Public Works and Government Services Canada

Phase III Environmental Site Assessment Padloping Island Former US Coast Guard Weather Station

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Project Number:

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Date:

December 14, 2010

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December 14, 2010

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Dear Giselle:

Project No: **60158472**

Regarding: **Phase III Environmental Site Assessment**
Padloping Island, Former US Coast Guard Weather Station

AECOM Canada Ltd. is pleased to submit our final report outlining the results of the Site Investigation conducted at the Padloping Island, Former US Coast Guard Weather Station Site. We thank you for the opportunity to complete this work on behalf of Public Works and Government Services Canada.

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)
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Executive Summary

The Padloping Island weather station site is located at 67° 02’ N, 62° 44’ W in Merchants Bay on the southwest portion of the island. Padloping Island is located off the northeast coast of the Cumberland Peninsula of Baffin Island, approximately 440 km north-northeast of Iqaluit and 75 km southeast of Qikiqtarjuak.

In 1943, the United States Military constructed a United States Air Force (USAF) weather station on Padloping Island, codenamed Crystal III. The station was operated by the USAF until the end of the Second World War; and subsequently operated by the Canadian Department of Transport until 1956. A long history of Inuit settlement near Padloping Island site predates the weather station, and a written history of an Inuit community dates back to 1884. The remains of a hamlet, abandoned in the early 1960s, are nearby the remains of the site.

The overall site has three distinct areas: the Main Station Area with associated Metal Dump and drum storage; the Old Hamlet Site, located approximately 1 km to the east; and the Original Station Site, which is a further 500 m to the east.

The Main Station is located on a coastal plain approximately 400 m from the bay. It is bordered by a steep cliff beyond two shallow lakes to the west and undulating hills to the east. The site is characterized by abandoned buildings in various states of advanced disrepair, fuel tanks, barrels, contaminated soil, hazardous materials, and scattered debris. A freshwater lake is located approximately 1.5 km northwest of the Main Station area.

The objective of AECOM’s Phase III Environmental Site Assessment (ESA) at Padloping Island was to collect all data necessary to develop a detailed Remedial Action Plan (RAP) in accordance with the Abandoned Military Site Remediation Protocol. The fieldwork for this assessment was conducted from August 4 to11, 2010.

The investigation and delineation of contaminated soil at Padloping Island 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 Remediation Protocol. Typical source areas for these contaminants are well documented from previous DEW Line site investigations and were the focus of the 2010 investigation.

Contaminated soil identified at Padloping Island includes:

- Approximately 66 m^3 of Tier II contaminated soil was identified.
- Approximately 11 m^3 of Tier II/Type B PHC contaminated soil was identified.
- Approximately 4 m^3 of Tier I contaminated soil was identified.
- Approximately 16 m^3 of hazardous contaminated soil (leachable lead) was identified.
- Approximately 116 m^3 of Type B hydrocarbon impacted soils and 131 m^3 of Type A hydrocarbon impacted soil was identified.

The presence of buried debris was confirmed at the beach ridge near the Original Station Site (Lobes A, B and C), at the Old Hamlet Site (Lobe D), south of the Main Station Area (South Mound Lobes H and I and West Mound Lobes (J, K, L, and M) and at the Pond Area north of the Main Station (Lobes E, F, and G) based on geophysical surveys. The total area of buried debris at the Padloping site is approximately 550 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.

The Original Station Site Lobes (A, B, and C) were classified as Class A due to the proximity to the ocean and therefore requires excavation. The Old Hamlet Site Lobe (D), Pond Area Lobes (E, F, and G), South Mound Lobes

(H and I) and West Mound Lobes (J, K, L and M) were considered a low environmental risk, and therefore were classified as Class C and can be 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 the nature of the activities conducted at the Padloping Island site, the following volumes of material types likely to be encountered in these buried debris areas has been estimated:

- Hazardous Materials: 4 m^3
- Non-hazardous Materials: 86 m^3
- Contaminated Soil: 92 m^3

Based on the combined results of the surface debris inventory, buried debris inventory, barrel assessment and demolition inventory, approximately 1,774 m^3 of non-hazardous waste was identified. This material is suitable for disposal in a non-hazardous waste landfill on the Padloping Island site. The estimated quantity of hazardous waste at Padloping Island is 34 m^3 of hazardous waste. These items consist mainly of asbestos-containing materials.

The following is a summary of the estimated volume of contaminated soils, hazardous and non-hazardous debris identified at the Padloping Island site:

Location	Contaminated Soil Volume (m^3)					Hazardous Material Volume (m^3)	Non-Hazardous Material Volume (m^3)
	Tier II	Tier II/Type B	Tier I	Type A	Type B		
Contaminated Soil Areas	66	11	4	131	116	16	n/a
Buried Debris Areas	46		46	-	-	4	86
Surface Debris Areas	-		-	-	-	34	1774
Demolition	-		-	-	-	n/a	n/a

Seven potential borrow areas were identified at Padloping Island. It is estimated that there is 121,000 m^3 of granular materials available from these borrow areas; however most of this consists of source material for Type 4 Granular Fill for which there is expected to be minimal requirements for. There will be requirements for Type 2 Granular Fill and there are limited quantities of source material for Type 2 Granular Fill identified in Borrow Area BA-2. Most areas contain oversize material (cobbles and boulders), but this is generally well below 10% (trace) of the overall soil matrix. There is concern that there may be insufficient quantities of Type 2 Granular Fill available at Padloping Island.

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 Padloping Island. Three proposed landfill/landfarm locations were investigated and identified as suitable locations. Alternate stabilization design can be provided for earth structures if there is insufficient Type 2 Granular Fill available at Padloping Island.

The access trails connecting the site areas were barely discernable in the field and consist of slightly depressed pathways in the tundra vegetation. These trails will require significant upgrading in the form of complete embankment construction to facilitate access for light and heavy construction traffic.

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1. Introduction

1.1 Location

The Padloping Island weather station site is located at 67° 02' N, 62° 44' W in Merchants Bay on the southwest portion of the island. Padloping Island is off the northeast coast of the Cumberland Peninsula of Baffin Island, approximately 440 km north-northeast of Iqaluit and 75 km southeast of Qikiqtarjuak.

The abandoned weather station is located on a coastal plain approximately 400 m from the bay. The overall site slopes gently towards the south with about a 6% grade overall and a 2% grade in the immediate vicinity of the Main Station Area. It is bordered by a steep cliff beyond two shallow lakes to the west and undulating hills to the east. The site is characterized by abandoned buildings in various states of advanced disrepair, fuel tanks, barrels, contaminated soil, hazardous materials and scattered debris.

The site is only accessible by helicopter or by sea during the summer months. It is understood that an ice landing strip, located just off the shoreline, was used in the past to facilitate landing of fixed wing aircraft during the winter months.

1.2 Scope of Work

The objective of the Phase III Environmental Site Assessment at Padloping Island 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:

- Obtain traditional knowledge regarding past and present land use of the sites from elders in Qikiqtarjuaq;
- Identify, characterize, and quantify all hazardous and non-hazardous materials at the site and in nearby water bodies;
- Identify and delineate contaminated areas;
- Complete a detailed survey;
- Document flora and fauna based on literature and professional experience;
- Label and inspect POL tanks registered with the Environment Canada (EC) Storage Tank Regulation requirements;
- Conduct water sampling to determine whether there is a suitable potable water source on-site;
- Identify potential locations for an engineered landfill(s) and/or landfarm;
- Identify borrow sources that may be used for the potential repair of site roads and barge landing areas as well as for the construction of a potential landfill(s) and/or landfarm;
- Evaluate the condition of site access roads and barge/beach landing areas;
- Evaluate the logistical challenges associated with mobilization, site remediation and demobilization activities; and,
- Increase local community and Inuit involvement in the program.
- Archaeological Assessment

The site is represented on the Figures in Appendix A and referenced throughout the report. Data tables summarizing the environmental analytical results received from Maxxam Laboratories 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 testpit logs are presented in Appendix F. The results of an archaeological assessment performed by Golder Associates Ltd. are presented in Appendix G, and finally the Federal Contaminated Sites Action Plan (FCSAP) Scoring Sheets are presented in Appendix H.

2. Background

2.1 Site Description

In 1943, the United States Military constructed a United States Air Force (USAF) weather station on Padloping Island, codenamed Crystal III. The station was operated by the USAF until the end of the Second World War; and subsequently operated by the Canadian Department of Transport until 1956. A long history of Inuit settlement near the Padloping Island site predates the weather station and a written history of an Inuit community dates back to 1884. The remains of a hamlet, abandoned in the early 1960s, are nearby the remains of the site.

The overall site has three distinct areas: the Main Station Area with associated Metal Dump and drum storage; the Old Hamlet site, located approximately 1 km to the east; and the Original Station Site, which is a further 500 m to the east. There is no airstrip at this site, limiting access to helicopter or boat during the summer months.

The site is located on a Crown Land parcel of approximately 260 hectares, encompassing government reserve 16M/2-1-1 which is excluded from the surrounding Inuit Owned Land (IOL) parcel BI 13 for which Inuit have surface rights.

2.2 Previous Investigations

The following reports were available for review:

- DEW Line Datafile Covering Letter - Andzans Associates. 1984
- Removal of Contaminants from DEW Sites in Canada's Eastern Arctic - Holz et al. 1986
- Padloping Island Military Inspection Form - DND. 1987
- Remediation Options for Abandoned US Coast Guard Bases at Cape Christian and Padloping Island, NWT - Avati Ltd. 1993
- An Environmental Assessment of Padloping Island, NWT (Phase I & II) - ESG/RMS. 1997
- Risk Assessment for Seven Abandoned Military Stations in the Eastern Arctic - Qikqtaaluk Corporation. 1998
- Limited Phase III Environmental Site Assessment and Limited Remedial Action Plan - Earth Tech/PWGSC. 2001-2002
- Padloping Island Human Health Screening Level Risk Assessment – Senes. 2003
- Padloping Island Ecological Risk Assessment – Senes. 2003
- Contaminated Sites Water Monitoring Program – East Nunavut – Gartner Lee. 2003, 2004
- Padloping Island Background Geochemistry Study – ESG. 2010

2.3 Description of the Environment

2.3.1 Climate

The Padloping Island site is located in a humid, extremely cold climate zone marked by very short, cold summers and is classified as having a high arctic and oceanic high arctic ecoclimate. Average monthly and annual weather data has been measured at a nearby station (Cape Dyer A, Nunavut, 66°35' N, 61°37' W, elevation 392.60 m, data from 1971 to 2000, Canadian Climate Normals, Environment Canada) and summarized in the following table.

Table 1: Meteorology, Precipitation and Temperature profiles at Cape Dyer, Nunavut

Month	Daily Mean (°C)	Daily Maximum (°C)	Daily Minimum (°C)	Extreme Maximum (°C)	Extreme Minimum (°C)	Rainfall (mm)	Snowfall (cm)	Snow Depth at Month-end (cm)
January	-24.2	-19.3	-29.1	1.1	-44.9	0.3	59.2	93
February	-25.5	-20.8	-30.2	2.2	-46.9	0	38.1	94
March	-22.9	-17.9	-27.9	2.8	-47.2	0	35.8	94
April	-16.3	-11.1	-21.4	10	-39.7	0.1	49.9	103
May	-6.9	-3.1	-10.5	11.7	-28.3	1.2	56.2	98
June	0.7	3.8	-2.4	17.8	-13.9	8.6	20.9	39
July	5.3	8.7	1.9	19.4	-5.5	34.5	7.4	1
August	4.4	7.5	1.2	18.9	-9.8	34.2	11	1
September	-1.2	1.7	-4	16.6	-18.9	15.2	50.8	20
October	-8.1	-4.2	-11.9	9.3	-31.1	3.4	95.2	52
November	-15.2	-10.7	-19.6	6.2	-39.4	0.9	79.6	70
December	-21.6	-16.8	-26.4	5.6	-45	0.1	62.1	82

2.3.2 Ecoregion

Padloping Island is situated within the Arctic Cordillera ecozone and specifically, the Davis Highlands Tundra ecoregion. This ecoregion is comprised of the Baffin Mountains extending along the north-eastern flank of Baffin and Bylot Islands.

2.3.3 Geology

The surficial geology at the Padloping Island is predominantly exposed bedrock overlain by thin patches of till and erratic boulders and residuum fields of predominantly bedrock blocks with interstitial sand and gravel with some glacial erratic and till mixed in by freeze-thaw action. At the site location, the surficial geology is comprised of ground morainal glacial till. The ice flow in the area generally came from the south and/or southwest, so the composition of the till probably reflects bedrock in that direction.

The bedrock at Padloping Island mainly consists of Precambrian sedimentary migmatite and metamorphosed greywacke, siltstone, and pelite of the Hoare Bay Group. About 10 km north of the south end of the island, there is a roughly east-west striking, 1 km wide shear zone of foliated granite of the Cumberland Batholith. At the northeast end of Padloping Island about 15 km from the site, overlying the Precambrian rocks, there are coarse clastic sedimentary rocks (sandstone, mudstone, and conglomerate) of the Cape Searle and Quqaluit Formations overlain by basaltic volcanic rocks of the Cape Dyer Formation.

2.3.4 Current Land Use

Padloping Island was the site of a former Inuit community and is used by surrounding communities for hunting and fishing.

2.3.5 Vegetation

The vegetation in this region is typical of Baffin tundra and is characterized by low species diversity and sparse vegetative cover. Typical plants found in this region include a discontinuous cover of mosses, lichens and cold-hardy vascular plants such as sedge and cottongrass.

2.3.6 Wildlife

The indigenous wildlife of the area includes the polar bear, arctic fox, arctic hare, ermine, lemming, ptarmigan, snowy owl, geese, migratory seabirds and marine mammals including whales, walrus and seals. In Davis Strait and the surrounding rivers, lakes, and fjords there are Arctic cod and char, as well as sculpins and Greenland sharks in some of the fjords.

3. Investigation

3.1 Contaminated Soil Delineation

3.1.1 Methodology

The investigation and delineation of contaminated soil at Padloping Island was completed for the contaminants of concern identified under the INAC Abandoned Military Site Remediation Protocol: arsenic, cadmium, chromium, cobalt, copper, lead, nickel, zinc, PCBs and petroleum hydrocarbons (PHCs). A background geochemical assessment was completed in 2009 (ESG 2010) and revealed the necessity for site-specific criteria (SSC) for nickel: 107 mg/kg versus 100 mg/kg. The SSC is included in Table B1 in Appendix B.

PCB and metal soil contamination at abandoned northern military sites tends to be restricted to surface or shallow depth. Typical source areas for these contaminants are well documented from previous site investigations and were the focus of the 1996 investigation by ESG.

Delineation of PHC impact was completed using the INAC Arctic PHC Evaluation Process, which is a component of the INAC Abandoned Military Site Remediation Protocol. The INAC 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.

The manner in which the investigation of PHC impact was completed depended on whether the expected impacts were Type A (F3 and F4 fractions), 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 (i.e. odour and/or staining), then additional sampling was completed surrounding the source, targeted to intercept expected migration pathways. Although manual excavation 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. Bulk soil samples were collected from two locations on site to determine grain size distribution.

Soil samples were collected from surface locations and shallow test pits excavated by hand. 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 0.1 m depth interval and the soil was placed in jars and bags 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. 10-0010/11). A review of quality assurance and quality control (QA/QC) for field and laboratory methodologies is provided in Section 3.11 and Table B10 in Appendix B.

The intent of the Phase III Environmental Site Assessment (ESA) was to delineate areas of impact that were previously identified by ESG in 1996 and Earth Tech in 2001. The sample locations from the previous investigations were not well identified since most sample tags had been moved from their original locations and reliable survey data was not available. The delineation of impacts previously identified by ESG was based on the approximate sample locations relative to building structures as described in the ESG report (ESG 1997). The Earth Tech samples were not used for delineation purposes because the sampling locations were not well documented nor could they be identified in the field through sample location markers. Where the previous sampling locations could be reasonably identified, confirmation and delineation of previously identified impacts was completed. During the course of the 2010 investigation, additional areas where contamination was suspected e.g. surface debris were investigated.

Most structures at Padloping Island have been partially or completely demolished. For most building locations, delineation sampling was completed outward from the edge of the debris pile. Building debris was not removed to facilitate the collection of samples inside building limits.

Soil sampling around lobes of buried debris was carried out by targeting locations both up-gradient and down-gradient of the lobe. Down-gradient sample locations were typically about 10 to 12 m from the edge of the lobe. Generally, samples were collected near surface and at depth (0.5 to 0.65 m).

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 Figures 2.0 to 6.0 can be found in Tables B1 to B3 in Appendix B. An overall summary of the contaminated soil areas identified at Padloping Island is presented in Table 2 at the end of Section 3.1.

3.1.2.1 Weather Building

Three of the ESG samples collected in this area (7636, 7637, and 7638 - associated with tags 124, 125, 126, respectively) had metals concentrations above the DEW Line Cleanup Criteria (DCC) Tier II criteria for cadmium, copper, lead, nickel and zinc. Two of the Earth Tech samples collected (PI-19 and PI-20) also had copper concentrations above the Tier II criterion.

ESG sample tags from the 1996 investigation were not located around the Weather Building. Delineation of the previously identified impacted sample locations (ESG-7636, 7637 and 7638) was attempted based on the descriptions of sample location related to building structures included in the ESG report (ESG 1997).

In 2010, fifteen samples were collected at the Weather Building (Appendix A, Figure 2.1) in the vicinity of previously identified cadmium, copper, lead, nickel and zinc contamination. Eleven samples were analyzed for metals. PCBs and PHCs were not investigated at this location since no impacts were previously identified by ESG or Earth Tech. No evidence of PCB or PHC contamination was observed in 2010.

Results indicate that five of the 11 samples analyzed (including one depth sample at 0.5 m) contain copper concentrations above the Tier II DCC of 100 mg/kg. The exceeding results are associated with ESG-7637 (tag 125). The exceeding concentrations ranged from 130 to 580 mg/kg. The samples collected to confirm/delineate ESG-7636 and ESG-7638 contained concentrations below the DCC.

The impact in this area is not fully delineated to the northeast however the extent of the contaminated area is expected to be associated with surface debris (Appendix C, IMG_0461). The size of the copper contaminated area is estimated to be 29 m^2 and extend to a depth of 0.6 m.

The results of grain size distribution for sample 10-0002 showed that soils collected from this area were coarse-grained with 83% of the soil being greater than 75 microns in size.

3.1.2.2 Kitchen/Mess Hall

ESG-7566 (tag 61) had a lead concentration of 210 mg/kg, exceeding the Tier I criterion. Earth Tech samples PI-07 and PI-08 had concentrations of 338 and 262 mg/kg respectively, also exceeding the Tier I criterion. ESG-7565 (tag 60) had a lead concentration of 1,000 mg/kg, which exceeds the Tier II criterion. Only one of the Earth Tech samples (PI-12) was above the Tier I criterion at a concentration of 206 mg/kg. ESG-7562/63 (tag 59) had a lead concentration of 2,900 mg/kg, which exceeds the Tier II criterion. ESG-7567 (tag 63) had a lead concentration of 560 mg/kg, which is above the Tier II criterion.

ESG sample tags ESG-7566, 7567, 7568 and 7569 were found to be in correct locations; however, tags ESG-7562/63 and 7565 were located in opposite locations according to the ESG report figures (ESG 1997). In 2010, 27 samples were collected in five locations around the Kitchen/Mess Hall (Appendix A, Figure 2.1) to confirm and/or delineate previously identified lead impacts. Twenty-three samples were analyzed for metals, three were analyzed for PCBs and PHCs due to the presence of mint green and white paint chips in the soil (10-0032, 10-0040, and 10-0041) and a hydrocarbon odour (10-0023, 10-0024, and 10-0025) and four of the 27 samples collected were not analyzed.

Metals and/or PHCs concentrations exceeding the relevant criteria were confirmed at three locations around the Kitchen/Mess Hall. One area located at the northeast corner of the building contained metals concentrations exceeding the cadmium Tier II criterion (7.2 mg/kg) and the lead Tier I criterion (250 mg/kg). A second impacted area was identified along the southeast wall of the building where samples contained Tier II levels of lead (1,300 and 1,500 mg/kg) and zinc (560 mg/kg). One sample in this area was analyzed for PHCs and Type B PHC was detected at 248 mg/kg. The third impacted area is located near the southeast corner of the building where delineation was limited by the presence of the fallen kitchen chimney (Appendix C, IMG_3515). This area contained concentrations of lead which exceed the Tier I (200 and 230 mg/kg) and Tier II (510 mg/kg) criteria. Two samples in this area were analyzed for PHCs: sample 10-0024 contained Type B PHC concentrations in exceedance of the Remedial Objectives listed in the Abandoned Military Site Remediation Protocol at 7,200 mg/kg and sample 10-0023 contained Type A TPH below the Remedial Objective at 1,010 mg/kg. The three samples analyzed for PCBs contained concentrations less than the applicable criteria.

The estimated areas of impact for the three Tier II areas are 21, 24, and 17 m^2 to a depth of 0.3 m.

3.1.2.3 Shower/Washrooms

ESG-7564 (tag 57) had a lead concentration of 210 mg/kg. Additional samples collected by Earth Tech (PI-02 and PI-03) had lead concentrations of 861 mg/kg and 595 mg/kg, respectively which are above the DCC Tier II criterion of 500 mg/kg. A third sample collected by Earth Tech (PI-01) contained lead at a concentration above the DCC Tier I criterion.

ESG sample tags ESG-7558, 7559, 7560 and 7564 were found to be in correct locations according to ESG report figures. In 2010, four samples were collected around ESG-7564 (Appendix A, Figure 2.1). Two samples were analyzed for metals and PHCs. PCBs were not investigated at this location since no impacts were previously identified by ESG or Earth Tech. No evidence of PCB contamination was observed in 2010.

Results confirm the previously identified lead impact on the east side of the building remains (ESG-7564) (Appendix C, IMG_3525). The lead concentration in sample 10-0043 (depth at 0.3 m) exceeds the Tier II criterion at 580 mg/kg. Lead wad detected in 10-0044 at 120 mg/kg which does not exceed the lead criterion. Samples 10-

0043 and 10-0044 were also analyzed for PHCs due to the observed hydrocarbon odour and staining. Sample 10-0043 contained Type B PHC concentrations which exceed the Remedial Objective listed in the Abandoned Military Site Remediation Protocol at 3,428 mg/kg. Sample 10-0044 contained detectable Type A PHC at a concentration of 490 mg/kg which is below the applicable objective. Lead and PHC impacts were not well delineated to the north and south since the samples collected in 2010 (10-0045 and 10-0046) were disposed by the laboratory before the 60 day holding time had expired. However, it can be assumed that the impact is limited to the visibly stained area.

The estimated area of impact is 22 m^2 to a depth of 0.5 m.

3.1.2.4 Generator Building

ESG collected a number of samples in the area of this building in 1996; however, only one was analyzed for TPH (ESG-7672 (tag 130)) and resulted in a concentration of 3,800 mg/kg. The results of the metal and PCB analysis were below criteria. Earth Tech also collected a number of samples around this area in 2001 (PI-39 to PI-43). The results indicate there are some significant Type A hydrocarbon stains.

Since previous investigations had concluded that there were no metal or PCB impacts in the vicinity, PHC delineation around the Generator Building was limited to visibly stained areas only. Sampling was completed in the centre of each of four stained areas and seven samples were collected (Appendix A, Figure 2.1). The limits of the stained areas were recorded by the surveyor. All seven samples (including two depth samples) were analyzed for PHCs and four surface samples were analyzed for metals and PCBs to confirm the absence of impact. All samples analyzed for PHCs exceed the criterion for Type A PHC of 20,000 mg/kg and range from 31,100 to 48,000 mg/kg. PCB and metals results were below the DCC. Surface water in the vicinity had a visible sheen as did groundwater encountered at 0.2 and 0.6 m in the two depth samples.

The extent of PHC impact is limited to the visibly stained areas (Appendix C, IMG_3481). The areas identified by sample tags 10-0047 and 10-0053 have estimated impact areas of 8 and 14 m^2, respectively to a depth of 0.3 m. The area defined by sample tags 10-0049 to 10-0052 should be combined into one area of approximately74 m^2 to a depth of 0.3 m.

3.1.2.5 Maintenance Garage

ESG-7521/22 (tag 21) had lead concentrations above the Tier I criterion. Three samples (PI-28 to PI-30) were collected by Earth Tech in 2001 to delineate the area and were found to be below the Tier I criterion. ESG-7519 (tag 19) had a zinc concentration above the Tier II criterion of 500 mg/kg. Three samples (PI-31 to PI-33) were collected by Earth Tech in 2001 to delineate the area and were found to be below the Tier II criterion.

ESG-7519 (tag 19) was found in its correct location according to ESG report figures and was not confirmed because the concentration detected in 1996 was well above the Tier II criterion of 500 mg/kg at 1,200 mg/kg. In total, 15 samples were collected to delineate the previously identified areas of impact with five being analyzed for metals and one analyzed for PHCs (Appendix A, Figure 2.1). All results were below the applicable criteria with detectable Type B PHC in sample 10-0068 at 76 mg/kg. PCBs were not investigated at this location since no impacts were previously identified by ESG or Earth Tech. No evidence of PCB contamination was observed in 2010 (Appendix C, IMG_3548).

The previously identified zinc impact at ESG-7519 (tag 19) should still be considered a contaminated soil area. The lead impact was not well delineated to the north and south since the samples collected in 2010 (10-0065 and 10-0066) were disposed by the laboratory before the 60 day holding time had expired. The approximate area of zinc impact is 9 m^2 to a depth of 0.3 m.

3.1.2.6 Maintenance Shed

ESG-7515 (tag 15) had concentrations of copper, nickel and zinc above the Tier II criteria and lead above the Tier I criterion. Two samples (PI-34, PI-35) were collected by Earth Tech to delineate the area and were found to be below the criteria for these parameters.

ESG-7515 (tag 15) was not located on-site, but a sample was taken in its assumed location to confirm the previously identified metal impacts. A total of ten samples were collected: five were analyzed for metals and four were analyzed for PHCs due to hydrocarbon odours observed during sampling (Appendix A, Figure 2.1). PCBs were not investigated at this location since no impacts were previously identified by ESG or Earth Tech. No evidence of PCB contamination was observed in 2010. Sample 10-0069 (collected at the assumed location of ESG-7515) contained a concentration of copper above the DCC Tier II criterion (110 mg/kg), but was below criteria for nickel, lead and zinc. The surface and depth samples collected at this location were also analyzed for PHCs and were found to be below the objective for Type A PHC (range from 2,460 to 6,800 mg/kg). Sample 10-0072, collected north of ESG-7515, contained Type B PHC concentration above the objective at 5,500 mg/kg.

The metal impact is delineated to the east and west using 1996 sampling locations and to the north and south by 2010 soil sampling locations. The approximate impacted area is 47 m^2 to a depth of 0.3 m. The Type B PHC impacted area is not well delineated, but the estimated area is 27 m^2 to a depth of 0.3 m.

Groundwater was encountered at 0.3 m in the shallow depth sample location.

3.1.2.7 Boiler/Incinerator

ESG collected a number of samples in this area in 1996; however, only one was analyzed for hydrocarbons (ESG-7507 (tag 6)) and resulted in a TPH concentration of 3,400 mg/kg. The results of the metal and PCB analysis were below criteria. Earth Tech also collected a number of samples around this area in 2001 (PI-44 to PI-46). The PHC result at PI-46 indicates Type B hydrocarbons exceed the objective.

In 2010, a total of eight samples were collected to delineate suspected hydrocarbon contamination south of the southeast wall of the Boiler/Incinerator (Appendix A, Figure 2.1). ESG-7507 (tag 6) was located and a small sampling grid was set up in the area (Appendix C, IMG_3482). Six samples were analyzed for PHCs and two were analyzed for PCBs. Metals were not investigated at this location since no impacts were previously identified by ESG or Earth Tech. No evidence of metal contamination was observed in 2010. Type A PHCs were identified in sample 10-0086 and Type B PHCs were identified in samples 10-0079, 10-0080/81 and 10-0083 at concentrations below their respective objectives. Sample 10-0082 contained Type B PHCs at a concentration of 3,813 mg/kg which is above the applicable objective. The impacted area was not well defined to the east and west since the samples collected in 2010 (10-0084 and 10-0085) were disposed by the laboratory before the 60 day holding time had expired. However, it can be assumed that the limits of the impacted area would not extend past the samples collected adjacent to the building (10-0079 and 10-0080/81) which contained concentrations below the applicable objective.

The extent of impacted soil is estimated to be 13 m^2 to a depth of 0.3 m.

3.1.2.8 Old Generator Building

ESG collected a number of samples in the area of this building in 1996; however, only one was analyzed for hydrocarbons and resulted in a TPH concentration of 2,800 mg/kg. The results of the metal and PCB analysis were below criteria. Earth Tech also collected a number of samples around this area in 2001 (PI-36 to PI-38). The results indicate there are significant Type A hydrocarbon stains in this location.

A total of 12 samples were collected to confirm and delineate the previously identified hydrocarbon impacts (Appendix A, Figure 3.0). Sampling was completed in the centre of each of three stained areas and the limits of the stained areas were recorded by the surveyor. Eight samples (including two depth samples) were analyzed for PHCs and two surface samples were analyzed for metals and PCBs to confirm the absence of impact. Of the eight samples analyzed for PHCs, 10-0087 exceeds the Type B PHC objective (5,800 mg/kg) and 10-0093 and 10-0094 exceed the objective for Type A PHC (34,600 and 31,000 mg/kg, respectively). PCB and metals results were below the DCC.

