size, which maybe the resultant of a small buried metallic object.

3.6 Beach POL

The results from the survey at the Beach POL (Petroleum, Oil and Lubricants) tanks are shown in Figure 6. Two (2) lobes were identified during processing in Calgary, Lobe N and Lobe O. The lobes are approximately 5 m in diameter and have a relatively low magnetic response compared to the other areas at CAM-A. Both lobes have similar characteristics, and are likely to be the results of buried metallic debris.

3.7 Inuit House

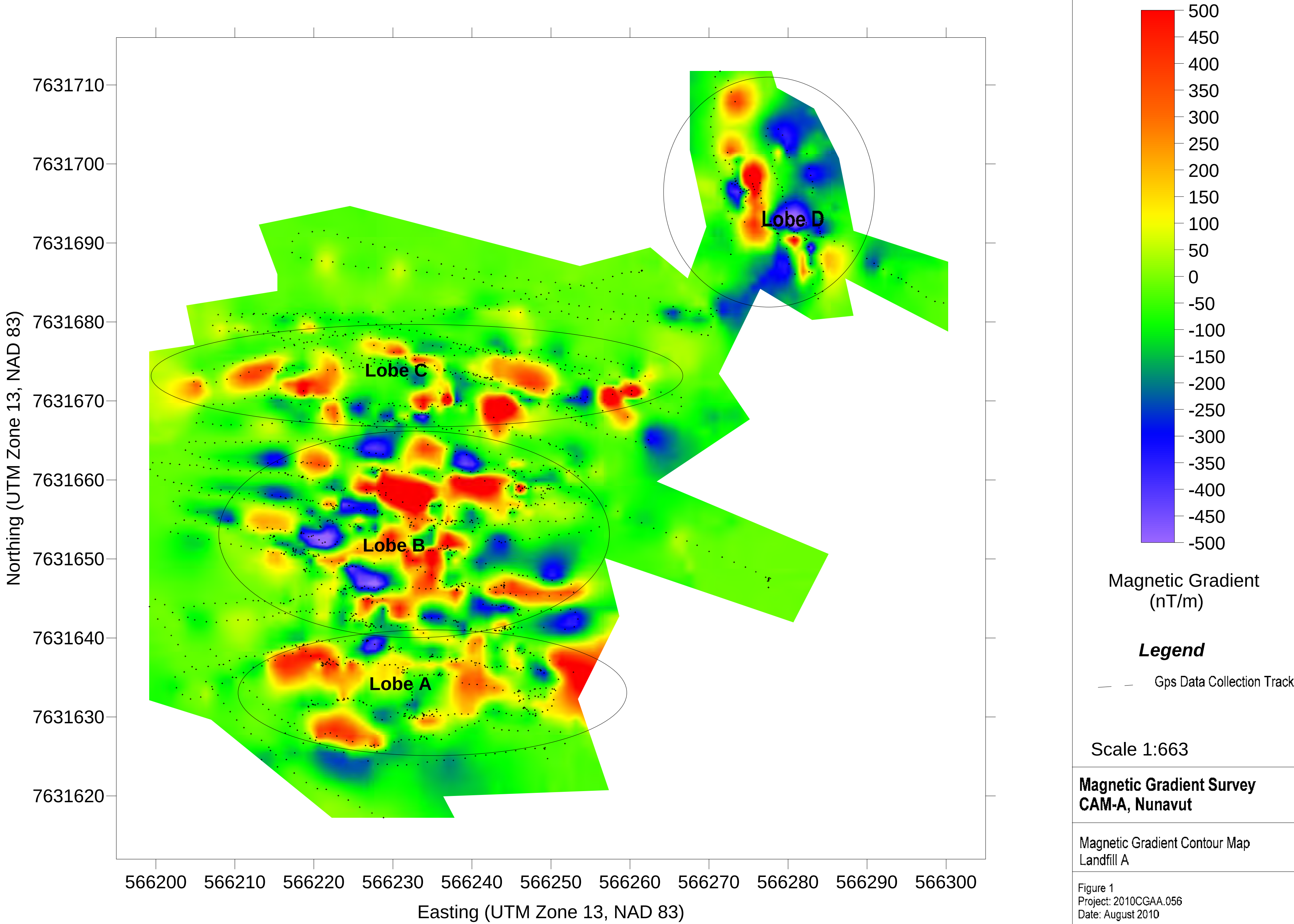
The results from the survey at the Inuit House are shown in Figure 7. There are three (3) lobes identified at the Inuit House in the processing stage in Calgary, Lobe P, Lobe Q and Lobe R. Lobe P is comprised of two smaller anomalies, which possibly represents metallic objects in the subsurface. Lobes Q and R are slightly larger anomalies, approximately 5 m in diameter. These anomalies may be the representation of larger metallic objects in the subsurface.

3.8 Borrow Area 1

The results from the survey at the Borrow Area 1 are shown in Figure 8. There are no identifiable lobes at this location. The anomalies generated in this area have small magnetic values and are most likely to be attributed to background readings.

4.0 CONCLUSION

The magnetic gradient survey conducted at CAM-A on Victoria Island, Nunavut, successfully delineated several landfills. Throughout the site, 20 landfill lobes were detected, 14 of which their boundaries were delineated in the field, which allowed AECOM personnel to survey their boundaries, and sample the soil surrounding them. The remaining 6 lobes were identified in the processing stage of the survey in Calgary.



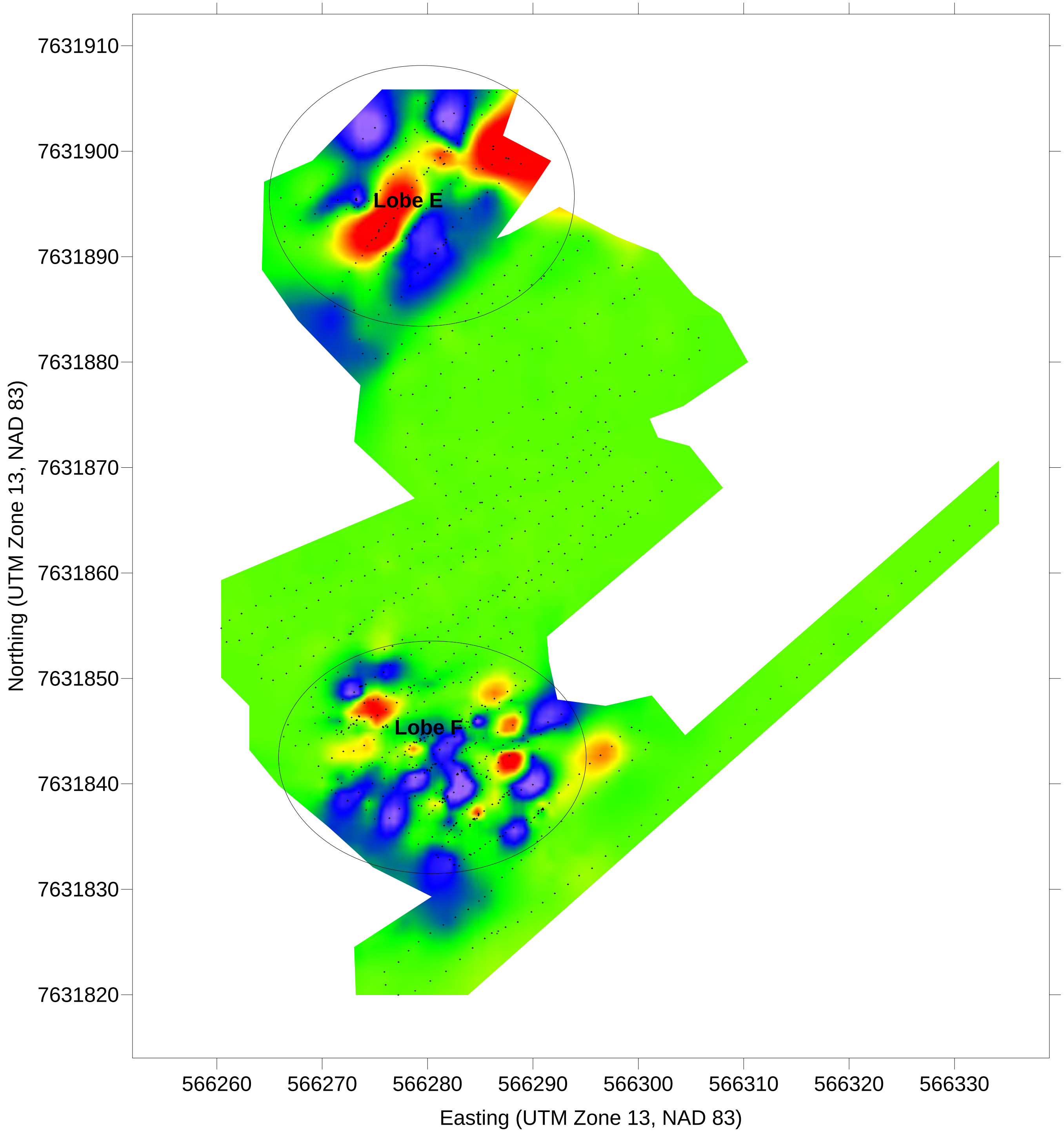
Scale 1:663

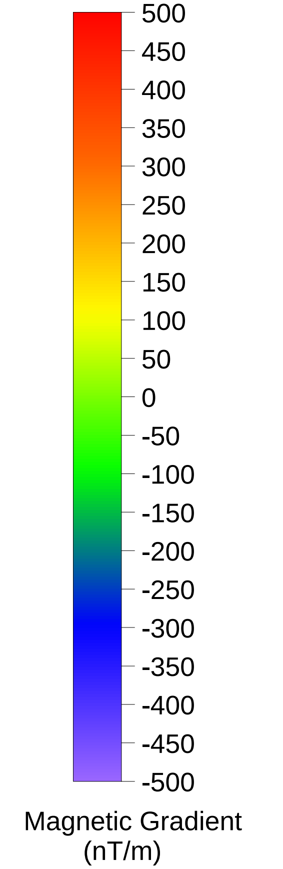
Magnetic Gradient Survey
CAM-A, Nunavut

Magnetic Gradient Contour Map
Landfill A

Figure 1
Project: 2010CGAA.056
Date: August 2010

Associated Geosciences





Legend

Gps Data Collection Track

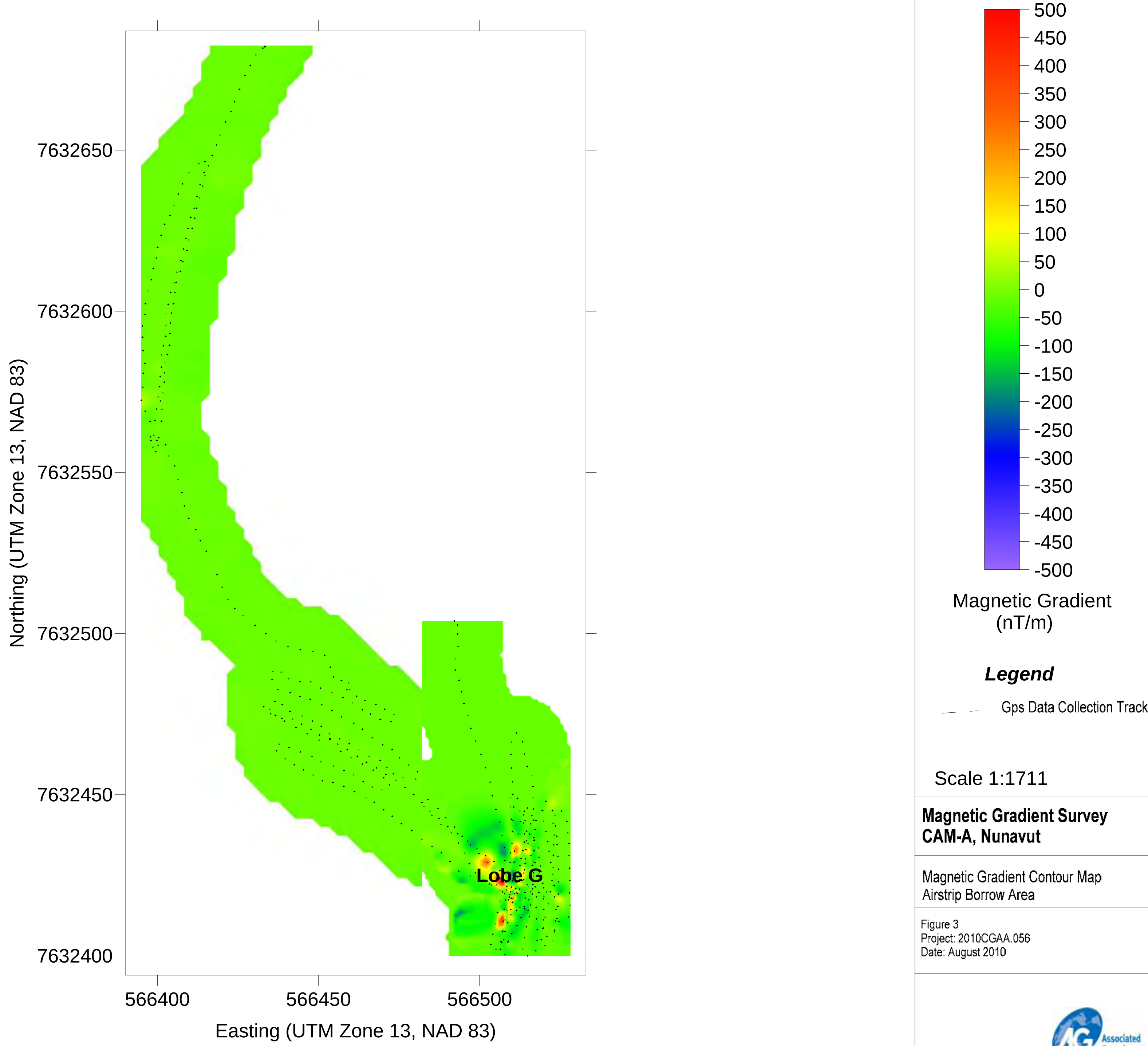
Scale 1:563

Magnetic Gradient Survey
CAM-A, Nunavut

Magnetic Gradient Contour Map
Landfill B

Figure 2
Project: 2010CGAA.056
Date: August 2010

Associated Geosciences



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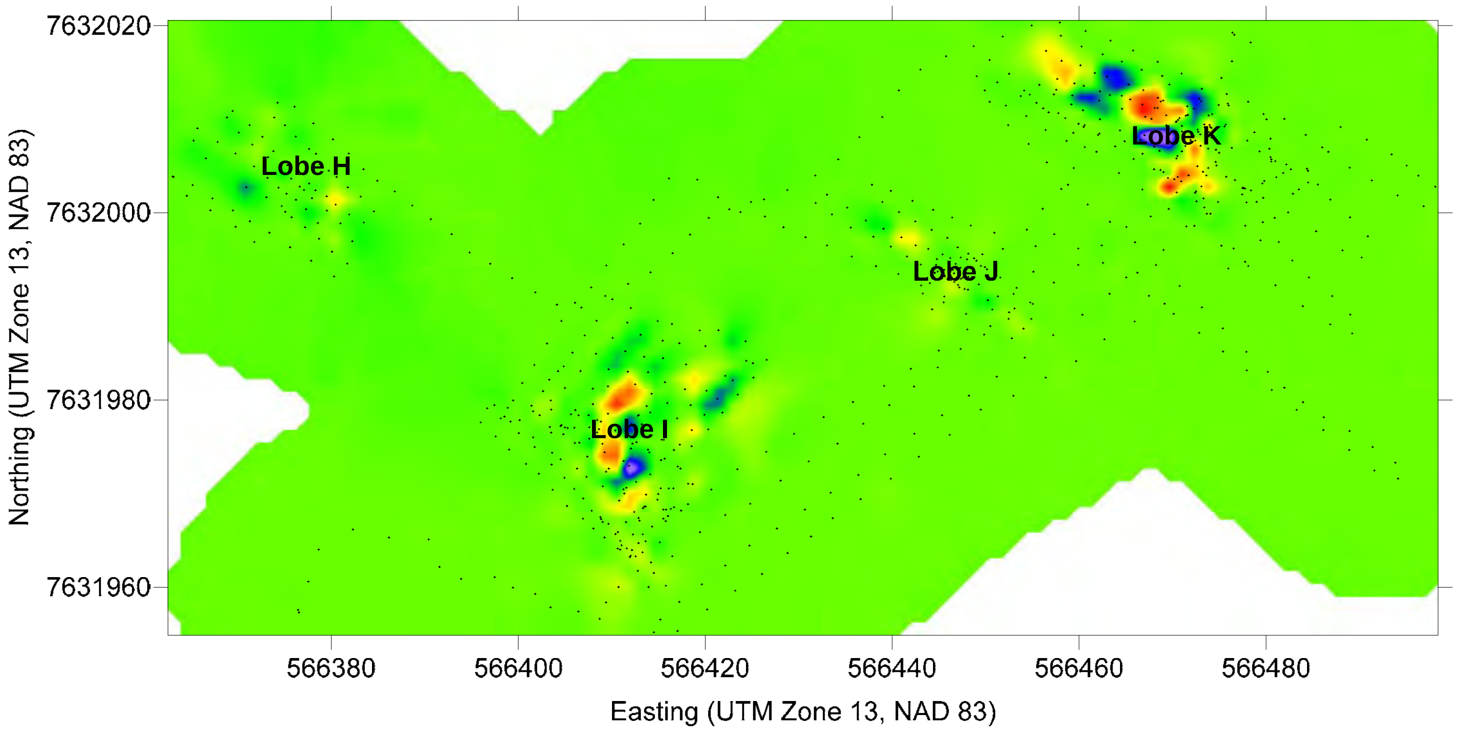
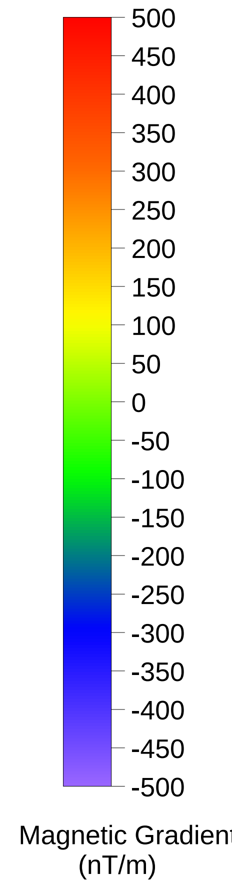
Magnetic Gradient Survey
CAM-A, Nunavut