The extent of PHC impact is limited to the visibly stained areas. The areas identified by sample tags 10-0087, 10-0093 and 10-0094 have estimated impact areas of 1, 5 and 9 m^2, respectively to a depth of 0.3 m.

An additional sample (10-0099) was collected in this area southwest of the concrete bases to delineate potential metal contamination from three large batteries in the vicinity (Appendix C, IMG_0472). The surface sample was analyzed for metals and the concentrations were below the DCC.

The results of grain size distribution for sample 10-0090 showed that soils collected from this area were coarse-grained with 81% of the soil being greater than 75 microns in size.

3.1.2.9 Water Tank Building

ESG-7596 (tag 88) had a lead concentration of 810 mg/kg, which exceeds the Tier II criterion. Three samples collected by Earth Tech in 2001 (PI-04 to PI-06) were below the Tier I criterion.

ESG-7596 (tag 88) was found in its correct location according to ESG report figures and was not confirmed because the concentration detected in 1996 was well above the Tier II criterion of 500 mg/kg at 810 mg/kg. In total, six samples were collected to delineate the previously identified area of impact with four being analyzed for metals (Appendix A, Figure 3.0). PCBs and PHCs were not investigated at this location since no impacts were previously identified by ESG or Earth Tech. No evidence of PCB of PHC contamination was observed in 2010. All metals results were below the applicable criteria.

The previously identified lead impact at ESG-7596 (tag 88) should still be considered a contaminated soil area. The approximate area of lead impact is 7 m^2 to a depth of 0.3 m.

3.1.2.10 Metal Dump

The metal dump consists of a large volume of surface debris including vehicle remains, tin cans, copper wire and a few barrels. The geophysical survey did not identify any buried debris in the area of the Metal Dump. According to the Abandoned Military Site Remediation Protocol, a grid size of 12 x 12 m would be appropriate to capture any potential contamination in an area that is larger than 2,500 m^2. Due to the widely spread nature of the debris, complete delineation of surface soils was not completed using a 12 x 12 m grid since it is likely that the results would have returned minimal impacted samples without proper delineation. In lieu of grid sampling, target sampling was completed in two areas: surrounding a large pile of copper wire and surrounding a small area of battery debris. The results are summarized below.

Six samples were collected around the copper wire and four were analyzed for metals (Appendix A, Figure 3.0). All results contained concentrations below the DCC.

Five samples were collected under and around a small area of battery debris (Appendix A, Figure 4.0). Three samples were analyzed for metals and one was analyzed for leachable lead. Two samples contained concentrations below the DCC but the third sample (10-0112) collected directly under the battery debris contained concentrations of copper at 360 mg/kg and lead at 380 mg/kg which exceed the Tier II and Tier I DCC, respectively. The leachable lead result 0.5 mg/L was below the applicable Transportation of Dangerous Goods regulation of 5 mg/L. The area of impact is not well delineated to the east or the south since the samples collected in 2010 (10-0115 and 10-0116) were disposed by the laboratory before the 60 day holding time had expired. However, it can be assumed that the contamination is confined to the area of battery debris as is typical on similar northern sites. A depth sample was not collected in this area as there was limited soil available between the rocks. As such, the estimated extent of impact is 5 m^2 to a depth of 0.3 m.

3.1.2.11 Original Powerhouse

ESG-7625 (tag 118) had a lead concentration of 600 mg/kg, which exceeds the Tier II criterion. Three samples collected by Earth Tech in 2001 (PI-51 to PI-53) were also above the Tier II criterion. ESG-7625 (tag 118) was found in its correct location according to the ESG report figures; however, none of the Earth Tech sample locations could be identified. Delineation was completed around the ESG sample tag with the collection of six samples. All six samples were analyzed for metals, and one was analyzed for PCBs and PHCs to confirm the absence of impact. It should be noted that the area is very wet and marshy with water running through the area toward the ocean. The depth sample was collected from 0.2 m since the area is very wet and further excavation was impeded by water and sloughing soil (Appendix C, IMG_0509).

Samples 10-0118 and depth 10-0119 (0.2 m) were collected in the same location as the 1996 ESG sampling tag to confirm the previously identified lead impact (Appendix A, Figure 6.0). Results indicate that Tier II lead is present at the surface and Tier II zinc is present at depth with concentrations 700 and 530 mg/kg, respectively. Tier I lead contamination is present at sample location 10-0123. A duplicate sample was collected at 10-0120/21 and results determined that 10-0120 exceeded the Tier I criterion for lead (380 mg/kg) and 10-0121 exceeded the Tier II criterion for lead (10,000 mg/kg). Since sample 10-0121 had a relatively high concentration of total lead, the sample was submitted for leachable lead analysis. The result indicates that this location contains leachable lead at 41.6 mg/L which is above the Transportation of Dangerous Goods criterion of 5 mg/L. The impact in this area is not well delineated though it can be assumed that the contamination is limited to the extent of the metal debris. The approximate areas of impact include hazardous, 54 m^2, Tier II, 31 m^2 and Tier I 13 m^2 to a depth of 0.3 m.

3.1.2.12 East Barrel Cache

A test pit was excavated south of the East Barrel Cache to evaluate hydrocarbon impacts in the area (Appendix C, E1). Samples were analyzed for metals, PCBs and PHCs. Results indicate that concentrations of metals were well below the DCC and that PCB and PHC results were below the applicable criteria (Appendix A, Figure 6.0).

A grab water sample W1 and associated sediment sample 10-0137 were collected from the ocean approximately 50 m east of the debris, W2 (soil samples 10-0124 and1 0-0125) was collected from the test pit south of the debris and W3 (sediment sample 10-0138) was collected from the ocean south of the debris. The water and sediment results are summarized in Section 3.6.

3.1.2.13 West Barrel Cache

The West Barrel Cache is composed of three piles of crushed barrels (Appendix C, IMG_0485 and IMG_0486). Surface and shallow depth sampling was completed down-gradient of the barrel piles to assess hydrocarbon impacts (Appendix A, Figure 5.0). A total of 11 samples were collected and 11 were analyzed for PHCs, four for metals and two for PCBs. Only one sample (10-0127) was above the guideline for Type B PHCs (within 30 m of a water body) with a concentration of 565 mg/kg. The other samples all had detectable PHCs in the range of 21 to 640 mg/kg, all of which are below the applicable objectives for Type A and Type B PHCs.

The impacted sample location is not well delineated. Water is present at 0.2 m from the surface. The estimated impacted area is 8 m^2 to a depth of 0.3 m.

A test pit was excavated south of the West Barrel Cache to evaluate hydrocarbon impacts in the area (Appendix C, E2). Samples were analyzed for metals, PCBs and PHCs. Results indicate that concentrations of metals were well below the DCC. The surface sample location had detectable concentrations of PCB aroclors 1254 and 1260 for a total PCB concentration of 0.42 ug/L. The surface and depth (0.4 m) sample locations contained Type B PHC concentrations above the applicable objective (330 mg/kg) in the range of 830 to 5,830 mg/kg. This test pit was completed 13 m south of the largest crushed barrel pile and is located 9.8 m from the high water line and 24.7 m from the low water line.

The impacted area has not been delineated to the south and further delineation sampling may be required. The estimated impacted area is 8 m^2 to a depth of 0.4 m.

A grab water sample W5 and associated sediment sample 10-0143 was collected from the ocean south of the West Barrel Cache. Grab sample W6 was collected from the test pit south of the West Barrel Cache. The water and sediment results are summarized in Section 3.6.

3.1.2.14 Station Area South Mound

The geomagnetic survey identified two lobes of potential buried debris south of the Main Station which have been denoted as South Mound Lobes H and I (Appendix C, E6). Due to the close proximity and limited size of these buried debris areas (combined area of 164 m^2), the potential impacts were assessed south of Lobe I with the completion of a row of three test pits 11 m from the limit of the buried debris area. One up-gradient test pit was completed 3 m from the limit of the buried debris area for comparison purposes (Appendix A, Figure 2.1 and 3.0).

Results indicate that all samples contain detectable metals concentrations that are less than the DCC with the exception of arsenic and cadmium which are below laboratory detection limits. A comparison of up-gradient to down-gradient results has revealed that the average up-gradient metals concentrations are roughly twice the average down-gradient results. PCBs (Aroclor 1254) were detected at the surface of the up-gradient test pit with a concentration of 0.03 mg/kg though there were no detectable PCBs in any of the down-gradient test pits. These results are unexpected since concentrations down-gradient of buried debris often tend to be higher than up-gradient concentrations. Buried debris area sampling was conducted based on the areas that were identified following a preliminary review of the geophysical data collected on site. Upon further review of the final geophysical data, it appears that further buried debris could be present upgradient of the upgradient test pit as depicted on Figure 2.1. The elevated concentrations in the upgradient test pit relative to the downgradient test pits may be attributed to the presence of further buried debris. All samples were analyzed for PHCs and it was determined that the up-gradient test pit had detectable Type A PHC at surface while down-gradient test pits 1 and 2 (DGTP #1 and DGTP #2) contained Type B PHC at surface and depth. DGTP #3 contained detectable F3 PHCs at surface (type not defined). PHC concentrations ranged from 15 to 450 mg/kg which are well below the applicable objectives. It is possible that the down-gradient Type B PHC detections are a result of the buried debris however it appears that there is no down-gradient metal or PCB impact from the minimal buried debris at South Mound Lobes H and I.

3.1.2.15 Original Hamlet Site

The geomagnetic survey identified one lobe of potential buried debris at the Original hamlet site that has been denoted as Hamlet Lobe D (Appendix C, E16). The area of buried debris is approximately 16 m^2. Potential impacts were assessed by completing one up-gradient test pit (7 m north of limit) and one down-gradient test pit (12 m south of limit) (Appendix A, Figure 5.0).

Results indicate that all samples contain detectable metals concentrations that are less than the DCC with the exception of arsenic and cadmium that are below laboratory detection limits. There were no PCB detections in any of the samples analyzed. Type A PHC was identified in both the up-gradient (375 mg/kg) and down-gradient (45 mg/kg) at surface. In general, the up-gradient and down-gradient test pit results are comparable and there appears to be no impact from the minimal buried debris at Hamlet Lobe D.

A grab water sample W4 and associated sediment sample 10-0139 were collected from the ocean south of the Original Hamlet Site and the results are summarized in Section 3.6.

3.1.2.16 Former AST Site

Four samples were collected by Earth Tech in 2001 (PI-47 to PI-50). The results indicate there are Type A and Type B hydrocarbons above criteria at this location (Appendix A, Figure 2.1).

Additional samples were not collected by AECOM in the 2010 investigation as the Earth Tech sample locations were not located or examined.

Table 2 presents a summary of the contaminated soil areas including the estimated areas, depths and volumes.

Table 2: Summary of Contaminated Soil Areas at Padloping Island

Location	Reference Sample Number	Contaminants	Hazardous			Tier II			Tier II/Type B PHC			Tier I			Type A PHC			Type B PHC			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)	Area (m^2)	Depth (m)	Volume (m^3)	Area (m^2)	Depth (m)	Volume (m^3)	Area (m^2)	Depth (m)	Volume (m^3)	
Weather Building	(10-0001;10-0002), 10-0003 to 10-0005	Cu				29	0.6	17.4													Not fully delineated
Kitchen/Mess Hall	10-0019, 10-0023, 10-0024	Pb, Type B PHC				21	0.3	6.3													
Kitchen/Mess Hall	10-0025, 10-0029, ESG-7562/63	Pb, Zn				24	0.3	7.2													
Kitchen/Mess Hall	10-0033	Cb, Pb				17	0.3	5.1													Not fully delineated
Shower/Washrooms	10-0043, ESG-7564	Pb, Type B PHC							22	0.5	11										Not fully delineated
Generator Building	10-0047, 10-0048	Type A PHC													8	0.3	2.4				
Generator Building	10-0049, 10-0050/51, 10-0052	Type A PHC													74	0.3	22.2				
Generator Building	10-0053	Type A PHC													14	0.3	4.2				
Maintenance Garage	ESG-7519	Zn				9	0.3	2.7													Not fully delineated
Maintenance Shed	10-0069	Cu				47	0.3	14.1													
Maintenance Shed	10-0072	Type B PHC																27	0.3	8.1	Not fully delineated
Boiler/Incinerator	10-0082	Type B PHC																13	0.3	3.9	Not fully delineated
Old Generator Building	10-0087	Type B PHC																1	0.3	0.3	
Old Generator Building	10-0093	Type A PHC													5	0.3	1.5				
Old Generator Building	10-0094	Type A PHC													9	0.3	2.7				
Water Tank Building	ESG-7596	Pb				7	0.3	2.1													
Metal Dump	10-0112	Cu, Pb				5	0.3	1.5													Not fully delineated
Original Powerhouse	(10-0118; 10-0119), 10-0120/21, 10-0123	Pb, Zn	54	0.3	16.2	31	0.3	9.3				13	0.3	3.9							Not fully delineated
West Barrel Cache	10-0127	Type B PHC																8	0.3	2.4	Not fully delineated
West Barrel Cache	(10-0140/41; 10-0142)	Type B PHC																8	0.4	3.2	Not fully delineated
Former AST Site	PI-47 to PI-50	Type A PHC, Type B PHC													196	0.5	98	196	0.5	98	

Notes: Reference sample numbers are either from AECOM 2010 (i.e. 10-0112), ESG 1997 (i.e. ESG-7596) and Earth Tech 2002 (i.e. PI-47).

3.2 Assessment of Existing Buried Debris Areas (Dumps)

The assessment of buried debris areas at Padloping Island was completed with the goal of classifying the buried debris locations according to the three categories specified under the INAC Abandoned Military Site Remediation Protocol:

- Class A: buried debris is located in an unstable, high erosion location. Remediation will involve relocation of buried debris to an engineered landfill.
- Class B: the buried debris 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 buried debris 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 as required.

3.2.1 Methodology

Prior to the field investigation, historical air photos taken during site operation in 1967 were reviewed to identify potential buried debris locations in addition to those previously identified. In general, these areas are associated with disturbed ground and 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 for investigation’.

Upon arrival on-site, each of the potential buried debris locations were ground-truthed to confirm that geophysical surveys were required, and if so, the geophysical survey boundaries were identified. 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 (e.g. 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 down-gradient of select anomalies. Down-gradient concentrations of naturally occurring inorganic elements (inorganics), were compared with up-gradient 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 down-gradient 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 down-gradient, and whether there were multiple elevated contaminants. If any anthropogenic contaminants were detected in down-gradient samples, this was considered evidence of contaminant migration, unless there was an up-gradient source (whose inputs would be captured by the up-gradient 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 down-gradient 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 were noted.

3.2.2 Results

There were thirteen buried debris lobes identified during the 2010 field investigation at Padloping Island. They are:

- Lobes A, B, and C - Three small anomalies, associated with the Original Station Site Area and located along the beach ridge near Warehouse No. 2, approximately 1200 m east of the sunken barges.
- Lobe D - One small anomaly located at the Old Hamlet Site approximately 750 m east of the sunken barges.
- Lobes E, F, and G - Three small anomalies designated as the Pond Area lobes located approximately 750 m northeast of the Main Station.
- Lobes H and I - Two small anomalies designated as the South Mound lobes and located adjacent to and southeast of the Main Station.
- Lobe J, K, L ,and M - Four small anomalies designated as West Mound lobes and located adjacent to and south of the Main Station.

The results of the dump assessments and the specific volumes associated with the waste component breakdowns are summarized in Table 3 on the next page.

Table 3. Summary of Buried Debris Area

	Existing Buried Debris Areas												
	Lobe A	**Lobe B**	**Lobe C**	**Lobe D**	**Lobe E**	**Lobe F**	**Lobe G**	**Lobe H**	**Lobe I**	**Lobe J**	**Lobe K**	**Lobe L**	**Lobe M**
Reference Drawing	Original Station Site	Original Station Site	Original Station Site	Old Hamlet Site	Pond Area	Pond Area	Pond Area	South Mound	South Mound	West Mound	West Mound	West Mound	West Mound
Photo Reference	P8110107.jpg	P8110107.jpg	P8110107.jpg	E16 - 12Aug10.jpg	IMG_3532	IMG_3531	IMG_3534	E6 - 12Aug10.jpg	E6 - 12Aug10.jpg	E8 - 12Aug10.jpg	E8 - 12Aug10.jpg	E8 - 12Aug10.jpg	E8 - 12Aug10.jpg
Estimated Landfill Extent	18 m^2	135 m^2	64 m^2	13 m^2	23 m^2	58 m^2	107 m^2	55 m^2	21 m^2	20 m^2	15 m^2	20 m^2	18 m^2
Estimated Depth	0.75 m	0.75 m	0.75 m	0.75 m	0.75 m	0.75 m	0.75 m	0.75 m	0.75 m	0.75 m	0.75 m	0.75 m	0.75 m
Estimated Volume	14	101	48	10	17	44	80	41	16	15	11	15	14
Estimated Volume of Hazardous Material	2 m^3 (1%)			n/a m^3 (1%)	n/a m^3 (1%)	n/a m^3 (1%)	1 m^3 (1%)	1 m^3 (1%)		1 m^3 (1%)			
Estimated Volume of Non-Hazardous Material	3 m^3 (20%)	20 m^3 (20%)	10 m^3 (20%)	2 m^3 (20%)	3 m^3 (20%)	10 m^3 (20%)	16 m^3 (20%)	8 m^3 (20%)	3 m^3 (20%)	3 m^3 (20%)	2 m^3 (20%)	3 m^3 (20%)	3 m^3 (20%)
Estimated Volume of Tier II Contaminated Soils	2 m^3 (10%)	10 m^3 (10%)	5 m^3 (10%)	1 m^3 (10%)	2 m^3 (10%)	5 m^3 (10%)	8 m^3 (10%)	4 m^3 (10%)	2 m^3 (10%)	2 m^3 (10%)	1 m^3 (10%)	2 m^3 (10%)	2 m^3 (10%)
Estimated Volume of Tier I Contaminated Soils	2 m^3 (10%)	10 m^3 (10%)	5 m^3 (10%)	1 m^3 (10%)	2 m^3 (10%)	5 m^3 (10%)	8 m^3 (10%)	4 m^3 (10%)	2 m^3 (10%)	2 m^3 (10%)	1 m^3 (10%)	2 m^3 (10%)	2 m^3 (10%)
Presence of Contaminants	No samples collected. No surface staining noted.	No samples collected. No surface staining noted.	No samples collected. No surface staining noted.	There was no surface staining or evidence of contaminant migration from this lobe.	No samples collected. No surface staining noted.	No samples collected. No surface staining noted.	No samples collected. No surface staining noted.	The down-gradient areas of Lobes H & I were evaluated together as there is only a small break between the two lobes. No surface staining or contaminant migration was identified.	The down-gradient areas of Lobes H & I were evaluated together as there is only a small break between the two lobes. No surface staining or contaminant migration was identified.	No samples collected. No surface staining noted.	No samples collected. No surface staining noted.	No samples collected. No surface staining noted.	No samples collected. No surface staining noted.
Presence of Exposed Debris	Occasional metal and cable in area.	Occasional metal and cable in area.	Occasional metal and cable in area.	Wooden building materials and various domestic debris in general area	Occasional wood and steel cable is exposed.	Occasional wood and steel cable is exposed.	Occasional wood and steel cable is exposed.	Various Main Station Debris in area including, wood, metal, barrels etc.	Various Main Station Debris in area including, wood, metal, barrels etc.	Various Main Station Debris in area including, wood, metal, barrels etc.	Various Main Station Debris in area including, wood, metal, barrels etc.	Various Main Station Debris in area including, wood, metal, barrels etc.	Various Main Station Debris in area including, wood, metal, barrels etc.

	Existing Buried Debris Areas												
	Lobe A	Lobe B	Lobe C	Lobe D	Lobe E	Lobe F	Lobe G	Lobe H	Lobe I	Lobe J	Lobe K	Lobe L	Lobe M
Topography	Lobe A is located on the plateau above the beach ridge and gently slopes toward the ocean.	Lobe B is located on the beach ridge and gently slopes toward the ocean.	Lobe C is located on the beach ridge and gently slopes toward the ocean.	Lobe D is located on the plateau above the beach ridge and gently slopes toward the ocean.	This area consists of a small pond with slightly mounded areas on three of four sides and a drainage course / outlet on the fourth (southwest) side.	This area consists of a small pond with slightly mounded areas on three of four sides and a drainage course / outlet on the fourth (southwest) side	This area consists of a small pond with slightly mounded areas on three of four sides and a drainage course / outlet on the fourth (southwest) side	The surface of Lobe H slopes at about 5% to the South towards the ocean.	The surface of Lobe I slopes at about 5% to the South towards the ocean.	The surface of Lobe J slopes at about 5% to the South towards the ocean.	The surface of Lobe K slopes at about 5% to the South towards the ocean.	The surface of Lobe L slopes at about 5% to the South towards the ocean.	The surface of Lobe M slopes at about 5% to the South towards the ocean.
Cover Material	organics	organics	organics	organics	sand and gravel	gravel and cobbles	sand and gravel	organics, some rocks	organics, some rocks	organics, some rocks	organics, some rocks	organics, some rocks	organics, some rocks
Vegetation Cover	There is approximately 90% vegetation cover on the lobe.	There is approximately 90% vegetation cover on the lobe.	There is approximately 90% vegetation cover on the lobe.	There is approximately 90% vegetation cover on the lobe.	There is approximately 90% vegetation cover on the lobe.	There is approximately 90% vegetation cover on the lobe.	There is approximately 90% vegetation cover on the lobe.	There is approximately 80% vegetation cover on the lobe.	There is approximately 80% vegetation cover on the lobe.	There is approximately 90% vegetation cover on the lobe.	There is approximately 90% vegetation cover on the lobe.	There is approximately 90% vegetation cover on the lobe.	There is approximately 90% vegetation cover on the lobe.
Evidence of Erosion	There is no evidence of erosion.	Located on beach ridge which could be subject to wave action during storm surges	Located on beach ridge which could be subject to wave action during storm surges	There is no evidence of erosion.	There is no evidence of erosion.	There is no evidence of erosion.	There is no evidence of erosion.	There is no evidence of erosion.	There is no evidence of erosion.	There is no evidence of erosion.	There is no evidence of erosion.	There is no evidence of erosion.	There is no evidence of erosion.
Annual Precipitation	250-300 mm	250-300 mm	250-300 mm	250-300 mm	250-300 mm	250-300 mm	250-300 mm	250-300 mm	250-300 mm	250-300 mm	250-300 mm	250-300 mm	250-300 mm
Distance to Down-gradient Waterbodies	The lobe is located on the beach ridge approximately 40 m away from high tide vegetation.	The lobe is located on the beach ridge approximately 10 m away from high tide vegetation.	The lobe is located on the beach ridge approximately 10 m up-gradient of the high tide vegetation.	The lobe is located on the beach ridge approximately 40 m away from high tide vegetation.	Approximately 900 m from the Tidal Bay to the Southwest.	Approximately 900 m from the Tidal Bay to the Southwest.	Approximately 900 m from the Tidal Bay to the Southwest.	There is a small area of standing water between Lobes H and I.	There is a small area of standing water between Lobes H and I.	Approximately 400 m away from the Ocean to the South.	Approximately 400 m away from the Ocean to the South.	Approximately 400 m away from the Ocean to the South.	Approximately 400 m away from the Ocean to the South.
Distance to freshwater/marine habitat	The lobe is located on the beach ridge approximately 40 m away from high tide vegetation.	The lobe is located on the beach ridge approximately 10 m away from high tide vegetation.	The lobe is located on the beach ridge approximately 10 m up-gradient of the high tide vegetation.	The lobe is located on the beach ridge approximately 40 m away from high tide vegetation.	Approximately 900 m from the Tidal Bay to the Southwest.	Approximately 900 m from the Tidal Bay to the Southwest.	Approximately 900 m from the Tidal Bay to the Southwest.	Approximately 400 m away from the Ocean to the South.	Approximately 400 m away from the Ocean to the South.	Approximately 400 m away from the Ocean to the South.	Approximately 400 m away from the Ocean to the South.	Approximately 400 m away from the Ocean to the South.	Approximately 400 m away from the Ocean to the South.
Terrestrial Habitat	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.	Polar Bear, Caribou, Arctic Fox, Hare and Lemming are among the wildlife known to frequent the general area.
Land Use	hunting and fishing	hunting and fishing	hunting and fishing	hunting and fishing	hunting and fishing	hunting and fishing	hunting and fishing	hunting and fishing	hunting and fishing	hunting and fishing	hunting and fishing	hunting and fishing	hunting and fishing
Comments	Due to the proximity to the marine environment and the potential for erosion during storm events, this lobe has been classified as Class A.	Due to the proximity to the marine environment and the potential for erosion during storm events, this lobe has been classified as Class A.	Due to the proximity to the marine environment and the potential for erosion during storm events, this lobe has been classified as Class A.	Based on the lack of contaminant migration and the stability of the lobe, it is being classified as Class C.	Based on the lack of visual evidence of contaminant migration and the stability of the lobe, it is being classified as Class C.	Based on the lack of visual evidence of contaminant migration and the stability of the lobe, it is being classified as Class C.	Based on the lack of visual evidence of contaminant migration and the stability of the lobe, it is being classified as Class C.	Based on the lack of contaminant migration and the stability of the lobe, it is being classified as Class C.	Based on the lack of visual evidence of contaminant migration and the stability of the lobe, it is being classified as Class C.	Based on the lack of visual evidence of contaminant migration and the stability of the lobe, it is being classified as Class C.	Based on the lack of visual evidence of contaminant migration and the stability of the lobe, it is being classified as Class C.	Based on the lack of visual evidence of contaminant migration and the stability of the lobe, it is being classified as Class C.	Based on the lack of visual evidence of contaminant migration and the stability of the lobe, it is being classified as Class C.

3.3 Assessment of Surface Debris and Barrels

3.3.1 Surface Debris Assessment

A surface debris inventory was completed by collecting hand-held GPS waypoints where debris was visible or where debris fields appeared to terminate. The GPS waypoints were downloaded onto the site plan drawing to generate debris area perimeters. The areas of surface debris created with these perimeter limits were then assigned a numerical or descriptive label. 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 4 presents an inventory of surface debris by location, including an estimate of the volumes of hazardous and non-hazardous debris. It should be noted that the surface debris covered extensive areas, in particular in the area to the west of the Main Station and Metal Dump roads. 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.

It is understood that the Old Hamlet Area is considered to be significant in terms of its place in 20th century Inuit history. The preliminary recommendations from (Golder 2010) include that none of the house foundations, stone tent rings and wooden flooring are to be removed from this area and that debris to be removed, including fuel barrels, metal and wood debris is to be hand picked. The recommendations also include that none of the recorded archaeological resources are to be disturbed by borrow sources, landfills or heavy vehicle traffic. These recommendations will affect the methodology and debris volumes to be removed from Debris Area 13, but will not have a significant effect on overall debris removal at this site.

3.3.2 Hazardous Debris Assessment

Three paint samples were collected at Padloping Island to assess PCB and lead concentrations. Samples were collected from two generators (yellow and orange) remaining at the Generator Building while the third sample was collected from a paint can south of the Maintenance Garage containing the same mint green paint that was found on some small pieces of site debris. The maintenance garage sample was also submitted for leachable lead analysis.

The results from the paint analysis found that none of these samples had PCB levels above the Canadian Environmental Protection Act (CEPA) criterion of 50 mg/kg. The results also found that the lead leachate from the garage sample was <0.1 mg/L and well below the TDGA criterion of 5.0 mg/L. Based on the results, these materials are considered non-hazardous and can be disposed of in a non-hazardous waste landfill.

Two concrete samples were collected, each from stained areas on the concrete supporting the generators at the Generator Building and the Old Generator Building. The results found that the PCB concentration in these concrete samples was <0.1 mg/kg and 0.2 mg/kg, respectively and well below the CEPA criterion of 50 mg/kg. Based on the results, these concrete materials are considered non-hazardous and can be disposed of in a non-hazardous waste landfill.

A complete summary of the paint and concrete analytical results is presented in Table B5 in Appendix B.

Table 4. Summary of Surface Debris Areas

Debris Area	Figure No.	Photos	Description	Location	Waypoints on Figures	Estimated Areal Extent (m^2)	Estimated Crushed Volume (m^3)	Hazardous Uncrushed Volume Component (m^3)	Comments
Library / Shower and Washroom Building Foundation and Debris	2.0	IMG_0454.JPG	**Foundation:** Approx. 50 - 200 mm square timber piles **Debris:** Corrugated sheet metal, structural steel, metal heaters, galvanized and steel plumbing, wire and electrical components, water tanks (2), misc. metal debris, timber flooring and planking, glass, porcelain, fibreglass insulation, asbestos board/shingles/ floor tile (hazardous)	Main Station	-	1,000	50	3	Access to Main Station Area Buildings is fair with site roads requiring significant upgrades for construction traffic.
Generator Building Foundation and Debris	2.0	IMG_3543.JPG	**Foundation:** Raised concrete slab on approx. 20 - 200 mm square timber piles. **Debris:** Generators (2), cylindrical steel tank (1500 US Gal.), misc. concrete and wood, barrels (2), misc. electrical wire and components, power poles (4), lead acid truck batteries (hazardous), lubricating oil (50 L) in diesel electric generators (hazardous)	Main Station	-	400	30	1	Access to Main Station Area Buildings is fair with site road requiring significant upgrades.
Kitchen / Mess Hall Foundation and Debris	2.0	IMG_3515.JPG	**Foundation:** Approx. 50 - 200 mm square timber piles (some partially burned). **Debris:** Concrete chimney, metal ducting, small cylindrical tanks (6), corrugated sheet metal, power pole, misc. wood and steel, barrels, misc. electrical wire and components, pipe sections, lead sheets (hazardous), asbestos board/shingles/floor tile (hazardous)	Main Station	-	600	40	5	Access to Main Station Area Buildings is fair with site road requiring significant upgrades.
Storage Container and Debris	2.0	IMG_3529.JPG	**Debris:** Remnants of a 20' Barge Container including steel angle iron structure and sheet metal on bottom half, corrugated sheet metal, fibreglass insulation, miscellaneous wood, metal and barrels, cylindrical steel tank (1500 US Gal.), misc. electrical wire and components	Main Station	-	500	20	-	Access to Main Station Area Buildings is fair with site roads requiring significant upgrades for construction traffic.
Showers / Washroom Foundation and Debris	2.0	IMG_3527.JPG	**Foundation:** Approx. 32 - 200 mm square timber piles (some partially burned). **Debris:** Steel angle iron, steel cylindrical water tanks (2), tracked flatbed carrier machine, corruguated sheet metal, misc. wood and steel, barrels, misc. electrical wire, cable and components, ducting, power poles (2)	Main Station	-	800	50	-	Access to Main Station Area Buildings is fair with site roads requiring significant upgrades for construction traffic.
Supply Depot Building Foundation and Debris	2.0	IMG_0460.JPG	**Debris:** corrugated metal panels, steel angle iron, power poles (3), timber beams, wood planking, barrels (1), metal strapping, wood boxes, wax paper rolls, misc. wood and metal, asbestos board/shingles/floor tiles (hazardous)	Main Station	-	600	25	4	Access to Main Station Area Buildings is fair with site roads requiring significant upgrades for construction traffic.
Accommodations Building Foundation and Debris	2.0	IMG_3536.JPG	**Foundation:** Approx. 32 - 200 mm square timber piles (some partially burned) **Debris:** steel angle iron, corrugated metal panels, wooden wall sections, fibreglass insulation, steel cable, bags of grout, yellow heavy steel machinary part, misc. wood and metal	Main Station	-	1,000	40	-	Access to Main Station Area Buildings is fair with site roads requiring significant upgrades for construction traffic.

Debris Area	Figure No.	Photos	Description	Location	Waypoints on Figures	Estimated Areal Extent (m^2)	Estimated Crushed Volume (m^3)	Hazardous Uncrushed Volume Component (m^3)	Comments
Maintenance Garage Foundation and Debris	2.0	IMG_3548.JPG	**Foundation:** Approx. 52 - 200 mm square and 300 x 200 mm timber piles (some partially burned) **Debris:** steel angle iron frame (intact), Corrugated sheet metal, truck, misc. barrels and metal pails, rebar, power poles (2), steel equipment parts including tracks, misc. wire and electrical components, water tanks (2), misc. metal debris	Main Station	-	1,000	60	-	Access to Main Station Area Buildings is fair with site roads requiring significant upgrades for construction traffic.
Boiler / Incinerator Building Foundation and Debris	2.0	IMG_0457.JPG	**Foundation:** Approx. 12 - 200 mm square timber piles **Debris:** Brick Chimney Structure (partially intact) on a concrete foundation, timber planking, steel water tanks (4), ducting, galvanized steel pipes, insulated wall panelling, cable, bags of cement, barrels (6), heater unit, power pole, misc. wood and steel, misc. electrical wire, asbestos board/shingles/floor tiles (hazardous)	Main Station	-	400	55	4	Access to Main Station Area Buildings is fair with site roads requiring significant upgrades for construction traffic. Standing Water in and around building footprint.
Metal Dump Debris Area	3.0	IMG_3475.JPG	**Debris:** trucks, cars, tractors, grader, motors, barrels, steel angle iron, barrels, power poles, misc. machinary parts, wood and metal	South of Main Station Area	-	8,000	250		Access to areas south of Main Station is fair with site roads requiring significant upgrades for construction traffic.
West of Main Station and Metal Dump Roads	1.0	113.jpg	**Debris:** approximately 200 barrels, power poles, misc. wood and metal	50 m to 300 m West of Road through Station and Metal Dump and Outside Previously Identified Debris Areas		160,000	30		Access to Area >50 m West of Main Station and Metal Dump Site Roads is fair to poor with some wet, boggy areas. ATV Access only.
1	2.0	IMG_0464.JPG	**Debris:** dozer, motors, barrels, structural steel, corrugated metal panels, ducting, auger flights, steel barrels, pile of power poles, wooden barrels, misc. wood and metal	East of Main Station Area	WP503 - 531	6,000	60	-	Access to Main Station Area is fair with site roads requiring significant upgrades for construction traffic.
2	2.0	IMG_0466.JPG	**Debris:** steel angle iron, corrugated sheet metal, misc. wood and metal debris	Main Station Area - South of Generator Building	WP532 - 537	1,100	5	-	Access to Main Station Area is fair with site roads requiring significant upgrades for construction traffic.
3	2.0	IMG_0468.JPG	**Debris:** , ducting, metal heater, tin cans, galvanized piping, misc. electrical wire, misc. wood and metal debris, asphalt shingles, asbestos board/shingles/floor tiles (hazardous), nine gas cylinders (hazardous), lead acid truck batteries (hazardous)	Weather Building Debris Area	WP538 - 546	300	5	5	Access to Main Station Area is fair with site roads requiring significant upgrades for construction traffic.

Debris Area	Figure No.	Photos	Description	Location	Waypoints on Figures	Estimated Areal Extent (m^2)	Estimated Crushed Volume (m^3)	Hazardous Uncrushed Volume Component (m^3)	Comments
4	3.0	IMG_0470.JPG	**Debris:** steel water tanks (2), stainless steel water tank, ducting, barrels, equipment tracks (2 sets), plumbing pipe, misc. electrical wire, timber planking, power pole, misc. wood, brick and metal debris, plaster pieces, fibreglass insulation, cardboard sheets, floor mats, asbestos board/shingles/floor tiles (hazardous)	Former Water Tank Building Site South of Main Station Area	WP547 - 553	1,200	10	4	Access to Areas south of Main Station Area is good.
5	3.0	IMG_0472.JPG and IMG_0474.JPG	**Debris:** corrugated sheet metal, barrels, metal heater, galvanized plumbing pipe, steel water tanks, timber planking, power poles, cardboard sheets, glass, plastic, ceramic, concrete blocks (2), misc. wood and metal debris, lead acid batteries (hazardous)	South of Main Station Area	WP554 - 575	3,200	40	1	Access to areas south of Main Station is fair with site roads requiring significant upgrades for construction traffic.
6	3.0	IMG_0477.JPG	**Debris:** barrels (approx. 240), plumbing pipe, metal heater, steel water tanks, truck, domenstic debris including tin cans and bedsprings, timber planking (some partially burnt), plastic, porcelin, glass, misc. electrical wire, wood and metal debris	South of Main Station Area	WP576 - 593	2,700	70	-	Access to areas south of Main Station is fair with site roads requiring significant upgrades for construction traffic.
7	3.0	IMG_0480.JPG	**Debris:** corrugated sheet metal, barrels, misc. metal debris	South of Main Station Area	WP595	20	2	-	Access to areas south of Main Station is fair with site roads requiring significant upgrades for construction traffic.
8	4.0	IMG_0482.JPG	**Debris:** dozer, sheet metal, bed springs, cinder blocks, wood planking, wooden barrels, misc. wood and metal, asbestos board/shingles/floor tiles (hazardous)	Metal Dump Area	WP596 - 601	200	2	4	Access to Metal Dump Area is fair with site roads requiring significant upgrades for construction Traffic.
9	4.0	IMG_0483.JPG and IMG_0484.JPG	**Debris:** corrugated metal panel, steel angle iron, bed springs, misc. wood and metal, asbestos floor tiles (hazardous)	Metal Dump Area	WP602 & 603	50	10	4	Access to Metal Dump Area is fair with site roads requiring significant upgrades for construction Traffic.
10	4.0	IMG_0491.JPG	**Debris:** crushed barrels, dozer blade, steel angle iron, wooden platform, OSB sheets, plastic garbage bags, ceramic electrical insulators, misc. wood and metal	West Beach Area	WP609 - 646 & WP636 - 648	5,500	450	-	Access to West Beach Area is fair with site roads requiring significant upgrades for construction Traffic.
11	4.0	IMG_0489.JPG and IMG_3535.JPG	**Debris:** one submerged barge, one partially submerged barge, steel chassis with hitch	West Beach Area - Submerged or Partially Submerged Items	-	4,500	90	-	Barges and steel chassis with hitch are partially to fully submerged dependant on the tide.
12	3.0	IMG_0498.JPG	**Debris:** small tanks, toilet, garbage can, steel angle iron, bed frames, corrugated sheet metal, misc. wood debris	South of Main Station Area	WP651	30	10	-	Access to areas south of Main Station is fair with site roads requiring significant upgrades for construction traffic.
13	5.0	IMG_0505.JPG and (IMG_504.JPG)	**Debris:** corrugated sheet metal, barrels, steel angle iron, bed frames, snowmobile base, metal house frame, domestic debris including clothing, shoes, dishes, etc., timber planking, plywood, plastic bottles, misc. wood and metal debris	Old Hamlet Site - Overall Debris Area (Concentrated Debris within)	WP652 – 730 (WP731 – 753)	54,000 (3,500)	80 (50 in concentrated debris area)	-	Access to Original Station Site - East and Water Lake is fair to poor with some wet, boggy areas. Good, but rough access along rocky beach ridge and ATV Access only on up-gradient tundra.

Debris Area	Figure No.	Photos	Description	Location	Waypoints on Figures	Estimated Areal Extent (m^2)	Estimated Crushed Volume (m^3)	Hazardous Uncrushed Volume Component (m^3)	Comments
14	6.0	IMG_0509.JPG	**Debris:** steel angle iron, corrugated sheet metal, ducting, timber piles and planking, barrels, misc. wood debris	Original Station Site	WP754 - 787	16,000	50	-	Access to Original Station Site - East and Water Lake is fair to poor with some wet, boggy areas. Good, but rough access along rocky beach ridge and ATV Access only on up-gradient tundra.
15	6.0	IMG_3485.JPG	**Debris:** crushed barrel piles (6), steel angle iron, corrugated sheet metal, boxes of tile, bags of grout, misc. wood and metal debris	Original Station Site - East	-	10,000	130	-	Access to Original Station Site - East and Water Lake is fair to poor with some wet, boggy areas. Good, but rough access along rocky beach ridge and ATV Access only on up-gradient tundra.
Site Roads Debris Corridor	2.0, 3.0, 4.0, 5.0 & 6.0	IMG_3483.JPG	**Debris:** approx. 120 scattered barrels, approx. 340 consolidated barrels in eight caches, power poles, fallen communication tower, wooden cross structure, steel drum roller (3), wooden storage container, misc. wood and metal debris	Within 50 m from centreline of Site Roads and Outside Previously Identified Debris Areas	-	190,000	100		Access to Original Station Site - East and Water Lake is fair to poor with some wet, boggy areas. Good, but rough access along rocky beach ridge and ATV Access only on up-gradient tundra.
Power Cable(s) between Main Station and Original Station Site	6.0		**Debris:** power cable	Between Main Station and Original Station Sites	-	5,500	10	-	Access to Original Station Site - East and Water Lake is fair to poor with some wet, boggy areas. Good, but rough access along rocky beach ridge and ATV Access only on up-gradient tundra.
TOTALS						**478100**	**1774**	**34**	

3.3.3 Barrel Assessment

The 2010 site investigation identified numerous caches with crushed or intact barrels located primarily in the vicinity of the Main Station and West and East Beach Areas. A volume estimate of the crushed barrels was facilitated by the surveyor who surveyed the extent of the crushed barrel piles. AECOM also identified 1261 uncrushed barrels (scattered or in small piles) at the site, located primarily along the road to the freshwater lake and to the west of the Main Station and Metal Dump access roads.

The 2010 investigation inspected all uncrushed barrels and identified those with contents. Approximately 17 barrels were identified to have liquid contents and were labelled with a barrel number using a paint marker.

In total, eight barrel samples were collected and analyzed for the parameters outlined in the Barrel Protocol included in the INAC Abandoned Military Site Remediation Protocol. A summary of the analytical results for the samples collected from the barrels is located in Table B4 in Appendix B. The following table summarizes the collected barrel samples:

Table 5: Barrel Assessment Summary

Sample Number	Location	Depth of Contents (cm)	Description of Contents	Comments	Analytical Results
B1	511415 E 7435699 N	15	Aqueous	Clear	No exceedances for the parameters tested under the Barrel Protocol Criteria
B22	511475 E 7435787 N	10	Aqueous	Light brown silt	No exceedances for the parameters tested under the Barrel Protocol Criteria
B201	511430 E 7435814 N	15	Aqueous	Light brown silt	No exceedances for the parameters tested under the Barrel Protocol Criteria
B204	511471 E 7435831 N	20	Aqueous	Light brown silt/rusty sediment	No exceedances for the parameters tested under the Barrel Protocol Criteria
B219	511498 E 7435799 N	5	Aqueous	Light brown silt/rusty sediment	No exceedances for the parameters tested under the Barrel Protocol Criteria
B291	North of West Barrel Cache	15	Aqueous	Rusty sediment	No exceedances for the parameters tested under the Barrel Protocol Criteria
B301	Northwest of West Barrel Cache	15	Aqueous	Rusty sediment	No exceedances for the parameters tested under the Barrel Protocol Criteria
B303	Northwest of West Barrel Cache	5	Aqueous	Rusty sediment	No exceedances for the parameters tested under the Barrel Protocol Criteria

Notes: GPS waypoints not collected for B291, B301 and B303.

3.4 Demolition Assessment

3.4.1 Methodology

A demolition investigation would typically be conducted to determine an inventory of the site facilities that would require dismantling for disposal. Almost all of the buildings and facilities at Padloping Island were either partially burned, previously dismantled or weathered to a state where demolition would be minor or not required at all. For the Phase III Environmental Site Assessment at Padloping Island, all debris on site will be considered as surface or buried debris.

3.5 Hazardous and Non-Hazardous Waste Assessment Summary

Based on the combined volumes of surface debris inventory, buried debris inventory and barrel assessment, the breakdown of hazardous versus non-hazardous debris for the Padloping Island Site is as follows:

- The total volume of non-hazardous waste is estimated to be 1,774 m^3 (crushed).
- The total volume of hazardous waste is estimated to be 34 m^3 (crushed).

3.6 Sediment and Surface Water Assessment

3.6.1 Methodology

Seven grab water samples with corresponding soil and/or sediment samples were collected to assess potential contaminant levels. Four samples were collected from the ocean: east of the East Barrel Cache, south of the East Barrel Cache, south of the Old Hamlet Site and south of the West Barrel Cache. Water samples were also collected from test pits south of the East Barrel Cache and south of the West Barrel Cache. Finally, a water sample was collected from the Freshwater Lake northwest of the site. There were no similar lakes in size and depth to the Freshwater Lake to use as a background reference sample.

A sediment sample was collected from each of the ocean and freshwater sample locations. Due to the coarse grain size of the sediments, the samples were collected as grab samples using a shovel. Soil samples were collected from the surface and depth of the test pits south of the East and West Barrel Caches. The results of the soil samples are discussed in Sections 3.1.2.12 and 3.1.2.13.

3.6.2 Results

3.6.2.1 Surface Water

Seven water samples were collected from seven locations in addition to one field blank. Four samples were collected from marine environments, one was collected from a freshwater environment and two were collected from test pits. The results are described in detail below.

<u>*Marine*</u>

Four marine samples were collected at Padloping Island: east of the East Barrel Cache, south of the East Barrel Cache, south of the Old Hamlet Site and south of the West Barrel Cache. The samples were submitted for routine chemistry, dissolved metals, PCB and hydrocarbon analyses and the results are summarized in Tables B6 to B9 in Appendix B. The results were compared to the CCME Guidelines for Protection of Aquatic Life for Marine Environments to establish the general quality of the water.

The samples were within range for the pH guideline of 7.0 to 8.7 and below the Nitrate-N guideline of 3.600 mg/L. Neither PCBs nor hydrocarbons were detected in the marine samples. The water samples were originally analyzed for metals by ICP, and not ICPMS which returns lower detection limits. Since this was a laboratory error, the samples were reanalyzed by ICPMS within the applicable sample holding time at no cost to the project. All metals results were below the applicable guidelines with the exception of arsenic, cadmium and chromium for which, despite the reanalysis, the detection limits still exceed the applicable guidelines and cannot be classified.

The results for all four marine samples, collected from different areas on site, are consistent with each other and do not show any impacts from station activities.

Freshwater

Freshwater samples were collected from test pits south of the East and West Barrel Caches and from the Freshwater Lake northwest of the Main Station (Appendix C, IMG_3509). The samples were submitted for routine chemistry, dissolved metals, PCB and hydrocarbon analyses and the results are summarized in Tables B6 to B9 in Appendix B. The results were compared to both the CCME Guidelines for the Protection of Aquatic Life for Freshwater environments as well as the Guidelines for Canadian Drinking Water Quality.

The pH of the Freshwater Lake did not comply with the applicable pH guidelines (Canadian Water Quality Guidelines for the Protection of Aquatic Life – Freshwater and Guidelines for Canadian Drinking Quality) with a value of 6.1. As described by Hamilton *et. al.* (2001), pH values across most of the Arctic Archipelago are basic (8-8.5) except when lakes are underlain by Pre-Cambrian metamorphic, intrusive and sedimentary rocks. A typical pH range for the latter type of lake, such as the Freshwater Lake at Padloping Island, is 5.8 to 8.1 (Hamilton 2001). As such, the pH of the Freshwater Lake (6.1) is in compliance with typical results. The results for dissolved metals showed that W6, collected from a test pit south of the West Barrel Cache, exceeded the applicable guidelines for aluminum (1.3 mg/L), copper (0.011 mg/L), iron (4.0 mg/L) and lead (0.0026 mg/L). As was the case with the marine samples, the freshwater samples were originally analyzed for metals by ICP, and not ICPMS which returns lower detection limits. Since this was a laboratory error, the samples were reanalyzed by ICPMS within the applicable sample holding time at no cost to the project. The original results showed that sample W6 (test pit south of the West Barrel Cache) exceeded the applicable guideline for zinc with a concentration of 0.04 mg/L; however, the second-round analysis returned a result that is below the laboratory detection limit. Despite the reanalysis, the detection limits for cadmium and selenium still exceed the applicable guidelines and cannot be classified. The samples could not be run a third time to achieve appropriate detection limits since there was limited sample volume available and the samples had expired the preferred holding time. PCBs and hydrocarbons were non-detect in the samples collected from the test pit south of the East Barrel Cache and from the Freshwater Lake. Sample W6, collected from the test pit south of the West Barrel Cache had detectable PCB aroclor 1254 for a total PCB concentration of 0.28 ug/L and detectable F1 to F4 hydrocarbon fractions of 110, 18,000, 2,500 and 220 ug/L respectively. There are no applicable PCB or F1 to F4 PHC guidelines to use for comparison; however, it is likely that these concentrations are a result of impacts from site activities (i.e. crushed barrel storage on the beach). This test pit was completed 13 m south of the largest crushed barrel pile and is located 9.8 m from the high water line and 24.7 m from the low water line.

With the exception of the few exceedances and inconsistencies noted above, the other results for the freshwater samples are all similar and do not show any impacts from station activities.

3.6.2.2 Sediment

The sediment results from the marine and freshwater environments had detectable concentrations of all inorganic parameters except arsenic and cadmium. Although, the results are well below the DCC, it was noted that the metal concentrations at the Freshwater Lake are slightly elevated compared to those of the marine sediment samples. Due to the remoteness of the Freshwater Lake to the Main Station, it is possible that this increase in inorganic parameters is due to a change in soil type rather than contaminant input from site activities. PCB and hydrocarbon results in all sediment samples were below the laboratory detection limits.

The surface and shallow depth sample results from the test pit locations at the East and West Barrel Caches are summarized in Sections 3.1.2.12 and 3.1.2.13.

3.7 Assessment of Granular Borrow Sources

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

3.7.1 Methodology

During investigation planning, air photos of the site were reviewed in terms of terrain. Based on observed geomorphology, potential borrow areas for various granular fill types were identified. Confirmation of the borrow areas as potential sources of granular fill material was completed during the site investigation. The site investigation consisted of excavating shallow test pits using hand tools (shovel). Soil samples were collected from each test pit for classification confirmation and laboratory index testing. Test pit depths ranged from 0.45 m to 1.0 m and were terminated due to seepage, sloughing or refusal on bedrock or boulders. The test pits were backfilled with excavated soils after completion.

Photographs were taken of each borrow area, each test pit, excavated soil from each test pit and any other feature of note. Selected geotechnical site photographs are provided 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), moisture contents and soil salinity. The laboratory test results are presented in Appendix D and are also shown on test pit logs in Appendix F.

3.7.2 Granular Material Types and Specifications

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. If used at this site, Type 1 Granular Fill would likely consist of oversize material from the production of other granular materials or possibly talus (fallen material) at the toe of slopes. If there are insufficient quantities of Type 1 Granular Fill available on site, finished slopes may be flattened by using Type 2 Granular Fill material without armouring. The grain size distribution shown in Table 1 is recommended:

Table 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 2.

Table 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

3.7.2.3 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 4 Granular Fill is an acceptable alternative for Type 3 Granular Fill.

3.7.2.4 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 Secure Soil Disposal Facility (SSDF). If used as backfill for the key trench excavations or core of a Secure Soil Disposal Facility, 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 construction and it may be necessary to air-dry it, if used for construction of berms, so that it can be placed and compacted according to the specifications. 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 4.

Table 8: 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

3.7.2.5 Type 5 Granular Fill

Type 5 Granular Fill is used for geomembrane bedding and should consist of rounded particles with a maximum size less than 25 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 Fill material should have a particle size distribution with the limits presented on Table 5.

Table 9: 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

Type 5 granular fill will likely be obtained from screening of Type 2 granular fill.

3.7.2.6 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. Type 6 granular fill can be obtained selectively or by screening material from Borrow Area 2.

3.7.3 Borrow Area Locations

Seven borrow areas were investigated during the site investigation all of which identified potential Type 4 Granular Fill. Two borrow areas (BA-1 and BA-2) are potential sources of limited quantities of Type 2 Granular Fill. The borrow areas contained oversized material (boulders) which may require screening. The oversized material may be suitable as Type 1 material for erosion protection of landfill surfaces. The locations of the borrow areas and test pits are shown on Figure 8.0. Each of the borrow areas is described in the following sections and are summarized in Table 6.

3.7.3.1 Borrow Area BA-1

Borrow Area BA-1 is situated between the Freshwater Lake and the Saltwater Bay located approximately 1,400 m northwest of the Main Station Area as shown on Figure 8.0. This borrow is accessible from the existing access trail that runs from the Main Station to the Freshwater Lake; however, this access trail is wet and in poor condition and will require significant improvements to be able to support construction traffic. This area has not been previously explored as borrow, but exhibits sporadic barrel debris and is considered partially disturbed.

Four test pits (TP-01 to TP-04) were excavated in this borrow area to characterize the subsurface material and to determine groundwater and permafrost conditions. Subsurface stratigraphy in the borrow area was variable and consisted of a surficial layer of peat underlain by silty sand and clay and silt. In one test pit the clay and silt was underlain by sandy gravel. The test pits were terminated at depths from 0.45 m to 0.8 m due to seepage and in one case, refusal was encountered at a cobble/boulder layer.

Sieve analyses were conducted on samples from test pits TP-01, TP-02, and TP-04. The samples from TP-01 and TP-04 had 7.6% and 7.2% gravel, 58.0% and 54.4% sand and 34.4% and 38.4% fines, respectively indicating that Borrow Area 1 contains material generally suitable as Types 3 and 4 Granular Fill. The sample from TP-02 had 62.9% gravel, 21.9% sand, and 15.2% fines indicating that this portion of Borrow Area 1 may supply a limited quantity of Type 2 granular fill source material at depth. The particle size results and gradation limits of Type 4 and Type 2 Fill are shown on Figures 9.0 and 10.0 in Appendix A. This borrow area, in general, contained oversized material (boulders) which could be screened for use as Type 1 Granular Fill. The average moisture content of the soil samples was approximately 8.9%. Appendix C contains select photos showing the Borrow Area BA-1 site (G112, G116, G118, and G119) and locations and conditions of test pits TP-01 (G1, G4), TP-02 (G7, G8), TP-03 (G9, G11), and TP-04 (G13, G14).

The identified area is approximately 80,000 m^2 in size. The depth of borrow extraction will have to be limited to minimize any adverse impact on the adjacent Freshwater Lake and the Saltwater Bay. Based on an assumed depth of 0.6 m, the volume of Type 4 Granular Fill estimated to be available from this area is approximately 48,000 m^3.

3.7.3.2 Borrow Area BA-2

Borrow Area BA-2 is located on a ridge northwest of the Main Station, north of an existing access road as shown on Figure 8.0. The western portion of Borrow Area 2 is disturbed while the eastern portion remained undisturbed. The disturbed portion was previously excavated and has stockpiles of large sorted boulders. There are bedrock outcrops and very large boulders along the western extent of the ridge and a boulder field between the ridge and access road.

Four test pits (TP-05 to TP-07, TP-12) 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 surficial layer of peat underlain by gravelly sand to gravel and sand. The test pits were terminated at depths from 0.75 m to 1.0 m due to refusal on a boulder layer.

Sieve analyses were conducted on samples from test pits TP-05, TP-07 and TP-12. The samples had 24.3% to 44.5% gravel, 40.9% to 63.4% sand, and 12.3% to 18.6% fines, respectively, indicating that Borrow Area 2 contains material generally suitable as Types 3 and 4 Granular Fill. Borrow Area BA-2 may also supply a limited quantity of Type 2 and Type 5 Granular Fill, however screening and blending may be required to bring material within Type 2 and Type 5 gradation limits. The particle size results and gradation limits of Type 4 and Type 2 Fill are shown on Figures 11.0 and 12.0 in Appendix A. This borrow area also contained oversized material (boulders) which could be screened for use as Type 1 Granular Fill. The average moisture content of the soil samples was approximately 9.2%. Appendix C contains select photos showing the Borrow Area BA-2 site (G72, G81, G82, and G85) and locations and conditions of test pits TP-05 (G16, G17), TP-06 (G20, G21), TP-07 (G22, G23), and TP-12 (G37, G38).

The identified area is approximately 60,000 m^2 in size (20,000 m^2 on the ridge and 40,000 m^2 in the boulder field). Based on assumed depth of 0.8 m, the volume of Type 2 or 4 material available from the ridge portion of this area is approximately 16,000 m^3 and the volume of Type 1 available from the boulder field is approximately 32,000 m^2.

3.7.3.3 Borrow Area BA-3

Borrow Area BA-3 is located northwest of the Old Hamlet Site as shown on Figure 8.0. This area was investigated as a proposed Landfill/Landfarm Site (LF-1) but consists of a large enough area to be used as a potential source for borrow material also. The area is undisturbed and not easily accessible as it is approximately 500 m from the existing access trail to the west. If this area is to be used as a source of borrow, the construction of an access road will be required.

Five test pits (TP-10, TP-11 and TP-15 to TP-17) were excavated in this borrow area to characterize the subsurface material and to determine groundwater and permafrost conditions. Test pits TP-10 and TP-11 were located in the immediate vicinity of Old Hamlet Site and were not evaluated because of archaeological factors at this location. The soils conditions north of the Old Hamlet Site consisted of a surficial layer of peat underlain by silty sand with some to trace gravel. The test pits were terminated at depths from 0.75 m to 0.8 m due to seepage/sloughing.

Sieve analyses were conducted on samples from Test pits TP-15, TP-16 and TP-17. The samples had 14.5% to 22.5% gravel, 50.1 to 54.4% sand, and 27.7% to 34.9% fines indicating that Borrow Area 3 contains material generally suitable as Type 4 Granular Fill. The particle size results and gradation limits of Type 4 Fill are shown on Figure 14.0 in Appendix A. This borrow area contained oversized material (boulders) which may require screening. The average moisture content of the soil samples was approximately 7.2%. Appendix C contains select photos showing the Borrow Area BA-3 site (G133, and G142) and locations and conditions of test pits TP-10 (G32, G33), TP-11 (G34, G35), TP-15 (G44, G45), TP-16 (G47, G47), and TP-17 (G48, G49).

It is understood that the Old Hamlet Site is considered to be significant in terms of its place in 20th century Inuit history. The preliminary recommendations from (Golder 2010) include that none of the recorded archaeological resources are to be disturbed by borrow sources, landfills or heavy vehicle traffic. The Borrow BA-3 area identified the availability of Type 4 Material, but is unlikely to be used because the proximity to the archaeological resource and expected limited requirement for Type 4 material.

3.7.3.4 Borrow Area BA-4

Borrow Area BA-4 is located in a disturbed area approximately 1.5 km north of an access road and approximately 600 m northeast of the Main Station Area, adjacent to a former American gravesite as shown of Figure 2.

One test pit (TP-13) was excavated in this borrow area to characterize the subsurface material and to determine groundwater and permafrost conditions. Subsurface stratigraphy in the test pit consisted of a surficial layer of peat underlain by sand with some silt and some gravel. The test pit was terminated at a depth of 0.7 m due to refusal at a boulder layer.

A sieve analysis was conducted on a sample from the test pit. The sample had 15.3% gravel, 65.3% sand, and 19.4% fines indicating that Borrow Area BA-4 contains material generally suitable as Types 4 Granular Fill. The particle size results and gradation limits of Type 4 Fill are shown on Figure 15 in Appendix A. Select photos are provided in Appendix C showing the Borrow Area BA-4 site and location and condition of the test pit TP-13 (G40 and G41).