Magnetic Gradient Contour Map
Airstrip Borrow Area

Figure 3
Project: 2010CGAA.056
Date: August 2010

Associated Geosciences





Legend

Gps Data Collection Track

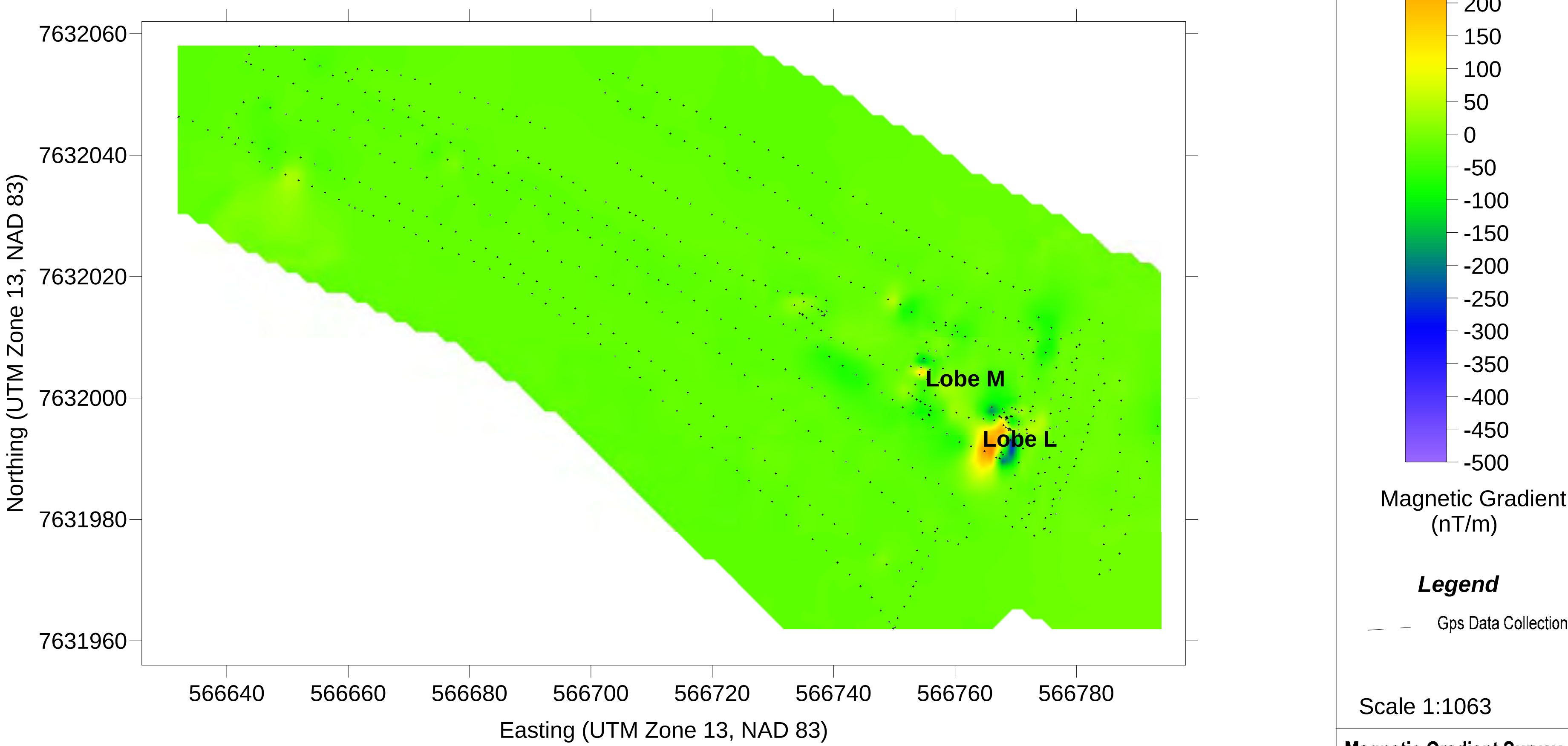
Scale 1:810

Magnetic Gradient Survey
CAM-A, Nunavut

Magnetic Gradient Contour Map
Worked Area

Figure 4
Project: 2010CGAA.056
Date: August 2010

Associated Geosciences



Legend

Gps Data Collection Track

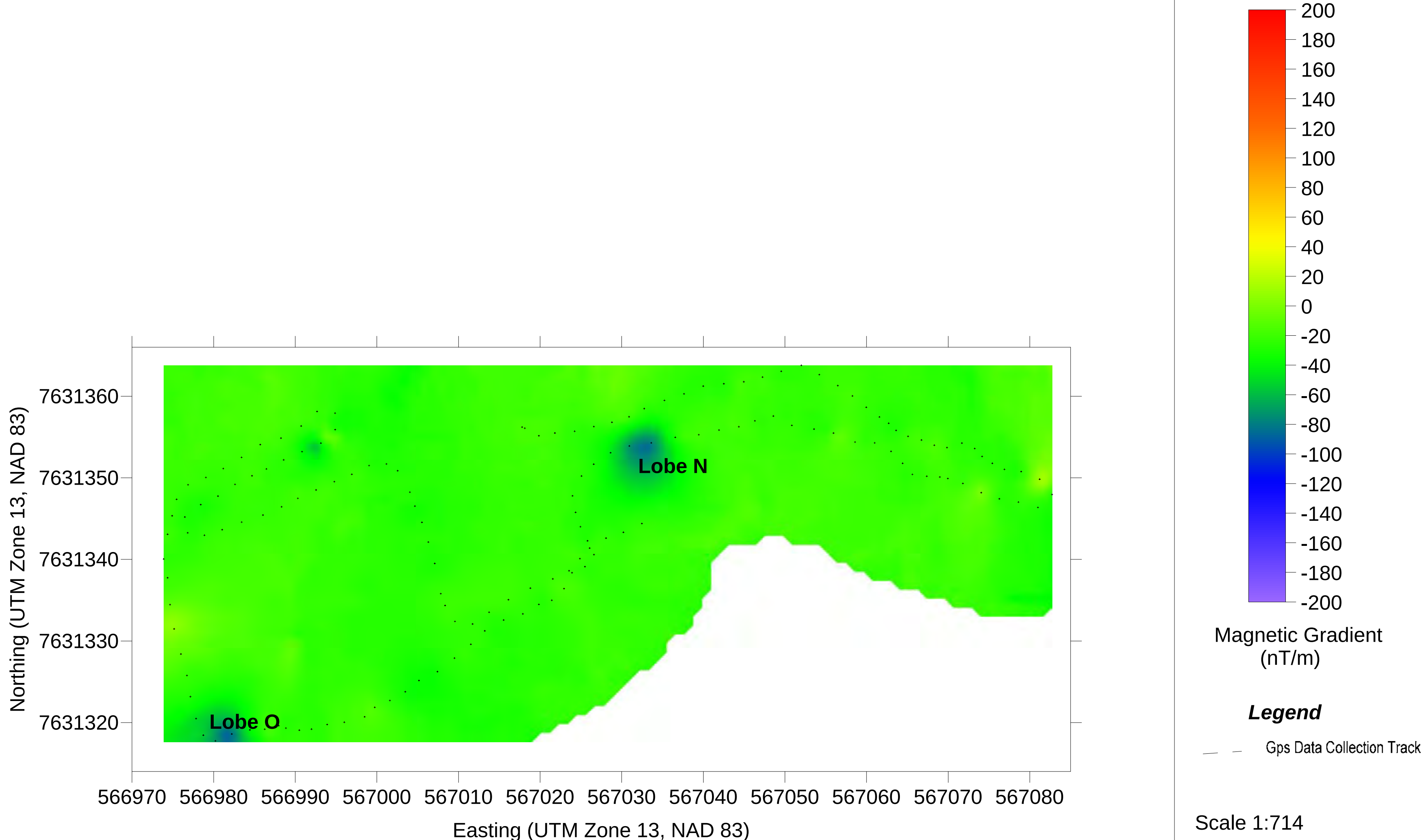
Scale 1:1063

Magnetic Gradient Survey
CAM-A, Nunavut

Magnetic Gradient Contour Map
MOD Train

Figure 5
Project: 2010CGAA.056
Date: August 2010

Associated Geosciences



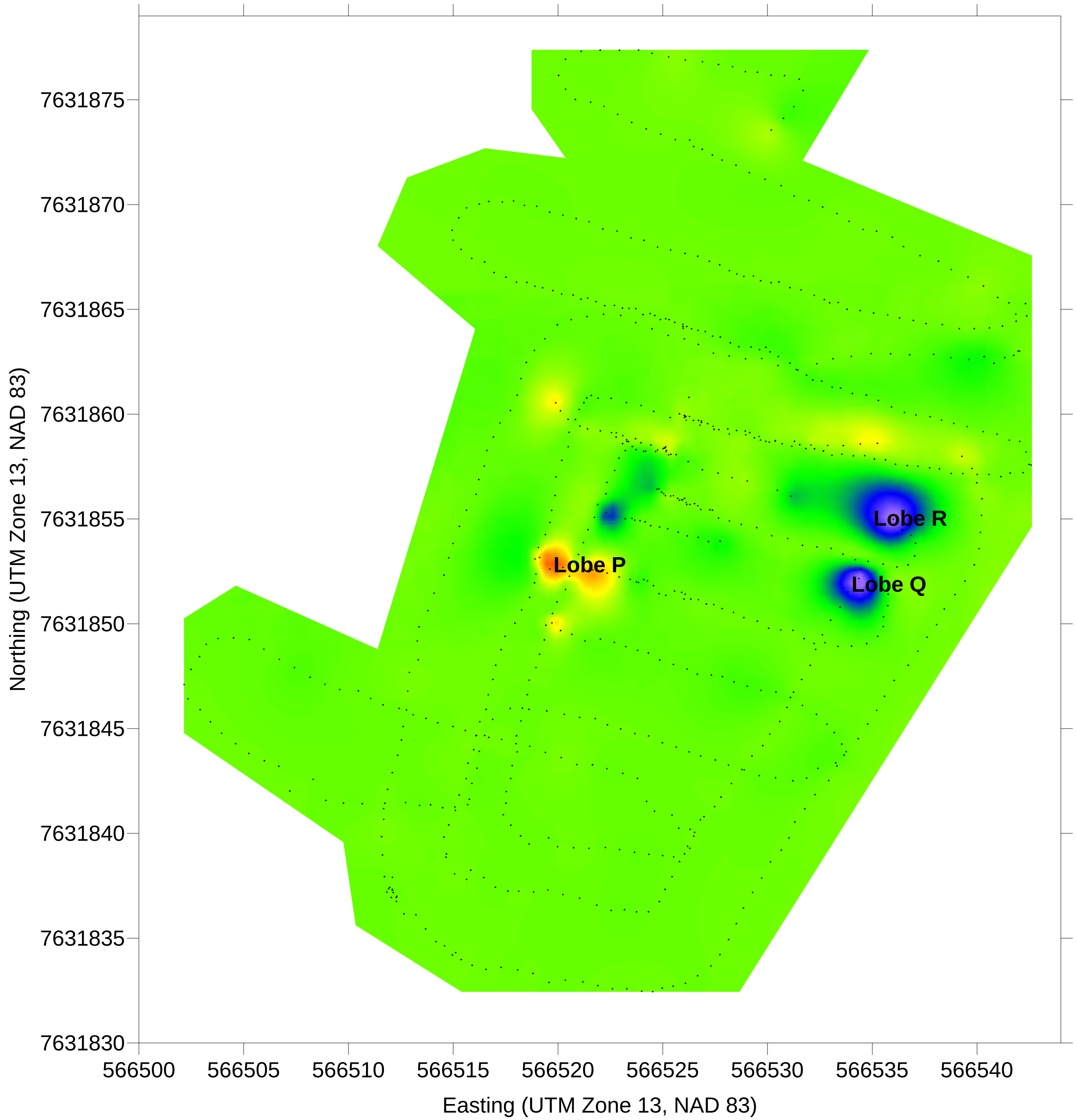
Scale 1:714

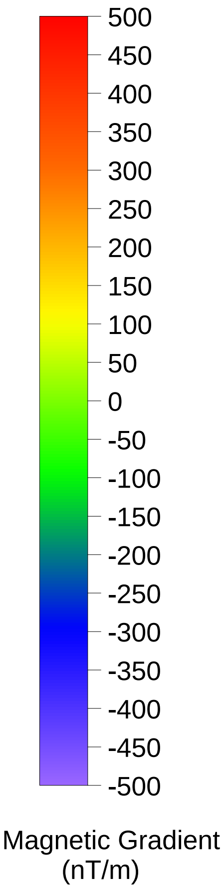
Magnetic Gradient Survey
CAM-A, Nunavut

Magnetic Gradient Contour Map
Beach POL

Figure 6
Project: 2010CGAA.056
Date: August 2010

Associated Geosciences





Legend

Gps Data Collection Track

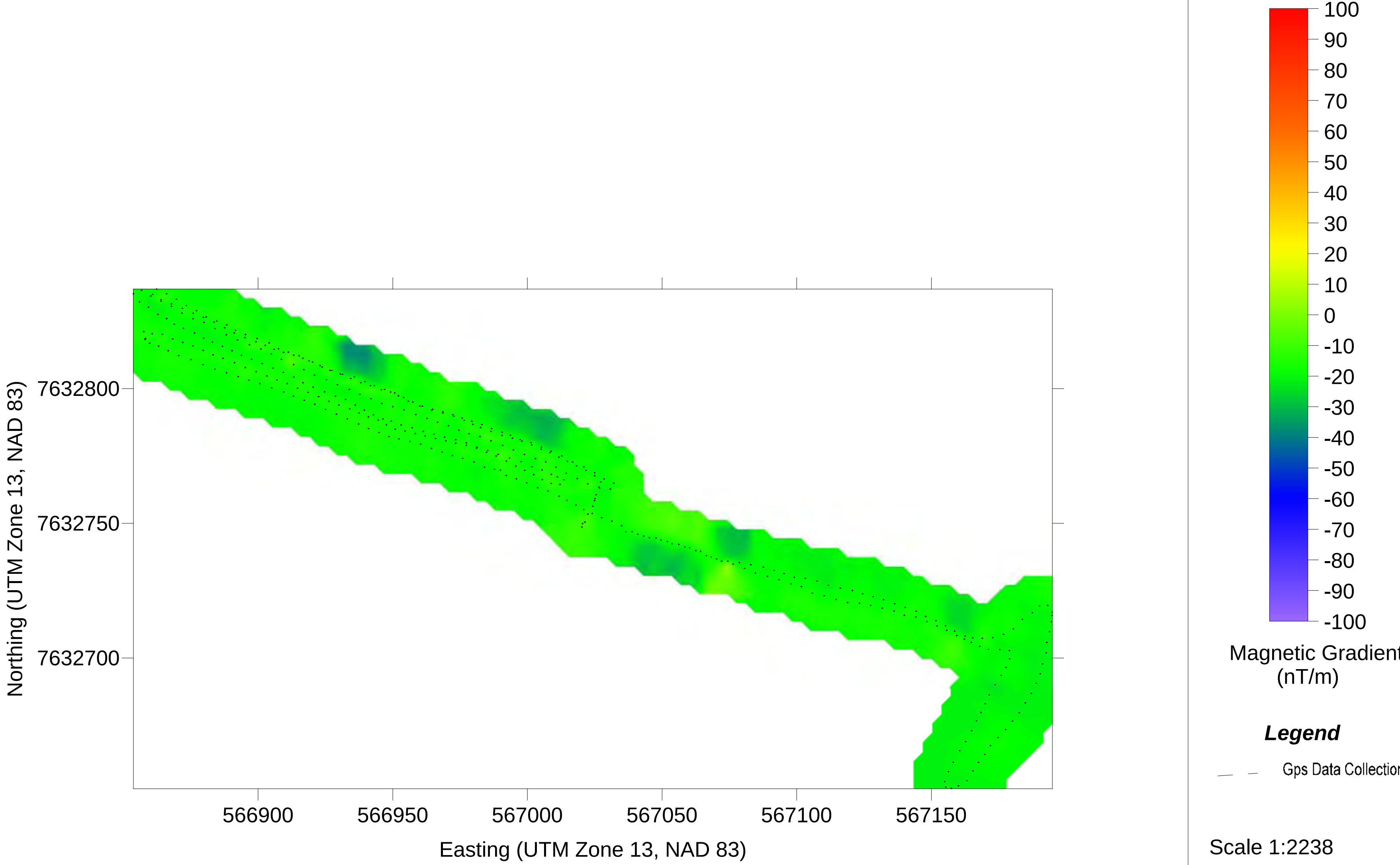
Scale 1:295

Magnetic Gradient Survey
CAM-A, Nunavut

Magnetic Gradient Contour Map
Inuit House Site

Figure 7
Project: 2010CGAA.056
Date: August 2010

Associated Geosciences



Legend

Gps Data Collection Track

Scale 1:2238

Magnetic Gradient Survey
CAM-A, Nunavut

Magnetic Gradient Contour Map
Borrow Area 1

Figure 8
Project: 2010CGAA.056
Date: August 2010

Associated Geosciences

Appendix F

Geotechnical Testpit Logs

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-01**
LOCATION: LF-1 (BA-13) N 7,633,043.2 E 566,407.8		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	GP		GRAVEL AND SAND - trace cobbles, mostly platy, some subangular and subrounded, maximum size 100 mm, brown, moist - gravel = 52 %, sand = 45 %, silt/clay = 3 % - salinity = 0.4 ppt	GRAB	S-1	●		
	SM		SAND - silty, some clay, trace gravel, light grey, wet	GRAB	S-2			
			END OF TESTPIT (0.8 m) - due to seepage					
1								1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.80 m
REVIEWED BY: RCA	COMPLETION DATE: 4/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-02**
LOCATION: LF-1 (BA-13) N 7,633,001.9 E 566,497.5		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	GP		GRAVEL AND SAND - trace cobbles, mostly platy, some subangular and subrounded, maximum size 100 mm, brown, moist - gravel = 52 %, sand = 45 %, silt/clay = 3 % - salinity = 0.4 ppt	GRAB	S-3	●		
	SM		SAND - silty, some clay, trace gravel, light grey, wet - gravel = 8 %, sand = 49 %, silt = 24 %, clay = 19 %	GRAB	S-4			
			END OF TESTPIT (0.8 m) - due to seepage					
1								1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.80 m
REVIEWED BY: RCA	COMPLETION DATE: 4/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-03**
LOCATION: BA-1 N 7,632,970.8 E 566,266.4		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	CL-ML		CLAY - silty, some sand, trace gravel, light brown, moist, low plastic - gravel = 1 %, sand = 19 %, silt = 47 %, clay = 33 %	GRAB	S-5		
1							1
			END OF TESTPIT (1.2 m) - at refusal on frozen ground				
2							

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.20 m
	REVIEWED BY: RCA	COMPLETION DATE: 4/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-04**
LOCATION: N 7,633,006.7 E 566,189.5		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	CL-ML		CLAY - silty, some sand, trace gravel, light brown, moist, low plastic	GRAB	S-5		
			- seepage				
1							1
			END OF TESTPIT (1.2 m) - at refusal on frozen ground				
2							

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.20 m
	REVIEWED BY: RCA	COMPLETION DATE: 4/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-05**
LOCATION: N 7,633,026.6 E 566,162.3		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SP		SAND AND GRAVEL - some cobbles, trace silt, platy and subrounded, maximum size 150 mm, light brown, moist to wet					
			- gravel = 47 %, sand = 49 %, silt/clay = 4 %	GRAB	S-7	●		
			- seepage	GRAB	S-8			
			END OF TESTPIT (0.95 m) - at refusal on frozen ground/boulder					
1								1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
	REVIEWED BY: RCA	COMPLETION DATE: 4/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-06**
LOCATION: BA-1 N 7,633,037.3 E 566,025.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SP		SAND AND GRAVEL - some cobbles, trace silt, platy and subrounded, maximum size 150 mm, light brown, moist to wet					
			- gravel = 47 %, sand = 49 %, silt/clay = 4 %	GRAB	S-9			
			END OF TESTPIT (0.95 m) - due to seepage and sloughing					
1								1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
	REVIEWED BY: RCA	COMPLETION DATE: 4/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-07**
LOCATION: BA-2 N 7,633,115.7 E 566,205.5		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, maximum size 150 mm, trace silt, light brown, dry to damp					
			- gravel = 56 %, sand 42 %, silt/clay = 2 %	GRAB	S-10			
			END OF TESTPIT (0.95 m) - at refusal on cobbles/boulder					
1								1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
	REVIEWED BY: RCA	COMPLETION DATE: 4/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-08**
LOCATION: BA-2 N 7,633,206.9 E 565,957.5		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, maximum size 150 mm, trace silt, light brown, dry to damp					
				GRAB	S-11	●		
			- gravel = 56 %, sand 42 %, silt/clay = 2 %					
	SP		SAND - trace gravel, trace silt, coarse grained, light brown, damp to moist	GRAB	S-12			
1								1
			END OF TESTPIT (1.2 m) - in sand					
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.20 m
	REVIEWED BY: RCA	COMPLETION DATE: 4/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-09**
LOCATION: LF-5 N 7,631,509.3 E 566,713.7		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	PT		PEAT				
	GP		GRAVEL AND SAND - cobbly, trace boulders, mostly platy, occasional subrounded/subangular, maximum size 300 mm, light brown, damp	GRAB	S-13		
1			- seepage				1
			END OF TESTPIT (1.05 m) - at refusal on boulder				
2							

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.05 m
	REVIEWED BY: RCA	COMPLETION DATE: 4/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-10**
LOCATION: LF-5 N 7,631,589.3 E 566,648.8		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SP		SAND - trace gravel, trace boulders, maximum size 350 mm, trace silt, fine to medium grained, poorly graded, brown, damp - gravel = 9 %, sand = 90 %, silt/clay = 1 %	GRAB	S-14			
	GP		GRAVEL AND SAND - cobbly, trace boulders, mostly platy, occasional subrounded/subangular, brown, moist to wet - gravel = 63 %, sand = 36 %, silt/clay = 1 % - salinity = 0.5 ppt - seepage - frozen ground	GRAB	S-15			
1			END OF TESTPIT (1.0 m) - at refusal on frozen ground					1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 1.00 m
REVIEWED BY: RCA	COMPLETION DATE: 4/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-11**
LOCATION: LF-5 N 7,631,601.2 E 566,544.1		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS
0	PT	PEAT				
	SP	SAND - trace gravel, trace boulders, maximum size 350 mm, trace silt, fine to medium grained, poorly graded, brown, damp - gravel = 9 %, sand = 90 %, silt/clay = 1 %	GRAB	S-16		
	GP	GRAVEL AND SAND - cobbly, trace boulders, mostly platy, occasional subrounded/subangular, brown, moist to wet - gravel = 63 %, sand = 36 %, silt/clay = 1 % - salinity 0.5 ppt - seepage - frozen ground	GRAB	S-17		
		END OF TESTPIT (0.95 m) - at refusal on frozen ground				
1						
2						

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
REVIEWED BY: RCA	COMPLETION DATE: 4/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-12**
LOCATION: LF-5 N 7,631,519.9 E 566,550.4		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	PT		PEAT				
	GP		GRAVEL AND SAND - cobbly, trace boulders, mostly platy, occasional subrounded/subangular, maximum size 300 mm, light brown, damp - gravel = 65 %, sand = 33 %, silt/clay = 2 % - salinity = 0.5 ppt - seepage	GRAB	S-18		
			END OF TESTPIT (0.95 m) - at refusal on boulder				
1							1
2							

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
REVIEWED BY: RCA	COMPLETION DATE: 4/8/10
PROJECT ENGINEER: Anwar Majid	

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-13**
LOCATION: LF-1 (BA-13) N 7,632,400.7 E 567,016.9		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SM		SAND - silty, some gravel, trace clay, trace cobbles, platy, subrounded, maximum size 300 mm, light brown, moist					
			- gravel = 27 %, sand = 55 %, silt/clay = 18 %	GRAB	S-19	●		
			- saturated, seepage					
1								1
			END OF TESTPIT (1.1 m) - at refusal on frozen ground					
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.10 m
	REVIEWED BY: RCA	COMPLETION DATE: 5/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-14**
LOCATION: Airstrip N 7,632,645.5 E 566,514.8		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist					
			- gravel = 52 %, sand = 45 %, silt/clay = 3 %	GRAB	S-20	●		
			- seepage					
1			END OF TESTPIT (1.0 m) - at refusal on frozen ground					1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 1.00 m
REVIEWED BY: RCA	COMPLETION DATE: 5/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-15**
LOCATION: Airstrip N 7,633,082.1 E 566,393.5		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist					
			- gravel = 61 %, sand = 36 %, silt/clay = 3 %	GRAB	S-21	●		
1								1
			END OF TESTPIT (1.1 m) - at refusal on cobbles/boulder					
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 1.10 m
REVIEWED BY: RCA	COMPLETION DATE: 5/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-16**
LOCATION: BA-3 N 7,632,700.5 E 567,139.6		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 150 mm, brown, damp to moist					
				GRAB	S-22	●		
			- gravel = 58 %, sand = 39 %, silt/clay = 3 %					
			END OF TESTPIT (0.95 m) - at refusal on frozen ground					
1								1
2								

	LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
AECOM	REVIEWED BY: RCA	COMPLETION DATE: 5/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-17**
LOCATION: BA-3 N 7,632,745.0 E 567,066.5		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist - gravel = 58 %, sand = 39 %, silt/clay = 3 %	GRAB	S-23			
1								1
			END OF TESTPIT (1.05 m) - at refusal on frozen ground					
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.05 m
	REVIEWED BY: RCA	COMPLETION DATE: 5/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-18**
LOCATION: BA-3 N 7,632,658.7 E 567,183.3		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist					
				GRAB	S-24	●		
			- gravel = 58 %, sand = 39 %, silt/clay = 3 %					
			END OF TESTPIT (0.9 m) - at refusal on boulder					
1								1
2								

LOG OF TESTHOLE CAM-A_TESTPIT LOGS_AUGUST 18, 2010.GPJ UMA.GDT 6/10/10

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.90 m
REVIEWED BY: RCA	COMPLETION DATE: 5/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-19**
LOCATION: LF-6 N 7,631,913.3 E 566,343.6		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SP		SAND - trace gravel, trace boulders, maximum size 350 mm, trace silt, fine-medium grained, poorly graded, brown, damp					
			- gravel = 3 %, sand = 95 %, silt = 2 %	GRAB	S-25	●		
			- seepage					
			END OF TESTPIT (0.95 m) - at refusal on frozen ground					
1								1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
REVIEWED BY: RCA	COMPLETION DATE: 5/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-20**
LOCATION: LF-6 N 7,631,835.0 E 566,427.2		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC — M.C. — LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	GP		GRAVEL AND SAND - trace cobbles, trace silt, trace boulders, mostly platy, occasional subrounded/subangular, brown, damp	GRAB	S-26	●		
			- gravel = 61 %, sand = 37 %, silt/clay = 2 % - salinity = 0.3 ppt					
			- seepage					
			END OF TESTPIT (0.95 m) - due to seepage and sloughing					
1								1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
REVIEWED BY: RCA	COMPLETION DATE: 5/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-21**
LOCATION: LF-6 N 7,631,801.6 E 566,494.9		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	GP		GRAVEL AND SAND - trace cobbles, trace boulders, platy and subrounded, medium grained, poorly graded, brown, damp					
			- gravel = 61 %, sand = 37 %, silt/clay = 2 %	GRAB	S-27	●		
			- seepage					
			END OF TESTPIT (0.95 m) - at refusal on frozen ground					
1								1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
	REVIEWED BY: RCA	COMPLETION DATE: 5/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-22**
LOCATION: LF-5 N 7,631,644.1 E 566,427.9		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SP		SAND - trace gravel, trace boulders, maximum size 350 mm, trace silt, fine-medium grained, poorly grade, brown, damp - gravel = 3 %, sand = 94 %, silt/clay = 3 %	GRAB	S-28	●		
	GP		GRAVEL AND SAND - cobbly, trace boulders, mostly platy, occasional subrounded/subangular, brown, moist to wet - seepage - gravel = 65 %, sand = 33 %, silt/clay = 2 % - salinity = 0.5 ppt	GRAB	S-29			
			END OF TESTPIT (0.95 m) - at refusal on frozen ground					
1								1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
REVIEWED BY: RCA	COMPLETION DATE: 5/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-23**
LOCATION: BA-4B N 7,632,479.2 E 567,489.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GW		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, light brown, damp to moist - gravel = 69 %, sand = 29 %, silt/clay = 2 %	GRAB	S-30			
1			END OF TESTPIT (1.0 m) - at refusal on cobbles and boulders					1
2								

	LOGGED BY: AM	COMPLETION DEPTH: 1.00 m
AECOM	REVIEWED BY: RCA	COMPLETION DATE: 6/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-24**
LOCATION: BA-4B N 7,632,471.4 E 567,592.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GW		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 150 mm, light brown, damp to moist - gravel = 69 %, sand = 29 %, silt/clay = 2 %	GRAB	S-31			
			END OF TESTPIT (0.8 m) - at refusal on cobbles and boulders					
1								1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.80 m
REVIEWED BY: RCA	COMPLETION DATE: 6/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-25**
LOCATION: BA-4B N 7,632,378.5 E 567,617.4		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 300 mm, light brown, damp to moist					
				GRAB	S-31A	●		
			- gravel = 68 %, sand = 31 %, silt/clay = 1 %					
			END OF TESTPIT (0.95 m) - at refusal on cobbles and boulders					
1								1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
	REVIEWED BY: RCA	COMPLETION DATE: 6/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-26**
LOCATION: BA-4B N 7,632,379.5 E 567,617.9		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 300 mm, light brown, damp to moist - gravel = 64 %, sand = 35 %, silt/clay = 1 %	GRAB	S-32			
			END OF TESTPIT (0.8 m) - at refusal on cobbles and boulders					
1								1
2								

	LOGGED BY: AM	COMPLETION DEPTH: 0.80 m
AECOM	REVIEWED BY: RCA	COMPLETION DATE: 6/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

LOG OF TESTHOLE CAM-A_TESTPIT LOGS_AUGUST 18, 2010.GPJ UMA.GDT 6/10/10

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-27**
LOCATION: BA-4C N 7,632,164.5 E 567,486.2		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, light brown, damp to moist - gravel = 64 %, sand = 35 %, silt/clay = 1 %	GRAB	S-33			
1			END OF TESTPIT (1.0 m) - at refusal on cobbles and boulders					1
2								

	LOGGED BY: AM	COMPLETION DEPTH: 1.00 m
AECOM	REVIEWED BY: RCA	COMPLETION DATE: 6/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

LOG OF TESTHOLE CAM-A_TESTPIT LOGS_AUGUST 18, 2010.GPJ UMA.GDT 6/10/10

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-28**
LOCATION: BA-5A N 7,633,043.7 E 566,519.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	ML-CL		SILT - sandy, clayey, trace gravel, trace cobbles, light grey, moist, low plastic - gravel = 0%, sand = 23 %, silt = 48 %, clay = 29 %	GRAB	S-34		
			END OF TESTPIT (0.9 m) - in silt				
1							1
2							

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.90 m
	REVIEWED BY: RCA	COMPLETION DATE: 6/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-29**
LOCATION: LF-1 (BA-13) N 7,633,074.9 E 566,415.4		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	ML-CL		SILT - sandy, clayey, trace gravel, trace cobbles, light grey, moist, low plastic	GRAB	S-35		
1							1
			END OF TESTPIT (1.1 m) - in silt				
2							

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.10 m
	REVIEWED BY: RCA	COMPLETION DATE: 6/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-30**
LOCATION: BA-5A N 7,633,151.1 E 566,465.3		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0			SAND - silty, some gravel, trace to some clay, trace cobbles, light grey, moist to wet					
	SM		- gravel = 17 %, sand = 51 %, silt/clay = 32 %	GRAB	S-36	●		
1								1
			END OF TESTPIT (1.1 m) - at refusal on frozen ground					
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.10 m
	REVIEWED BY: RCA	COMPLETION DATE: 6/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-31**
LOCATION: BA-3 N 7,632,845.3 E 566,878.3		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	PT		PEAT				
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, brown, damp to moist - gravel = 66 %, sand = 32 %, silt/clay = 2 %	GRAB	S-37		
			END OF TESTPIT (0.95 m) - at refusal on boulder				
1							1
2							

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
	REVIEWED BY: RCA	COMPLETION DATE: 6/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-32**
LOCATION: BA-5A N 7,632,994.1 E 566,669.8		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC — M.C. — LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GM		GRAVEL AND SAND - some silt, trace clay, trace cobbles, mostly platy, trace subrounded, light grey, damp to moist					
			- gravel = 47 %, sand = 35 %, silt/clay = 18 %	GRAB	S-38	●		
			END OF TESTPIT (0.9 m) - at refusal on cobbles/boulder					
1								1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.90 m
REVIEWED BY: RCA	COMPLETION DATE: 6/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-33**
LOCATION: BA-5 N 7,632,912.3 E 566,719.7		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	PT		PEAT				
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, brown, damp to moist				
			- gravel = 66 %, sand = 32 %, silt/clay = 2 %	GRAB	S-39		
			END OF TESTPIT (0.95 m) - at refusal on boulder				
1							1
2							

	LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
AECOM	REVIEWED BY: RCA	COMPLETION DATE: 6/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-35**
LOCATION: BA-6 N 7,631,709.1 E 566,585.3		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist	GRAB	S-41			
			- gravel = 65 %, sand = 33 %, silt/clay = 2 %					
1			END OF TESTPIT (1.0 m) - at refusal on boulder					1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.00 m
	REVIEWED BY: RCA	COMPLETION DATE: 6/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-36**
LOCATION: BA-6 N 7,631,641.7 E 566,667.7		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SP		SAND - trace silt, trace gravel, medium grained, poorly graded, light grey, damp					
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist	GRAB	S-42	●		
			- gravel = 65 %, sand = 33 %, silt/clay = 2 %					
1			- seepage					1
			END OF TESTPIT (1.1 m) - at refusal on frozen ground					
2								

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-37**
LOCATION: BA-6A N 7,631,702.6 E 566,685.2		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist					
			- gravel = 59 %, sand = 40 %, silt/clay = 1 %	GRAB	S-43	●		
			- seepage					
			END OF TESTPIT (0.9 m) - due to seepage and sloughing					
1								1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.90 m
REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-38**
LOCATION: BA-6A N 7,631,606.4 E 566,907.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC — M.C. — LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SP		SAND - trace platy gravel, trace silt, medium grained, poorly graded, light brown, damp					
				GRAB	S-44	●		
			- gravel = 7 %, sand = 92 %, silt/clay = 1 %					
1			- seepage					1
			END OF TESTPIT (1.1 m) - due to seepage and sloughing					
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 1.10 m
REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-39**
LOCATION: BA-6A N 7,631,624.7 E 567,008.5		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC — M.C. — LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SP		SAND - trace platy gravel, trace silt, medium grained, poorly graded, light brown, damp					
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist - gravel = 59 %, sand = 40 %, silt/clay = 1 %	GRAB	S-45	●		
			END OF TESTPIT (0.8 m) - at refusal on boulder					
1								1
2								

	LOGGED BY: AM	COMPLETION DEPTH: 0.80 m
AECOM	REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-40**
LOCATION: BA-6A N 7,631,629.1 E 567,104.5		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SP		SAND - trace platy gravel, trace silt, medium grained, poorly graded, light brown, damp					
			- gravel = 7 %, sand = 92 %, silt/clay = 1 %	GRAB	S-46			
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist					
			- gravel = 59 %, sand = 40 %, silt/clay = 1 %	GRAB	S-47			
			END OF TESTPIT (0.9 m) - at refusal on boulder					
1								1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.90 m
REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-41**
LOCATION: BA-7 N 7,631,933.1 E 566,450.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC — M.C. — LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, occasional boulders, maximum size 200 mm, mostly platy, occasional subrounded/subangular, light brown, damp					
			- gravel = 64 %, sand = 36 %	GRAB	S-48			
1								1
			END OF TESTPIT (1.2 m) - in gravel and sand					
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.20 m
	REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-42**
LOCATION: BA-7 N 7,632,003.5 E 566,526.2		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC — M.C. — LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	SP		SAND - trace silt, trace gravel, medium grained, poorly graded, dry to damp, light brown					
	GP		GRAVEL AND SAND - cobbly, occasional boulders, maximum size 200 mm, mostly platy, occasional subrounded/subangular, light brown, damp - gravel = 55 %, sand = 45 %	GRAB	S-49	●		
			END OF TESTPIT (0.9 m) - due to seepage and sloughing					
1								1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.90 m
	REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-43**
LOCATION: LF-2 (BA-14) N 7,632,493.5 E 566,362.7		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist					
	SM		SAND - silty, gravelly, trace cobbles, trace clay, platy/subrounded/subangular, light grey, moist	GRAB	S-50	●		
			- gravel = 35 %, sand = 45 %, silt/clay = 20 % - salinity = 1.5 ppt					
1			- seepage					1
			END OF TESTPIT (1.1 m) - at refusal on boulder					
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.10 m
	REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-44**
LOCATION: LF-2 (BA-14) N 7,632,475.5 E 566,273.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC — M.C. — LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist	GRAB	S-51			
	SM		SAND - silty, gravelly, trace cobbles, trace clay, platy/subrounded/subangular, light grey, moist - gravel = 35 %, sand = 45 %, silt/clay = 20 % - salinity = 1.5 ppt	GRAB	S-52	●		
1			- seepage					1
			END OF TESTPIT (1.2 m) - due to seepage and sloughing					
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.20 m
	REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-45**
LOCATION: LF-2 (BA-14) N 7,632,563.6 E 566,319.6		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	PT		PEAT				
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist				
	SC		SAND - clayey, silty, trace gravel, grey, wet, low plastic - gravel = 3 %, sand = 44 %, silt = 30 %, clay = 23 % - cobbly - seepage	GRAB	S-53		
			END OF TESTPIT (0.9 m) - at refusal on boulder				
1							1
2							

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.90 m
	REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-46**
LOCATION: LF-3 N 7,632,501.0 E 566,547.6		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	GP-GM		SAND AND GRAVEL - some cobbles, some silt, trace clay, mostly platy, occasional subrounded/subangular, light brown, wet - gravel = 45 %, sand = 45 %, silt/clay = 10 % - salinity = 0.5 ppt - seepage	GRAB	S-53A	●		
			END OF TESTPIT (0.8 m) - at refusal on cobbles and boulders					
1								1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.80 m
REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-47**
LOCATION: LF-3 N 7,632,444.8 E 566,601.3		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT	PEAT					
	GP-GM	SAND AND GRAVEL - some cobbles, some silt, trace clay, mostly platy, occasional subrounded/subangular, light brown, wet to very wet - gravel = 45 %, sand = 45 %, silt/clay = 10 % - salinity = 0.5 ppt - seepage	GRAB	S-54	●		
		END OF TESTPIT (0.7 m) - at refusal on cobbles and boulders					
1							1
2							

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.70 m
REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-48**
LOCATION: LF-3 N 7,632,375.1 E 566,589.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SP		SAND - gravelly, some cobbles, trace boulders, trace silt, brown, moist					
	GP-GM		SAND AND GRAVEL - some cobbles, some silt, trace clay, mostly platy, occasional subrounded/subangular, light brown, wet to very wet - gravel = 45 %, sand = 45 %, silt/clay = 10 % - salinity = 0.5 ppt	GRAB	S-55	●		
1			- seepage					1
			END OF TESTPIT (1.1 m) - due to seepage and sloughing					
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 1.10 m
REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-49**
LOCATION: LF-4 (BA-15) N 7,632,338.0 E 566,691.6		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SP		SAND - trace gravel, trace cobbles, medium grained, poorly graded, light brown, damp to moist					
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist	GRAB				
			- gravel = 58 %, sand = 37 %, silt/clay = 5 %		S-56	●		
1			- seepage					1
			END OF TESTPIT (1.1 m) - due to seepage and sloughing					
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 1.10 m
REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-50**
LOCATION: LF-4 (BA-15) N 7,632,362.4 E 566,796.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SP		SAND - trace gravel, trace cobbles, medium grained, poorly graded, light brown, damp to moist					
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, brown, damp to moist	GRAB	S-57	●		
			- gravel = 58 %, sand = 37 %, silt/clay = 5 %					
			END OF TESTPIT (0.95 m) - at refusal on boulder/cobbles					
1								1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
	REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-51**
LOCATION: LF-4 (BA-15) N 7,632,418.4 E 566,881.1		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, brown, damp to moist					
				GRAB	S-58	●		
			- gravel = 64 %, sand = 30 %, silt/clay = 6 %					
			- low plastic clay from 0.5 to 0.6 m					
			- seepage					
1								1
			END OF TESTPIT (1.1 m) - due to seepage					
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 1.10 m
REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-52**
LOCATION: LF-4 (BA-15) N 7,632,387.8 E 566,983.1		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Quadivator	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0			GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, brown, moist					
	GP			GRAB	S-59	●		
			- gravel = 64 %, sand = 30 %, silt/clay = 6 %					
1			END OF TESTPIT (1.0 m) - in gravel and sand					1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 1.00 m
	REVIEWED BY: RCA	COMPLETION DATE: 7/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-53**
LOCATION: BA-4D N 7,632,218.0 E 567,258.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist					
				GRAB	S-60	●		
			- gravel = 68 %, sand = 30 %, silt/clay = 2 %					
			END OF TESTPIT (0.9 m) - at refusal on cobbles and boulders					
1								1
2								

	LOGGED BY: AM	COMPLETION DEPTH: 0.90 m
AECOM	REVIEWED BY: RCA	COMPLETION DATE: 8/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-54**
LOCATION: BA-9 N 7,632,380.0 E 567,208.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, light brown, moist					
			- gravel = 62 %, sand = 36 %, silt/clay = 2 %	GRAB	S-61	●		
			END OF TESTPIT (0.9 m) - at refusal on cobbles/boulder					
1								1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.90 m
	REVIEWED BY: RCA	COMPLETION DATE: 8/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-55**
LOCATION: BA-9 N 7,632,448.0 E 567,087.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 450 mm, light brown, moist - gravel = 62 %, sand = 36 %, silt/clay = 2 %	GRAB	S-62	●		
			END OF TESTPIT (0.6 m) - at refusal on boulder					
1								1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.60 m
REVIEWED BY: RCA	COMPLETION DATE: 8/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-56**
LOCATION: BA-9 N 7,632,571.0 E 566,782.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, some silt, mostly platy, occasional subrounded/subangular, light brown, moist - gravel = 56 %, sand = 36 %, silt/clay = 8 %	GRAB	S-63	●		
			END OF TESTPIT (0.6 m) - due to seepage					
1								1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.60 m
	REVIEWED BY: RCA	COMPLETION DATE: 8/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-57**
LOCATION: BA-9 N 7,632,668.0 E 566,578.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0			GRAVEL AND SAND - cobbly, trace boulders, some silt, mostly platy, occasional subrounded/subangular, light brown, moist					
	GP		- gravel = 56 %, sand = 36 %, silt/clay = 8 %	GRAB	S-63A	●		
			- seepage					
			END OF TESTPIT (0.9 m) - due to seepage					
1								1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.90 m
	REVIEWED BY: RCA	COMPLETION DATE: 8/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-58**
LOCATION: BA-10 N 7,632,315.0 E 566,933.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	SM		SAND - gravelly, silty, some cobbles, occasional boulders, trace clay, mostly platy, occasional subrounded/subangular, light brown, wet					
			- gravel = 29 %, sand = 53 %, silt/clay = 18 %	GRAB	S-64	●		
			END OF TESTPIT (0.9 m) - due to seepage					
1								1
2								