The identified area is only 500 m^2 in size. The Borrow BA-4 area identified the availability of Type 4 Material, but is unlikely to be used because of its small size, difficult access and expected limited requirement for Type 4 material.

3.7.3.5 Metal Dump Borrow Area BA-5

Borrow Area BA-5 is located in a disturbed area with a high concentration of metal debris. The area is in a metal dump site to the west of an access road approximately 350 m southwest of the Main Station Area as shown on Figure 8.0. This area was investigated as a proposed landfill site (LF-3) and evaluated for potential borrow.

One test pit (TP-14) was excavated in this borrow area to characterize the subsurface material and to determine groundwater and permafrost conditions. Subsurface stratigraphy in the test pit consisted of a surficial layer of peat underlain by gravelly, silty sand. The test pit was terminated at a depth of 0.55 m due to seepage.

A sieve analysis was conducted on a sample from the test pit. The sample had 31.3% gravel, 43.7% sand, and 25% fines indicating that Borrow Area 5 contains material generally suitable as Type 4 Granular Fill. The particle size results and gradation limits of Type 4 Fill are shown on Figure 16.0 in Appendix A. The moisture content of the soil sample was 5.9%. Appendix C contains select photos showing the Borrow Area BA-5 site and location and condition of the test pit TP-14 (G42 and G43).

The Borrow BA-5 area identified the availability of Type 4 Material, but is unlikely to be used because of the high groundwater table, extensive surface debris and expected limited requirement for Type 4 material.

3.7.3.6 Borrow Area BA-6

Borrow Area BA-6 is situated on an undisturbed point between the ocean and a saltwater bay approximately 450 m to the southeast of the Main Station Area as shown on Figure 8.0. The access to this borrow is expected to be difficult as it is located approximately 200 m away from an existing access trail.

Two test pits (TP-08 and TP-09) 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 surficial layer of peat underlain by silty sand with some gravel. The test pits were terminated at depths of 0.45 m and 0.65 m due to seepage.

Sieve analyses were conducted on samples from the two test pits. The samples had 9.6% and 21.8% gravel, 63.1% and 56.4% sand, and 27.3% and 21.8% fines, respectively, indicating that Borrow Area 6 contains material generally suitable as Type 4 Granular Fill. The particle size results and gradation limits of Type 4 Fill are shown on Figure 17.0 in Appendix A. The average moisture content of the soil samples was approximately 8.5%. Appendix C contains select photos showing the Borrow Area BA-6 site and locations and conditions of Test pits TP-08 (G26, G27) and TP-09 (G29, G90).

The identified area is approximately 50,000 m^2 in size. Based on an assumed depth of 0.5 m, the volume of Type 4 granular fill estimated to be available from this area is approximately 25,000 m^3.

3.7.3.7 Main Station Borrow Area BA-7

Borrow Area 7 is located at the Main Station Area as shown on Figure 8.0. This area was investigated as a proposed landfill site (LF-2) and evaluated for potential borrow. The area has been previously disturbed and has a high concentration of debris. The area is accessible from the existing access trails.

Two test pits (TP-18 and TP-19) 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 surficial layer of peat underlain by silty gravelly sand. The test pits were both terminated at a depth of 0.6 m due to seepage/sloughing.

Sieve analyses were conducted on samples from the two test pits. The samples had 20.4% and 26.6% gravel, 53.3% and 61.4% sand, and 26.3% and 12.0% fines, respectively, indicating that Borrow Area 7 contains material generally suitable as Type 4 Granular Fill. The particle size results and gradation limits of Type 4 Fill are shown on Figure 18.0 in Appendix A. Select photos are provided in Appendix C showing the Borrow Area BA-7 site and locations and conditions of test pits TP-18 (G52, G53) and TP-19 (G55, G56).

The Borrow BA-7 area identified the availability of Type 4 Material, but is unlikely to be used because of the high groundwater table, extensive surface debris and expected limited requirement for Type 4 material.

3.7.4 Summary of Borrow Materials

The soil types encountered in most of the borrow areas at Padloping Island generally consisted of material similar to Type 4 Granular Fill, and included “silty, clayey sand”, “sand and silt”, “sand with some silt”, “silty sand with some gravel”, “sand with some gravel”, “silty gravelly sand”, “gravelly sand”, “gravel and sand”, and “sandy gravel”. Due to the variability of the material within the borrow areas, minor blending with gravel, sand or silt may be required to bring the material within Type 4 gradation limits. Moisture conditioning (wetting or drying) of Type 4 material may also be required if it is used to backfill key trenches or construct the core of a Tier II Disposal Facility. The Type 4 material is suitable for use as Type 3 Granular Fill.

There is expected to be a considerable requirement for Type 2 Granular Fill for the remediation of the Padloping Island site and there is a definite concern with the availability of limited source material for this granular type. The borrow investigation revealed that some material from Borrow Area BA-2 could be screened and/or blended to produce Type 2 Granular Fill, however it is not known if there will be sufficient material available for processing to produce Type 2 Granular Fill from this single borrow area. The Type 2 source material encountered in Borrow Area No. 2 consisted of “sandy gravel” and “gravel and sand”. Blending with gravel may be required to bring material within the recommended Type 2 gradation limits.

One additional borrow source that should be considered is the talus material at the base of the mountain (photo G116 in Appendix C) to the west of the Freshwater Lake and Tidal Bay. This area was not investigated during the 2010 program due to time constraints, however, this borrow may consist of additional and possibly improved source material for Types 2, 5 and 6 Granular Fill.

If there are insufficient available quantities of Type 2 Granular Fill, then a specialized stabilization design or additional borrow sourcing may be required to meet remediation requirements during construction.

Type 5 Fill for geomembrane bedding and Type 6 for Intermediate Fill was not readily available at site in the borrow areas. It is expected that Type 2 source material from Borrow Area B-2 could be screened to produce Type 5 and 6 Material; however, it should be stressed that production of sufficient quantities of Type 2 is the priority for this site.

Table 10: Borrow Area Summary

Borrow Area	Available Granular Fill Type	Area (m^2)	Depth (m)	Volume (m^3)	Comments
BA-1	4	80,000	0.6	48,000	Partially disturbed
BA-2 (Ridge)	2/4	20,000	0.8	16,000	Disturbed
BA-2 (Boulder Field)	1	40,000	0.8	32,000	Disturbed
BA-3	4	120,000	-	-	Undisturbed and not expected to be used.
BA-4	4	500	-	-	Disturbed and not expected to be used.
Metal Dump (BA-5)	4	5,600	-	-	Disturbed and not expected to be used.
BA-6	4	50,000	0.5	25,000	Undisturbed
Main Station Area (BA-7)	4	40,000	-	-	Disturbed and not expected to be used.
Talus Material near BA-1	2, 5 or 6?	Unknown	Unknown	Unknown	Naturally Disturbed

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 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 scale of air photos and 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 test pits. 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:

- Is the area 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.
- Does the area have suitable soil and groundwater 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.
- Is the area in a location with limited surface water run-off or where surface run-off can be redirected away from the facility? Drainage should not be impeded.
- Does the location have relatively flat topography? In some cases, a uniformly but gently sloping ground surface may be preferable to achieve good drainage on final covers without having to heighten up gradient berms.
- Is there an appropriate setback distance from water bodies?
- Does the location 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?
- Is the area in close proximity to work areas (landfill excavation, demolition, contaminated soil excavation, etc.)?
- Is there good access for construction equipment?

- Is the area disturbed or undisturbed? Preference is generally given to previously disturbed areas to minimize the impact on 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 debris from former 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 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 settlements.

The landfill cover and berms can be constructed using the limited quantities of Type 2 Granular Fill available on site or with Select Types 3 Granular Fill or combinations thereof. For exterior slopes constructed with Type 3, the sideslopes would need to be flattened. The recommended gradation for the gravel 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% of Standard Proctor Dry Density (ASTM D698). The landfill footprint should be graded and any surficial 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.

For berms constructed with Type 2 Granular Fill, the exterior sideslopes should be no steeper than 3H:1V and interior slopes should be no steeper than 1.5H:1V with a minimum final top width of 2 m. For berms constructed with select Type 3 Granular Fill, the exterior sideslopes should be no steeper than 5H:1V. Alternatively the select Type 3 sideslopes could steepened to 3H:1V if they are suitable armoured with Type 1 rip rap material

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 water 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 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. The preferred gradation for the intermediate fill is provided in Section 3.7.2.

3.8.3 Secure Soil Disposal Facility

Soils contaminated with 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. 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 land-filled 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 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 settlements.

The landfill berms would need to be constructed with the limited quantities of Type 2 Granular Fill identified on site, incorporating a core of Type 4 Granular Fill. The core material should have a minimum degree of saturation of 90% and be compacted to a minimum of 95% 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 % of SPMDD (ASTM D698). The berms should be constructed with exterior sideslopes 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 landfill footprint should be graded and any surficial 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 Type 5 bedding sand layer meeting the grading specifications described in Section 3.7.2. Type 5 Granular Fill is expected to be difficult to produce from the existing borrow areas identified during the site investigation. The landfill cover should be constructed using the limited 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. A levelling course will be required for the cell floor to create a working surface for construction equipment. The levelling course typically consists of a minimum 300 mm layer of Type 2 Granular Fill placed directly on the native tundra comprising the treatment cell floor. Any boulders or oversize material should be pushed aside.

The berms should be constructed using Type 4 Granular Fill with exterior sideslopes of 3H:1V and interior slopes of 2H:1V with a minimum final top width of 2 m. The berm should be keyed into permafrost. All granular fill should be placed in horizontal lifts not exceeding 250 mm and compacted to a minimum of 95% of SPMDD (ASTM D698). The final landfarm surface should be graded at 2% to 4% towards the outside edge(s) and uniformly compacted with the random action of tracked equipment. Once land-farming is complete, the perimeter berms should be collapsed and graded to allow for positive drainage in the area.

3.8.5 Recommended Landfill/Landfarm Locations

Four potential landfill locations, including Landfill/Landfarm LF-1 at Borrow 3, Landfill LF-2 at the Main Station, Landfill LF-3 at the Metal Dump and Landfill / Landfarm LF-4 at the Borrow No. 6 were identified and evaluated during the field program. The locations of the landfill sites are shown on Figure 8.0.

The volume of currently identified Type B Contaminated soils at Padloping Island is 116 m^3 and the anticipated footprint required for a landfarm treatment facility is expected to be small and less than 1000 m^2. The airspace of a non-hazardous waste landfill at Padloping Island for non-hazardous debris, contaminated soil and intermediate fill is estimated at 2500 m^3 and would require a footprint of approximately 4,000 m^2.

The preferred location for SSDF and/or Landfarm is LF-4. LF-2 and LF-3 were investigated as locations for NHWLF and may also be alternative locations for SSDF. All three Landfill locations are also considered suitable borrow sources of Type 4 Fill; therefore, these locations may be used as borrow sources prior to landfill /landfarm construction.

It is understood that the Old Hamlet Site is considered to be significant in terms of its place in 20th century Inuit history. The preliminary recommendations from (Golder 2010) include that none of the recorded archaeological features are to be disturbed by borrow sources, landfills or heavy vehicle traffic. These recommendations may affect the access to and use of the Landfill Site LF-1 site and Borrow Area BA-3.

3.8.5.1 Proposed SSDF and Landfarm Location (LF-4)

The proposed location for the SSDF and/or landfarm is LF-4 as shown on Figure 8.0. The site is located in a well drained, disturbed area west of the Main Station Area. The area is close to existing site access trails. If this location is to be considered for a SSDF and/or landfarm site, construction of an access road will be required as it is located approximately 200 m away from an existing access trail. The LF-4 location is on a relatively flat ground which slopes gently to the south (towards the ocean). This area was also investigated as a potential source for borrow material (BA-6).

Two test pits (TP-08 and TP-09) were excavated in this area to characterize the subsurface material and to determine groundwater and permafrost conditions. Subsurface stratigraphy in the borrow area consisted of a surficial layer of peat underlain by silty, sand with some gravel. The test pits were terminated at depths of 0.45 m and 0.65 m due to seepage.

Sieve analyses were conducted on samples from the two test pits. The samples had 9.6% and 21.8% gravel, 63.1% and 56.4% sand, and 27.3% and 21.8% fines, respectively, indicating that Borrow Area 6 contains material generally suitable as Type 4 Granular Fill. The particle size results and gradation limits of Type 4 Fill are shown on Figure 17.0 in Appendix A. The average moisture content of the soil samples was approximately 8.5%. Appendix C contains select photos showing the Borrow Area 6 site and locations and conditions of test pits TP-08 (G26, G27) and TP-09 (G29, G90).

Salinity testing was conducted on a soil samples from TP-9. The sample had a salinity of <0.5 ppt indicating that the foundation soil has acceptable saline conditions for the construction of an SSDF.

3.8.5.2 Proposed NHWLF Location (LF-2)

The proposed location for the NHWLF is the Landfill LF-2) site located at the Main Station Area, as shown on Figures 8.0. The area is a well drained, highly disturbed area with high concentrations of debris, which will have to be cleared from the landfill footprint prior to construction. The Landfill LF-2 site is on relatively flat ground which slopes gently at about 2.5% to the south (towards the ocean). The area is accessible from the existing access trails and was also investigated as a potential source for borrow material (BA-7).

Two test pits (TP-18 and TP-19) were excavated at this location to determine subsurface soil, groundwater and permafrost conditions. Subsurface stratigraphy in the borrow area consisted of a surficial layer of peat underlain by silty gravelly sand. The test pits were both terminated at a depth of 0.6 m due to seepage/sloughing. Seepage was encountered in both test pits below 0.3 m and frozen ground was not encountered in any of the test pits. A zone of seepage is common above frozen ground in permafrost areas and should be expected at this location.

Sieve analyses were conducted on samples from the two test pits. The samples had 20.4% and 26.6% gravel, 53.3% and 61.4% sand, and 26.3% and 12.0% silt/clay, respectively. The sieve analyses results and gradation limits of Type 4 Fill are shown on Figure 18.0 which indicate that the subsurface soils in this area consist of silty gravelly sand.

Salinity testing was conducted on a soil sample from TP-19. The sample had a salinity of <0.5 ppt indicating that the foundation soil has acceptable saline conditions for the construction of an SSDF.

Appendix C contains select photos showing the Landfill 2 (LF-2) site and locations and conditions of test pits TP-18 (G52, G53) and TP-19 (G55, G56).

The Landfill 2 site is on a relatively flat ground sloping gently towards the south and its plan area is approximately 10,000 m^2. This area may be considered an alternative location for construction of a SSDF or NHWLF considering the foundation conditions (soils and depth to groundwater) and its proximity to site access trails, borrow areas and Station Area.

3.8.5.3 Proposed Alternate NHWLF and SSDF Location (LF-3)

An alternate NHWLF and/or SSDF site is Landfill 3 (LF-3), located in a well drained, disturbed area within a metal dump-site as shown on Figures 3.0, 4.0 and 8.

3.8.5.4 Proposed Landfill Site LF-1

The other potential landfill location investigated was Landfill LF-3 near the Old Hamlet Site. It is understood that the Old Hamlet Site is considered to be significant in terms of its place in 20th century Inuit history. The preliminary recommendations from (Golder 2010) include that none of the recorded archaeological resources are to be disturbed by borrow sources, landfills or heavy vehicle traffic. As such, there was no further consideration Landfill LF-3 due to potential conflicts with this archaeological site.

3.9 Assessment of Site Access

3.9.1 Air Access

There is no airstrip at the Padloping Island Site and air access was facilitated by helicopter for the site investigation. It is understood that an ice landing strip, located just off the shoreline, was used in the past to facilitate landing of fixed wing aircraft during the winter months.

3.9.2 Roadway Evaluation

There are a number of access trails throughout the site connecting the Main Station Area with the Beach Areas, Old Hamlet Site and the Water Supply Lake. These routes were often barely discernable in the field and consisted of trails where the surficial vegetation had been bladed away in the past and had re-established since (Photo g151.jpg). The access trails are typically 3 to 4 m wide and consist of slightly depressed pathways in the tundra vegetation. In some cases, the access trails have become preferential drainage pathways for surficial runoff and are quite wet (Photo g145.jpg). There are various drainage pathways running across the access trails to the Water Supply Lake and Beach Areas (Photo IMG_0509.JPG). These sections are barely passable with ATV's and may be more problematic in the spring.

The existing site access trails are not expected to be suitable to allow access for heavy equipment or pick-up trucks. Access roads will have to be completely established by constructing roadway embankments with sandy gravel material from local borrow sources. It would be preferable to use the existing site access routes so as not to impact undisturbed native tundra areas. The top width of the roadway embankment should be constructed with a minimum top width of 5 m for single lane heavy construction equipment traffic. Widened or pull out sections will be required for two way heavy equipment traffic.

3.9.3 Beach Landing Area

The preferred beach landing area is at the West Beach, where barges have historically accessed the site. The West Beach is approximately 500 m from the Main Station Area. The landing area itself is in good condition (photo 159.jpg), however, upgrades in the form of a raised gravel pad will be required to facilitate storage and access requirements for barge off-loading activities. Barges have also landed at the East Beach, however this area is further away from site remediation areas and site access roadway to this area traverses several wet, boggy areas.

3.9.4 Contractor Camp and Laydown Area

There is no obvious gravelled pad area at Padloping Island for a camp/laydown area. A pad could be built at the West Beach Area or on the ridge at Borrow No. 2 with local sandy gravel material.

3.10 Traditional Land Use

As part of the Phase III ESA program, the collection of Traditional Knowledge (TK) regarding the site was collected. The following information was gathered through conversations with Mr. Johnny Kooneeliusie (Bear Monitor) during the site investigation activities:

- The site was a former Inuit Community and has historically been used for hunting and fishing,
- The Padloping site is a regular stop for cruise ships touring the area.

- There is an Inuit grave yard located near the Tidal Bay Inlet west of the sunken barges (Refer to P. 37 of the Golder Archaeological Impact Assessment provided in Appendix G).
- There was a single grave near TP-13 northeast of the Main Station. Mr. Kooneeliusie indicated that this was the gravesite of an American Soldier and the body had been since ex-patriated to the United States (Refer to P. 29 of the Golder Archaeological Impact Assessment provided in Appendix G).
- Some of the building materials from the Padloping Site have been relocated to Qikiqtarjuaq for use.
- Mr. Kooneeliusie did not recall any difficulties with barge access during site operation.

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 Padloping Island 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 QA/QC program completed during the investigation.

Following the initial round of analyses, 19 additional samples were requested to be analyzed. Unfortunately, 11 of those 19 samples had been disposed by the laboratory in Ottawa, ON since they had passed the 30 day hold time that is standard in eastern Canada. The assumption of AECOM and Maxxam staff Edmonton, AB and Calgary, AB was that the samples would be held for 60 days as is standard in western Canada. This miscommunication resulted in the incomplete delineation in four areas on site, where samples had been collected but could not be analyzed.

It should also be noted that the water samples were originally analyzed for metals by ICP, and not ICPMS which results in lower detection limits. The results from both analytical methods were compared and with the exception of the zinc result for W6 (sample collected from a test pit south of the West Barrel Cache) the results were consistent between the two analytical methods. Despite the reanalysis, the laboratory detection limits for a few parameters still did not meet the applicable guidelines and as a result, those sample results cannot be classified.

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 Association for Environmental Analytical Laboratories (CAEAL) for the specific analyses conducted.

Quality Assurance (QA) measures established for the investigation included collection of a field blank for water samples to ensure there are not environmental factors that could lead to inflated results. Also, duplicate field samples were collected 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 soil 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:

$$RPD = 100 \times \left(\frac{(x-y)}{(x+y)/2}\right)$$

Where x is the primary results and y is the blind duplicate result.

Table B10 in Appendix B compares sample analysis between the original samples and their duplicates. Acceptable RPD values vary based on the analytical parameters, the sample matrix and the concentrations of analytes in the sample. 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 Blank and Field Duplicate Samples

One field blank was collected for the water samples. All parameters analyzed (routine chemistry, dissolved metals, PCBs and PHCs) had concentrations that were below the laboratory detection limit which suggests that there were no environmental factors present to inflate sample results.

During this program, 15 field duplicates for soil samples were collected and 12 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. RPD was calculated for all parameters analyzed in each sample set. For the majority of the parameter results, the RPD values were below 35% for metals and below 50% for PHCs and PCBs. The results of these calculations are summarized in Table B10 in Appendix B.

Five of the 12 duplicate pairs were found to have exceedances in alert criteria. One set of duplicate samples from the Maintenance Shed with sample numbers 10-0070 and 10-0071 exceeded the recommended alert criteria for toluene with a resulting RPD of 96%. Samples 10-0090 and 10-0091 collected from the Old Generator Building had a 63% RPD for F2 PHC which exceeds the alert criteria for organics. A set of duplicates collected from the Original Powerhouse (10-0120 and 10-0121) had RPDs for lead and zinc above the alert criteria: 185 and 44%, respectively. Samples 10-0140 and 10-0141 collected from a test pit south of the West Barrel Cache had an RPD of 96% for F2 PHC. Finally, a duplicate pair (10-0150 and 10-0151) collected from the geophysical anomaly at Station Area South Mound exceeded the alert criteria for F2 PHC with an RPD of 104%.

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.

Six other duplicate sets had 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 values for RPD.

3.11.2.2 Laboratory QA/QC

Maxxam Analytics (Maxxam) was the analytical laboratory used for the 2010 sampling program. Maxxam ran matrix spike samples, spiked blank samples, method blank samples and QC standard samples to determine analytical accuracy. 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 confirm 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 laboratory detection limit.

4. Conclusions

The conclusions included in this report are based on the information and data collected during the Phase III Environmental Assessment at the Padloping Island site. The following is a summary of the conclusions:

- Approximately 16 m^3 of Hazardous (leachable lead) soil was identified for disposal off-site.
- Approximately 66 m^3 of Tier II contaminated soil was identified for disposal.
- Approximately 11 m^3 of Tier II/Type B PHC contaminated soil was identified for disposal.
- Approximately 4 m^3 of Tier I contaminated soil was identified for disposal.
- Approximately 116 m^3 of Type B hydrocarbon impacted soils were identified for treatment and 131 m^3 of Type A hydrocarbon impacted soil was identified for disposal.
- Twenty-one contaminated soil areas were identified of which ten require further delineation prior to excavation.
- The area identified by Earth Tech as the Former AST Area requires confirmation for Type A and B hydrocarbon contamination prior to excavation.
- Five existing buried debris areas comprising thirteen lobes were identified and investigated. The results indicate that Original Station Site Lobes (A, B and C) were identified as Class A, due to the proximity of these lobes to the marine environment and it is likely these lobes will be excavated. The Old Hamlet Site Lobe (D), Pond Area Lobes (E, F and G), South Mound Lobes (H and I) and West Mound Lobes (J, K, L and M) were considered to be low environmental risk, and therefore was classified as Class C.
- It is estimated the volume of non-hazardous waste is 1,774 m^3.
- It is estimated the volume of hazardous debris is 34 m^3.
- Seven potential borrow areas were identified at Padloping Island. It is estimated that there is 121,000 m^3 of granular materials available from four of these borrow areas; however, most of this consists of source material for Type 4 Granular Fill for which there is expected to be minimal requirements for. There will be requirements for Type 2 Granular Fill and there are limited quantities of source material for Type 2 Fill identified in Borrow Area BA-2. Most areas contain oversize material (cobbles and boulders), but this is generally well below 10% (trace) of the overall soil matrix. There is concern that there may be insufficient quantities of Type 2 Granular Fill available at Padloping Island.
- Four proposed landfill/landfarm locations were investigated and three were identified as suitable locations.
- There is no airstrip at the Padloping Island Site and air access was facilitated by helicopter for the site investigation. The area at the West Beach is expected to be suitable for landing of barges.
- There are site access trails throughout the site connecting the Main Station Area with the Beach Areas, Old Hamlet Site and the Water Supply Lake. These trails were often times, barely discernable in the field and consist of slightly depressed pathways in the tundra vegetation. These trails will require significant upgrading to facilitate access for light and heavy construction traffic.
- The National Classification System for Contaminated Sites was used to classify Padloping Island as a Class 1 Site (High Priority for Action).

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

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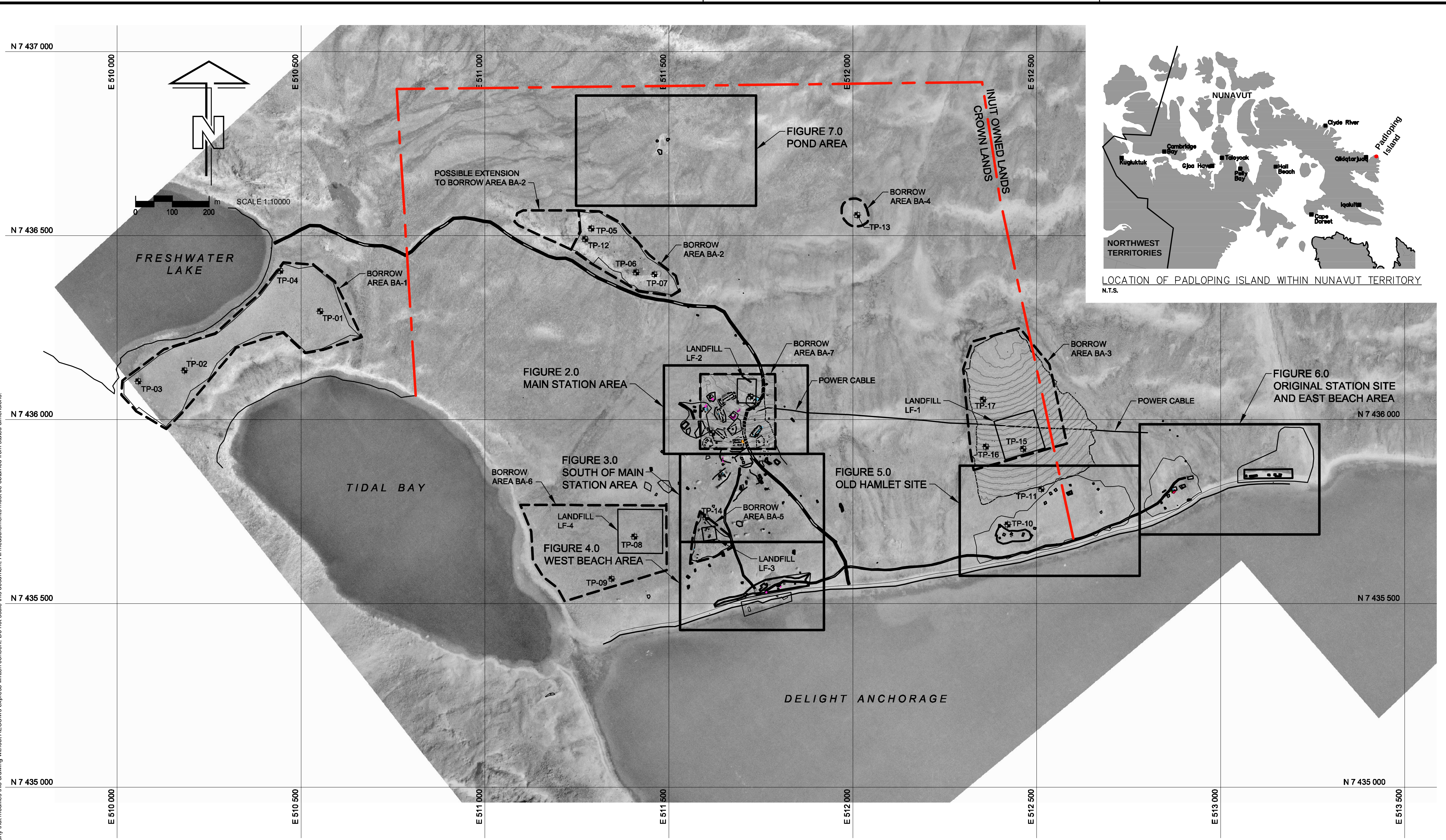
Appendix A