AECOM

LOGGED BY: AM	COMPLETION DEPTH: 0.90 m
REVIEWED BY: RCA	COMPLETION DATE: 8/8/10
PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-59**
LOCATION: BA-10 N 763,255.0 E 566,877.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, brown, damp to moist					
	SP-SM		SAND - gravelly, some cobbles, some silt, trace clay, light brown, wet - gravel = 41 %, sand = 49 %, silt/clay = 10 %	GRAB	S-64A	●		
			END OF TESTPIT (0.8 m) - due to seepage					
1								1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.80 m
	REVIEWED BY: RCA	COMPLETION DATE: 8/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-60**
LOCATION: BA-11 N 7,633,179.0 E 566,701.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, maximum size 200 mm, brown, damp to moist - gravel = 68 %, sand = 30 %, silt/clay = 2 %	GRAB	S-65		
			END OF TESTPIT (0.9 m) - at refusal on boulder				
1							1
2							

	LOGGED BY: AM	COMPLETION DEPTH: 0.90 m
AECOM	REVIEWED BY: RCA	COMPLETION DATE: 9/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

LOG OF TESTHOLE CAM-A_TESTPIT LOGS_AUGUST 18, 2010.GPJ UMA.GDT 6/10/10

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-61**
LOCATION: BA-12 N 7,633,260.0 E 566,601.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PLASTIC / M.C. / LIQUID (10 20 30 40)	COMMENTS	DEPTH (m)
0	PT		PEAT					
	GP		GRAVEL AND SAND - cobbly, trace boulders, trace silt, mostly platy, occasional subrounded/subangular, brown, damp to moist					
	SM		SAND - silty, some clay, some gravel, light grey, moist					
				GRAB	S-66	●		
			- gravel = 15 %, sand = 43 %, silt/clay = 42 %					
			END OF TESTPIT (0.95 m) - at refusal on frozen ground					
1								1
2								

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
	REVIEWED BY: RCA	COMPLETION DATE: 9/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

PROJECT: CAM-A Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP10-62**
LOCATION: BA-12 N 7,633,354.0 E 566,441.0		PROJECT NO.: 60156118
CONTRACTOR:	METHOD: Pickaxe and Shovel	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH (m)
0	CL		CLAY - silty, sandy, some gravel, trace cobbles, reddish brown, moist, low plastic				
			- gravel = 10 %, sand = 23 %, silt = 36 %, clay = 31 %	GRAB	S-67		
			END OF TESTPIT (0.95 m) - in clay				
1							1
2							

AECOM	LOGGED BY: AM	COMPLETION DEPTH: 0.95 m
	REVIEWED BY: RCA	COMPLETION DATE: 9/8/10
	PROJECT ENGINEER: Anwar Majid	Page 1 of 1

LOG OF TESTHOLE CAM-A_TESTPIT LOGS_AUGUST 18, 2010.GPJ UMA.GDT 6/10/10

Appendix G

Heritage Report

FINAL REPORT

ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF THE CAM-A INTERMEDIATE DEW LINE SITE, STURT POINT, NUNAVUT

NUNAVUT ARCHAEOLOGIST PERMIT 10-018A

Submitted to:

The Department of Culture, Language, Elders and Youth (CLEY), Nunavut

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1 Copy	**Museum of Civilization** **Ottawa**
3 Copies	**Golder Associates Ltd.** **Calgary, Alberta**

December 2010 **10-1333-0022**

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EXECUTIVE SUMMARY

This report details the results of an Archaeological Impact Assessment completed under Nunavut Archaeologist Permit 10-018A issued by the Department of Culture, Language, Elders and Youth, Nunavut to Sean Webster of Golder Associates Ltd. This study was completed on behalf of AECOM and Public Works and Government Services Canada and included the assessment of the Sturt Point area on Victoria Island, located approximately 85 km east of Cambridge Bay, Nunavut. This Archaeological Impact Assessment was carried out in conjunction with the Phase III Environmental Site Assessment, Hazardous and Non-Hazardous Materials Audit, Geotechnical Evaluation and Remedial Action Plan being conducted in advance of planned reclamation activities at the CAM-A Intermediate Distant Early Warning Line site location.

Procedures employed for this project are considered standard for projects of this nature in the region and entailed pre-field studies, on-ground reconnaissance, site documentation and assessment, reporting and recommendation formulation. Project planning also included provisions for a representative of the local community to accompany the field crew during the field inspection. Gary Avalak of Cambridge Bay accompanied the team during the assessment.

Lack of vegetation and sedimentation enabled surface examination of the facility areas to adequately assess for the presence of cultural materials. In addition, areas adjacent to locations that will be impacted during remediation were also examined. During the study, six sites were identified and documented as per the *Nunavut Archaeological and Palaeontological Sites Regulations*, including NeLv 1, 2 and 3 and NeLw 1, 2 and 3. In addition, several sites representing more recent occupation of the area were also noted during the assessment. These sites are described in this report, however; they do not meet the technical requirements to be considered archaeological sites.

It is recommended that the remediation of the CAM-A site be allowed to proceed with the condition that no impacts occur within 30 m of sites NeLv 1, NeLv 2, NeLv 3, NeLw 1, NeLw 2 and NeLw 3.

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1. INTRODUCTION

In August of 2010, Golder Associates Ltd. (Golder) conducted an Archaeological Impact Assessment (AIA) of the CAM-A Intermediate Distant Early Warning (DEW) Line Site in conjunction with the Phase III Environmental Site Assessment (ESA), Hazardous and Non-Hazardous Materials Audit, Geotechnical Evaluation, Remedial Action Plan on behalf of AECOM and Public Works and Government Services Canada (PWGSC). The CAM-A Intermediate DEW Line site is located at Sturt Point, Victoria Island, approximately 85 km east of Cambridge Bay, Nunavut (Figure 1). All required fieldwork was completed under an Archaeological Permit (10-018A) issued by the Department of Culture, Language, Elders and Youth (CLEY), Nunavut to Sean Webster of Golder.

The purpose of the AIA was to conduct a pedestrian suvey and subsurface testing within the area of the CAM-A DEW Line site location to assess the potential for previously unrecorded archaeological resources. The intent of this program was not to conduct a full AIA of the entire Sturt point area; however, during traverses of the former DEW Line station some lands outside of proposed impacts were investigated. This report details the nature of the studies conducted, presents their results, and makes recommendations relating to heritage concerns in respect of the proposed remediation program.

1.1 Archaeological Resources Defined

The *Nunavut Archaeological and Palaeontological Sites Regulations* (2001) define an archaeological artifact as “any tangible evidence of human activity that is more than 50 years old and in respect of which an unbroken chain of possession or regular pattern of usage cannot be demonstrated.” An archaeological site is defined as “any site where an archaeological artifact is found”.

Archaeological sites are non-renewable resources that may be located at or near the ground surface or may be deeply buried. Archaeological sites are typically classified as prehistoric or historic. Prehistoric or precontact archaeological sites are those sites which

L:\2010\1333\10-1333-0022\8470\Fig 1 10133300228470A001 CAM-A location.dwg Dec 10, 2010 - 9:43am

INSET MAP NOT TO SCALE

2 0 2

SCALE KILOMETRES

LEGEND

PROJECT AREA

REFERENCE

TOPOGRAPHIC MAP 67B 4th EDITION OBTAINED FROM Canmatrix. COPYRIGHT 1995 HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES : TRANSVERSE MERCATOR DATUM : NAD83 COORDINATE SYSTEM : UTM ZONE 13

PROJECT

CAM-A DEW LINE SITE STURT POINT

TITLE

CAM-A PROJECT LOCATION AND STUDY AREA BOUNDARY

Golder Associates
Calgary, Alberta

PROJECT	10.1333.0022.8470		FILE No. 10133300228470A001
DESIGN	BM	31/03/10	SCALE AS SHOWN REV. 0
CADD	SS	06/10/10	
CHECK	SW	10/12/10	**FIGURE: 1**
REVIEW	GC	10/12/10	

contain features or artifacts that reflect the use of a given land base by people prior to European influences. Prehistoric sites typically include ancient campsites, resource harvesting and processing sites, features, artifact scatters and isolated artifact finds.

Features are non-portable articles that indicate a human modification of the local environment. In prehistoric sites in Nunavut these often include items such as hearths, tent rings, stone cairns, and caches. Artifacts are portable items that have been modified by people at some time in the past. These include such items as projectile points, stone flaking debris, cut and modified bone and ceramics. Historic sites generally represent the remains of 19^{th} and early-20^{th} century non-aboriginal habitation, as well as sites associated with industrial and military development. These sites are typically identified by the presence of buildings or structural remains, but may include any site that has evidence of historic use of the landscape. Although not consistently managed under the legislation another important category of historic sites are the remains of traditional use of the land by Aboriginal peoples.

1.2 Potential Impacts

Heritage resources are fragile, non-renewable resources that are generally situated on or near the ground surface. Alteration of the landscape can result in the damage or complete destruction of all or portions of archaeological sites. These alterations often involve the displacement of artifacts resulting in the loss of valuable contextual information or may involve the destruction of the artifacts and features themselves resulting in complete information loss. Losses are permanent and irreversible. Primary, secondary and tertiary impacts are possible with any development. The approach proposed herein is designed to mitigate any potential impacts to heritage resources that could result from the program.

Primary impacts include those disturbances resulting immediately from activity such as the proposed testing during the Phase III ESA and during planned remediation activities. The primary impact zones within the CAM-A DEW Line Site area will be within the remediation footprint including access roads, temporary work zones, borrow pits and dumps. During remediation, vegetation in the area will be cleared, soil will be removed during stripping and excavation, structures will be demolished, materials and equipment will be removed, and the weight of heavy equipment will be sufficient to compress soil strata within the work area resulting in impact to any buried artifacts and features. Individual sites are likely to be affected to varying degrees depending upon where they are located within the proposed areas of impact.

Secondary impacts are indirect impacts that occur after the remediation program is complete. Since the project is of limited duration and will not result in the creation of any permanent structures or facilities, there is no operation phase that will have an effect on heritage resources. Secondary impacts related to site revisits are anticipated to be minimal. Erosion of sloping terrain due to alterations in the vegetation and soils composition may affect sites; however, it is anticipated that excavated areas will be backfilled reducing dramatic changes in slope and therefore potential loss of context due to erosion is likely to be minimal.

Tertiary impacts are the results of changes in land use patterns induced by the program. This area has a long history of use by local people, and use of the area is expected to neither increase nor decrease as a result of the remediation program. Intentional and unintentional impacts to heritage resources can result from increased visitation to specific areas within the region. However, the potential for this type of tertiary impact is anticipated to be low.

2. OBJECTIVES

AIA's for projects of this nature are conducted as required by the Government of Nunavut according to requirements set out in the *Nunavut Archaeological and Palaeontological Sites Regulations* (2001) issued by the Department of Culture, Language, Elders and Youth (CLEY). AIA's are conducted in advance of development to ensure that any heritage resources present are identified and properly managed. The primary objectives of this study were to:

- identify and evaluate archaeological and heritage resources within the proposed area of impact;
- assess the significance of any additional sites identified;
- assess potential development impacts to heritage resources;
- recommend viable measures for managing potential adverse impacts; and
- prepare a Final Report for distribution as required, including submission to CLEY.

This report provides a detailed description of the program adopted to achieve these objectives, as well as its results.

3. PHYSICAL AND CULTURAL SETTING

3.1 Environmental Context

An understanding of past environmental conditions and the environmental factors that shape human approaches to subsistence and settlement patterns enable archaeologists to not only locate sites, but also to provide more accurate interpretations of individual sites. The physical aspects of the environs (topography, drainage, climate and soils) as well as resource availability (flora, fauna, lithic materials and water) are prime criteria for the identification of site location and function. Assessments of the universal cultural activities of site location, travel within and through the area, and resource exploitation are key components of any archaeological site analysis.

The regional environment influences where specific activities and occupation are located in a pattern of seasonal movements according to the availability of resources: a seasonal round. The variables of archaeological site distribution can be identified and combined into useful criteria for suggesting the potential of an environment to hold heritage resources that includes a wide variety of landforms frequently associated with coastlines and lake shores, river banks, eskers and kames, and bedrock knolls in Arctic environs. Distribution patterns partially reflect environmental opportunities presented to human groups as well as cultural preferences demonstrated by site location. Topography influences much human activity including travel, communication, resource catchments, dwelling locations and eventually constrains human activity areas to defined localities. Based on existing heritage resources, the environment is a key factor in human settlement patterns.

3.2 Regional Environment

Prior to contact with Europeans, the environment in which the people of North America lived strongly influenced their culture and economy. The people who inhabited the North took advantage of the seasons and all the resources that were available.

Victoria Island is mainly moraine covered low-lands and drumlin fields, with many raised beaches (Collignon 2005). The vegetation is typical of a tundra environment and consists of arctic willows, marshy lowlands and lichen on rocky outcrops. Inland small herds of musk-oxen and caribou as well as white foxes, wolves, ptarmigans and Arctic owls are found on the island; while seals and polar bears inhabit the coastal areas.

The CAM-A site area is characterized by hummocks, rolling hills and raised beaches compost of coarse grained gravel. The station facilities were constructed on the highest beach ridge at Sturt Point. During the study the only wildlife observed were several musk-oxen. Vegetation is limited to low lying, wet areas which are typically covered in moss. Exposed beach ridges are sparsely covered in moss and lichen.

3.3 Cultural Chronology

Many of the archaeological materials in the project area represent human activity after the ice sheet receded between 10,000 to 8,000 years ago. Most heritage resources sites have been located on eskers in this regional environment (Noble 1981: 97) and Wright (1995: 121) refers to this early period, 10,000 to 6,000 B.P., as the Early Shield culture and suggests a direct development out of eastern and northern predecessors based on technological characteristics and trends.

Between approximately 6,000 and 3,000 B.P. lanceolate projectile points are seen as horizon markers. The Shield Archaic is replaced by the Arctic Small Tool tradition (ASTt) components, attributable to *Palaeo-Eskimo* peoples.

3.3.1 Arctic Small Tool tradition (4200 B.P. to 2800 B.P.)

There is presently little evidence to link Palaeo-Arctic tradition occupations to the Arctic Small Tool tradition (ASTt) occupations that succeed them. The ASTt represents a widespread cultural manifestation that covers all of the Canadian Arctic as well as parts of Alaska and Greenland. The ASTt is typically thought to date between approximately

4,200 and 2,800 B.P. (McGhee 1990). It includes the Denbigh Flint complex in northern Alaska, the Independence I culture of the Canadian High Arctic, the Inuvik Phase and the Pre-Dorset culture in Arctic Canada, and the Sarqaq culture in Greenland. It is thought that the ASTt relates to a separate migration of peoples from Siberia and does not appear to be related to the preceding Palaeo-Arctic tradition. As the name implies, the toolkit of the ASTt is comprised of lithic artifacts that are finely made and smaller than tools of similar function and age from elsewhere in North America. These include microblades and microcores, burins, gravers, small side and end scrapers, side and end blades, and bipointed (arrow) and triangular (harpoon) projectile points (Wright 1995). In Alaska it appears to have developed into the cultures of the Norton tradition while in Canada it developed into the Dorset culture.

The Canadian Tundra Tradition (3,300 – 2,600 B.P.) has been described as a local variant of the ASTt which focused on caribou exploitation (Noble 1981). Sites of this cultural tradition are widespread, being represented in sites on Great Slave and Great Bear Lakes eastward to North Henik Lake near Hudson Bay. Characterized by large lenticular and oval bifaces, small triangular and side notched points, side blades, burin and microblade technology, these assemblages are most commonly associated with orange/pink and white quartzites. Native copper appears in some sites toward the end of this period.

Following the ASTt is the Taltheilei Shale Tradition (2,500 B.P. to 100 B.P.), seen as ancestral to development of the Athapaskan people (Noble 1981). Artifacts of siliceous shale originating on the eastern arm of Great Slave Lake are characteristic; although Taltheilei artifacts have also been identified in the Barrens south of Kugluktuk at Itchen Lake (Blower 2003). Lanceolate projectile points continue to be important in the tool assemblage but small corner and side notched points occur in the latter half of the tradition. The prominent biface and burin and microblade technologies of the preceding phase are notably absent.

3.3.2 Dorset Culture (2,500 B.P. to 1,000 B.P.)

The Dorset culture occupied the Canadian Arctic from 2,500 BP until at least 1,000 BP. (McGhee 1990). Best known for miniature carvings, Dorset appears to have been a more successful adaptation to the conditions of the north than the preceding ASTt cultures from which it developed. This is demonstrated by the huge area occupied by Dorset groups and by evidence that they had perfected winter hunting on the sea ice. Cooler conditions in the northern hemisphere around 3,000 years ago resulted in expansion of the sea ice and a shift away from terrestrial hunting of caribou and hunting of sea mammals from boats in open water to a procurement of sea mammals from coastal edges and sea ice. This is evidenced in the archaeological record with a shift away from bow hunting to harpoon and spear hunting (McGhee 1990). Artifacts recovered from sites representing this period are more diverse and “reflect a richer and more secure way of life than that of earlier Palaeo-Eskimos.” including the establishment of permanent winter villages (McGhee 1990).

However, when the people of the Thule culture arrived in the Canadian Arctic approximately 1,000 years ago, the Dorset culture had largely or entirely disappeared for reasons that are not well understood (McGhee 2001; Wright 1999).

3.3.3 Thule (800 B.P. to 400 B.P.)

The Thule tradition dates from approximately 800 to 400 B.P. and is derived from the Norton tradition in northern Alaska. More specifically, Thule grows out of the Old Bering Sea and Punuk traditions, which have numerous similarities to Thule cultural assemblages. These assemblages suggest subsistence based on maritime resources such as seals and whales that were hunted from kayaks or umiaks as identified by harpoon floats. Thule represented a new kind of adaptation to the Arctic environment, based on the hunting of large sea mammals in open water through the use of drag floats attached to the harpoon line. Large skin boats and the use of dogs to pull large sleds were other Thule innovations. Winters were spent in sometimes large communities of semi-subterranean houses, subsisting on a stored surplus obtained most typically by hunting bowhead whales. The introduction of Thule into the Canadian Arctic is noted by a distinct change in a number of cultural markers from the Dorset culture. The earliest Thule occupations currently recognized are on islands in the Bering Strait and exhibit an almost complete reliance on maritime resources; however, later sites demonstrate that both maritime and terrestrial resources were utilized (McGhee 1990). Climatic changes following the thirteenth century likely caused the Thule to modify their way of life into that of the various historic Inuit groups.

3.4 Historic Inhabitants

Historic use of the project area is identified with the ‘Copper Inuit’. The traditional territory of the Copper Inuit extends from the Coppermine River east to the Perry River and the south coast of Banks Island south to Great Bear Lake (Damas 1984). The subsistence, economy and settlement pattern of the Copper Inuit was greatly influenced by seasonal fluctuations. In the spring they would leave their more sedentary villages along the coast to hunt and fish inland. Subsistence from late May until November was reliant on caribou, fish, fowl and small game common on the interior tundra. In the fall during the caribou migration hunting caribou was often the most dominant form of subsistence. The Copper Inuit would return to the coast in the fall to build villages for the winter; breathing-hole sealing was the most prevalent activity during the winter months. This method involved specialty trained dogs to locate the seals’ breathing holes; each hunter would station themselves at a hole and quietly wait for a seal to come up to breathe (Damas 1984). Other resources that were occasionally used include polar bears in the winter and musk-oxen in the summer.

The largest grouping of Copper Inuit was during the winter months when they would gather in villages along the coast (more people was beneficial for breathing-hole sealing). Over the summer they split up into smaller groups and even individual nuclear families when subsistence was based on fishing, hunting small animals and foraging. In the late autumn many of these groups would reunite for the sewing period, when sewing their winter garments was the most important task (Damas 1984).