Figures



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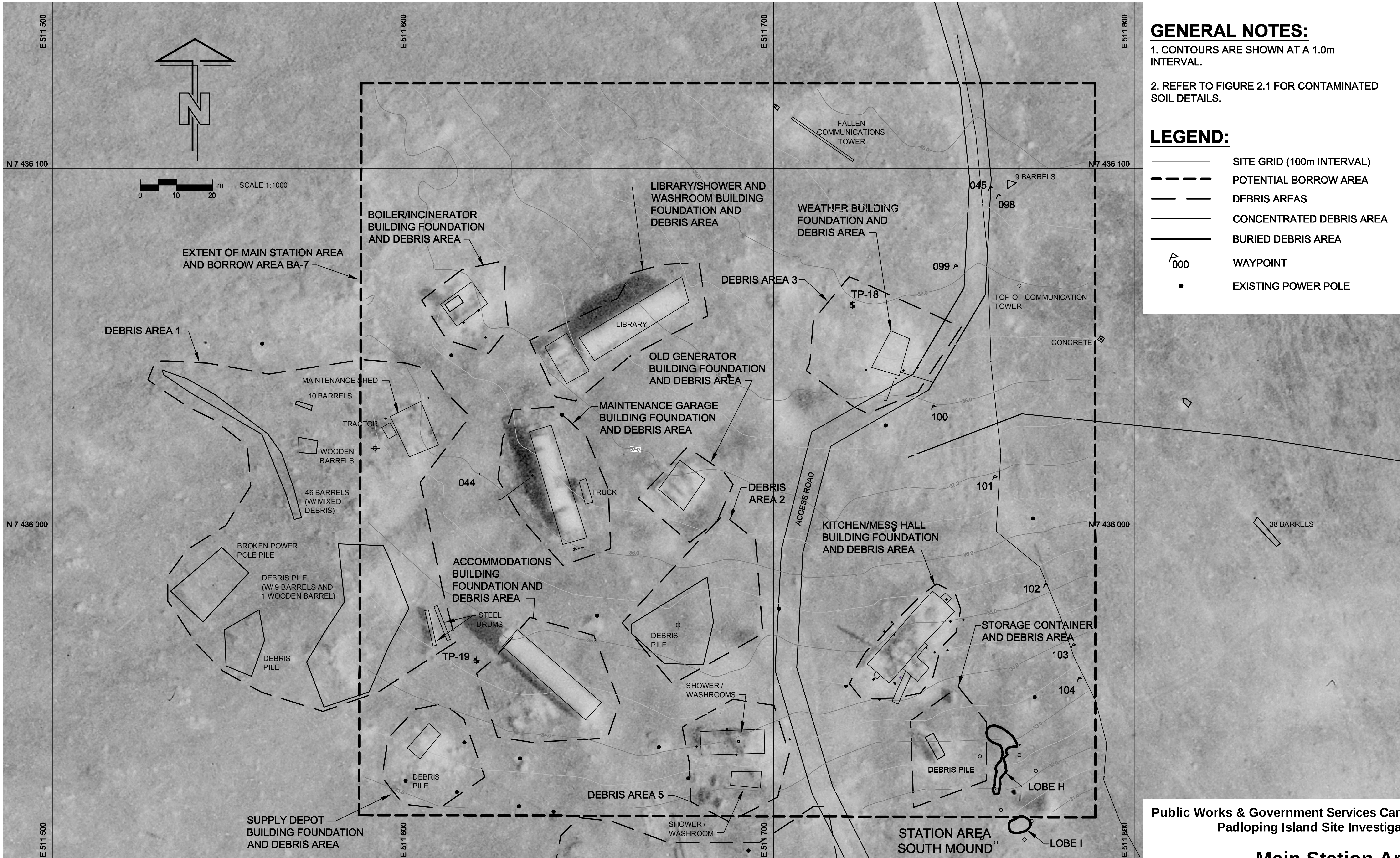
AECOM

Public Works & Government Services Canada
Padloping Island Site Investigation

Overall Site Plan

Figure 1.0



Public Works & Government Services Canada
Padloping Island Site Investigation

Main Station Area

Figure 2.0

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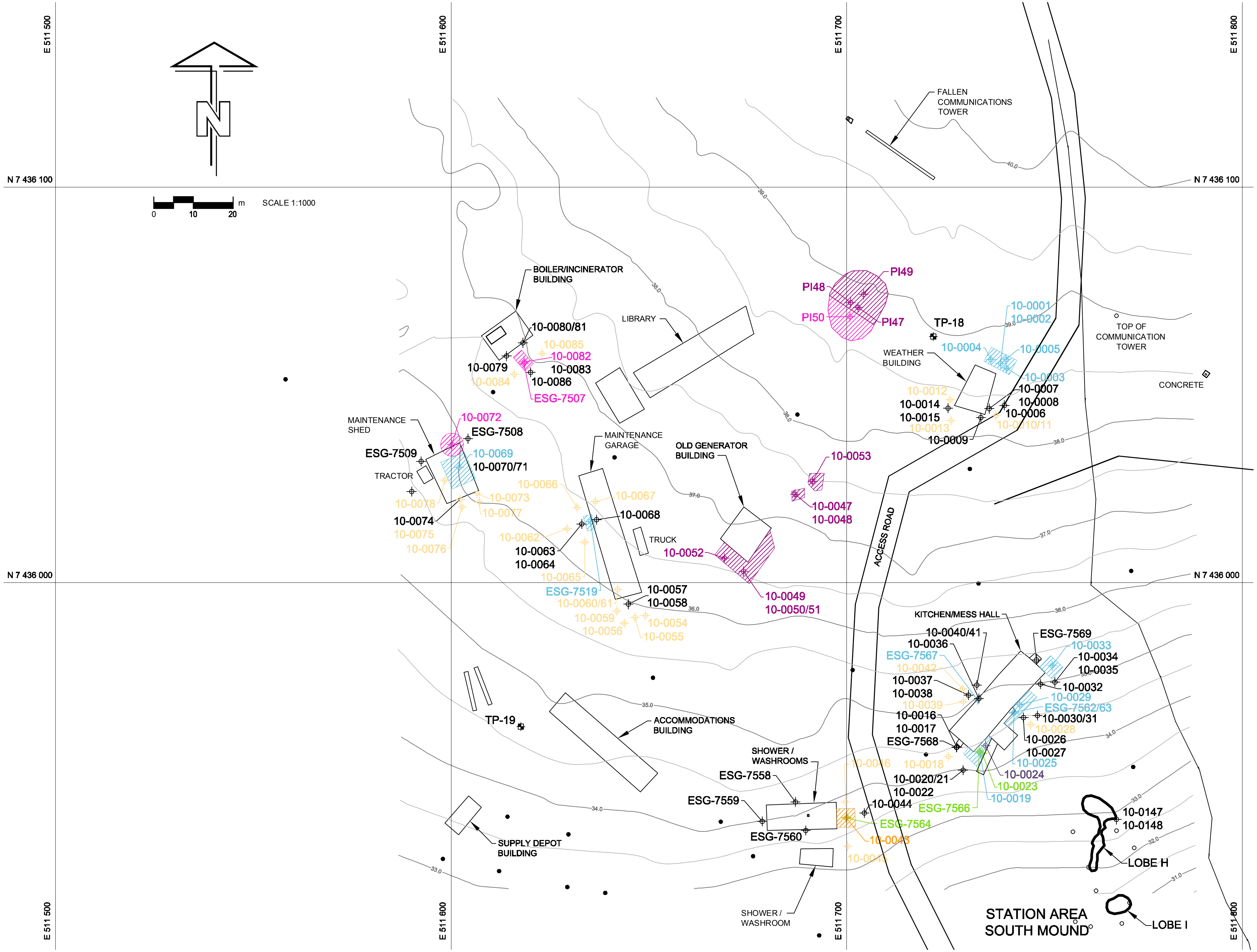

GENERAL NOTES:

1. CONTOURS ARE SHOWN AT A 1.0m INTERVAL.

LEGEND:

	SITE GRID (100m INTERVAL)
	BURIED DEBRIS AREA
ESG-7000	ESG SAMPLE LOCATION - TIER I
ESG-7000	ESG SAMPLE LOCATION - TIER II
10-0000	SAMPLE LOCATION (BELOW CRITERIA)
10-0000	SAMPLE LOCATION (NOT ANALYZED)
10-0000	TIER I
10-0000	TIER I / TYPE B PHC
10-0000	TIER II
10-0000	TIER II / TYPE B PHC
10-0000	TYPE A PHC
10-0000	TYPE B PHC
PI48	EARTH TECH SAMPLE LOCATION
	EXISTING POWER POLE
	TIER II ESTIMATED AREA OF CONTAMINATION
	TIER II / TYPE B PHC ESTIMATED AREA OF CONTAMINATION
	TYPE A PHC ESTIMATED AREA OF CONTAMINATION
	TYPE B PHC ESTIMATED AREA OF CONTAMINATION

Public Works & Government Services Canada
Padloping Island Site Investigation

Main Station Area Environmental Plan

Figure 2.1

AECOM

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AECOM

Public Works & Government Services Canada
Padloping Island Site Investigation

South of Main Station Area

Figure 3.0

Public Works & Government Services Canada
Padloping Island Site Investigation

West Beach Area

Figure 4.0

AECOM

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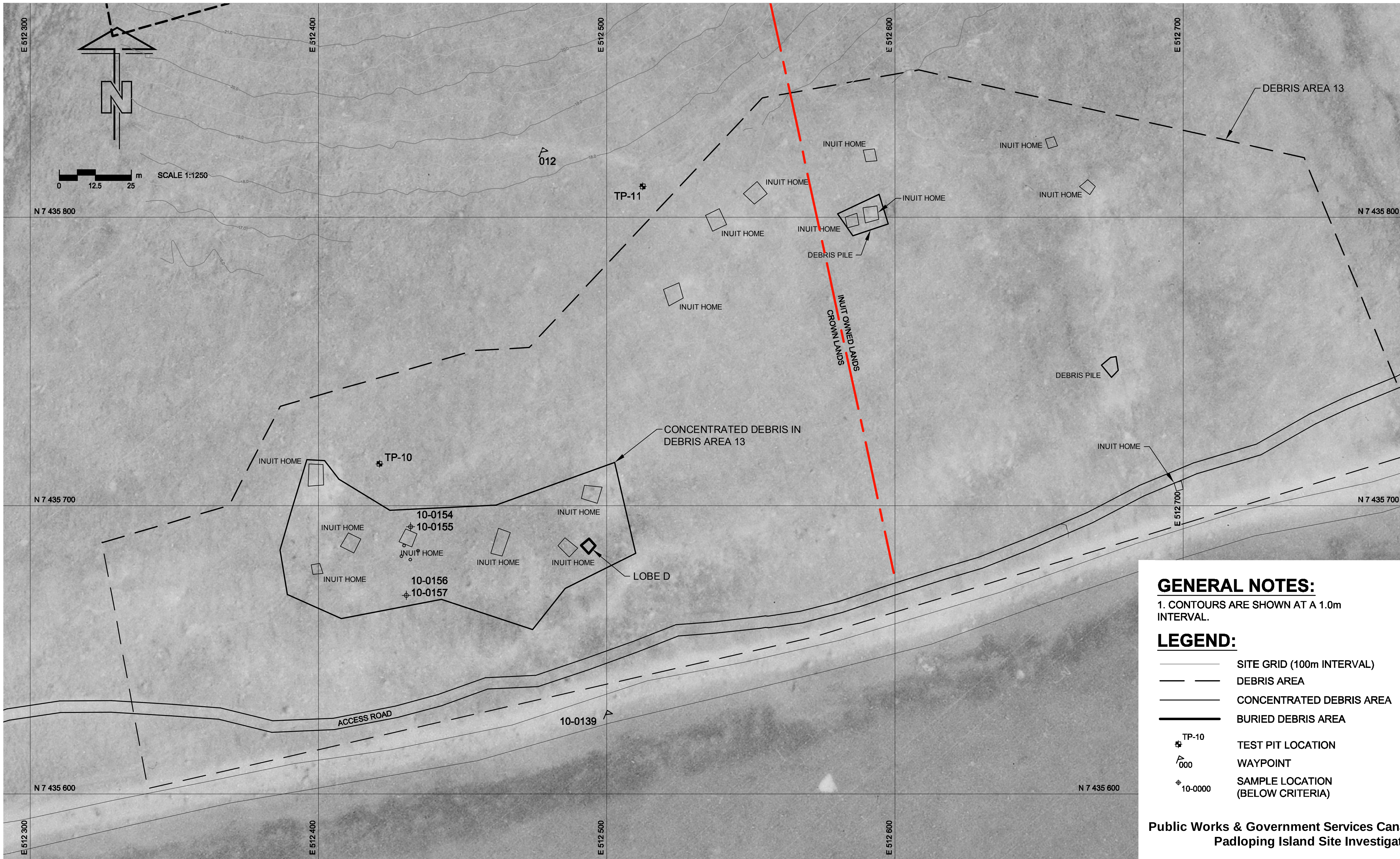

GENERAL NOTES:

1. CONTOURS ARE SHOWN AT A 1.0m INTERVAL.

LEGEND:

SITE GRID (100m INTERVAL)
DEBRIS AREA
CONCENTRATED DEBRIS AREA
BURIED DEBRIS AREA
TP-10 TEST PIT LOCATION
000 WAYPOINT
10-0000 SAMPLE LOCATION (BELOW CRITERIA)

Public Works & Government Services Canada
Padloping Island Site Investigation

Old Hamlet Site

Figure 5.0

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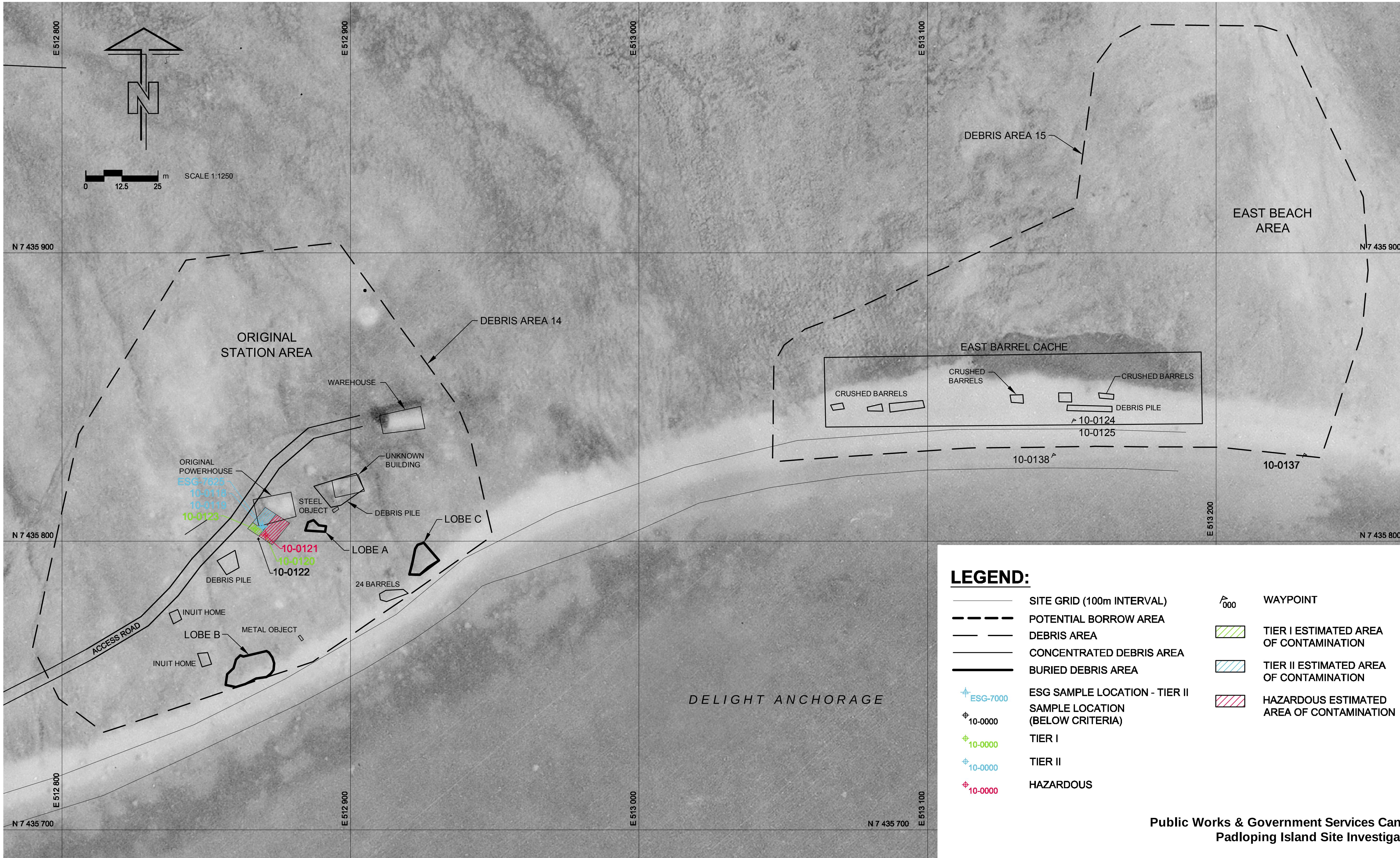

Public Works & Government Services Canada
Padloping Island Site Investigation

Original Station Site and East Beach Area

Figure 6.0

AECOM

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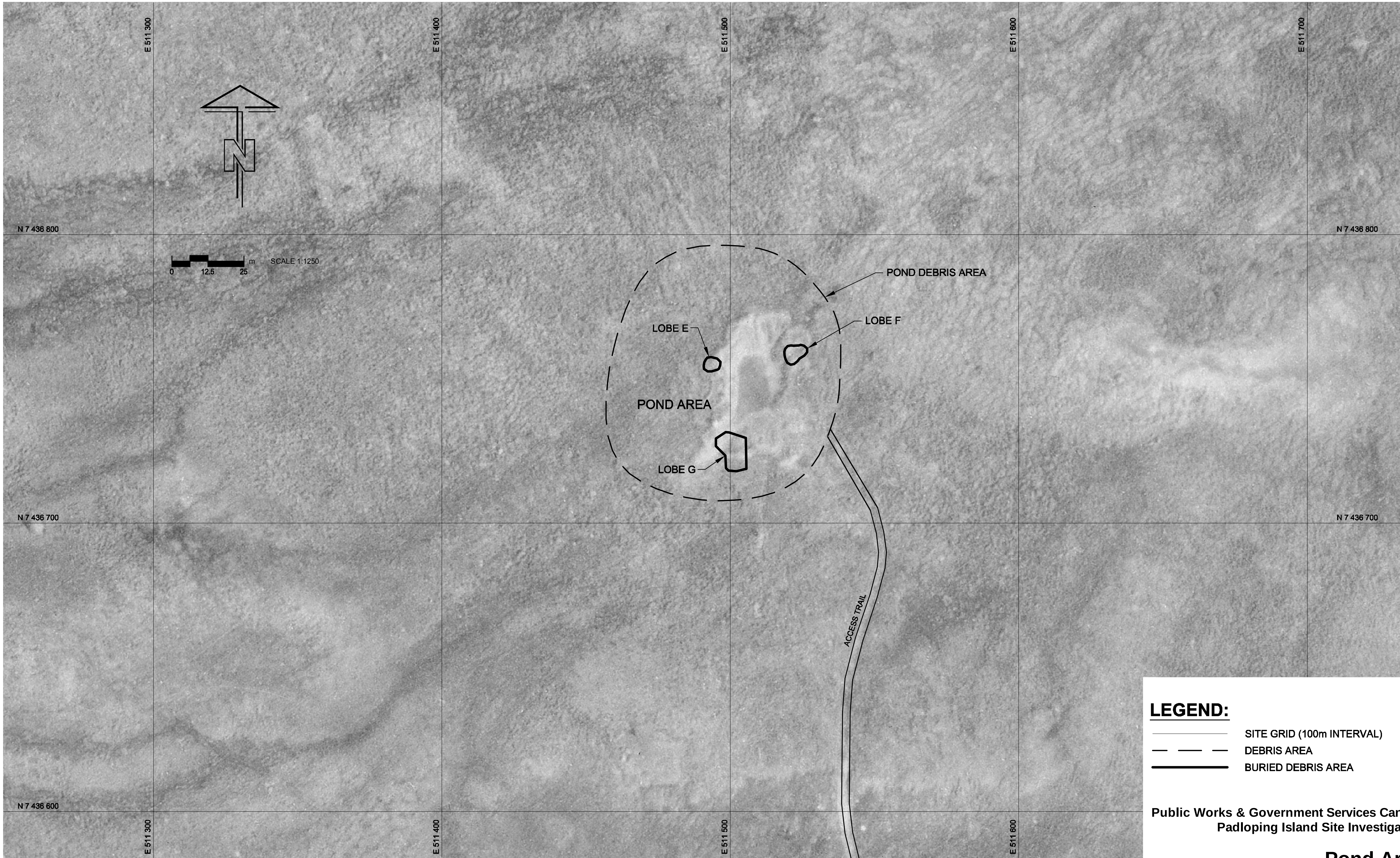


LEGEND:

SITE GRID (100m INTERVAL)
DEBRIS AREA
BURIED DEBRIS AREA

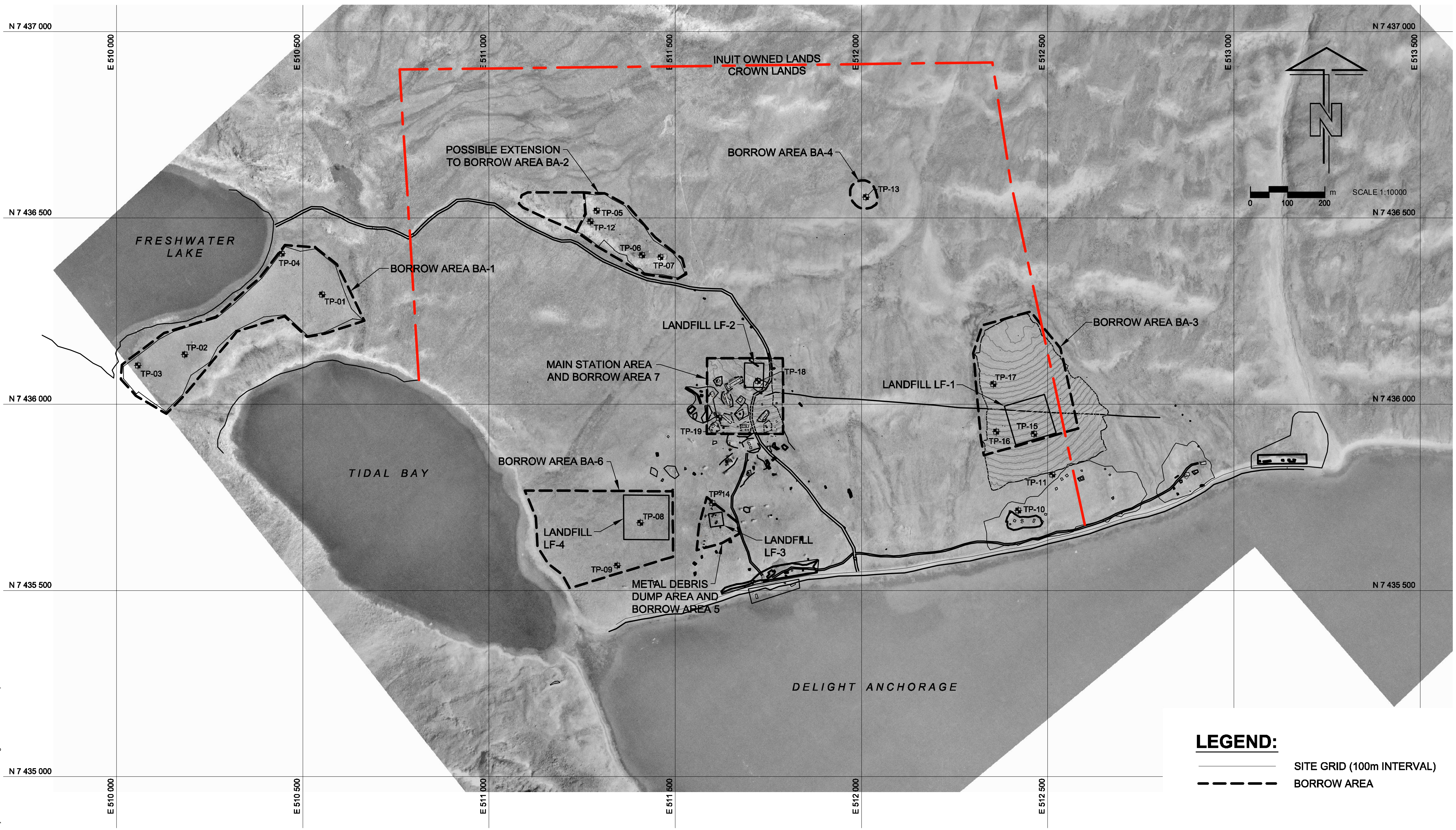
Public Works & Government Services Canada
Padloping Island Site Investigation

Pond Area

Figure 7.0

ISS/REV: 0A
AECOM FILE NAME: 60158472-01-B-F07-R0X.dwg Saved By: hasslerb PLOT: 10/12/03 10:57:26 AM B SIZE 11" x 17" (279.4mm x 431.8mm)

AECOM



Public Works & Government Services Canada
Padloping Island Site Investigation

Geotechnical Plan

Figure 8.0

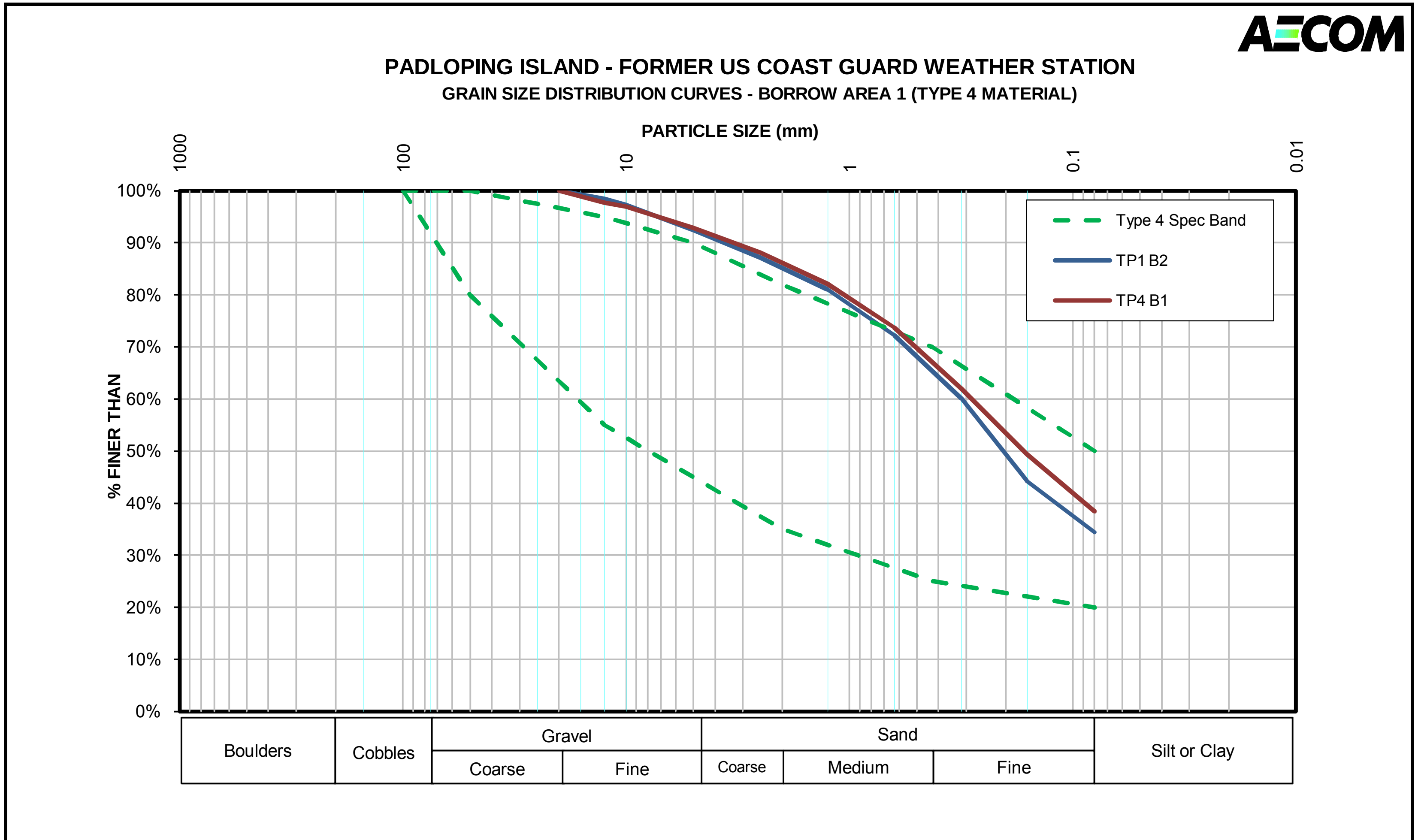
B SIZE 11" x 17" (279.4mm x 431.8mm)

PLOT: 10/12/03 11:04:01 AM   Saved By: hasslerb

AECOM FILE NAME: 60158472-01-B-F08-R0X.dwg

ISS/REV: 0A

AECOM



PADLOPING ISLAND - FORMER US COAST GUARD WEATHER STATION
GRAIN SIZE DISTRIBUTION CURVES - BORROW AREA 1 (TYPE 4 MATERIAL)
PARTICLE SIZE (mm)
1000
100
10
1
0.1
0.01
% FINER THAN
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Type 4 Spec Band
TP1 B2
TP4 B1
Boulders
Cobbles
Gravel
Coarse
Fine
Sand
Coarse
Medium
Fine
Silt or Clay

Figure 9

PADLOPING ISLAND - FORMER US COAST GUARD WEATHER STATION

GRAIN SIZE DISTRIBUTION CURVES - BORROW AREA 1 (TYPE 2 MATERIAL)

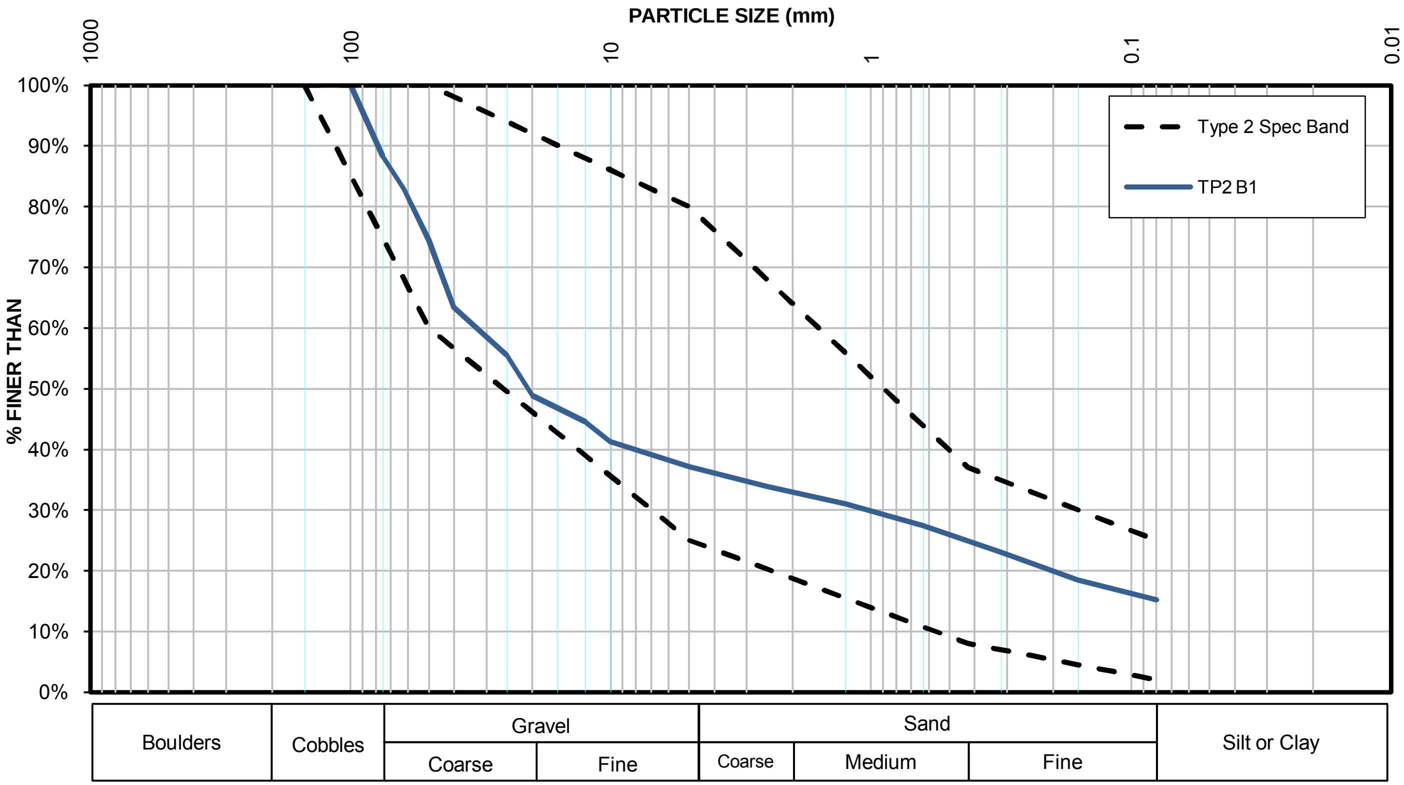


Figure 10

PADLOPING ISLAND - FORMER US COAST GUARD WEATHER STATION

GRAIN SIZE DISTRIBUTION CURVES - BORROW AREA 2 (TYPE 4 MATERIAL)

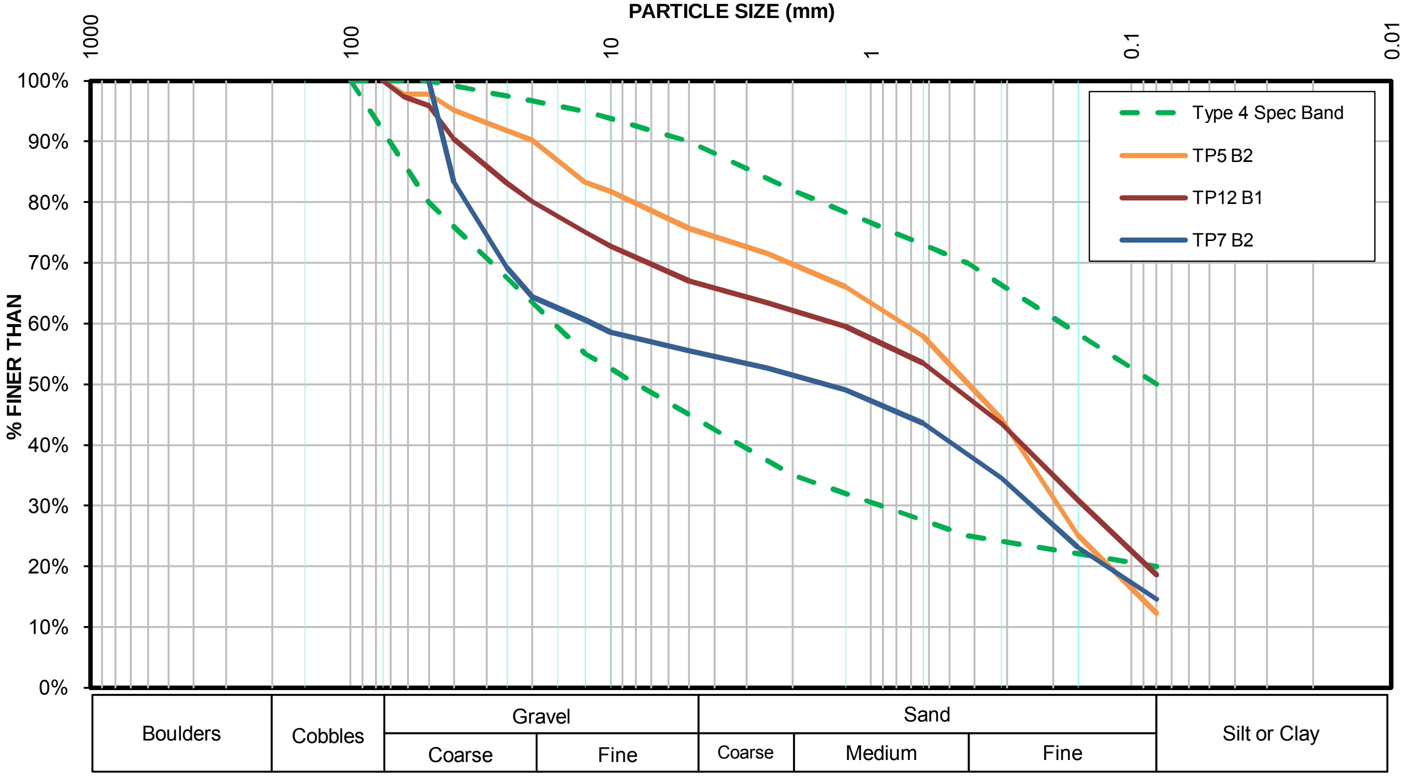


Figure 11

PADLOPING ISLAND - FORMER US COAST GUARD WEATHER STATION

GRAIN SIZE DISTRIBUTION CURVES - BORROW AREA 2 (TYPE 2 MATERIAL)

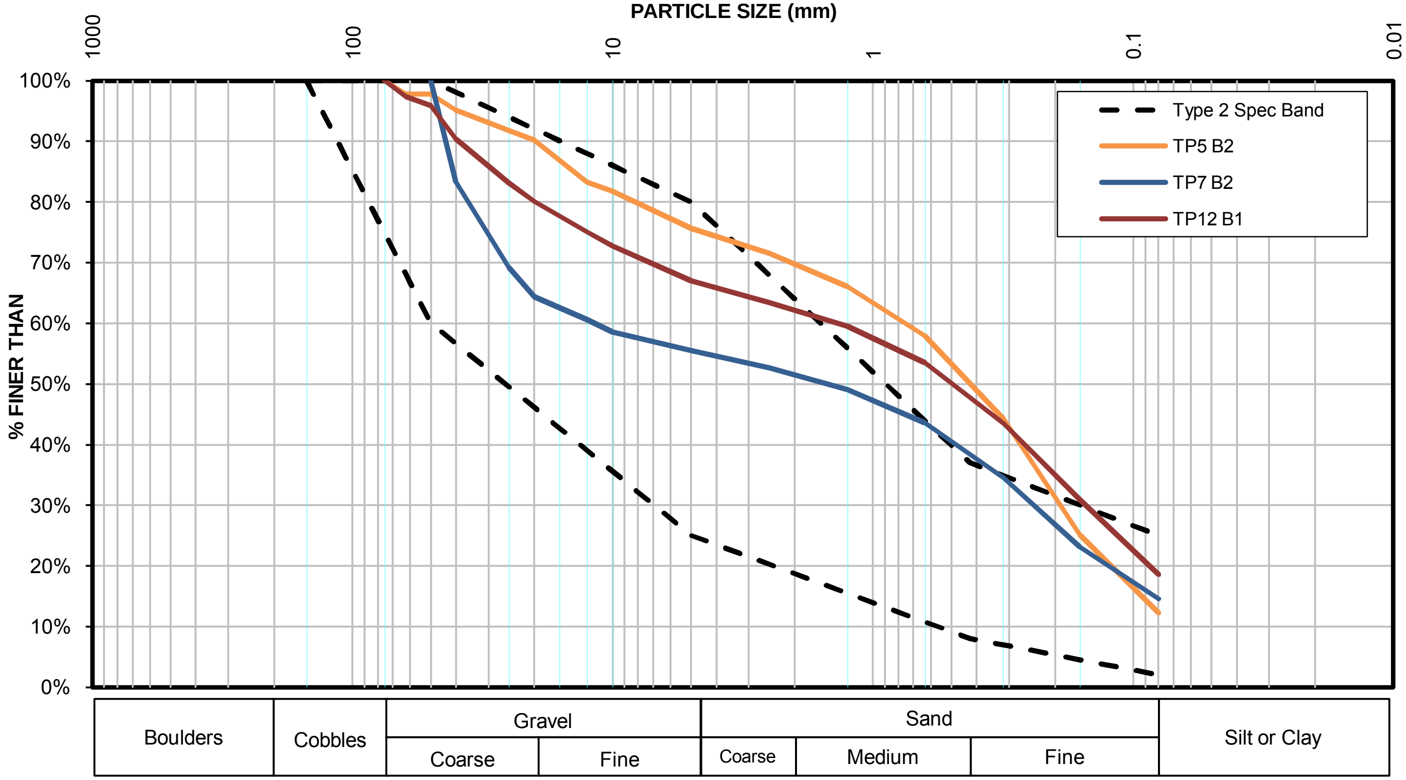


Figure 12

AECOM

PADLOPING ISLAND - FORMER US COAST GUARD WEATHER STATION

GRAIN SIZE DISTRIBUTION CURVES - BORROW AREA 3, LANDFILL 1 (TYPE 4 MATERIAL)

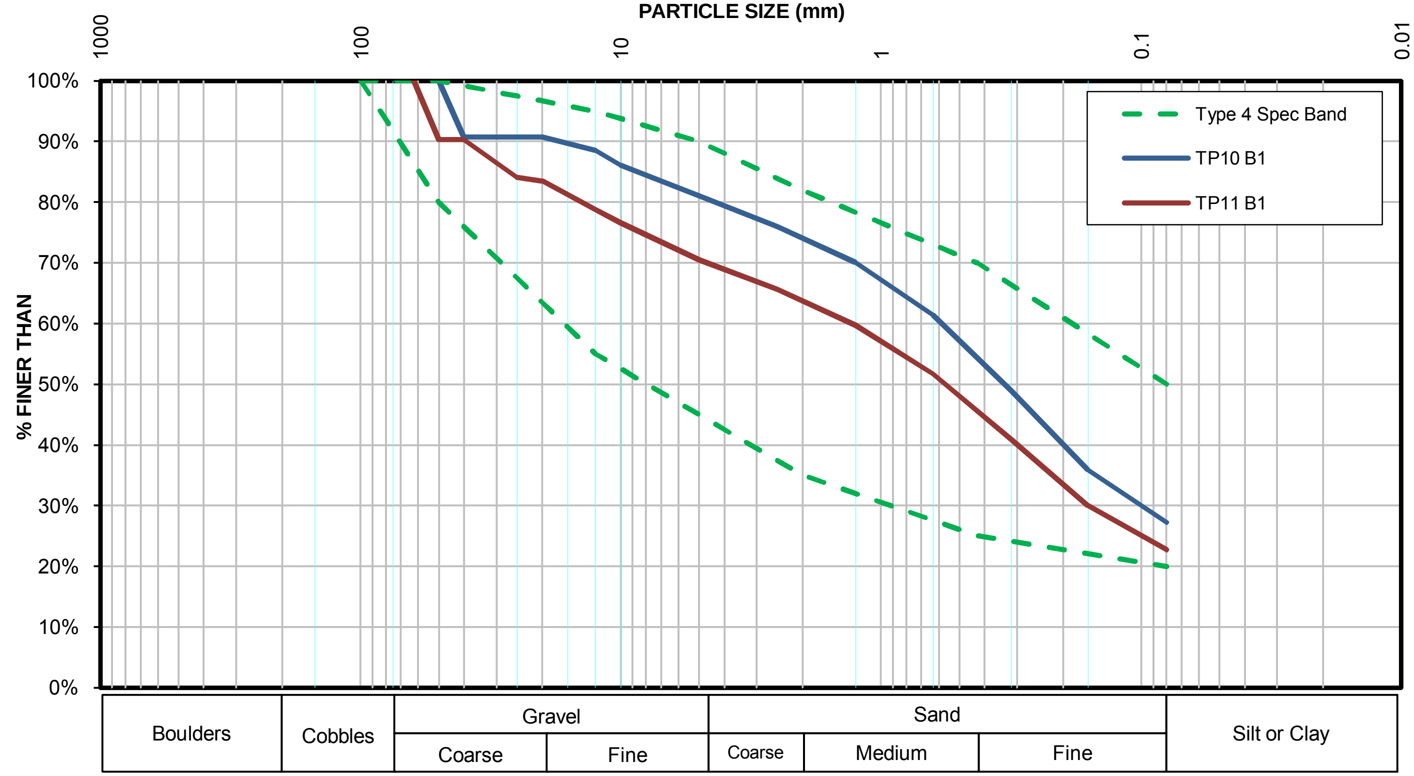


Figure 13

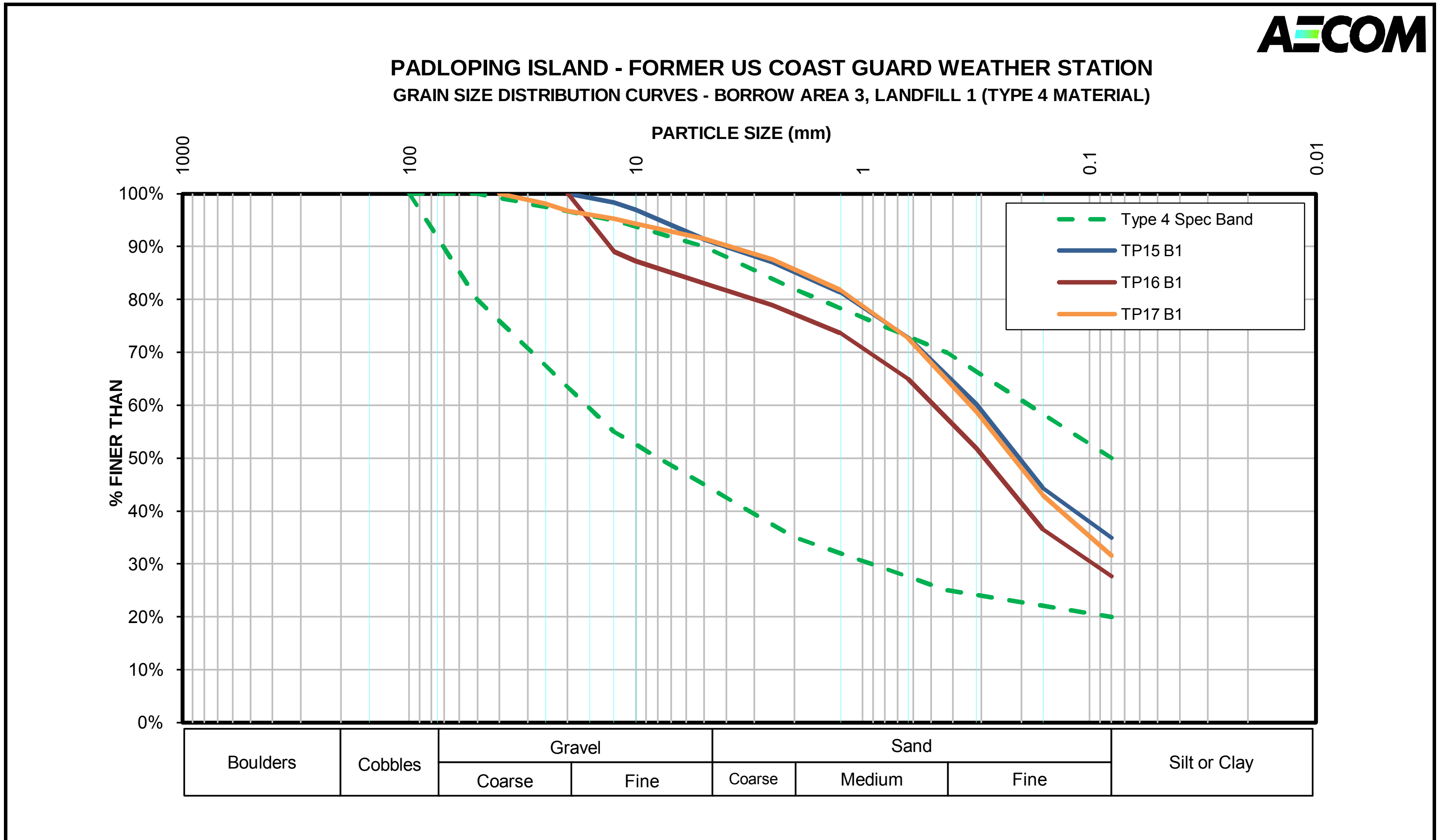

AECOM
PADLOPING ISLAND - FORMER US COAST GUARD WEATHER STATION
GRAIN SIZE DISTRIBUTION CURVES - BORROW AREA 3, LANDFILL 1 (TYPE 4 MATERIAL)
PARTICLE SIZE (mm)
1000
100
10
1
0.1
0.01
% FINER THAN
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Type 4 Spec Band
TP15 B1
TP16 B1
TP17 B1
Boulders
Cobbles
Gravel
Coarse
Fine
Sand
Coarse
Medium
Fine
Silt or Clay

Figure 14

PADLOPING ISLAND - FORMER US COAST GUARD WEATHER STATION

GRAIN SIZE DISTRIBUTION CURVES - BORROW AREA 4 (TYPE 4 MATERIAL)

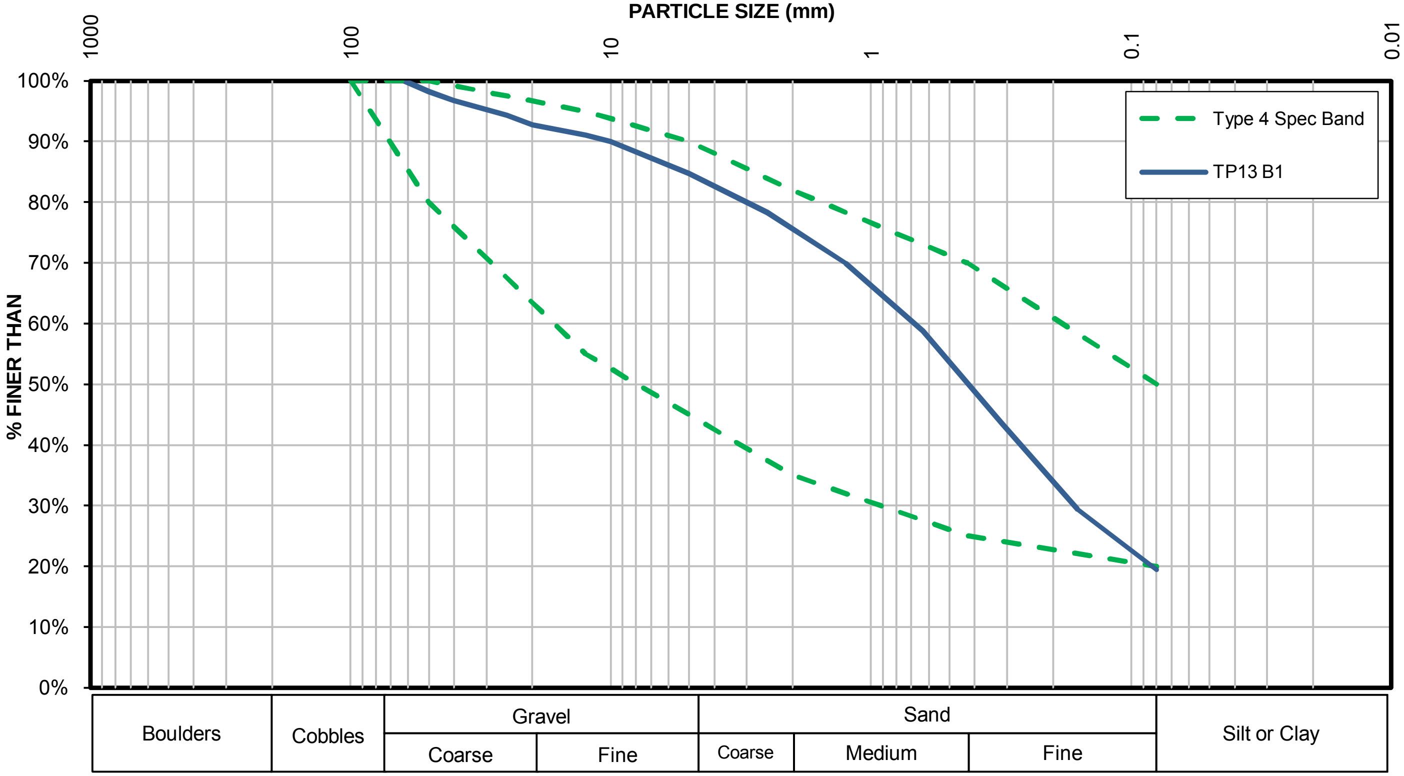


Figure 15

PADLOPING ISLAND - FORMER US COAST GUARD WEATHER STATION

GRAIN SIZE DISTRIBUTION CURVES - BORROW AREA 5, LANDFILL 3 (TYPE 4 MATERIAL)

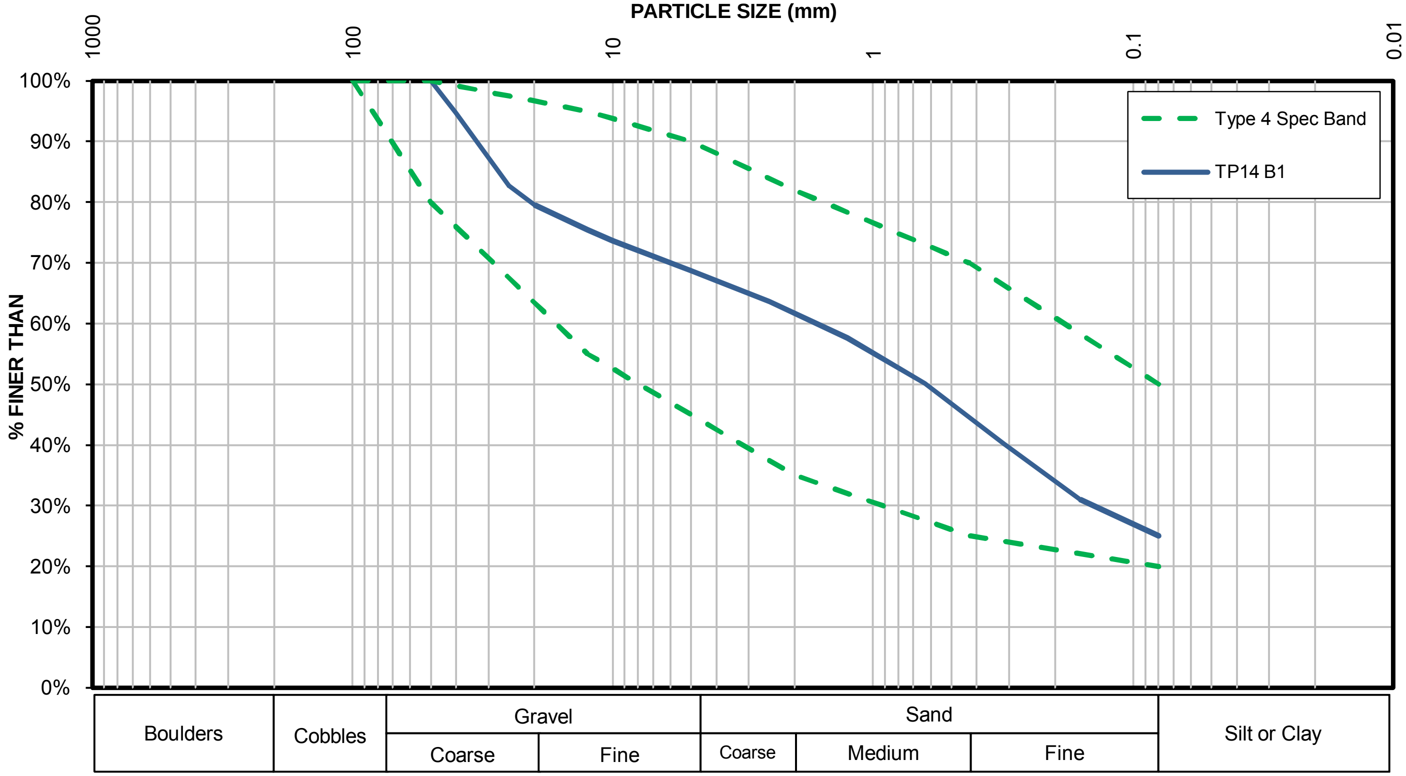


Figure 16

AECOM

PADLOPING ISLAND- FORMER US COAST GUARD WEATHER STATION

GRAIN SIZE DISTRIBUTION CURVES - BORROW AREA 6 (TYPE 4 MATERIAL)

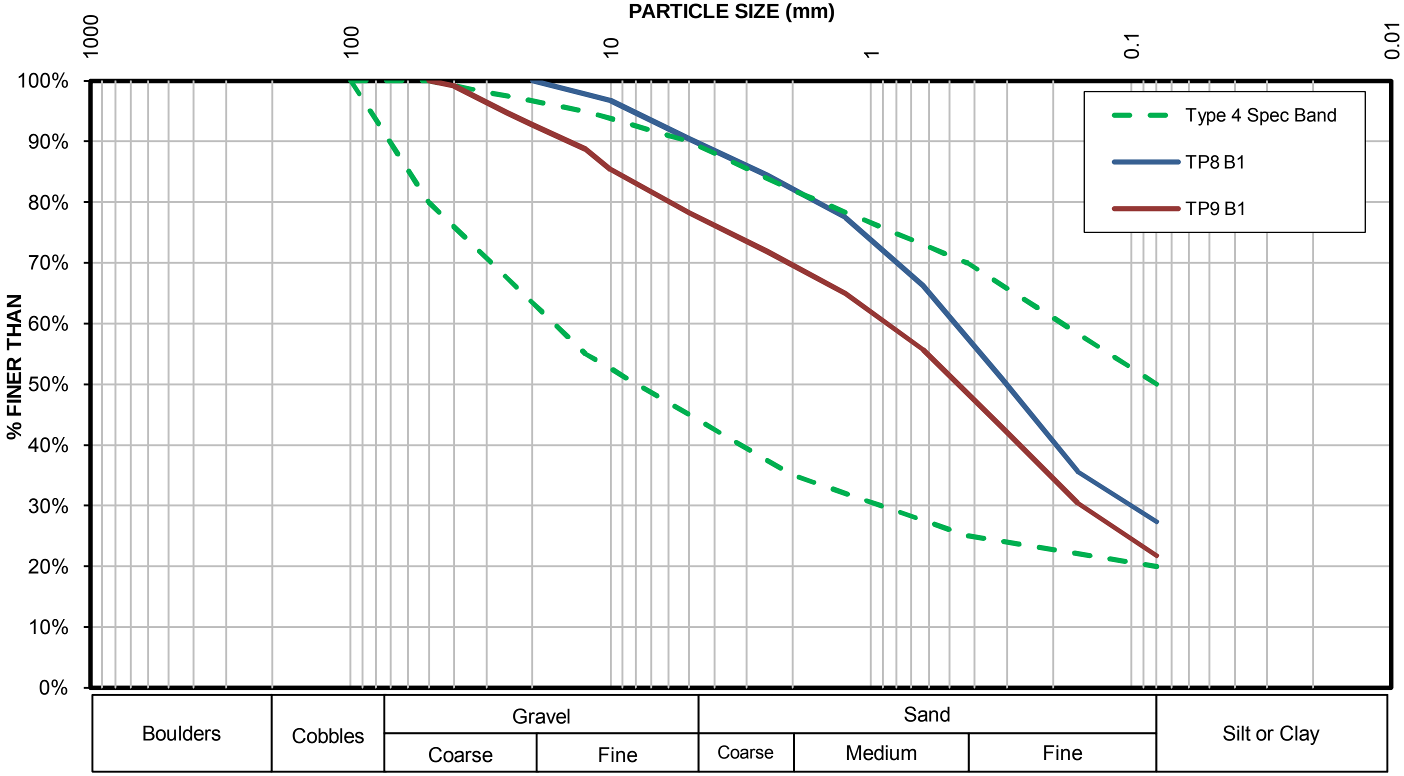


Figure 17

PADLOPING ISLAND - FORMER US COAST GUARD WEATHER STATION

GRAIN SIZE DISTRIBUTION CURVES - BORROW AREA 7, LANDFILL 2 (TYPE 4 MATERIAL)