Although many of the characteristics described are similar with other Inuit groups there are some distinguishing characteristics that the Copper Inuit have. According to Damas (1984) aside form the territory that they inhabited, the Copper Inuit were also known for their wide use of copper; their distinctively tailored clothing; and their social and familial organization.

4. PROCEDURES

4.1 Pre-Field Studies

To identify areas of possible archaeological concern, several data sources were reviewed before fieldwork began. Archaeological site records maintained by the Archaeological Survey of Canada in Ottawa were examined as part of the background to the study. A review of general environmental information for the region was conducted to provide a context for the field work that followed and National Topographic Series (NTS) maps of the project area were also examined to determine the nature of landforms in the region. Previously conducted archaeological studies for the region were also consulted, such as both past and more recent documents and reports produced for the proposed Mackenzie Valley Pipeline.

Some of this information was incorporated into the permit application for review by the CLEY. A permit to conduct the AIA was issued by CLEY to Sean Webster of Golder on June 7th, 2010.

4.2 In-Field Studies

All of the potential areas of impact within the proposed Phase III ESA and remediation areas were examined using a combination of pedestrian traverses, visual examination and judgmental shovel tests. Pedestrian traverses and visual inspections were used to identify surface evidence of heritage resources such as historic buildings, depressions and other artifacts. All subsurface exposures present within the area, including natural exposures, were examined to determine the potential for buried cultural components. Existing disturbances such as eroding slopes were also examined if it appeared that they might aid in the identification of buried cultural components within the proposed areas of impact. In areas where there were no existing exposures and/or where dense vegetation was present, judgmental shovel tests were excavated to determine the potential for buried heritage resources.

4.3 Heritage Feature / Structure Evaluation

Evaluations of heritage features and standing structures were to be completed for features/structures that are observed during the investigations. These evaluations would consider perceived heritage resource value and community cultural value as well as the predicted impact from the proposed program. In general, disturbed sites with limited cultural remains would be assigned lower archaeological resource values than undisturbed sites, large sites with large amounts of cultural material, complex sites, and multicomponent sites. Undisturbed multicomponent sites would generally be assigned the highest heritage resource value.

4.4 Detailed Archaeological Site Investigations / Mitigation

If required, mitigation of significant heritage resources sites may include a number of different options. Prior to evaluation of these mitigative options, the perceived value of the identified archaeological sites will be discussed with the AECOM and PWGSC Project team to determine the feasibility of avoiding important sites. Only if site avoidance is not possible, will other mitigative measures such as collection and documentation, and controlled mapping/excavation be considered. In areas of no sediment deposition surface collection and mapping of artifacts and features may satisfy regulatory requirements for mitigation. Recommendations for excavation may include a controlled excavation mitigative plan and will specify the number of square metres and suggest locations for excavation units/blocks.

Overall mitigative options are summarized below:

- collection and documentation undertaken at the time of the field assessment at all sites with low archaeological resource value;
- avoidance if feasible at all sites assigned high archaeological resource value;

- mitigative excavations which will be recommended at those sites assigned high archaeological resource value that could not be avoided by borrow source relocation; and
- a management plan for required mitigation relative to the proposed construction schedule will be discussed with the site project team.

4.5 Reporting

The final permit report outlining the results of the archaeological studies, submitted in October of 2010 to CLEY, which summarizes the results of the AIA that was conducted under Nunavut Permit #10-018A, issued to Sean Webster of Golder. This report includes a project description, the environmental setting, the historical and archaeological context for the project area, field methodology, and the results of the field reconnaissance. The report includes both descriptive, as well as mapped data on the sites, artifacts, and features identified, as well as detailed information on the nature, content, and significance of the artifacts and features identified. Cultural material recovered has been inventoried, described, and discussed within the report text to aid in evaluation of scientific and interpretive value. All identified sites have been documented on appropriate site inventory forms.

5. RESULTS

5.1 Pre-Field Studies

A pre-field record review of the site files maintained at the Canadian Museum of Civilization was conducted to determine whether any previously recorded sites might be affected by the Phase III ESA and proposed remediation activities and to gain an appreciation of the distribution and nature of sites in the region prior to conducting the AIA. The search yielded no information on previously recorded heritage resources sites in the Sturt Point area prior to conducting the AIA. As such, no revisits or information updates to existing sites were required.

5.2 Field Investigations

The AIA assessment included examination of all of the areas of moderate to high archaeological potential that has been disturbed by the CAM-A DEW Line site as well as areas identified as having potential for future borrow sources or dumps. The disturbed areas that were surveyed included the station area, airstrip, beach, barrel dumps, landfills and all the existing roads and anywhere there was evidence of a bull dozer push or any other disturbance (Plate 1 and 2). Previously undisturbed areas that were examined included the periphery of all the impacted areas as well as several areas that were identified as potential borrow areas, landfills and landfarms for remediation activities.

During the survey six heritage resource sites were identified and recorded. In addition, several land use sites consisting of the remains of two Inuit houses, two areas with modern tent rings, a recent cairn and a burial were also observed. All of these sites are described in greater detail below.

Plate 1 View south of antenna and main facility location CAM-A DEW Line site.

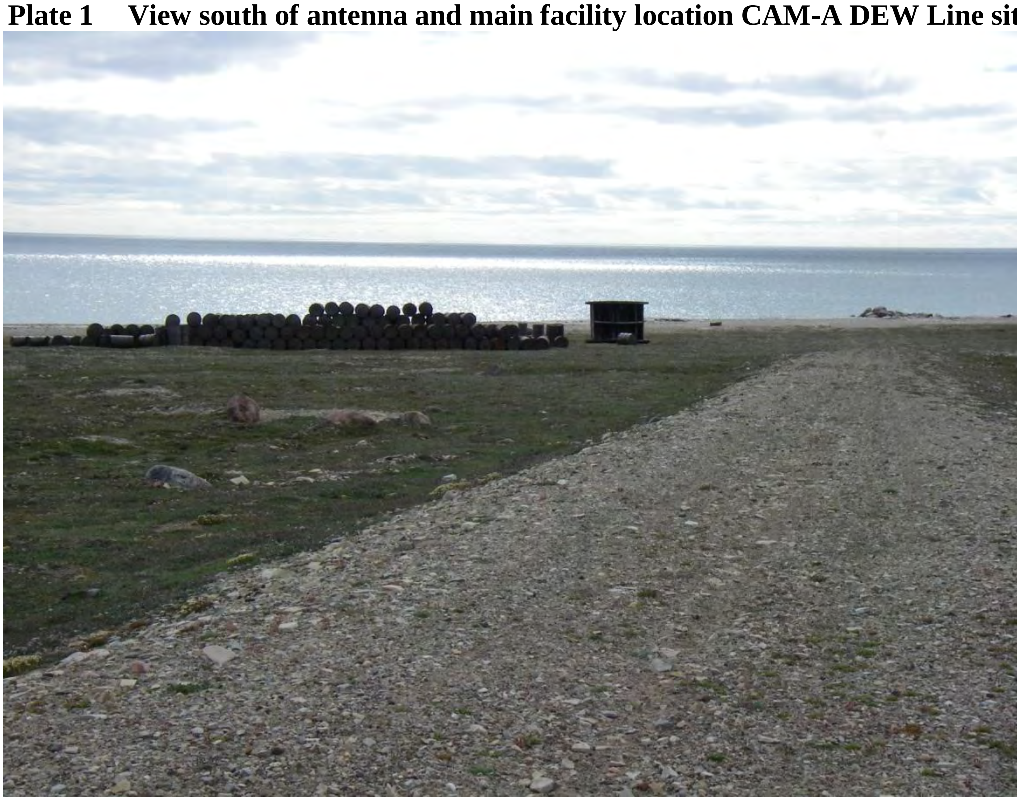

Plate 2 Barrels on the beach near the barge landing at CAM-A.

5.3 Newly Identified Heritage Resource Sites

5.3.1 NeLv 1

NeLv 1 is located approximately 280 southeast of the south end of the airstrip at CAM-A. The site is situated on an elevated beach ridge located 500 m northwest of the current coastline. The area immediately north and northwest of the site has been disturbed as a result of construction of the DEW Line Site, but the site itself remains undisturbed. The site consists of four caches and a rectangular feature identified by Gary Avalak as a hunting blind (Table 1). All of the features were found in an area roughly 45 m by 65 m E-W in size. The caches are aligned with the beach ridge, roughly running east-west with the hunting blind along the eastern edge of the site (Plate 3 and 4). No artifacts were noted in the vicinity of the features. The pattern of lichen growth suggests that the site predates the construction of the DEW Line Site. This site is considered to have moderate potential and it is recommended that the site be avoided.

Table 1 NeLv-1 Features

Feature No.	Feature Type	Measurements (m)	Notes
S1 F1	Cache	3.0 N-S x 4.0 E-W	Large partially collapsed cache. Interior compartment 1 x 0.5 m. Heavy lichen growth.
S1 F2	Cache	4.0 N-S x 3.0 E-W	Intact cache approximately 1 m high. Interior is box shaped and 1.5 x 0.5 m in size and 0.5 m deep.
S1 F3	Hunting Blind	2.0 N-S x 2.0 E-W	Three walls in a rectangular shape, with the open wall the the north. Walls have collapsed slightly, with the south wall being the highest at 0.7 m.
S1 F4	Cache	2.5 N-S x 3.0 E-W	Partially collapsed cache with an interior compartment roughly 0.7 x 0.7 m.
S1 F5	Cache	2.0 N-S x 2.0 E-W	Open cache, interior compartment 0.5 x 1.0 m.

Plate 3 View southeast of cache feature (S1 F5) at NeLv 1.

Plate 4 View southeast of hunting blind at NeLv 1.

5.3.2 NeLw 1

This is a newly recorded site consisting of four caches (Table 2; Plate 5 and 6). The caches are aligned with the beach ridge, roughly running east-west. The site is located on the fourth beach ridge, approximately 350 east of the barge landing at CAM-A and 100 m north of the current coastline. All of the caches have partially or completely collapsed. A caribou innominate and a fox cranium are located on the tundra immediately adjacent to one of the caches (S3 F4). No other artifacts were noted in the vicinity of the features. The pattern of lichen growth suggests that the site predates the construction of the DEW Line Site. This site is considered to have moderate potential and it is recommended that the site be avoided.

Table 2 NeLw 1 Features

Feature No.	Feature Type	Measurements (m)	Notes
S3 F1	Cache	1.0 N-S x 2.0 E-W	Large partially collapsed cache. Interior compartment 1 x 0.5 m. Heavy lichen growth.
S3 F2	Cache	2.0 N-S x 2.0 E-W	Collapsed cache located approximately 10 m northeast of Cache S3 F1.
S3 F3	Cache	2.5 N-S x 3.0 E-W	Large partially collapsed cache. Interior compartment 1.25 x 0.5 m and 0.75 m high.
S3 F4	Cache	2.0 N-S x 3.5 E-W	Large collapsed cache with an interior compartment roughly 1.0 x 0.75 m. Associated with faunal remains outside of cache.

5.3.3 NeLw 2

This is a newly recorded site consisting of two caches (Table 3). Both of the caches have been constructed using large boulders to form the northeast wall of the feature (Plate 7). Several unidentified faunal remains were noted in the sod around the surface of one of the caches (S4 F2). No other artifacts were noted. The pattern of lichen growth suggests that the site predates the construction of the DEW Line Site. This site is considered to have moderate potential and it is recommended that the site be avoided.

Plate 5 View west of NeLw 1 site area with cache feature (S4 F2) in foreground.

Plate 6 View southeast of large cache (S3 F3) at NeLw 1.

Table 3 NeLw-2 Features

Feature No.	Feature Type	Measurements (m)	Notes
S4 F1	Cache	4.0 N-S x 3.0 E-W	Large partially collapsed cache. Interior compartment 1 x 0.75 m. Heavy lichen growth.
S4 F2	Cache	3.5 N-S x 3.0 E-W	Large partially collapsed cache located 2 m south of Cache S4 F1. Interior compartment 1.5 x 0.75 m.

Plate 7 View east of large partially collapsed caches at NeLw 2.

5.3.4 NeLw 3

NeLw 3 is a newly recorded site consisting of three historic tent rings (Table 4). Two of the features are rectangular in shape while the third is roughly circular (Plate 8 and 9). A weathered vertebrae from an unidentified mammal is present within the second ring (S6 F2) and a humerus, radius and ulna from a seal were identified just outside of the third feature (S6 F3). An aluminum A-Frame tripod structure is located 9 metres south of the third ring (Plate 10). Rocks supporting the base of the A-Frame show a similar pattern of vegetation and lichen growth as the rocks in the rings and, as such, they are assumed to be historic rings possibly associated with the construction of the DEW Line Site. No other artifacts were noted in the immediate vicinity of the rings and therefore exact age is difficult to determine. This site is considered to have moderate potential and it is recommended that the site be avoided.

Table 4 NeLw-3 Features

Feature No.	Feature Type	Measurements (m)	Notes
S6 F1	Tent Ring	3.0 N-S x 2.0 E-W	Rectangular in shape, opening in north wall. Feature includes 19 exposed stones.
S6 F2	Tent Ring	3.0 N-S x 2.0 E-W	Rectangular in shape, consisting of 18 stones. South wall completely open. Vertebrae within feature.
S6 F3	Tent Ring	4.0 N-S x 3.5 E-W	Roughly circular in shape, consisting of 35 stones. There is a small (1 m) opening in the south wall. Limb elements from seal outside of feature.

Plate 8 View north of tent ring (S6 F1) at NeLw 3.

Plate 9 View west of NeLw 3 site area with tent ring (S6 F3) in foreground.

Plate 10 View southwest of aluminum tripod adjacent to NeLw 3.

5.3.5 NeLv 2

This is a newly recorded site consisting of a collapsed cache and a linear cairn (Plate 11). The cairn is approximately 4 m long and 0.75 m high, is oriented north-south and extends down a the slope to the next beach ridge. The function of the cairn is unknown. The cache is roughly 3.0 m north-south by 3.0 m east-west and is located immediately east of the cairn. The cairn has collapsed and there were no artifacts noted in the vicinity of the features. This site is considered to have moderate potential and it is recommended that the site be avoided.

Plate 11 View south of cache (left) and cairn (right) at NeLv 2.

5.3.6 NeLv 3

NeLv 3 is a newly recorded burial recorded after the completion of the AIA. The site was discovered by members of the Project management team from AECOM while conduicting a reconnaissance of the beach areas northwest of the CAM-A site. The burial is located approximately 600 m northwest of two Inuit houses associated with the DEW Line Site (described below). The site is situated above the active beach ridge, approximately 55 m west of the current coastline. Human remains, including a cranium, humerus, scapula, vertebrae and several ribs are scattered along the beach within a 4.0 x 5.0 m area along with the remains of a collapsed wooden box (possibly a makeshift coffin); pieces of the box may have been collected from the houses to the south. The site is outside of the archaeological study area associated with the DEW Line Site remediation project and will not be impacted by planned remediation activities.

5.4 Additional Cultural Resources

Several other cultural resources sites were identified during the AIA that were noted but not officially recorded as they do not meet the criteria to be designated as archaeological sites under the *Nunavut Archaeological and Palaeontological Sites Regulations* (2001). These sites include several Inuit houses, two sets of recent tent rings, and a dedicated cairn. These sites are described in further detail below.

5.4.1 Inuit Houses

The remains of two Inuit houses were recorded on the beach, approximately 850 m northeast of the CAM-A airstrip. Both of the houses have partially collapsed (Plate 12). A third structure, that may have been another house, has burned to the ground and only the framing from the floor remains. The area surrounding the houses includes numerous barrels, wire, broken boards, snowmobile parts, glass and a ladder. A circular tent ring is located to the south of one of the houses. Fragments of glass, several tin cans and some broken wood were recorded within the ring. In addition, the partial remains of a wooden boat are situated east of the tent ring, adjacent to the coastline (Plate 13).

Plate 12 View north of Inuit house on beach at Sturt Point.

Plate 13 Partial remains of a boat on beach next to Inuit houses at Sturt Point.

5.4.2 Tent rings (GAL S2 and GAL S5)

Two sets of recent tent rings were noted during the AIA. The first set (GAL S2) is located on the second beach ridge, approximately 75 m from the current coastline. The site includes three rings, all on the same ridge, across an area roughly 40 m long (Table 5; Plate 14). Many of the stones used to construct the rings have little to no lichen growth on the top surface suggesting recent use. In addition a shotgun shell, plastic, a zipper fragment and a tin can lid were associated with the rings.

Table 5 GAL S2 Features

Feature No.	Feature Type	Measurements (m)	Notes
S2 F1	Tent Ring	3.0 N-S x 2.0 E-W	Rectangular in shape, opening in south wall. Feature includes 14 stones, with a sandstone platform in the southwest corner. Associated with shotgun shell and plastic.
S2 F2	Tent Ring	2.0 N-S x 2.0 E-W	Square in shape, consisting of 50 stones. Slight opening in east wall. Numerous stones with no lichen growth.
S2 F3	Tent Ring	3.0 N-S x 2.0 E-W	Roughly circular in shape, consisting of 55 stones. There is a small (1 m) opening in the south wall. A zipper fragment and tin can lid are present inside the feature.

Site GAL S5 is located 65 m southwest of NeLw 3 on the same ridge line. The site includes two tent rings located approximately 20 m apart (Table 6; Plate 15). Areas to the west of the site have been impacted by previous development, likely as a granular source for the DEW line site. Materials associated with the rings include a tin can, a shotgun shell, wood fragments, and a heavily weathered fragment from a caribou antler.

Table 6 GAL S5 Features

Feature No.	Feature Type	Measurements (m)	Notes
S5 F1	Tent Ring	3.0 N-S x 3.0 E-W	Circular in shape, opening in north wall. Comprised of 20 stones. Associated with shotgun shell and a tin can.
S5 F2	Tent Ring	2.0 N-S x 2.0 E-W	Circular in shape with openings in the south and north wall. Wood and antler associated with feature.

Plate 14 View west of modern tent ring (GAL S2) on beach at Sturt Point.

Plate 15 View southeast of modern tent ring (GAL S5) on beach at Sturt Point.

5.4.3 Harrop Cairn

This site includes a cairn constructed on the top of an in-ground storage area at the west end of the main facilities location at CAM-A. The cairn was erected and dedicated on August 17, 1976 by Dr. A.H. Harrop and family. Dr. Harrop was the Chief Commissioner of the Order of St. John and the cairn includes a plaque indicating that the cairn was erected "in commemoration of the many Arctic explorers whose lives were lost in these vast Territories, in hope that it may some day be used to save lives." The cairn contains a survival kit, visible through the stones of the cairn. The cairn does not appear to have been opened since construction (Plate 16). Although not designated as a heritage resource, it is recommended that the site be avoided during remediation, in keeping with the intent of the dedication.

Plate 16 View southwest of Harrop Cairn at CAM-A facility location.

6. SUMMARY AND RECOMMENDATIONS

The AIA of the CAM-A Intermediate DEW Line site conducted under Nunavut Permit 10-018A led to the discovery of six new archaeological sites (NeLv 1, 2 and 3 and NeLw 1, 2 and 3) and a number of more contemporary sites including several tent rings, Inuit houses and a cairn. The disturbed nature of CAM-A area and the lack of vegetation and sedimentation enabled a high visibility surface examination of the facility areas to adequately assess for the presence of cultural materials.

Table 7 Site Summary and Recommendations

Site	Type	Significance	Recommendations
NeLv 1	Caches and blind	Moderate	Avoidance is recommended
NeLw 1	Caches	Moderate	Avoidance is recommended
NeLw 2	Caches	Moderate	Avoidance is recommended
NeLw 3	Historic tent rings	Low	Avoidance is recommended
NeLv 2	Cache and cairn	Moderate	Avoidance is recommended
NeLv 3	Burial	High	Avoidance is recommended; site will not be impacted.
Inuit Houses*	Cabins	Low	No further work recommended
GAL S2*	Tent rings	Low	No further work recommended
GAL S5*	Tent rings	Low	No further work recommended
Harrop Cairn*	Cairn	Moderate	Avoidance is recommended

* Sites not officially recorded as archaeological resources.

Based on the results of the AIA, AECOM and PWGSC have fulfilled the requirements to indentify the potential for impact to heritage resources during the proposed remediation/reclamation of the CAM-A DEW Line site at Sturt Point. **As a result, it is recommended that PWGSC be allowed to proceed with the remediation of the CAM-A DEW Line site area with the condition that no impacts occur within 30 m of sites NeLv 1, 2, 3, NeLw 1, 2, and 3. In addition, it is also recommended that the Harrop Cairn be avoided, if possible.**

7. CLOSURE

We trust the above meets your present requirements. If you have any questions or require additional details, please contact the undersigned.