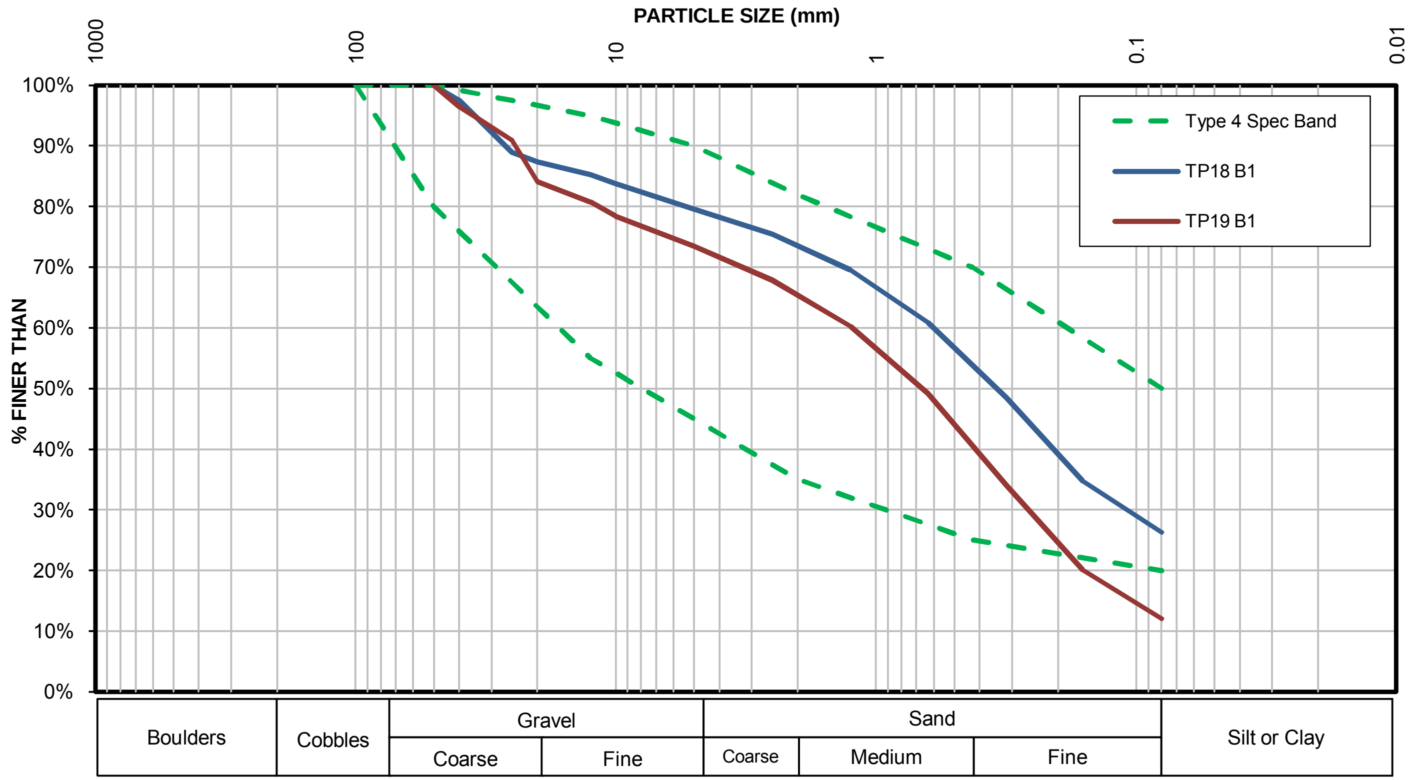


Figure 18

Appendix B

Data Summary Tables

Table B1: Soil and Sediment Metal Results

Sample #	Area	Depth [m]	Comments	As [mg/kg]	Cd [mg/kg]	Cr [mg/kg]	Co [mg/kg]	Cu [mg/kg]	Pb [mg/kg]	Ni [mg/kg]	Zn [mg/kg]	Lead Leachable [mg/L]
TDG for Leachable Lead[1]												**5**
Tier II[2]				**30**	**5.0**	**250**	**50**	**100**	**500**	**100**	**500**	
Site Specific Tier II[3]										**107**		
Tier I[2]									**200**			
10-0001	Weather Building	0.1		<1	0.1	50	10	**150**	26	30	63	
10-0002	Weather Building	0.5	depth 0001	<1	0.1	45	8.8	**130**	24	28	56	
10-0003	Weather Building	0.1		<1	0.1	71	12	**130**	25	42	89	
10-0004	Weather Building	0.1		<1	0.6	42	6.4	**580**	120	32	120	
10-0005	Weather Building	0.1						**230**				
10-0006	Weather Building	0.1		<1	<0.1	17	4.4	15	4	11	20	
10-0007	Weather Building	0.1		<1	<0.1	34	7.3	26	5	21	39	
10-0008	Weather Building	0.5	depth 0007	<1	<0.1	26	5.7	24	8	16	33	
10-0009	Weather Building	0.1		<1	0.1	37	7.8	46	31	24	58	
10-0010	Weather Building	0.1	duplicate 0011									
10-0011	Weather Building	0.1	duplicate 0010									
10-0012	Weather Building	0.1										
10-0013	Weather Building	0.1										
10-0014	Weather Building	0.1		<1	<0.1	16	3.4	9.1	2	9.8	18	
10-0015	Weather Building	0.5	depth 0014	<1	<0.1	20	4.7	15	4	13	24	
10-0016	Kitchen/Mess Hall	0.1		<1	<0.1	19	4.1	7.1	3	15	19	
10-0017	Kitchen/Mess Hall	0.3	depth 0016	<1	<0.1	21	4.9	8.6	4	16	35	
10-0018	Kitchen/Mess Hall	0.1										
10-0019	Kitchen/Mess Hall	0.1		<1	1.1	27	4.7	20	**510**	20	290	
10-0020	Kitchen/Mess Hall	0.1	duplicate 0021	<1	<0.1	31	7.1	15	16	26	33	
10-0021	Kitchen/Mess Hall	0.1	duplicate 0020	<1	<0.1	29	6.4	16	19	23	44	
10-0022	Kitchen/Mess Hall	0.3	depth 0020/21	<1	<0.1	23	5.1	11	16	19	24	
10-0023	Kitchen/Mess Hall	0.1							**230**			
10-0024	Kitchen/Mess Hall	0.1		<1	0.9	44	6.2	42	**200**	31	110	
10-0025	Kitchen/Mess Hall	0.1		<1	0.4	14	2.3	11	**1500**	8.6	220	
10-0026	Kitchen/Mess Hall	0.1		<1	0.5	40	6.5	24	84	30	140	
10-0027	Kitchen/Mess Hall	0.3	depth 0026	<1	0.3	42	7.3	20	36	32	79	
10-0028	Kitchen/Mess Hall	0.1										
10-0029	Kitchen/Mess Hall	0.1		<1	1.1	60	11	63	**1300**	40	**560**	
10-0030	Kitchen/Mess Hall	0.1	duplicate 0031	<1	0.2	45	8.9	23	73	37	78	
10-0031	Kitchen/Mess Hall	0.1	duplicate 0030	<1	0.2	46	8.8	24	64	36	80	
10-0032	Kitchen/Mess Hall	0.1		<1	0.4	61	11	21	71	52	110	
10-0033	Kitchen/Mess Hall	0.1		<1	**7.2**	56	11	51	**250**	40	260	
10-0034	Kitchen/Mess Hall	0.1		<1	<0.1	34	6	12	11	24	37	
10-0035	Kitchen/Mess Hall	0.3	depth 0034	<1	<0.1	45	7	15	6	32	35	
10-0036	Kitchen/Mess Hall	0.1		<1	0.3	62	12	27	80	52	110	
10-0037	Kitchen/Mess Hall	0.1		<1	<0.1	25	5.5	16	10	20	29	
10-0038	Kitchen/Mess Hall	0.3	depth 0037	<1	<0.1	80	13	23	6	70	48	
10-0039	Kitchen/Mess Hall	0.1										
10-0040	Kitchen/Mess Hall	0.1	duplicate 0041	<1	<0.1	58	10	56	81	45	100	
10-0041	Kitchen/Mess Hall	0.1	duplicate 0040	<1	<0.1	53	9.6	49	60	45	96	
10-0042	Kitchen/Mess Hall	0.1										
10-0043	Shower/Washrooms	0.3		<1	0.2	26	4.6	18	**580**	18	90	

Table B1: Soil and Sediment Metal Results

Sample #	Area	Depth [m]	Comments	As [mg/kg]	Cd [mg/kg]	Cr [mg/kg]	Co [mg/kg]	Cu [mg/kg]	Pb [mg/kg]	Ni [mg/kg]	Zn [mg/kg]	Lead Leachable [mg/L]
TDG for Leachable Lead[1]												**5**
Tier II[2]				**30**	**5.0**	**250**	**50**	**100**	**500**	**100**	**500**	
Site Specific Tier II[3]										**107**		
Tier I[2]									**200**			
10-0044	Shower/Washrooms	0.1							120			
10-0045	Shower/Washrooms	0.1										
10-0046	Shower/Washrooms	0.1										
10-0047	Generator Building	0.1		<1	0.2	29	5.9	15	21	19	200	
10-0048	Generator Building	0.3	depth 0047									
10-0049	Generator Building	0.1		<1	0.3	50	8.7	37	62	40	110	
10-0050	Generator Building	0.7	duplicate 0051; depth 0049									
10-0051	Generator Building	0.7	duplicate 0050; depth 0049									
10-0052	Generator Building	0.1		<1	0.2	40	7.5	23	93	26	92	
10-0053	Generator Building	0.1		<1	0.1	23	4.2	10	12	13	44	
10-0054	Maintenance Garage	0.1										
10-0055	Maintenance Garage	0.1										
10-0056	Maintenance Garage	0.1										
10-0057	Maintenance Garage	0.1		<1	0.3	38	8.4	48	54	29	110	
10-0058	Maintenance Garage	0.3	depth 0057	<1	0.3	36	7.7	99	75	25	110	
10-0059	Maintenance Garage	0.1										
10-0060	Maintenance Garage	0.1	duplicate 0061									
10-0061	Maintenance Garage	0.1	duplicate 0060									
10-0062	Maintenance Garage	0.1										
10-0063	Maintenance Garage	0.1		<1	0.4	36	8.3	19	7	23	59	
10-0064	Maintenance Garage	0.3	depth 0063	<1	<0.1	35	7.9	18	15	23	61	
10-0065	Maintenance Garage	0.1										
10-0066	Maintenance Garage	0.1										
10-0067	Maintenance Garage	0.1										
10-0068	Maintenance Garage	0.1		<1	0.5	37	6.9	17	21	20	180	
10-0069	Maintenance Shed	0.1		<1	1.3	32	6.4	**110**	120	27	240	
10-0070	Maintenance Shed	0.3	duplicate 0071; depth 0069	<1	0.4	32	6.9	70	59	29	210	
10-0071	Maintenance Shed	0.3	duplicate 0070; depth 0069	<1	0.4	35	7.3	65	57	29	210	
10-0072	Maintenance Shed	0.1						13				
10-0073	Maintenance Shed	0.1										
10-0074	Maintenance Shed	0.1		<1	0.4	39	8.3	56	140	27	230	
10-0075	Maintenance Shed	0.3	depth 0074									
10-0076	Maintenance Shed	0.1										
10-0077	Maintenance Shed	0.1										
10-0078	Maintenance Shed	0.1										
10-0079	Boiler/Incinerator	0.1										
10-0080	Boiler/Incinerator	0.1	duplicate 0081									
10-0081	Boiler/Incinerator	0.1	duplicate 0080									
10-0082	Boiler/Incinerator	0.1										
10-0083	Boiler/Incinerator	0.3	depth 0082									
10-0084	Boiler/Incinerator	0.1										
10-0085	Boiler/Incinerator	0.1										
10-0086	Boiler/Incinerator	0.1										

Table B1: Soil and Sediment Metal Results

Sample #	Area	Depth [m]	Comments	As [mg/kg]	Cd [mg/kg]	Cr [mg/kg]	Co [mg/kg]	Cu [mg/kg]	Pb [mg/kg]	Ni [mg/kg]	Zn [mg/kg]	Lead Leachable [mg/L]
TDG for Leachable Lead[1]												**5**
Tier II[2]				**30**	**5.0**	**250**	**50**	**100**	**500**	**100**	**500**	
Site Specific Tier II[3]										**107**		
Tier I[2]									**200**			
10-0087	Old Generator Building	0.1										
10-0088	Old Generator Building	0.1										
10-0089	Old Generator Building	0.1		<1	0.7	37	7.1	21	34	26	77	
10-0090	Old Generator Building	0.3	duplicate 0091; depth 0089									
10-0091	Old Generator Building	0.3	duplicate 0090; depth 0089									
10-0092	Old Generator Building	0.1										
10-0093	Old Generator Building	0.1										
10-0094	Old Generator Building	0.1		<1	2.9	41	8	26	52	28	180	
10-0095	Old Generator Building	0.3	depth 0094									
10-0096	Old Generator Building	0.1										
10-0097	Old Generator Building	0.1										
10-0098	Old Generator Building	0.1										
10-0099	Old Generator Building	0.1		<1	0.1	39	7.6	23	26	25	62	<0.1
10-0100	Water Tank Building	0.1	duplicate 0101									
10-0101	Water Tank Building	0.1	duplicate 0100									
10-0102	Water Tank Building	0.1		<1	0.4	25	5.3	84	87	18	130	
10-0103	Water Tank Building	0.1		<1	0.2	18	4.2	38	6	13	45	
10-0104	Water Tank Building	0.1		<1	<0.1	13	3.2	6.2	6	9.6	15	
10-0105	Water Tank Building	0.3	depth 0104	<1	<0.1	28	6.5	12	3	20	25	
10-0106	Metal Dump	0.1										
10-0107	Metal Dump	0.1		<1	<0.1	32	6.3	12	3	22	24	
10-0108	Metal Dump	0.3	depth 0107	<1	<0.1	48	8.9	18	3	31	36	
10-0109	Metal Dump	0.1										
10-0110	Metal Dump	0.1	duplicate 0111	<1	0.2	47	7.9	29	5	30	56	
10-0111	Metal Dump	0.1	duplicate 0110	<1	<0.1	47	8	25	4	31	45	
10-0112	Metal Dump	0.1		<1	0.3	130	21	**360**	**380**	76	170	0.5
10-0113			not collected									
10-0114	Metal Dump	0.1		<1	<0.1	2	0.4	18	25	1.5	25	
10-0115	Metal Dump	0.1										
10-0116	Metal Dump	0.1										
10-0117	Metal Dump	0.1		<1	<0.1	1	0.2	0.5	<1	0.6	<5	
10-0118	Original Powerhouse	0.1		<1	1.9	20	3.8	82	**700**	13	350	
10-0119	Original Powerhouse	0.2	depth 0118	<1	1.5	28	5.5	21	29	19	**530**	
10-0120	Original Powerhouse	0.1	duplicate 0121						**380**		160	
10-0121	Original Powerhouse	0.1	duplicate 0120						**10000**		250	**41.6**
10-0122	Original Powerhouse	0.1							69		56	
10-0123	Original Powerhouse	0.1		<1	0.5	9	1.8	14	**200**	6.7	120	
10-0124	Test Pit - South of East Barrel Cache	0.1	water sample W2	<1	<0.1	<1	0.6	1.4	<1	2.1	<5	
10-0125	Test Pit - South of East Barrel Cache	0.5	depth 0124; water sample W2	<1	<0.1	<1	0.7	1.5	2	2.3	<5	
10-0126	West Barrel Cache	0.1										
10-0127	West Barrel Cache	0.1										
10-0128	West Barrel Cache	0.1		<1	<0.1	40	6.5	16	12	26	38	
10-0129	West Barrel Cache	0.3	depth 0128	<1	<0.1	41	6.1	17	12	26	37	

Table B1: Soil and Sediment Metal Results

AECOM

Sample #	Area	Depth [m]	Comments	As [mg/kg]	Cd [mg/kg]	Cr [mg/kg]	Co [mg/kg]	Cu [mg/kg]	Pb [mg/kg]	Ni [mg/kg]	Zn [mg/kg]	Lead Leachable [mg/L]
TDG for Leachable Lead[1]												**5**
Tier II[2]				**30**	**5.0**	**250**	**50**	**100**	**500**	**100**	**500**	
Site Specific Tier II[3]										**107**		
Tier I[2]									**200**			
10-0130	West Barrel Cache	0.1	duplicate 0131									
10-0131	West Barrel Cache	0.1	duplicate 0130									
10-0132	West Barrel Cache	0.1		6	0.3	59	8.9	42	160	38	110	
10-0133	West Barrel Cache	0.2	depth 0132	<1	<0.1	38	5.5	13	16	24	34	
10-0134	West Barrel Cache	0.1										
10-0135	West Barrel Cache	0.1										
10-0136	West Barrel Cache	0.1										
10-0137	Sediment - East of East Barrel Cache	0.1	water sample W1	<1	<0.1	<1	0.7	1.6	2	1.9	5	
10-0138	Sediment - South of East Barrel Cache	0.1	water sample W3	<1	<0.1	<1	0.8	1.9	3	3.1	6	
10-0139	Sediment - South of Hamlet Area	0.1	water sample W4	<1	<0.1	2	1	1.7	4	2.9	<5	
10-0140	Test Pit - South of West Barrel Cache	0.1	duplicate 0141; water sample W6	<1	<0.1	4	1.4	5.3	24	6	22	
10-0141	Test Pit - South of West Barrel Cache	0.1	duplicate 0140; water sample W6	<1	<0.1	6	1.8	6.8	21	7.1	25	
10-0142	Test Pit - South of West Barrel Cache	0.4	depth 0140/41; water sample W6	<1	0.1	41	6.4	16	8	31	37	
10-0143	Sediment - South of West Barrel Cache	0.1	water sample W5	<1	<0.1	3	1.4	3	3	5.3	10	
10-0144	Sediment - Freshwater Lake	0.1	water sample W7	<1	<0.1	12	3.8	6.9	2	9.6	18	
10-0145	Station Area South Mound - DGTP #1	0.1		<1	<0.1	33	6.9	17	3	25	33	
10-0146	Station Area South Mound - DGTP #1	0.6		<1	<0.1	21	4.8	9.2	2	19	18	
10-0147	Station Area South Mound - UGTP	0.1		<1	<0.1	79	14	39	12	66	77	
10-0148	Station Area South Mound - UGTP	0.65		<1	<0.1	49	8.7	19	3	42	36	
10-0149	Station Area South Mound - DGTP #2	0.1		<1	<0.1	37	7.3	18	18	28	47	
10-0150	Station Area South Mound - DGTP #2	0.6	duplicate 0151	<1	<0.1	24	6	14	2	19	24	
10-0151	Station Area South Mound - DGTP #2	0.6	duplicate 0150	<1	<0.1	29	6.6	19	2	23	30	
10-0152	Station Area South Mound - DGTP #3	0.1		<1	<0.1	30	6	12	2	25	27	
10-0153	Station Area South Mound - DGTP #3	0.5		<1	<0.1	50	9.5	23	4	37	45	
10-0154	Original Hamlet Site - UGTP	0.1		<1	<0.1	44	8.5	25	4	31	44	
10-0155	Original Hamlet Site - UGTP	0.6		<1	<0.1	23	5.5	12	2	17	23	
10-0156	Original Hamlet Site - DGTP	0.1		<1	<0.1	32	7.3	20	4	23	37	
10-0157	Original Hamlet Site - DGTP	0.55		<1	<0.1	14	4.8	9	2	13	19	

Notes:

Samples with no results were collected and put on hold at the laboratory to be analyzed as needed.

(1) Transportation of Dangerous Goods Regulations (SOR/2008-34)

(2) Dew Line Cleanup Criteira (DCC) for Soil (INAC 2009)

(3) Site Specific Criteria (SSC) (ESG 2010)

Table B2: Soil and Sediment PCB Results

Sample #	Area	Depth [m]	Comments	Aroclor 1242 [mg/kg]	Aroclor 1254 [mg/kg]	Aroclor 1260 [mg/kg]	PCB Total [mg/kg]
CEPA[1]							50
Tier II[2]							5.0
Tier I[2]							1.0
10-0001	Weather Building	0.1					
10-0002	Weather Building	0.5	depth 0001				
10-0003	Weather Building	0.1					
10-0004	Weather Building	0.1					
10-0005	Weather Building	0.1					
10-0006	Weather Building	0.1					
10-0007	Weather Building	0.1					
10-0008	Weather Building	0.5	depth 0007				
10-0009	Weather Building	0.1					
10-0010	Weather Building	0.1	duplicate 0011				
10-0011	Weather Building	0.1	duplicate 0010				
10-0012	Weather Building	0.1					
10-0013	Weather Building	0.1					
10-0014	Weather Building	0.1					
10-0015	Weather Building	0.5	depth 0014				
10-0016	Kitchen/Mess Hall	0.1					
10-0017	Kitchen/Mess Hall	0.3	depth 0016				
10-0018	Kitchen/Mess Hall	0.1					
10-0019	Kitchen/Mess Hall	0.1					
10-0020	Kitchen/Mess Hall	0.1	duplicate 0021				
10-0021	Kitchen/Mess Hall	0.1	duplicate 0020				
10-0022	Kitchen/Mess Hall	0.3	depth 0020/21				
10-0023	Kitchen/Mess Hall	0.1					
10-0024	Kitchen/Mess Hall	0.1					
10-0025	Kitchen/Mess Hall	0.1					
10-0026	Kitchen/Mess Hall	0.1					
10-0027	Kitchen/Mess Hall	0.3	depth 0026				
10-0028	Kitchen/Mess Hall	0.1					
10-0029	Kitchen/Mess Hall	0.1					
10-0030	Kitchen/Mess Hall	0.1	duplicate 0031				
10-0031	Kitchen/Mess Hall	0.1	duplicate 0030				
10-0032	Kitchen/Mess Hall	0.1		<0.01	<0.01	<0.01	<0.01
10-0033	Kitchen/Mess Hall	0.1					
10-0034	Kitchen/Mess Hall	0.1					
10-0035	Kitchen/Mess Hall	0.3	depth 0034				
10-0036	Kitchen/Mess Hall	0.1					
10-0037	Kitchen/Mess Hall	0.1					
10-0038	Kitchen/Mess Hall	0.3	depth 0037				
10-0039	Kitchen/Mess Hall	0.1					
10-0040	Kitchen/Mess Hall	0.1	duplicate 0041	<0.01	<0.01	<0.01	<0.01
10-0041	Kitchen/Mess Hall	0.1	duplicate 0040	<0.01	<0.01	<0.01	<0.01
10-0042	Kitchen/Mess Hall	0.1					
10-0043	Shower/Washrooms	0.3					

Table B2: Soil and Sediment PCB Results

Sample #	Area	Depth [m]	Comments	Aroclor 1242 [mg/kg]	Aroclor 1254 [mg/kg]	Aroclor 1260 [mg/kg]	PCB Total [mg/kg]
CEPA[1]							50
Tier II[2]							5.0
Tier I[2]							1.0
10-0044	Shower/Washrooms	0.1					
10-0045	Shower/Washrooms	0.1					
10-0046	Shower/Washrooms	0.1					
10-0047	Generator Building	0.1		<0.01	<0.01	<0.01	<0.01
10-0048	Generator Building	0.3	depth 0047				
10-0049	Generator Building	0.1		<0.05	<0.05	<0.05	<0.05
10-0050	Generator Building	0.7	duplicate 0051; depth 0049				
10-0051	Generator Building	0.7	duplicate 0050; depth 0049				
10-0052	Generator Building	0.1		<0.05	<0.05	<0.05	<0.05
10-0053	Generator Building	0.1		<0.01	<0.01	<0.01	<0.01
10-0054	Maintenance Garage	0.1					
10-0055	Maintenance Garage	0.1					
10-0056	Maintenance Garage	0.1					
10-0057	Maintenance Garage	0.1					
10-0058	Maintenance Garage	0.3	depth 0057				
10-0059	Maintenance Garage	0.1					
10-0060	Maintenance Garage	0.1	duplicate 0061				
10-0061	Maintenance Garage	0.1	duplicate 0060				
10-0062	Maintenance Garage	0.1					
10-0063	Maintenance Garage	0.1					
10-0064	Maintenance Garage	0.3	depth 0063				
10-0065	Maintenance Garage	0.1					
10-0066	Maintenance Garage	0.1					
10-0067	Maintenance Garage	0.1					
10-0068	Maintenance Garage	0.1					
10-0069	Maintenance Shed	0.1					
10-0070	Maintenance Shed	0.3	duplicate 0071; depth 0069				
10-0071	Maintenance Shed	0.3	duplicate 0070; depth 0069				
10-0072	Maintenance Shed	0.1					
10-0073	Maintenance Shed	0.1					
10-0074	Maintenance Shed	0.1					
10-0075	Maintenance Shed	0.3	depth 0074				
10-0076	Maintenance Shed	0.1					
10-0077	Maintenance Shed	0.1					
10-0078	Maintenance Shed	0.1					
10-0079	Boiler/Incinerator	0.1					
10-0080	Boiler/Incinerator	0.1	duplicate 0081				
10-0081	Boiler/Incinerator	0.1	duplicate 0080				
10-0082	Boiler/Incinerator	0.1		<0.01	<0.01	<0.01	<0.01
10-0083	Boiler/Incinerator	0.3	depth 0082	<0.01	<0.01	<0.01	<0.01
10-0084	Boiler/Incinerator	0.1					
10-0085	Boiler/Incinerator	0.1					
10-0086	Boiler/Incinerator	0.1					

Sample #	Area	Depth [m]	Comments	Aroclor 1242 [mg/kg]	Aroclor 1254 [mg/kg]	Aroclor 1260 [mg/kg]	PCB Total [mg/kg]
CEPA[(1)]							**50**
Tier II[(2)]							**5.0**
Tier I[(2)]							**1.0**
10-0087	Old Generator Building	0.1					
10-0088	Old Generator Building	0.1					
10-0089	Old Generator Building	0.1		<0.05	<0.05	<0.05	<0.05
10-0090	Old Generator Building	0.3	duplicate 0091; depth 0089				
10-0091	Old Generator Building	0.3	duplicate 0090; depth 0089				
10-0092	Old Generator Building	0.1					
10-0093	Old Generator Building	0.1					
10-0094	Old Generator Building	0.1		<0.01	<0.01	<0.01	<0.01
10-0095	Old Generator Building	0.3	depth 0094				
10-0096	Old Generator Building	0.1					
10-0097	Old Generator Building	0.1					
10-0098	Old Generator Building	0.1					
10-0099	Old Generator Building	0.1					
10-0100	Water Tank Building	0.1	duplicate 0101				
10-0101	Water Tank Building	0.1	duplicate 0100				
10-0102	Water Tank Building	0.1					
10-0103	Water Tank Building	0.1					
10-0104	Water Tank Building	0.1					
10-0105	Water Tank Building	0.3	depth 0104				
10-0106	Metal Dump	0.1					
10-0107	Metal Dump	0.1					
10-0108	Metal Dump	0.3	depth 0107				
10-0109	Metal Dump	0.1					
10-0110	Metal Dump	0.1	duplicate 0111				
10-0111	Metal Dump	0.1	duplicate 0110				
10-0112	Metal Dump	0.1					
10-0113			not collected				
10-0114	Metal Dump	0.1					
10-0115	Metal Dump	0.1					
10-0116	Metal Dump	0.1					
10-0117	Metal Dump	0.1					
10-0118	Original Powerhouse	0.1					
10-0119	Original Powerhouse	0.2	depth 0118				
10-0120	Original Powerhouse	0.1	duplicate 0121				
10-0121	Original Powerhouse	0.1	duplicate 0120				
10-0122	Original Powerhouse	0.1					
10-0123	Original Powerhouse	0.1		<0.01	<0.01	<0.01	<0.01
10-0124	Test Pit - South of East Barrel Cache	0.1	water sample W2	<0.01	<0.01	<0.01	<0.01
10-0125	Test Pit - South of East Barrel Cache	0.5	depth 0124; water sample W2	<0.01	<0.01	<0.01	<0.01
10-0126	West Barrel Cache	0.1					
10-0127	West Barrel Cache	0.1					
10-0128	West Barrel Cache	0.1		<0.01	<0.01	<0.01	<0.01
10-0129	West Barrel Cache	0.3	depth 0128	<0.01	<0.01	<0.01	<0.01

Table B2: Soil and Sediment PCB Results

Sample #	Area	Depth [m]	Comments	Aroclor 1242 [mg/kg]	Aroclor 1254 [mg/kg]	Aroclor 1260 [mg/kg]	PCB Total [mg/kg]
CEPA[1]							**50**
Tier II[2]							**5.0**
Tier I[2]							**1.0**
10-0130	West Barrel Cache	0.1	duplicate 0131				
10-0131	West Barrel Cache	0.1	duplicate 0130				
10-0132	West Barrel Cache	0.1					
10-0133	West Barrel Cache	0.2	depth 0132				
10-0134	West Barrel Cache	0.1					
10-0135	West Barrel Cache	0.1					
10-0136	West Barrel Cache	0.1					
10-0137	Sediment - East of East Barrel Cache	0.1	water sample W1	<0.01	<0.01	<0.01	<0.01
10-0138	Sediment - South of East Barrel Cache	0.1	water sample W3	<0.01	<0.01	<0.01	<0.01
10-0139	Sediment - South of Hamlet Area	0.1	water sample W4	<0.01	<0.01	<0.01	<0.01
10-0140	Test Pit - South of West Barrel Cache	0.1	duplicate 0141; water sample W6	<0.01	<0.01	<0.01	<0.01
10-0141	Test Pit - South of West Barrel Cache	0.1	duplicate 0140; water sample W6	<0.01	0.35	0.07	0.42
10-0142	Test Pit - South of West Barrel Cache	0.4	depth 0140/41; water sample W6	<0.01	0.05	<0.01	0.05
10-0143	Sediment - South of West Barrel Cache	0.1	water sample W5	<0.01	<0.01	<0.01	<0.01
10-0144	Sediment - Freshwater Lake	0.1	water sample W7	<0.01	<0.01	<0.01	<0.01
10-0145	Station Area South Mound - DGTP #1	0.1		<0.01	<0.01	<0.01	<0.01
10-0146	Station Area South Mound - DGTP #1	0.6		<0.01	<0.01	<0.01	<0.01
10-0147	Station Area South Mound - UGTP	0.1		<0.01	0.03	<0.01	0.03
10-0148	Station Area South Mound - UGTP	0.65		<0.01	<0.01	<0.01	<0.01
10-0149	Station Area South Mound - DGTP #2	0.1		<0.01	<0.01	<0.01	<0.01
10-0150	Station Area South Mound - DGTP #2	0.6	duplicate 0151	<0.01	<0.01	<0.01	<0.01
10-0151	Station Area South Mound - DGTP #2	0.6	duplicate 0150	<0.01	<0.01	<0.01	<0.01
10-0152	Station Area South Mound - DGTP #3	0.1		<0.01	<0.01	<0.01	<0.01
10-0153	Station Area South Mound - DGTP #3	0.5		<0.01	<0.01	<0.01	<0.01
10-0154	Original Hamlet Site - UGTP	0.1		<0.01	<0.01	<0.01	<0.01
10-0155	Original Hamlet Site - UGTP	0.6		<0.01	<0.01	<0.01	<0.01
10-0156	Original Hamlet Site - DGTP	0.1		<0.01	<0.01	<0.01	<0.01
10-0157	Original Hamlet Site - DGTP	0.55		<0.01	<0.01	<0.01	<0.01

Notes:

Samples with no results were collected and put on hold at the laboratory to be analyzed as needed.