GOLDER ASSOCIATES LTD.

Report prepared by:	Report reviewed by:
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8. REFERENCES

Blower, David

2003 Heritage Resources Studies Mitigation and Assessment 2002, Bathurst Inlet Port and Road Project, Nunavut Permit 02-035A. Department of Culture, Language, Elders and Youth, Iqaluit.

Collignon, Beatrice

2005 Encyclopedia of the Arctic, Volume 3 O-Z Index. Ed. by, Mark Nutall, pp 2130-2131. Routledge, New York.

Damas, David

1984 Copper Eskimo. In, In, Handbook of North American Indians, Pp 391 – 396. Smithsonian Institution, Washington.

Government of Nunavut

2001 Nunavut Archaeological and Paleontological Sites Regulations. Department of Culture, Language, Elders and Youth, Iqaluit.

McGhee, Robert

1990 Canadian Arctic Prehistory. Canadian Museum of Civilization, Hull.

Noble, William. C.

1981 Prehistory of the Great Slave Lake and Great Bear Lake Region. In, Handbook of North American Indians Volume 6, Subarctic. Pp. 97-129. Smithsonian Institution. Washington.

Wright, J. V.

1995 A History of the Native People of Canada, Volume I (10,000 – 1,000 B.C.) Mercury Series, Archaeological Survey of Canada, Paper 152. Canadian Museum of Civilization, Hull.

1999 A History of the Native People of Canada, Volume II (1,000 B.C. – A.D. 500.) Mercury Series, Archaeological Survey of Canada, Paper 152. Canadian Museum of Civilization, Hull.

Appendix H

FCSAP Scoring Sheets

CCME National Classification System for Contaminated Sites (2008, 2010 v 1.2)
Pre-Screening Checklist

Question	Response (yes / no)	Comment
1. Are **Radioactive material**, **Bacterial contamination** or **Biological hazards** likely to be present at the site?	No	If yes, do not proceed through the NCSCS. Contact applicable regulatory agency immediately.
2. Are there **no contamination exceedances** (known or suspected)? Determination of exceedances may be based on: 1) CCME environmental quality guidelines; 2) equivalent provincial guidelines/standards if no CCME guideline exists for a specific chemical in a relevant medium; or 3) toxicity benchmarks derived from the literature for chemicals not covered by CCME or provincial guidelines/standards.	No	If yes (i.e., there are no exceedances), do not proceed through the NCSCS.
3. Have **partial/incompleted or no environmental site investigations** been conducted for the Site?	No	If yes, do not proceed through the NCSCS.
4. Is there direct and signficant evidence of **impacts to humans** at the site, or off-site due to migration of contaminants from the site?	No	If yes, automatically rate the site as Class 1, a priority for remediation or risk management, regardless of the total score obtained should one be calculated (e.g., for comparison with other Class 1 sites).
5. Is there direct and significant evidence of **impacts to ecological receptors** at the site, or off-site due to migration of contaminants from the site?	No	Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are considered to be severe, the site may be categorized as Class 1, regardless of the numerical total NCSCS score. For the purpose of application of the NCSCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction.
6. Are there indicators of significant **adverse effects in the exposure zone** (i.e., the zone in which receptors may come into contact with contaminants)? Some examples are as follows: -Hydrocarbon sheen or NAPL in the exposure zone -Severely stressed biota or devoid of biota; -Presence of material at ground surface or sediment with suspected high concentration of contaminants such as ore tailings, sandblasting grit, slag, and coal tar.	No	If yes, automatically rate the site as Class 1, a priority for remediation or risk management, regardless of the total score obtained should one be calculated (e.g., for comparison with other Class 1 sites).
7. Do measured concentrations of volatiles or unexploded ordnances represent an **explosion hazard**?	No	If yes, automatically rate the site as Class 1, a priority for remediation or risk management, and do not continue until the safety risks have been addressed. Consult your jurisdiction's occupational health and safety guidance or legislation on exposive hazards and measurement of lower explosive limits.

If none of the above applies, proceed with the NCSCS scoring.

CCME National Classification System for Contaminated Sites (2008, 2010 v 1.2)
Summary of Site Conditions

Subject Site:	**CAM-A, Sturt Point, Nunavut**	
Civic Address: *(or other description of location)*	CAM-A, Sturt Point, Nunavut	
Site Common Name : *(if applicable)*	CAM-A Intermediate DEW Line Site	
Site Owner or Custodian: *(Organization and Contact Person)*	Indian and Northern Affairs Canada (INAC)	
Legal description *or* metes and bounds:	CAM-A Sturt Point is located on Victoria Island, Nunavut (68^0 47' N, 103^0 20' W).	
Approximate Site area:	86 Ha	
PID(s) : *(or Parcel Identification Numbers [PIN] if untitled Crown land)*	Canada Survey Records 88569, Canada Lands	
Centre of site: *(provide latitude/longitude or UTM coordinates)*	Latitude: Longitude:	______ degrees ______ min ______ secs ______ degrees ______ min ______ secs
	UTM Coordinate:	Northing 7632073 Easting 566596
Site Land Use:	Current:	Not used. Abandoned Intermediate DEW Line Site
	Proposed:	Remediation to eliminate exposure to physical and chemical hazards.
Site Plan	**To delineate the bounds of the Site a site plan MUST be attached. The plan must be drawn to scale indicating the boundaries in relation to well-defined reference points and/or legal descriptions. Delineation of the contamination should also be indicated on the site plan.**	
Provide a brief description of the Site:	CAM-A Sturt Point is located on Victoria Island, Nunavut (68^0 47' N, 103^0 20' W). The site is located along the coast and overlooks the Queen Maud Gulf. The site is located approximately 80 km east of Cambridge Bay. The terrain of the area is relatively flat with several ponds and lakes and an average elevation of 50 m above sea level. CAM-A was reserved by the Department of National Defence (DND) in 1956 for use as a DEW Line Site and was constructed in 1959. The radar facility was typical of all intermediate sites and consisted of a module train, warehouse, garage, a POL storage facility, a radar tower, an airstrip and a beach cargo landing area. In addition to the main site, a beach landing area was constructed along with gavel roads linking the various facilities. Access to the site is provided by airstrips and the beach cargo area. The main airstrip (~1,200 m long) is located north of the station facilities with an approximate northwest-southeast orientation. The site was abandoned as part of the DEW Line system in 1963, and the responsibility of the site was taken over by Indian and Northern Affairs Canada (INAC).	
Affected media and Contaminants of Potential Concern (COPC):	The investigation and delineation of contaminated soil at CAM-A was completed for the contaminants of concern listed in the INAC Abandoned Military Site Remediation Protocol. The contaminants of concern are: arsenic, cadmium, cobalt, copper, lead, nickel, zinc, PCBs and petroleum hydrocarbons. Delineation of petroleum hydrocarbon (PHC) impacts was completed using the INAC Arctic PHC Evaluation Process, which is included in the INAC Abandoned Military Site Protocol (2009).	

Please fill in the "letter" that best describes the level of information available for the site being assessed:

Site Letter Grade **C**

If letter grade is F, <u>do not</u> continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent.

Scoring Completed By:	Dara Schmidt
Date Scoring Completed:	16-Nov-10

CCME National Classification System (2008, 2010 v 1.2)

(I) Contaminant Characteristics

CAM-A, Sturt Point, Nunavut

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
1. Residency Media (replaces physical state)				
Which of the following residency media are known (or strongly suspected) to have one or more exceedances of the applicable CCME guidelines? **yes** = has an exceedance or strongly suspected to have an exceedance **no** = does not have an exceedance or strongly suspected not to have an exceedance		Soil concentrations have been compared to the DEW Line Cleanup Criteria outlined in the Abandoned Military Site Remediation Protocol published by INAC (2009). Exceedances for lead, Type B PHC (F1+F2+F3) and PCBs were identified. Two (2) monitoring wells were installed in the area of the Beach POL. Both wells had parameters which exceed the CCME Protection of Aquatic Life Guideline - Freshwater for arsenic, cadmium, and copper. The criteria for the Guidelines for Canadian Drinking Water Quality (May 2008) were exceeded for chloride, and total dissolved solids (TDS) for the samples taken at the freshwater Lake. The sample, taken from the surface water near the north end of the outfall had concentrations of aluminum, cadmium, and copper which exceed the CCME Protection of Aquatic Life Guideline - Freshwater. Hydrocarbons and PCBs were non-detect in all surface water samples collected. The results from the sediment sample collected from the freshwater lake had no results that exceeded the INAC criteria. Hydrocarbons were not detected and PCBs were reported as non-detect. These results are summarized in the Phase III ESA (AECOM 2010)	The overall score is calculated by adding the individual scores from each residency media (having one or more exceedance of the most conservative media specific and land-use appropriate CCME guideline). Summary tables of the Canadian Environmental Quality Guidelines for soil, water (aquatic life, non-potable groundwater environments, and agricultural water uses) and sediment are available on the CCME website at http://www.ccme.ca/publications/ceqg_rcqe.html?category_id=124 For potable groundwater environments, guidelines for Canadian Drinking Water Quality (for comparison with groundwater monitoring data) are available on the Health Canada website at http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guide-res_recom/index_e.html.	An increasing number of residency media containing chemical exceedances often equates to a greater potential risk due to an increase in the number of potential exposure pathways.
A. Soil	Yes			
Yes No Do Not Know				
B. Groundwater	Yes			
Yes No Do Not Know				
C. Surface water	Yes			
Yes No Do Not Know				
D. Sediment	No			
Yes No Do Not Know				
"Known" -score	6			
"Potential" - score	---			
2. Chemical Hazard				
What is the relative degree of chemical hazard of the contaminant in the list of hazard rankings proposed by the Federal Contaminated Sites Action Plan (FCSAP)?	High	CEPA PCB soil and material impacts were detected onsite. (AECOM, 2010)	The relative degree of chemical hazard should be selected based on the most hazardous contaminant known or suspected to be present at the site. The degree of hazard has been defined by the Federal Contaminated Sites Action Plan (FCSAP) and a list of substances with their associated hazard (Low, Medium and High) has been provided as a separate sheet in this file. *See Attached Reference Material for Contaminant Hazard Rankings.*	Hazard as defined in the revised NCS pertains to the physical properties of a chemical which can cause harm. Properties can include toxic potency, propensity to biomagnify, persistence in the environment, etc. Although there is some overlap between hazard and contaminant exceedance factor below, it will not be possible to derive contaminant exceedance factors for many substances which have a designated chemical hazard designation, but don't have a CCME guideline. The purpose of this category is to avoid missing a measure of toxic potential.
High Medium Low Do Not Know				
"Known" -score	8			
"Potential" - score	---			
3. Contaminant Exceedence Factor				
What is the ratio between the measured contaminant concentration and the applicable CCME guidelines (or other "standards")?	High (>100x)	PCB soil and material impacts detected onsite. (AECOM, 2010)	Ranking of contaminant "exceedance" is determined by comparing contaminant concentrations with the *most conservative media-specific and land-use appropriate CCME* environmental quality guidelines. **Ranking should be based on contaminant with greatest exceedance of CCME guidelines.** Ranking of contaminant hazard as high, medium and low is as follows: High = One or more measured contaminant concentration is greater than 100 X appropriate CCME guidelines Medium = One or more measured contaminant concentration is 10 - 99.99 X appropriate CCME guidelines Low = One or more measured contaminant concentration is 1 - 9.99 X appropriate CCME guidelines Mobile NAPL = Contaminant is a non-aqueous phase liquid (i.e., due to its low solubility, it does not dissolve in water, but remains as a separate liquid) and is present at a sufficiently high saturation (i.e., greater than residual NAPL saturation) such that there is significant potential for mobility either downwards or laterally. Other standards may include local background concentration or published toxicity benchmarks. Results of toxicity testing with site samples can be used as an alternative. This approach is only relevant for contaminants that do not biomagnify in the food web, since toxicity tests would not indicate potential effects at higher trophic levels. High = lethality observed. Medium = no lethality, but sub lethal effects observed. Low = neither lethal nor sub lethal effects observed.	In the event that elevated levels of a material with no associated CCME guidelines are present, check provincial and USEPA environmental criteria. Hazard Quotients (sometimes referred to as a screening quotient in risk assessments) refer to the ratio of measured concentration to the concentration believed to be the threshold for toxicity. A similar calculation is used here to determine the contaminant exceedance factor (CEF). Concentrations greater than one times the applicable CCME guideline (i.e., CEF=>1) indicate that risks are possible. Mobile NAPL has the highest associated score (8) because of its highly concentrated nature and potential for increase in the size of the impacted zone.
Mobile NAPL High (>100x) Medium (10x to 100x) Low (1x to 10x) Do Not Know				
"Known" -score	6			
"Potential" - score	---			

CCME National Classification System (2008, 2010 v 1.2)

(I) Contaminant Characteristics

CAM-A, Sturt Point, Nunavut

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method of Evaluation	Notes
4. Contaminant Quantity (known or strongly suspected)				
What is the known or strongly suspected quantity of all contaminants? >10 hectare (ha) or 5000 m^3 2 to 10 ha or 1000 to 5000 m^3 <2 ha or 1000 m^3 Do Not Know	2 to 10 ha or 1000 to 5000 m3	1,242.8 m3, impacted soil (AECOM, 2010)	Measure or estimate the area or quantity of total contamination (i.e, all contaminants known or strongly suspected to be present on the site). The "Area of Contamination" is defined as the area or volume of contaminated media (soil, sediment, groundwater, surface water) exceeding appropriate environmental criteria.	A larger quantity of a potentially toxic substance can result in a larger frequency of exposure as well as a greater probability of migration, therefore, larger quantities of these substances earn a higher score.
"Known" -score	6			
"Potential" - score	---			
5. Modifying Factors				
Does the chemical fall in the class of persistent chemicals based on its behavior in the environment? Yes No Do Not Know	Yes	PCB soil and material impacts were detected onsite. (AECOM, 2010)	Persistent chemicals, e.g., PCBs, chlorinated pesticides etc. either do not degrade or take longer to degrade, and therefore may be available to cause effects for a longer period of time. Canadian Environmental Protection Act (CEPA) classifies a chemical as persistent when it has at least one of the following characteristics: (a) in air, (i) its half-life is equal to or greater than 2 days, or (ii) it is subject to atmospheric transport from its source to a remote area; (b) in water, its half-life is equal to or greater than 182 days; (c) in sediments, its half-life is equal to or greater than 365 days; or (d) in soil, its half-life is equal to or greater than 182 days. This list does not include metals or metalloids, which in their elemental form do not degrade. However metals and metalloids form chemical species in the environment, many of which are not readily bioavailable.	*Examples of Persistent Substances are provided in attached Reference Materials*
Are there contaminants present that could cause damage to utilities and infrastructure, either now or in the future, given their location? Yes No Do Not Know	No	With the exeption of one portion of the former module train, there is currently no infrastructure remaining on the site.		Some contaminants may react or absorb into underground utilities and infrastructure. For example, organic solvents may degrade some plastics, and salts could cause corrosion of metal.
How many different contaminant classes have representative CCME guideline exceedances? one two to four five or more Do Not Know	two to four	Chlorinated hydrocarbons, inorganics (metals), light extractable PHCs, and heavy extractable PHCs	For the purposes of the revised NCS ranking system, the following chemicals represent distinct chemical "classes": inorganic substances (including metals), volatile petroleum hydrocarbons, light extractable petroleum hydrocarbons, heavy extractable petroleum hydrocarbons, PAHs, phenolic substances, chlorinated hydrocarbons, halogenated methanes, phthalate esters, pesticides.	*Refer to the Reference Material sheet for a list of example substances that fall under the various chemical classes.*
"Known" - Score	4			
"Potential" - Score	---			

Contaminant Characteristic Total

Raw Total Scores- "Known"	30
Raw Total Scores- "Potential"	0
Raw Combined Total Scores	30
Total Score (Raw Combined / 40 * 33)	**24.8**

CCME National Classification System (2008, 2010 v 1.2)

(II) Migration Potential (Evaluation of contaminant migration pathways)

CAM-A, Sturt Point, Nunavut

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Groundwater Movement				
A. Known COPC exceedances and an operable groundwater pathway within and/or beyond the property boundary.				
i) For **potable groundwater environments**, 1) groundwater concentrations exceed background concentrations and 1X the Guideline for Canadian Drinking Water Quality (GCDWQ) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater contamination. For **non-potable environments** (typically urban environments with municipal services), 1) groundwater concentrations exceed 1X the applicable non potable guidelines or modified generic guidelines (which exclude ingestion of drinking water pathway) or 2) there is known contact of contaminants with groundwater, based on physical evidence of groundwater impacts. ii) Same as (i) except the information is not known but <u>strongly suspected</u> based on indirect observations. iii) Meets GCDWQ for **potable environments**; meets non-potable criteria or modified generic criteria (excludes ingestion of drinking water pathway) for **non-potable environments** **or** Absence of groundwater exposure pathway (i.e., there is no aquifer (see definition at right) at the site or there is an adequate isolating layer between the aquifer and the contamination, and within 5 km of the site there are no aquatic receiving environments and the groundwater does not daylight). Score	12 9 0 12 12	The groundwater in the at this site is not meant to be potable. The groundwater concentrations exceed the relevant guidelines (Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater). There is no known contact of contaminants with the groundwater (i.e. buried debris). There is no identified aquifer at this site however the site is within 30 m of a marine environment.	Review chemical data and evaluate groundwater quality. The evaluation method concentrates on 1) a potable or non-potable groundwater environment; 2) the groundwater flow system and its potential to be an exposure pathway to known or potential receptors An aquifer is defined as a geologic unit that yields groundwater in usable quantities and drinking water quality. The aquifer can currently be used as a potable water supply or could have the potential for use in the future. Non-potable groundwater environments are defined as areas that are serviced with a reliable alternative water supply (most commonly provided in urban areas). The evaluation of a non-potable environment will be based on a site specific basis. Physical evidence includes significant sheens, liquid phase contamination, or contaminant saturated soils. Seeps and springs are considered part of the groundwater pathway. In Arctic environments, the potability and evaluation of the seasonal active layer (above the permafrost) as a groundwater exposure pathway will be considered on a site-specific basis.	The 1992 NCS rationale evaluated the off-site migration as a regulatory issue. The exposure assessment and classification of hazards should be evaluated regardless of the property boundaries. Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a groundwater supply source in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resources such as internet links. Note that for potable groundwater that also daylights into a nearby surface water body, the more stringent guidelines for both drinking water and protection of aquatic life should be considered. **Selected References** <u>Potable Environments</u> Guidelines for Canadian Drinking Water Quality: <u>www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guide-res_recom/index_e.html</u> <u>Non-Potable Environments</u> Canadian Water Quality Guidelines for Protection of Aquatic Life. CCME. 1999 <u>www.ccme.ca</u> Compilation and Review of Canadian Remediation Guidelines, Standards and Regulations. Science Applications International Corporation (SAIC Canada), report to Environment Canada, January 4, 2002.
NOTE: If a score is assigned here for Known COPC Exceedances, then you can skip Part B (Potential for groundwater pathway) and go to Section 2 (Surface Water Pathway)				
B. Potential for groundwater pathway.				
a. Relative Mobility High Moderate Low Insignificant Do Not Know Score	High 4		Organics Koc (L/kg) / Metals with higher mobility at acidic conditions / Metals with higher mobility at alkaline conditions Koc < 500 (i.e., log Koc < 2.7) / pH < 5 / pH > 8.5 Koc = 500 to 5000 (i.e., log Koc = 2.7 to 3.7) / pH = 5 to 6 / pH = 7.5 to 8.5 Koc = 5,000 to 100,000 (i.e., log Koc = 3.7 to 5) / pH > 6 / pH < 7.5 Koc > 100,000 (i.e., log Koc > 5)	Reference: US EPA Soil Screening Guidance (Part 5 - Table 39) If a score of zero is assigned for relative mobility, it is still recommended that the following sections on potential for groundwater pathway be evaluated and scored. Although the Koc of an individual contaminant may suggest that it will be relatively immobile, it is possible that, with complex mixtures, there could be enhanced mobility due to co-solvent effects. Therefore, the Koc cannot be relied on solely as a measure of mobility. An evaluation of other factors such as containment, thickness of confining layer, hydraulic conductivities and precipitation infiltration rate are still useful in predicting potential for groundwater migration, even if a contaminant is expected to have insignificant mobility based on its chemistry alone.
b. Presence of engineered sub-surface containment? No containment Partial containment Full containment Do Not Know Score	No containment 3		Review the existing engineered systems or natural attenuation processes for the site and determine if full or partial containment is achieved. Full containment is defined as an engineered system or natural attenuation processes, monitored as being effective, which provide for full capture and/or treatment of contaminants. All chemicals of concern must be contained for “Full Containment” scoring. Natural attenuation must have sufficient data, and reports cited with monitoring data to support steady state conditions and the attenuation processes. If there is no containment or insufficient natural attenuation process, this category is evaluated as high. If there is less than full containment or if uncertain, then evaluate as medium. In Arctic environments, permafrost will be evaluated, as appropriate, based on detailed evaluations, effectiveness and reliability to contain/control contaminant migration.	Someone experienced must provide a thorough description of the sources researched to determine the containment of the source at the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps, geotechnical reports or natural attenuation studies and other resources such as internet links. **Selected Resources:** United States Environmental Protection Agency (USEPA) 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. EPA/600/R-98/128. Environment Canada – Ontario Region – Natural Attenuation Technical Assistance Bulletins (TABS) Number 19 –21.
c. Thickness of confining layer over aquifer of concern or groundwater exposure pathway 3 m or less including no confining layer or discontinuous confining layer 3 to 10 m > 10 m Do Not Know			The term "confining layer" refers to geologic material with little or no permeability or hydraulic conductivity (such as unfractured clay); water does not pass through this layer or the rate of movement is extremely slow. Measure the thickness and extent of materials that will impede the migration of contaminants to the groundwater exposure pathway. The evaluation of this category is based on:	

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
Score	3 m or less 1		1) The presence and thickness of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as drinking water sources or 2) The presence and thickness of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated zone (e.g., water table aquifer, first hydrostratigraphic unit or other groundwater pathway).	
d. Hydraulic conductivity of confining layer $>10^{-4}$ cm/s or no confining layer 10^{-4} to 10^{-6} cm/s $<10^{-6}$ cm/s Do Not Know Score	>10-4 cm/s 1		Determine the nature of geologic materials and estimate hydraulic conductivity from published material (or use "Range of Values of Hydraulic Conductivity and Permeability" figure in the Reference Material sheet). Unfractured clays should be scored low. Silts should be scored medium. Sand, gravel should be scored high. The evaluation of this category is based on: 1) The presence and hydraulic conductivity ("K") of saturated subsurface materials that impede the vertical migration of contaminants to lower aquifer units which can or are used as a drinking water source, groundwater exposure pathway or 2) The presence and permeability ("k") of unsaturated subsurface materials that impede the vertical migration of contaminants from the source location to the saturated water table aquifer, first hydrostratigraphic unit or other groundwater pathway.	
B. Potential for groundwater pathway.				
e. Precipitation infiltration rate (Annual precipitation factor x surface soil relative permeability factor) High Moderate Low Very Low None Do Not Know Score	Very Low 0.2	Annual precipitation = 151.4 mm (AECOM, 2010) Precipitation factor = 0.15 Permeability factor = 0.09 (assuming sand)	Precipitation Refer to Environment Canada precipitation records for relevant areas. Divide annual precipitation by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score). Permeability For surface soil relative permeability (i.e., infiltration) assume: gravel (1), sand (0.6), loam (0.3) and pavement or clay (0). Multiply the surface soil relative permeability factor with precipitation factor to obtain the score for precipitation infiltration rate.	
f. Hydraulic conductivity of aquifer $>10^{-2}$ cm/s 10^{-2} to 10^{-4} cm/s $<10^{-4}$ cm/s Do Not Know Score	10-2 to 10-4 cm/s 1		Determine the nature of geologic materials and estimate hydraulic conductivity of all aquifers of concern from published material (refer to "Range of Values of Hydraulic Conductivity and Permeability" in the Reference Material sheet).	
Potential groundwater pathway total	10.2			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
Groundwater pathway total	**12**			
2. Surface Water Movement				
A. Demonstrated migration of COPC in surface water above background conditions				
Known concentrations of surface water: i) Concentrations exceed background concentrations and exceed CCME CWQG for protection of aquatic life, irrigation, livestock water, and/or recreation (whichever uses are applicable at the site) by >1 X; or There is known contact of contaminants with surface water based on site observations. or In the absence of CWQG, chemicals have been proven to be toxic based on site specific testing (e.g. toxicity testing; or other indicator testing of exposure).	12	Surface water in the Freshwater Lake exceeds the guideline for chloride and TDS. The sample, taken from the surface water near the north end of the outfall had exceedances for aluminum, cadmium and copperfor the the CCME Protection of Aquatic Life Guideline - Freshwater. (AECOM, 2010)	Collect all available information on quality of surface water near to site. Evaluate available data against Canadian Water Quality Guidelines (select appropriate guidelines based on local water use, e.g., recreation, irrigation, aquatic life, livestock watering, etc.). The evaluation method concentrates on the surface water flow system and its potential to be an exposure pathway. Contamination is present on the surface (above ground) and has the potential to impact surface water bodies. Surface water is defined as a water body that supports one of the following uses: recreation, irrigation, livestock watering, aquatic life.	General Notes: Someone experienced must provide a thorough description of the sources researched to classify the surface water body in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. Selected References: CCME. 1999. Canadian Water Quality Guidelines for the Protection of Aquatic Life www.ccme.ca CCME. 1999. Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses (Irrigation and Livestock Water) www.ccme.ca Health and Welfare Canada. 1992. Guidelines for Canadian Recreational Water Quality.
ii) Same as (i) except the information is not known but strongly suspected based on indirect observations.	8			
iii) Meets CWQG or absence of surface water exposure pathway (i.e., Distance to nearest surface water is > 5 km.)	0			

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
Score	12 12			
NOTE: If a score is assigned here for Demonstrated Migration in Surface Water, then you can skip Part B (Potential for migration of COPCs in surface water) and go to Section 3 (Surface Soils)				
B. Potential for migration of COPCs in surface water				
a. Presence of containment No containment Partial containment Full containment Do Not Know Score	No containment 5		Review the existing engineered systems and relate these structures to site conditions and proximity to surface water and determine if full containment is achieved: score low if there is full containment such as capping, berms, dikes; score medium if there is partial containment such as natural barriers, trees, ditches, sedimentation ponds; score high if there are no intervening barriers between the site and nearby surface water. Full containment must include containment of all chemicals.	
b. Distance to Surface Water 0 to <100 m 100 - 300 m >300 m Do Not Know Score	0 to <100 m 3		Review available mapping and survey data to determine distance to nearest surface water bodies.	
c. Topography Contaminants above ground level and slope is steep Contaminants at or below ground level and slope is steep Contaminants above ground level and slope is intermediate Contaminants at or below ground level and slope is intermediate Contaminants above ground level and slope is flat Contaminants at or below ground level and slope is flat Do Not Know Score	At/below and interme 1		Review engineering documents on the topography of the site and the slope of surrounding terrain. Steep slope = >50% Intermediate slope = between 5 and 50% Flat slope = < 5% Note: Type of fill placement (e.g., trench, above ground, etc.).	
d. Run-off potential High (rainfall run-off score > 0.6) Moderate (0.4 < rainfall run-off score <0.6) Low (0.2 < rainfall run-off score <0.4) Very Low (0 < rainfall run-off score < 0.2) None (rainfall run-off score = 0) Do Not Know Score	Very Low 0.2	Annual precipitation = 151.4 mm (AECOM, 2010) Precipitation factor = 0.15 Infiltration factor = 0.045 (assuming sand)	Rainfall Refer to Environment Canada precipitation records for relevant areas. Divide rainfall by 1000 and round to nearest tenth (e.g., 667 mm = 0.7 score). The former definition of "annual rainfall" did not include the precipitation as snow. This minor adjustment has been made. The second modification was the inclusion of permeability of surface materials as an evaluation factor. Permeability For infiltration assume: gravel (0), sand (0.3), loam (0.6) and pavement or clay (1). Multiply the infiltration factor with precipitation factor to obtain rainfall run off score.	Selected Sources: Environment Canada web page link: www.msc.ec.gc.ca Snow to rainfall conversion apply ratio of 15 (snow):1(water)
e. Flood potential 1 in 2 years 1 in 10 years 1 in 50 years Not in floodplain Do Not Know Score	Do Not Know 0.5		Review published data such as flood plain mapping or flood potential (e.g., spring or mountain run-off) and Conservation Authority records to evaluate flood potential of nearby water courses both up and down gradient. Rate zero if site not in flood plain.	
Potential surface water pathway total	9.7			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
Surface water pathway total	**12**			
3. Surface Soils (potential for dust, dermal and ingestion exposure)				
A. Demonstrated concentrations of COPC in surface soils (top 1.5 m)				
COPCs measured in surface soils exceed the CCME soil quality guideline.	12	COPCs measured in surface soils exceed relevant site guidelines (DEW Line Cleanup Criteria) outlined in the INAC Abandoned Military Site Remediation Protocol (2009).	Collect all available information on quality of surface soils (i.e., top 1.5 metres) at the site. Evaluate available data against Canadian Soil Quality Guidelines. Select appropriate guidelines based on current (or proposed future) land use (i.e, agricultural, residential/parkland, commercial, or industrial), and soil texture if applicable (i.e., coarse or fine).	Selected References: CCME. 1999. Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health www.ccme.ca
Strongly suspected that soils exceed guidelines	9			
COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock).	0			
Score	12 12			
NOTE: If a score is assigned here for Demonstrated Concentrations in Surface Soils, then you can skip Part B (Potential for a surface soils migration pathway) and go to Section 4 (Vapour)				
B. Potential for a surface soils (top 1.5 m) migration pathway				

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
a. Are the soils in question covered? Exposed Vegetated Landscaped Paved Do Not Know	Exposed	Soils are exposed both covered with moss and vegetation and exposed in some areas.	Consult engineering or risk assessment reports for the site. Alternatively, review photographs or perform a site visit. Landscaped surface soils must include a minimum of 0.5 m of topsoil.	The possibility of contaminants in blowing snow have not been included in the revised NCS as it is difficult to assess what constitutes an unacceptable concentration and secondly, spills to snow or ice are most efficiently mitigated while freezing conditions remain.
Score	6			
b. For what proportion of the year does the site remain covered by snow? 0 to 10% of the year 10 to 30% of the year More than 30% of the year Do Not Know	>30% of year	The value of this selection should score a 2 not a zero. The potential surface soil pathway total is actually 8.	Consult climatic information for the site. The increments represent the full span from soils which are always wet or covered with snow (and therefore less likely to generate dust) to those soils which are predominantly dry and not covered by snow (and therefore are more likely to generate dust).	
Score	0			
Potential surface soil pathway total	6			
Allowed Potential score	---	**Note: If a "known" score is provided, the "potential" score is disallowed.**		
Soil pathway total	**12**			
4. Vapour				
A. Demonstrated COPCs in vapour.				
Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations.	12	VOCs were measured in some soil samples and were found to be below risk based concentrations. (AECOM, 2010)	Consult previous investigations, including human health risk assessments, for reports of vapours detected.	
Strongly suspected (based on observations and/or modelling)	9			
Vapour has not been measured and volatile hydrocarbons have not been found in site soils or groundwater.	0			
	Go to Potential			
Score	---			
NOTE: If a score is assigned here for Demonstrated COPCs in Vapour, then you can skip Part B (Potential for COPCs in vapour) and go to Section 5 (Sediment)				
B. Potential for COPCs in vapour				
a. Relative Volatility based on Henry's Law Constant, H' (dimensionless) High (H' > 1.0E-1) Moderate (H' = 1.0E-1 to 1.0E-3) Low (H' < 1.0E-3) Not Volatile Do Not Know	Low	Low volatility has been applied because there are minimal detectable BTEXs. Most contaminants of concern (i.e. Metals and PCBs) have no volatility.	Reference: US EPA Soil Screening Guidance (Part 5 - Table 36) *Provided in Attached Reference Materials*	If the Henry's Law Constant for a substance indicates that it is not volatile, and a score of zero is assigned here for relative volatility, then the other three questions in this section on Potential for COPCs will be automatically assigned scores of zero and you can skip to section 5.
Score	1			
b. What is the soil grain size? Fine Coarse Do Not Know	Coarse	Bulk sampling completed for soil samples indicate coarse grained material onsite. (AECOM 2010)	Review soil permeability data in engineering reports. The greater the permeability of soils, the greater the possible movement of vapours. Fine-grained soils are defined as those which contain greater than 50% by mass particles less than 75 µm mean diameter (D50 < 75 µm). Coarse-grained soils are defined as those which contain greater than 50% by mass particles greater than 75 µm mean diameter (D50 > 75 µm).	
Score	4			
c. Is the depth to the source less than 10m? Yes No Do Not Know	Yes		Review groundwater depths below grade for the site.	
Score	2			
d. Are there any preferential pathways? Yes No Do Not Know	No		Visit the site during dry summer conditions and/or review available photographs. Where bedrock is present, fractures would likely act as preferential pathways.	Preferential pathways refer to areas where vapour migration is more likely to occur because there is lower resistance to flow than in the surrounding materials. For example, underground conduits such as sewer and utility lines, drains, or septic systems may serve as preferential pathways. Features of the building itself that may also be preferential pathways include earthen floors, expansion joints, wall cracks, or foundation perforations for subsurface features such as utility pipes, sumps, and drains.
Score	0			
Potential vapour pathway total	7			
Allowed Potential score	7	Note: If a "known" score is provided, the "potential" score is disallowed.		
Vapour pathway total	**7**			

CCME National Classification System (2008, 2010 v 1.2)

(II) Migration Potential (Evaluation of contaminant migration pathways)

CAM-A, Sturt Point, Nunavut

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
5. Sediment Movement				
A. Demonstrated migration of sediments containing COPCs				
There is evidence to suggest that sediments originally deposited to the site (exceeding the CCME sediment quality guidelines) have migrated.	12	Sediments in the Freshwater Lake do not contain COPCs. (AECOM, 2010)	Review sediment assessment reports. Evidence of migration of contaminants in sediments must be reported by someone experienced in this area.	Usually not considered a significant concern in lakes/marine environments, but could be very important in rivers where transport downstream could be significant.
Strongly suspected (based on observations and/or modelling)	9			
Sediments have been contained and there is no indication that sediments will migrate in future. **or** Absence of sediment exposure pathway (i.e., within 5 km of the site there are no aquatic receiving environments, and therefore no sediments).	0			
	0			
Score	0			
NOTE: If a score is assigned here for Demonstrated Migration of Sediments, then you can skip Part B (Potential for Sediment Migration) and go to Section 6 (Modifying Factors)				
B. Potential for sediment migration				
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")?	Do Not Know		Review existing sediment assessments. If sediment coring has been completed, it may indicate that historically contaminated sediments have been covered over by newer "clean" sediments. This assessment will require that cores collected demonstrate a low concentration near the top and higher concentration with sediment depth.	
Yes No Do Not Know	2			
b. For lakes and marine habitats, are the contaminated sediments in shallow water and therefore likely to be affected by tidal action, wave action or propeller wash?	Do Not Know		Review existing sediment assessments. If the sediments present at the site are in a river, select "no" for this question.	
Yes No Do Not Know	2			
c. For rivers, are the contaminated sediments in an area prone to sediment scouring?	Do Not Know		Review existing sediment assessments. It is important that the assessment is made under worst case flows (high yearly flows). Under high yearly flows, areas which are commonly depositional may	
Yes No Do Not Know	2			
Potential sediment pathway total	6			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
Sediment pathway total	**0**			
6. Modifying Factors				
Are there subsurface utility conduits in the area affected by contamination?	No		Consult existing engineering reports. Subsurface utilities can act as conduits for contaminant migration.	
Yes No Do Not Know				
Known	0			
Potential	0			

Migration Potential Total

Raw "known" total	36	
Raw "potential" total	7.0	
Raw combined total	43.0	Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore, the total "Potential" Score may not reflect the sum of the individual "Potential" scores.
Total (max 33)	**22.2**	

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

CAM-A, Sturt Point, Nunavut

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
1. Human				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to humans as a result of the contaminated site. (Class 1 Site*) Same as above, but "Strongly Suspected" based on observations or indirect evidence. No quantified or suspected exposures/impacts in humans. Score	22 10 0 Go to Potential ---	Site is not frequented by humans.	*Where adverse effects on humans are documented, the site should be automatically designated as a Class 1 site (i.e., action required). There is no need to proceed through the NCS in this case. However, a scoring guideline (22) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites). This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1 for noncarcinogenic chemicals and incremental cancer risks that exceed acceptable levels defined by the jurisdiction for carcinogenic chemicals (for most jurisdictions this is typically either $>10^{-5}$ or $>10^{-6}$). Known impacts can also be evaluated based on blood testing (e.g. blood lead >10 ug/dL) or other health based testing. This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 0.2 for non-carcinogenic chemicals and incremental lifetime cancer risks for carcinogenic chemicals that are within acceptable levels as defined by the jurisdiction (for most jurisdictions this is less than either 10^{-6} or 10^{-5}).	Known adverse impact includes domestic and traditional food sources. Adverse effects based on food chain transfer to humans and/or animals can be scored in this category. However, the weight of evidence must show a direct link of a contaminated food source/supply and subsequent ingestion/transfer to humans. Any associated adverse effects to the environment are scored separately later in this worksheet. Someone experienced must provide a thorough description of the sources researched to evaluate and determine the quantified exposure/impact (adverse effect) in the vicinity of the contaminated site. **Selected References:** Health Canada – Federal Contaminated Site Risk Assessment in Canada Parts 1 and 2 Guidance on Human Heath Screening Level Risk Assessments (www.hc-sc.gc.ca/ewh-semt/pubs/contamsite/index_e.html) United States Environmental Protection Agency, Integrated Risk Information System (IRIS) – http://toxnet.nml.nih.gov
NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Human Exposure) and go to Section 2 (Human Exposure Modifying Factors)				
B. Potential for human exposure				
a) Land use (provides an indication of potential human exposure scenarios) Agricultural Residential / Parkland Commercial Industrial Do Not Know Score	Agricultural 3	The site is accesible by boat in the summer. This site fits the CCME definition for Agricultural.	Review zoning and land use maps over the distances indicated. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place. Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	This is the main "receptor" factor used in site scoring. A higher score implies a greater exposure and/or exposure of more sensitive human receptors (e.g., children).
b. Indicate the level of accessibility to the contaminated portion of the site (e.g., the potential for coming in contact with contamination) Limited barriers to prevent site access; contamination not covered Moderate access or no intervening barriers, contaminants are covered. Remote locations in which contaminants not covered. Controlled access or remote location and contaminants are covered Do Not Know Score	Mod. access, covered 1	Site is remote but not controlled and the contaminants are not covered. (AECOM, 2010)	Review location and structures and contaminants at the site and determine if there are intervening barriers between the site and humans. A low rating should be assigned to a (covered) site surrounded by a fence or in a remote location, whereas a high score should be assigned to a site that has no cover, fence, natural barriers or buffer.	
B. Potential for human exposure				
c) Potential for intake of contaminated soil, water, sediment or foods for operable or potentially operable pathways, as identified in Worksheet II (Migration Potential). i) direct contact Is dermal contact with contaminated surface water, groundwater, sediments or soils anticipated? Yes No Do Not Know Score	Yes 3	Soils exceed the CCME guidelines at the site, therefore dermal contact is possible. (AECOM, 2010)	If soils or potable groundwater are present exceeding their respective CCME guidelines, dermal contact is assumed. Exposure to surface water, non-potable groundwater or sediments exceeding their respective CCME guidelines will depend on the site. Select "Yes" if dermal exposure to surface water, non-potable groundwater or sediments is expected. For instance, dermal contact with sediments would not be expected in an active port. Only soils in the top 1.5 m are defined by CCME (2003) as surface soils. If contaminated soils are only located deeper than 1.5 m, direct contact with soils is not anticipated to be an operable contaminant exposure pathway.	Exposure via the skin is generally believed to be a minor exposure route. However for some organic contaminants, skin exposure can play a very important component of overall exposure. Dermal exposure can occur while swimming in contaminated waters, bathing with contaminated surface water/groundwater and digging in contaminated dirt, etc.
ii) inhalation (i.e., inhalation of dust, vapour) Vapour - Are there inhabitable buildings on the site within 30 m of soils or groundwater with volatile contamination as determined in Worksheet II (Migration Potential)? Yes No Do Not Know Score	No 0		If inhabitable buildings are on the site within 30 m of soils or groundwater exceeding their respective guidelines for volatile chemicals, there is a potential of risk to human health (Health Canada, 2004). Review site investigations for location of soil samples (having exceedances of volatile substances) relative to buildings. Refer to (II) Migration Potential worksheet, 4B.a), *Potential for COPCs in Vapour* for a definition of volatility.	Exposure via the lungs (inhalation) can be a very important exposure pathway. Inhalation can be via both particulates (dust) and gas (vapours). Vapours can be a problem where buildings have been built on former industrial sites or where volatile contaminants have migrated below buildings resulting in the potential for vapour intrusion. Assesses the potential for humans to be exposed to vapours originating from site soils. The closer the receptor is to a source of volatile chemicals in soil, the greater the potential of exposure. Also, coarser-grained soil will convey vapour much more efficiently in the soil than finer grained material such as clays and silts. General Notes; Someone experienced must provide a thorough description of the sources researched to determine the presence/absence of a vapour migration and/or dust generation in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links. Selected References; Canadian Council of Ministers of the Environment (CCME). 2006. Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines. PN 1332. www.ccme.ca Golder, 2004. Soil Vapour Intrusion Guidance for Health Canada Screening Level Risk Assessment (SLRA) Submitted to Health Canada, Burnaby, BC
Dust - If there is contaminated surface soil (e.g. top 1.5 m) , indicate whether the soil is fine or coarse textured. If it is known that surface soil is not contaminated, enter a score of zero. Fine Coarse Surface soil is not contaminated or absent (bedrock) Do Not Know Texture Score inhalation total	Coarse 1 1	Bulk sampling completed for soil samples indicate coarse grained material onsite. (AECOM 2010)	Consult grain size data for the site. If soils (containing exceedances of the CCME soil quality guidelines) predominantly consist of fine material (having a median grain size of 75 microns; as defined by CCME (2006)) then these soils are more likely to generate dusts.	
B. Potential for human exposure				
iii) Ingestion (i.e., ingestion of food items, water and soils [for children]), including traditional foods.		There is debris within 100 m of the Freshwater Lake on site, however most debris is centered around the Main Station which is more than a kilometre away from the lake. (AECOM, 2010)	Review available site data to determine if drinking water (groundwater, surface water, private, commercial or municipal supply) is known or suspected to be contaminated above Guidelines for	**Selected References:** Guidelines for Canadian Drinking Water Quality: www.hc-sc.gc.ca/hecs-sesc/water/publications/drinking_water_quality_guidelines/toc.htm

CCME National Classification System (2008, 2010 v 1.2)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

CAM-A, Sturt Point, Nunavut

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
		away from the lake. (AECOM, 2010)	commercial or municipal supply) is known or suspected to be contaminated above Guidelines for Canadian Drinking Water Quality. If drinking water supply is known to be contaminated, some immediate action (e.g., provision of alternate drinking water supply) should be initiated to reduce or eliminate exposure. The evaluation of significant potential for exceedances of the water supply in the future may be based on the capture zones of the drinking water wells; contaminant travel times; computer modelling of flow and contaminant transport.	sesc/water/publications/drinking_water_quality_guidelines/toc.htm Drinking water can be an extremely important exposure pathway to humans. If site groundwater or surface water is not used for drinking, then this pathway is considered to be inoperable. Consider both wild foods such as salmon, venison, caribou, as well as agricultural sources of food items if the contaminated site is on or adjacent to agricultural land uses.
Drinking Water: Choose a score based on the proximity to a drinking water supply, to indicate the potential for contamination (present or future). 0 to 100 m 100 to 300 m 300 m to 1 km 1 to 5 km No drinking water present Do Not Know	0 to 100 m			
Score	3			
Is an alternative water supply readily available? Yes No Do Not Know	No			
Score	1			
Is human ingestion of contaminated soils possible? Yes No Do Not Know	Yes		If contaminated soils are located within the top 1.5 m, it is assumed that ingestion of soils is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely, and the duration is shorter. Refer to human health risk assessment reports for the site in question.	
Score	3			
Are food items consumed by people, such as plants, domestic animals or wildlife harvested from the contaminated land and its surroundings? Yes No Do Not Know	Yes	There is potential the site is used for hunting purposes.	Use human health risk assessment reports (or others) to determine if there is significant reliance on traditional food sources associated with the site. Is the food item in question going to spend a large proportion of its time at the site (e.g., large mammals may spend a very small amount of time at a small contaminated site)? Human health risk assessment reports for the site in question will also provide information on potential bioaccumulation of the COPC in question.	
Score	1			
Ingestion total	8			
Human Health Total "Potential" Score	16	Note if a "Known" Human Health score is provided, the "Potential" score is disallowed.		
Allowed "Potential" Score	16			
2. Human Exposure Modifying Factors				
a) Strong reliance of local people on natural resources for survival (i.e., food, water, shelter, etc.) Yes No Do Not Know	Yes	Locals may use the area for hunting		
Known	6			
Potential	---			
Raw Human "known" total	6			
Raw Human "potential" total	16			
Raw Human Exposure Total Score	22			
Human Health Total (max 22)	**22.0**			
3. Ecological				
A. Known exposure				
Documented adverse impact or high quantified exposure which has or will result in an adverse effect, injury or harm or impairment of the safety to terrestrial or aquatic organisms as a result of the contaminated site.	18	Terrestrial wildlife observed on site included muskoxen and hare. There is a chance that they would experience exposures. Sediment samples contained concentrations below applicable guidelines so it is assumed that aquatic organisms are not affected.	Some low levels of impact to ecological receptors are considered acceptable, particularly on commercial and industrial land uses. However, if ecological effects are deemed to be severe, the site may be categorized as class one (i.e., a priority for remediation or risk management), regardless of the numerical total NCS score. For the purpose of application of the NCS, effects that would be considered severe include observed effects on survival, growth or reproduction which could threaten the viability of a population of ecological receptors at the site. Other evidence that qualifies as severe adverse effects may be determined based on professional judgement and in consultation with the relevant jurisdiction. If ecological effects are determined to be severe and an automatic Class 1 is assigned, there is no need to proceed through the NCS. However, a scoring guideline (18) is provided in case a numerical score for the site is still desired (e.g., for comparison with other Class 1 sites).	CCME, 1999: Canadian Water Quality Guidelines for the Protection of Aquatic Life. www.ccme.ca CCME, 1999: Canadian Water Quality Guidelines for the Protection of Agricultural Water Uses. www.ccme.ca Sensitive receptors- review: Canadian Council on Ecological Areas; www.ccea.org. Ecological effects should be evaluated at a population or community level, as opposed to at the level of individuals. For example, population-level effects could include reduced reproduction, growth or survival in a species. Community-level effects could include reduced species diversity or relative abundances. Further discussion of ecological assessment endpoints is provided in *A Framework for Ecological Risk Assessment: General Guidance* (CCME 1996). Notes: Someone experienced must provide a thorough description of the sources researched to classify the environmental receptors in the vicinity of the contaminated site. This information must be documented in the NCS Site Classification Worksheet including contact names, phone numbers, e-mail correspondence and/or reference maps/reports and other resource such as internet links.
Same as above, but "Strongly Suspected" based on observations or indirect evidence.	12		This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients >1. Alternatively, known impacts can also be evaluated based on a weight of evidence assessment involving a combination of site observations, tissue testing, toxicity testing and quantitative community assessments. Scoring of adverse effects on individual rare or endangered species will be completed on a case-by-case basis with full scientific justification.	
No quantified or suspected exposures/impacts in terrestrial or aquatic organisms	0		This category can be based on the outcomes of risk assessments and applies to studies which have reported Hazard Quotients of less than 1 and no other observable or measurable sign of impacts. Alternatively, it can be based on a combination of other lines of evidence showing no adverse effects, such as site observations, tissue testing, toxicity testing and quantitative community assessments.	
	Go to Potential			
Score	---			
NOTE: If a score is assigned here for Known Exposure, then you can skip Part B (Potential for Ecological Exposure) and go to Section 4 (Ecological Exposure Modifying Factors)				
B. Potential for ecological exposure (for the contaminated portion of the site)				
a) Terrestrial i) Land use Agricultural (or Wild lands)		The site is located in the wilderness and is a habitat for species of special concern (i.e. barren ground caribou and polar bears) under Committee on the Status of Endangered Wildlife in Canada (COSEWIC).	Review zoning and land use maps. If the proposed future land use is more "sensitive" than the current land use, evaluate this factor assuming the proposed future use is in place (indicate in the worksheet that future land use is the consideration).	

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

CAM-A, Sturt Point, Nunavut

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
Residential/Parkland Commercial Industrial Do Not Know Score	Agricultural (or Wild lands 3		Agricultural land use is defined as uses of land where the activities are related to the productive capability of the land or facility (e.g., greenhouse) and are agricultural in nature, or activities related to the feeding and housing of animals as livestock. Wild lands are grouped with agricultural land due to the similarities in receptors that would be expected to occur there (e.g., herbivorous mammals and birds) and the similar need for a high level of protection to ensure ecological functioning. Residential/Parkland land uses are defined as uses of land on which dwelling on a permanent, temporary, or seasonal basis is the activity (residential), as well as uses on which the activities are recreational in nature and require the natural or human designed capability of the land to sustain that activity (parkland). Commercial/Industrial land uses are defined as land on which the activities are related to the buying, selling, or trading of merchandise or services (commercial), as well as land uses which are related to the production, manufacture, or storage of materials (industrial).	
ii) Uptake potential Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site? Yes No Do Not Know Score	Yes 1	Impacted soils are located within the upper 1.5 m of the site. (AECOM, 2010)	If contaminated soils are located within the top 1.5 m, it is assumed that direct contact of soils with plants and soil invertebrates is an operable exposure pathway. Exposure to soils deeper than 1.5 m is possible, but less likely.	
iii) Ingestion (i.e., wildlife or domestic animals ingesting contaminated food items, soils or water) Are terrestrial animals likely to be ingesting contaminated water at the site? Yes No Do Not Know Score	Yes 1	Surface water samples taken from the outfall area exceed the CCME Protection of Aquatic Life Guideline - Freshwater for of aluminum, cadmium, and copper. It is possible that terrestrial animals could ingest contaminated water at the site. (AECOM, 2010)	Refer to an Ecological Risk Assessment for the site. If there is contaminated surface water at the site, assume that terrestrial organisms will ingest it.	
Are terrestrial animals likely to be ingesting contaminated soils at the site? Yes No Do Not Know Score	Yes 1	Terrestrial animals could ingest contaminated PCB and lead impacted soils at the site.	Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.	
Can the contamination identified bioaccumulate? Yes No Do Not Know Score	Yes 1	The site is located in the wilderness and is a habitat for species of special concern (i.e. barren ground caribou and polar bears) under Committee on the Status of Endangered Wildlife in Canada (COSEWIC).	Bioaccumulation of contaminants within food items is considered possible if: 1) The Log(Kow) of the contaminant is greater than 4 (as per the chemical characteristics work sheet) and concentrations in soils exceed the most conservative CCME soil quality guideline for the intended land use, or 2) The contaminant in collected tissue samples exceeds the Canadian Tissue Residue Guidelines.	
Distance to sensitive terrestrial ecological area 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know Score	0 to 300 m 3		It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor located within this area of the site will be subject to further evaluations. It is also considered that any environmental receptor located greater than 5 km will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org.	Environmental receptors include: local, regional or provincial species of interest or significance; arctic environments (on a site specific basis); nature preserves, habitats for species at risk, sensitive forests, natural parks or forests.
Raw Terrestrial Total Potential	10	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
Allowed Terrestrial Total Potential	10			
B. Potential for ecological exposure (for the contaminated portion of the site)				
b) Aquatic i) Classification of aquatic environment Sensitive Typical Not Applicable (no aquatic environment present) Do Not Know Score	Sensitive 3	The primary aquatic environment at the site is the Queen Maud Gulf Area which is considered a sensitive aqualtic environment.	"Sensitive aquatic environments" include those in or adjacent to shellfish or fish harvesting areas, marine parks, ecological reserves and fish migration paths. Also includes those areas deemed to have ecological significance such as for fish food resources, spawning areas or having rare or endangered species. "Typical aquatic environments" include those in areas other than those listed above.	
ii) Uptake potential Does groundwater daylighting to an aquatic environment exceed the CCME water quality guidelines for the protection of aquatic life at the point of contact? Yes No (or Not Applicable) Do Not Know Score	Do Not Know 0.5		Groundwater concentrations of contaminants at the point of contact with an aquatic receiving environment can be estimated in three ways: 1) by comparing collected nearshore groundwater concentrations to the CCME water quality guidelines (this will be a conservative comparison, as contaminant concentrations in groundwater often decrease between nearshore wells and the point of discharge). 2) by conducting groundwater modeling to estimate the concentration of groundwater immediately before discharge. 3) by installing water samplers, "peepers", in the sediments in the area of daylighting groundwater.	
Distance from the contaminated site to an important surface water resource 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know Score	0 to 300 m 3	Impacted soils have been identified within 30 m of the marine habitat.	It is considered that within 300 m of a site, there is a concern for contamination. Therefore an environmental receptor or important water resource located within this area of the site will be subject to further evaluation. It is also considered that any environmental receptor located greater than 5 km away will not be a concern for evaluation. Review Conservation Authority mapping and literature including Canadian Council on Ecological Areas link: www.ccea.org.	Environmental receptors include: local, regional or provincial species of interest or significance, sensitive wetlands and fens and other aquatic environments.
Are aquatic species (i.e., forage fish, invertebrates or plants) that are consumed by predatory fish or wildlife consumers, such as mammals and birds, likely to accumulate contaminants in their tissues? Yes No Do Not Know Score	Yes 1		Bioaccumulation of food items is possible if: 1) The Log(Kow) of the contaminant is greater than 4 (as per the chemical characteristics work sheet) and concentrations in sediments exceed the CCME ISQGs. 2) The contaminant in collected tissue samples exceeds the CCME tissue quality guidelines.	
Raw Aquatic Total Potential	7.5	Note if a "Known" Ecological Effects score is provided, the "Potential" score is		

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

CAM-A, Sturt Point, Nunavut

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
Allowed Aquatic Total Potential	7.5	disallowed.		
4. Ecological Exposure Modifying Factors				
a) Known occurrence of a species at risk.		The site is located in the wilderness and is a habitat for species of special concern (i.e. barren ground caribou and polar bears) under Committee on the Status of Endangered Wildlife in Canada (COSEWIC).	Consult any ecological risk assessment reports. If information is not present, utilize on-line databases such as Eco Explorer. Regional, Provincial (Environment Ministries), or Federal staff (Fisheries and Oceans or Environment Canada) should be able to provide some guidance.	Species at risk include those that are extirpated, endangered, threatened, or of special concern. For a list of species at risk, consult Schedule 1 of the federal Species at Risk Act (http://www.sararegistry.gc.ca/species/schedules_e.cfm?id=1). Many provincial governments may also provide regionally applicable lists of species at risk. For example, in British Columbia, consult: BCMWLAP. 2005. Endangered Species and Ecosystems in British Columbia. Provincial red and blue lists. Ministry of Sustainable Resource Management and Water, Land and Air Protection. http://srmwww.gov.bc.ca/atrisk/red-blue.htm
Is there a potential for a species at risk to be present at the site?				
Yes				
No				
Do Not Know	Yes			
	2			
Score	---			
b) Potential impact of aesthetics (e.g., enrichment of a lake or tainting of food flavor).				
Is there evidence of aesthetic impact to receiving water bodies?	Yes		Documentation may consist of environmental investigation reports, press articles, petitions or other records.	This Item will require some level of documentation by user, including contact names, addresses, phone numbers, e-mail addresses. Evidence of changes must be documented, please attach copy of report containing relevant information.
Yes				
No	2			
Do Not Know	---			
Is there evidence of olfactory impact (i.e., unpleasant smell)?	Yes	In some areas, the soil has a slight hydrocarbon odor. (AECOM, 2010)	Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat.	
Yes				
No	2			
Do Not Know	---			
Is there evidence of increase in plant growth in the lake or water body?	No		A distinct increase of plant growth in an aquatic environment may suggest enrichment. Nutrients e.g., nitrogen or phosphorous releases to an aquatic body can act as a fertilizer.	
Yes				
No	0			
Do Not Know	---			
Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different?	Do Not Know		Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.	
Yes	---			
No	1			
Do Not Know				
Ecological Modifying Factors Total - Known	**6**			
Ecological Modifying Factors Total - Potential	**1**			
Raw Ecological Total - Known	6			
Raw Ecological Total - Potential	18.5			
Raw Ecological Total	24.5			
Ecological Total (Max 18)	**18.0**			
5. Other Potential Contaminant Receptors				
a) Exposure of permafrost (leading to erosion and structural concerns)				Plants and lichens provide a natural insulating layer which will help prevent thawing of the permafrost during the summer. Plants and lichens may also absorb less solar radiation. Solar radiation is turned into heat which can also cause underlying permafrost to melt.
Are there improvements (roads, buildings) at the site dependant upon the permafrost for structural integrity?	Yes		Consult engineering reports, site plans or air photos of the site. When permafrost melts, the stability of the soil decreases, leading to erosion. Human structures, such as roads and/or buildings are often dependent on the stability that the permafrost provides.	
Yes				
No	4			
Do Not Know	---			
Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment?	No		Melting permafrost leads to a decreased stability of underlying soils. Wind or surface run-off erosion can carry soils into nearby aquatic habitats. The increased soil loadings into a river can cause an increase in total dissolved solids and a resulting decrease in aquatic habitat quality. In addition, the erosion can bring contaminants from soils to aquatic environments.	
Yes				
No	0			
Do Not Know	---			
Other Potential Receptors Total - Known	**4**			
Other Potential Receptors Total - Potential	**0**			

Exposure Total		
Raw Human Health + Ecological Total - Known	16	Only includes "Allowed potential" - if a "Known" score was supplied under a given category then the "Potential" score was not included.
Raw Human Health + Ecological Total - Potential	34.5	
Raw Total	50.5	
Exposure Total (max 34)	**37.3**	

CCME National Classification System (2008, 2010 v 1.2)
Score Summary

Scores from individual worksheets are tallied in this worksheet.
Refer to this sheet after filling out the revised NCS completely.

I. Contaminant Characteristics

	Known	Potential
1. Residency Media	6	---
2. Chemical Hazard	8	---
3. Contaminant Exceedance Factor	6	---
4. Contaminant Quantity	6	---
5. Modifying Factors	4	---
Raw Total Score	30	0
Raw Total Score (Known + Potential)	30	
Adjusted Total Score (Raw Total / 40 *33)	**24.8**	(max 33)

II. Migration Potential

	Known	Potential
1. Groundwater Movement	12	---
2. Surface Water Movement	12	---
3. Soil	12	---
4. Vapour	---	7
5. Sediment Movement	0	---
6. Modifying Factors	0	0
Raw Total Score	36	7
Raw Total Score (Known + Potential)	43	
Adjusted Total Score (Raw Total / 64 * 33)	**22.2**	(max 33)

III. Exposure

	Known	Potential
1. Human Receptors		
A. Known Impact	---	
B Potential		
a. Land Use		3
b. Accessibility		1
c. Exposure Route		
i. Direct Contact		3
ii. Inhalation		1
iii. Ingestion		8
2. Human Receptors Modifying Factors	6	---
Raw Total Human Score	6	16
Raw Total Human Score (Known + Potential)	22	
Adjusted Total Human Score	22.0	(maximum 22)
3. Ecological Receptors		
A. Known Impact	---	
B. Potential		
a. Terrestrial		10
b. Aquatic		7.5
4. Ecological Receptors Modifying Factors	6	1
Raw Total Ecological Score	6	18.5
Raw Total Ecological Score (Known + Potential)	24.5	
Adjusted Total Ecological Score	18.0	(maximum 18)
5. Other Receptors	4	0
Total Other Receptors Score (Known + Potential)	4	
Total Exposure Score (Human + Ecological + Other)	**44.0**	
Adjusted Total Exposure Score (Total Exposure / 46 * 34)	**32.5**	(max 34)

Site Score

CAM-A, Sturt Point, Nunavut

Site Letter Grade	**C**
Certainty Percentage	**81%**
% Responses that are "Do Not Know"	**-17%**
Total NCSCS Score for site	**79.4**
Site Classification Category	**1**

Site Classification Categories*:

Class 1 - High Priority for Action (Total NCS Score >70)
Class 2 - Medium Priority for Action (Total NCS Score 50 - 69.9)
Class 3 - Low Priority for Action (Total NCS Score 37 - 49.9)
Class N - Not a Priority for Action (Total NCS Score <37)
Class INS - Insufficient Information (>15% of responses are "Do Not Know")

* NOTE: The term "action" in the above categories does not necessarily refer to remediation, but could also include risk assessment, risk management or further site characterization and data collection.

Appendix I

Site Video (DVD)