(1) Canadian Environmental Protection Act, 1999

(2) Dew Line Cleanup Criteira (DCC) for Soil (INAC 2009)

Table B3: Soil and Sediment PHC Results

Sample #	Area	Depth [m]	Comments	Benzene [mg/kg]	Toluene [mg/kg]	Ethylbenzene [mg/kg]	Xylene [mg/kg]	F1 [mg/kg]	F1 minus BTEX [mg/kg]	F2 [mg/kg]	F3 [mg/kg]	F4 [mg/kg]	F4G[4] [mg/kg]	Total TPH: Dominant TPH Type	Total TPH: TYPE A [mg/kg]	Total TPH: TYPE B [mg/kg]
PHCs - Protection of Freshwater Aquatic Life [1]									**1290**	**330**						**330**
PHCs - Protection of Terrestrial Wildlife [2]																**2500**
PHCs - Human Health										**11000**	**20000**				**20000**	
PHCs - Management Limit [3]																**5000**
10-0001	Weather Building	0.1														
10-0002	Weather Building	0.5	depth 0001													
10-0003	Weather Building	0.1														
10-0004	Weather Building	0.1														
10-0005	Weather Building	0.1														
10-0006	Weather Building	0.1														
10-0007	Weather Building	0.1														
10-0008	Weather Building	0.5	depth 0007													
10-0009	Weather Building	0.1														
10-0010	Weather Building	0.1	duplicate 0011													
10-0011	Weather Building	0.1	duplicate 0010													
10-0012	Weather Building	0.1														
10-0013	Weather Building	0.1														
10-0014	Weather Building	0.1														
10-0015	Weather Building	0.5	depth 0014													
10-0016	Kitchen/Mess Hall	0.1														
10-0017	Kitchen/Mess Hall	0.3	depth 0016													
10-0018	Kitchen/Mess Hall	0.1														
10-0019	Kitchen/Mess Hall	0.1														
10-0020	Kitchen/Mess Hall	0.1	duplicate 0021													
10-0021	Kitchen/Mess Hall	0.1	duplicate 0020													
10-0022	Kitchen/Mess Hall	0.3	depth 0020/21													
10-0023	Kitchen/Mess Hall	0.1		<0.002	0.009	<0.002	<0.002	<10	<10	120	900	110		Type A	1010	
10-0024	Kitchen/Mess Hall	0.1		<0.02	<0.02	<0.02	<0.04	<10	<10	3400	3800	<10		Type B		7200
10-0025	Kitchen/Mess Hall	0.1		<0.02	<0.02	<0.02	<0.04	76	76	32	140	32		Type B		248
10-0026	Kitchen/Mess Hall	0.1														
10-0027	Kitchen/Mess Hall	0.3	depth 0026													
10-0028	Kitchen/Mess Hall	0.1														
10-0029	Kitchen/Mess Hall	0.1														
10-0030	Kitchen/Mess Hall	0.1	duplicate 0031													
10-0031	Kitchen/Mess Hall	0.1	duplicate 0030													
10-0032	Kitchen/Mess Hall	0.1														
10-0033	Kitchen/Mess Hall	0.1														
10-0034	Kitchen/Mess Hall	0.1														
10-0035	Kitchen/Mess Hall	0.3	depth 0034													
10-0036	Kitchen/Mess Hall	0.1														
10-0037	Kitchen/Mess Hall	0.1														
10-0038	Kitchen/Mess Hall	0.3	depth 0037													
10-0039	Kitchen/Mess Hall	0.1														
10-0040	Kitchen/Mess Hall	0.1	duplicate 0041													
10-0041	Kitchen/Mess Hall	0.1	duplicate 0040													
10-0042	Kitchen/Mess Hall	0.1														
10-0043	Shower/Washrooms	0.3		<0.02	<0.02	<0.02	<0.04	28	28	2300	1100	<10		Type B		3428
10-0044	Shower/Washrooms	0.1		<0.002	0.009	<0.002	<0.002	<10	<10	21	380	110		Type A	490	
10-0045	Shower/Washrooms	0.1														
10-0046	Shower/Washrooms	0.1														
10-0047	Generator Building	0.1		<0.02	<0.02	<0.02	0.09	50	50	240	38000	7200		Type A	45200	
10-0048	Generator Building	0.3	depth 0047	<0.02	<0.02	<0.02	<0.04	<10	<10	150	25000	6100		Type A	31100	
10-0049	Generator Building	0.1		<0.02	<0.02	<0.02	<0.04	19	19	1900	27000	21000		Type A	48000	
10-0050	Generator Building	0.7	duplicate 0051; depth 0049	<0.02	<0.02	<0.02	0.26	130	130	5500	26000	14000		Type A	40000	

Table B3: Soil and Sediment PHC Results

AECOM

Sample #	Area	Depth [m]	Comments	Benzene [mg/kg]	Toluene [mg/kg]	Ethylbenzene [mg/kg]	Xylene [mg/kg]	F1 [mg/kg]	F1 minus BTEX [mg/kg]	F2 [mg/kg]	F3 [mg/kg]	F4 [mg/kg]	F4G[4] [mg/kg]	Total TPH: Dominant TPH Type	Total TPH: TYPE A [mg/kg]	Total TPH: TYPE B [mg/kg]
PHCs - Protection of Freshwater Aquatic Life [1]									1290	330						330
PHCs - Protection of Terrestrial Wildlife [2]																2500
PHCs - Human Health										11000	20000				20000	
PHCs - Management Limit [3]																5000
10-0051	Generator Building	0.7	duplicate 0050; depth 0049	<0.02	<0.02	<0.02	0.23	110	110	6100	30000	16000		Type A	46000	
10-0052	Generator Building	0.1		<0.02	0.06	<0.02	0.06	<10	<10	240	21000	25000		Type A	46000	
10-0053	Generator Building	0.1		<0.02	<0.02	<0.02	<0.04	21	21	87	28000	19000		Type A	47000	
10-0054	Maintenance Garage	0.1														
10-0055	Maintenance Garage	0.1														
10-0056	Maintenance Garage	0.1														
10-0057	Maintenance Garage	0.1														
10-0058	Maintenance Garage	0.3	depth 0057													
10-0059	Maintenance Garage	0.1														
10-0060	Maintenance Garage	0.1	duplicate 0061													
10-0061	Maintenance Garage	0.1	duplicate 0060													
10-0062	Maintenance Garage	0.1														
10-0063	Maintenance Garage	0.1														
10-0064	Maintenance Garage	0.3	depth 0063													
10-0065	Maintenance Garage	0.1														
10-0066	Maintenance Garage	0.1														
10-0067	Maintenance Garage	0.1														
10-0068	Maintenance Garage	0.1		<0.02	<0.02	<0.02	<0.04	42	42	11	23	<10		Type B		76
10-0069	Maintenance Shed	0.1		0.04	0.26	0.1	0.29	<10	<10	530	4600	2200	9300	Type A	13900	
10-0070	Maintenance Shed	0.3	duplicate 0071; depth 0069	0.08	0.6	0.24	0.67	19	17	390	1900	680		Type A	2580	
10-0071	Maintenance Shed	0.3	duplicate 0070; depth 0069	<0.02	0.21	0.09	0.34	76	75	430	1800	660		Type A	2460	
10-0072	Maintenance Shed	0.1		<0.02	<0.02	<0.02	<0.04	<10	<10	2500	3000	<10		Type B		5500
10-0073	Maintenance Shed	0.1														
10-0074	Maintenance Shed	0.1														
10-0075	Maintenance Shed	0.3	depth 0074													
10-0076	Maintenance Shed	0.1														
10-0077	Maintenance Shed	0.1														
10-0078	Maintenance Shed	0.1														
10-0079	Boiler/Incinerator	0.1		<0.02	<0.02	<0.02	<0.04	81	81	30	18	<10		Type B		129
10-0080	Boiler/Incinerator	0.1	duplicate 0081	<0.02	<0.02	<0.02	<0.04	<10	<10	73	77	<10		Type B		150
10-0081	Boiler/Incinerator	0.1	duplicate 0080	<0.02	<0.02	<0.02	<0.04	<10	<10	61	73	<10		Type B		134
10-0082	Boiler/Incinerator	0.1		<0.02	0.02	<0.02	<0.04	13	13	2300	1500	33		Type B		3813
10-0083	Boiler/Incinerator	0.3	depth 0082	<0.02	<0.02	<0.02	<0.04	99	99	1500	890	<10		Type B		2489
10-0084	Boiler/Incinerator	0.1														
10-0085	Boiler/Incinerator	0.1														
10-0086	Boiler/Incinerator	0.1		<0.002	0.007	<0.002	<0.002	<10	<10	49	170	40		Type A	210	
10-0087	Old Generator Building	0.1		<0.02	<0.02	<0.02	<0.04	100	100	2800	2900	710		Type B		5800
10-0088	Old Generator Building	0.1														
10-0089	Old Generator Building	0.1		<0.02	<0.02	<0.02	<0.04	48	48	2800	14000	4500		Type A	18500	
10-0090	Old Generator Building	0.3	duplicate 0091; depth 0089	<0.02	<0.02	<0.02	<0.04	42	42	2100	14000	3700		Type A	17700	
10-0091	Old Generator Building	0.3	duplicate 0090; depth 0089	<0.02	<0.02	<0.02	<0.04	95	95	1100	9100	2800		Type A	11900	
10-0092	Old Generator Building	0.1														
10-0093	Old Generator Building	0.1		<0.02	<0.02	<0.02	<0.04	29	29	430	27000	7600		Type A	34600	
10-0094	Old Generator Building	0.1		<0.02	<0.02	<0.02	<0.04	14	14	50	24000	7000		Type A	31000	
10-0095	Old Generator Building	0.3	depth 0094	<0.02	<0.02	<0.02	<0.04	<10	<10	120	9900	3400		Type A	13300	
10-0096	Old Generator Building	0.1														
10-0097	Old Generator Building	0.1														
10-0098	Old Generator Building	0.1														
10-0099	Old Generator Building	0.1		<0.02	0.11	<0.02	0.05	<10	<10	18	220	30		Type A	250	
10-0100	Water Tank Building	0.1	duplicate 0101													

Table B3: Soil and Sediment PHC Results

Sample #	Area	Depth [m]	Comments	Benzene [mg/kg]	Toluene [mg/kg]	Ethylbenzene [mg/kg]	Xylene [mg/kg]	F1 [mg/kg]	F1 minus BTEX [mg/kg]	F2 [mg/kg]	F3 [mg/kg]	F4 [mg/kg]	F4G[(4)] [mg/kg]	Total TPH		
														Dominant TPH Type	TYPE A [mg/kg]	TYPE B [mg/kg]
PHCs - Protection of Freshwater Aquatic Life [(1)]									**1290**	**330**						**330**
PHCs - Protection of Terrestrial Wildlife [(2)]																**2500**
PHCs - Human Health										**11000**	**20000**				**20000**	
PHCs - Management Limit [(3)]																**5000**
10-0101	Water Tank Building	0.1	duplicate 0100													
10-0102	Water Tank Building	0.1														
10-0103	Water Tank Building	0.1														
10-0104	Water Tank Building	0.1														
10-0105	Water Tank Building	0.3	depth 0104													
10-0106	Metal Dump	0.1														
10-0107	Metal Dump	0.1														
10-0108	Metal Dump	0.3	depth 0107													
10-0109	Metal Dump	0.1														
10-0110	Metal Dump	0.1	duplicate 0111													
10-0111	Metal Dump	0.1	duplicate 0110													
10-0112	Metal Dump	0.1														
10-0113			not collected													
10-0114	Metal Dump	0.1														
10-0115	Metal Dump	0.1														
10-0116	Metal Dump	0.1														
10-0117	Metal Dump	0.1														
10-0118	Original Powerhouse	0.1														
10-0119	Original Powerhouse	0.2	depth 0118													
10-0120	Original Powerhouse	0.1	duplicate 0121													
10-0121	Original Powerhouse	0.1	duplicate 0120													
10-0122	Original Powerhouse	0.1														
10-0123	Original Powerhouse	0.1		<0.02	<0.02	<0.02	<0.04	<10	<10	<100	930	1800	6200	Type A	7130	
10-0124	Test Pit - South of East Barrel Cache	0.1	water sample W2	<0.02	<0.02	<0.02	<0.04	<10	<10	<10	<10	<10				
10-0125	Test Pit - South of East Barrel Cache	0.5	depth 0124; water sample W2	<0.02	<0.02	<0.02	<0.04	<10	<10	<10	<10	<10				
10-0126	West Barrel Cache	0.1		<0.02	<0.02	<0.02	<0.04	<10	<10	<10	55	56		Type A	111	
10-0127	West Barrel Cache	0.1		<0.02	<0.02	<0.02	<0.04	<10	<10	45	520	26		Type B		**565**
10-0128	West Barrel Cache	0.1		<0.02	<0.02	<0.02	<0.04	<10	<10	23	170	30		Type A	200	
10-0129	West Barrel Cache	0.3	depth 0128	<0.02	<0.02	<0.02	<0.04	<10	<10	31	120	<10		Type B		151
10-0130	West Barrel Cache	0.1	duplicate 0131	<0.02	<0.02	<0.02	<0.04	<10	<10	<10	71	31		Type A	102	
10-0131	West Barrel Cache	0.1	duplicate 0130	<0.02	<0.02	<0.02	<0.04	<10	<10	<10	96	31		Type A	127	
10-0132	West Barrel Cache	0.1		<0.02	<0.02	<0.02	<0.04	<10	<10	16	470	170		Type A	640	
10-0133	West Barrel Cache	0.2	depth 0132	<0.02	<0.02	<0.02	<0.04	<10	<10	<10	<10	<10				
10-0134	West Barrel Cache	0.1		<0.02	<0.02	<0.02	<0.04	<10	<10	<10	61	21		Type A	82	
10-0135	West Barrel Cache	0.1		<0.02	<0.02	<0.02	<0.04	<10	<10	<10	230	120		Type A	350	
10-0136	West Barrel Cache	0.1		<0.02	<0.02	<0.02	<0.04	<10	<10	<10	21	<10		neither	21	21
10-0137	Sediment - East of East Barrel Cache	0.1	water sample W1	<0.02	<0.02	<0.02	<0.04	<10	<10	<10	<10	<10				
10-0138	Sediment - South of East Barrel Cache	0.1	water sample W3	<0.02	<0.02	<0.02	<0.04	<10	<10	<10	<10	<10				
10-0139	Sediment - South of Hamlet Area	0.1	water sample W4	<0.02	<0.02	<0.02	<0.04	<10	<10	<10	<10	<10				
10-0140	Test Pit - South of West Barrel Cache	0.1	duplicate 0141; water sample W6	<0.02	<0.02	<0.02	<0.04	17	17	1200	400	42		Type B		**1617**
10-0141	Test Pit - South of West Barrel Cache	0.1	duplicate 0140; water sample W6	<0.02	<0.02	<0.02	<0.04	<10	<10	420	410	<10		Type B		**830**
10-0142	Test Pit - South of West Barrel Cache	0.4	depth 0140/41; water sample W6	<0.02	<0.02	<0.02	<0.04	330	330	4200	1300	110		Type B		**5830**
10-0143	Sediment - South of West Barrel Cache	0.1	water sample W5	<0.02	<0.02	<0.02	<0.04	<10	<10	<10	<10	<10				
10-0144	Sediment - Freshwater Lake	0.1	water sample W7	<0.02	<0.02	<0.02	<0.04	<10	<10	<10	<10	<10				
10-0145	Station Area South Mound - DGTP #1	0.1		<0.002	<0.002	<0.002	<0.002	<10	<10	93	54	14		Type B		147
10-0146	Station Area South Mound - DGTP #1	0.6		<0.002	<0.002	<0.002	<0.002	<10	<10	16	<10	<10		Type B		16
10-0147	Station Area South Mound - UGTP	0.1		<0.002	<0.002	<0.002	<0.002	<10	<10	<10	150	83	<100	Type A	233	
10-0148	Station Area South Mound - UGTP	0.65		<0.002	<0.002	<0.002	<0.002	<10	<10	<10	<10	<10				
10-0149	Station Area South Mound - DGTP #2	0.1		<0.002	<0.002	<0.002	<0.002	<10	<10	130	300	21		Type B		430
10-0150	Station Area South Mound - DGTP #2	0.6	duplicate 0151	<0.002	<0.002	<0.002	<0.002	<10	<10	110	46	<10		Type B		156

Table B3: Soil and Sediment PHC Results

Sample #	Area	Depth [m]	Comments	Benzene [mg/kg]	Toluene [mg/kg]	Ethylbenzene [mg/kg]	Xylene [mg/kg]	F1 [mg/kg]	F1 minus BTEX [mg/kg]	F2 [mg/kg]	F3 [mg/kg]	F4 [mg/kg]	F4G[4] [mg/kg]	Total TPH		
														Dominant TPH Type	TYPE A [mg/kg]	TYPE B [mg/kg]
PHCs - Protection of Freshwater Aquatic Life [1]									**1290**	**330**						**330**
PHCs - Protection of Terrestrial Wildlife [2]																**2500**
PHCs - Human Health										**11000**	**20000**				**20000**	
PHCs - Management Limit [3]																**5000**
10-0151	Station Area South Mound - DGTP #2	0.6	duplicate 0150	<0.002	<0.002	<0.002	<0.002	<10	<10	350	100	<10		Type B		450
10-0152	Station Area South Mound - DGTP #3	0.1		<0.002	<0.002	<0.002	<0.002	<10	<10	<10	15	<10		neither	15	15
10-0153	Station Area South Mound - DGTP #3	0.5		<0.002	<0.002	<0.002	<0.002	<10	<10	<10	<10	<10				
10-0154	Original Hamlet Site - UGTP	0.1		<0.002	<0.002	<0.002	<0.002	<10	<10	<10	75	66	300	Type A	375	
10-0155	Original Hamlet Site - UGTP	0.6		<0.002	<0.002	<0.002	<0.002	<10	<10	<10	<10	<10				
10-0156	Original Hamlet Site - DGTP	0.1		<0.002	<0.002	<0.002	<0.002	<10	<10	<10	25	20		Type A	45	
10-0157	Original Hamlet Site - DGTP	0.55		<0.002	<0.002	<0.002	<0.002	<10	<10	<10	<10	<10				

Notes:

[1] Within 30 m of a water body

[2] For surface soils to 0.5 m depth

[3] Below 0.5 m depth, a value of 5000 mg/kg may be applied based on professional judgement

[4] In cases where results for both F4 and F4G were reported, the greater of the two results was used for classification purposes.
Samples with no results were collected and put on hold at the laboratory to be analyzed as needed.
All PHC Remedial Objectives were obtained from the Abandoned Military Site Remediation Protocol (INAC 2009)

Table B4: Barrel Results

Sample #	Comments	Alcohol							Glycol				Aroclor 1242 [mg/kg]	Aroclor 1254 [mg/kg]	Aroclor 1260 [mg/kg]	PCB Total [mg/kg]	Chlorine [mg/L]	Cadmium [ppm]	Chromium [ppm]	Lead [ppm]
		Methanol [%]	Ethanol [%]	1-Propanol [%]	n-Propanol [%]	1-Butanol [%]	n-Butanol [%]	Total Alcohol [%]	Ethylene Glycol [%]	Propylene Glycol [%]	Triethylene Glycol [%]	Total Glycols [%]								
Barrel Protocol Criteria [1]								**2**				**2**				**2**	**1000**	**2**	**10**	**100**
B1	Aqueous - clear	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3	<0.5	<0.5	<0.5	<0.5	5	<0.02	<0.05	<0.1
B22	Aqueous - light brown silt	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3	<1	<1	<1	<1	3	<0.2	0.8	<1
B201	Aqueous - light brown silt	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3	<0.5	<0.5	<0.5	<0.5	97	<0.2	0.7	<1
B204	Aqueous - light brown silt/rusty sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3	<0.5	<0.5	<0.5	<0.5	8	<0.02	0.06	<0.1
B219	Aqueous - light brown silt/rusty sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3	<0.5	<0.5	<0.5	<0.5	7	<0.2	3.0	<1
B291	Aqueous - rusty sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3	<0.5	<0.5	<0.5	<0.5	9	<0.02	<0.05	<0.1
B301	Aqueous - rusty sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3	<0.5	<0.5	<0.5	<0.5	6	<0.2	1.2	<1
B303	Aqueous - rusty sediment	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.3	<0.5	<0.5	<0.5	<0.5	8	<0.2	3.5	<1

Notes:

(1) Barrel Protocol Criteria and Disposal Summary (INAC 2009)

Table B5: Structural PCB and Lead Results

AECOM

Sample #	Area	Comments	Pb [%]	Lead Leachable [mg/L]	Aroclor 1242 [mg/kg]	Aroclor 1254 [mg/kg]	Aroclor 1260 [mg/kg]	PCB Total [mg/kg]
CEPA[1]								**50**
TDG for Leachable Lead[2]				**5**				
P1	Generator Building - Orange Generator	orange paint	26		<0.1	0.7	0.1	0.8
P2	Generator Building - Yellow Generator	yellow paint	35		<0.3	<0.3	<0.3	<0.3
P3	South of Maintenance Garage	mint green paint	0.99	<0.1	<0.1	<0.1	<0.1	<0.1
C1	Old Generator Building - Southern Concrete Block	concrete was stained, not painted			<0.1	<0.1	<0.1	<0.1
C2	Generator Building	concrete was stained, not painted			<0.1	0.2	<0.1	0.2

Notes:

(1) Canadian Environmental Protection Act, 1999

(2) Transportation of Dangerous Goods Regulations (SOR/2008-34)

Table B6: Water Routine Results

Sample #	Area	Comments	Alkalinity (Total as CaCO3) [mg/L]	Hardness [mg/L]	Ion Balance [%]	Electrical Conductivity [umho/cm]	TDS [mg/L]	Orthophosphate [mg/L]	pH	Sulfate [mg/L]	Chloride [mg/L]	Nitrite-N [mg/L]	Nitrate-N [mg/L]	Nitrate + Nitrite-N [mg/L]
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine (December, 2007)									**7.0-8.7**				**3.600**	
W1	Ocean - East of East Barrel Cache	associated sediment sample 0137	96	4500	8.09	43400	27300	0.01	7.9	2100	16000	<0.01	<0.1	<0.1
W3	Ocean - South of East Barrel Cache	associated sediment sample 0138	92	4500	4.78	42600	27200	0.01	7.8	2000	16000	<0.01	<0.1	<0.1
W4	Ocean - South of Hamlet Area	associated sediment sample 0139	98	4900	3.62	44500	27800	0.02	7.9	2200	17000	<0.01	<0.1	<0.1
W5	Ocean - South of West Barrel Cache	associated sediment sample 0143	96	4600	3.5	43300	27900	0.01	7.8	2100	15000	<0.01	<0.1	<0.1
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (December, 2007)									**6.5-9**			**0.060**	**2.900**	
Guidelines for Canadian Drinking Water Quality (May, 2008)							**500**		**6.5-8.5**	**500**	**250**	**3.2**	**10**	
W2	Test Pit - South of East Barrel Cache	associated soil samples 0124 and 0125	4	2	NC	40	26	<0.01	6.9	1	6	<0.01	0.1	0.1
W6	Test Pit - South of West Barrel Cache	associated soil samples 0140/41 and 0142	25	2	NC	112	68	0.02	6.8	1	15	<0.01	<0.1	<0.1
W7	Freshwater Lake	associated sediment sample 0144	2	3	NC	26	16	<0.01	**6.1**	<1	5	<0.01	<0.1	<0.1
FB	Collected at Freshwater Lake		<1	<1	NC	2	<10	<0.01	**5.7**	<1	<1	<0.01	<0.1	<0.1

Table B7: Water Element Results

Sample #	Area	Comments	Aluminum [mg/L]	Antimony [mg/L]	Arsenic [mg/L]	Barium [mg/L]	Beryllium [mg/L]	Bismuth [mg/L]	Boron [mg/L]	Cadmium [mg/L]	Calcium [mg/L]	Chromium [mg/L]	Cobalt [mg/L]	Copper [mg/L]	Iron [mg/L]	Lead [mg/L]	Magnesium [mg/L]
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine (December, 2007)					**0.0125**					**0.00012**		**0.056[1]**					
W1	Ocean - East of East Barrel Cache	associated sediment sample 0137	<0.1	<0.01	<0.02	<0.1	<0.01	<0.02	3.7	<0.002	350	<0.1	<0.01	<0.02	<2	<0.01	1100
W3	Ocean - South of East Barrel Cache	associated sediment sample 0138	<0.1	<0.0005	<0.02	<0.1	<0.01	<0.02	3.8	<0.002	340	<0.1	<0.01	<0.02	<2	<0.01	1100
W4	Ocean - South of Hamlet Area	associated sediment sample 0139	<0.1	<0.0005	<0.02	<0.1	<0.01	<0.02	3.8	<0.002	360	<0.1	<0.01	<0.02	<2	<0.01	1100
W5	Ocean - South of West Barrel Cache	associated sediment sample 0143	<0.1	<0.01	<0.02	<0.1	<0.01	<0.02	3.9	<0.002	340	<0.1	<0.01	<0.02	<2	<0.01	1100
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (December, 2007)			**0.1[2]**		**0.0050**					**0.000017**		**0.0089[1]**		**0.002[3]**	**0.300**	**0.001[4]**	
Guidelines for Canadian Drinking Water Quality (May, 2008)				**0.006**	**0.010**	**1**			**5**	**0.005**		**0.05**		**1.0**	**0.3**	**0.01**	
W2	Test Pit - South of East Barrel Cache	associated soil samples 0124 and 0125	0.015	<0.0005	<0.001	<0.005	<0.0005	<0.001	<0.010	<0.0001	0.40	<0.005	<0.0005	<0.001	<0.1	<0.0005	0.38
W6	Test Pit - South of West Barrel Cache	associated soil samples 0140/41 and 0142	**1.3**	0.0008	<0.001	0.015	<0.0005	<0.001	0.016	<0.0001	<0.2	<0.005	0.0007	**0.011**	**4.0**	**0.0026**	0.57
W7	Freshwater Lake	associated sediment sample 0144	0.006	<0.0005	<0.001	<0.005	<0.0005	<0.001	<0.010	<0.0001	0.74	<0.005	<0.0005	<0.001	<0.1	<0.0005	0.53
FB	Collected at Freshwater Lake		<0.005	<0.0005	<0.001	<0.005	<0.0005	<0.001	<0.01	<0.0001	<0.2	<0.005	<0.0005	<0.001	<0.1	<0.0005	<0.05

Sample #	Area	Comments	Manganese [mg/L]	Molybdenum [mg/L]	Nickel [mg/L]	Phosphorous [mg/L]	Potassium [mg/L]	Selenium [mg/L]	Silicon [mg/L]	Silver [mg/L]	Sodium [mg/L]	Strontium [mg/L]	Sulphur [6] [mg/L]	Tin [mg/L]	Titanium [mg/L]	Vanadium [mg/L]	Zinc [mg/L]
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine (December, 2007)																	
W1	Ocean - East of East Barrel Cache	associated sediment sample 0137	<0.04	<0.02	<0.02	<2	340	<0.04	<1	<0.002	9300	6.1	652	<0.02	<0.1	0.026	<0.1
W3	Ocean - South of East Barrel Cache	associated sediment sample 0138	<0.04	<0.02	<0.02	<2	330	<0.04	<1	<0.002	9100	5.9	663	<0.02	<0.1	0.039	<0.1
W4	Ocean - South of Hamlet Area	associated sediment sample 0139	<0.04	<0.02	<0.02	<2	340	<0.04	<1	<0.002	9400	6.2	704	<0.02	<0.1	0.049	<0.1
W5	Ocean - South of West Barrel Cache	associated sediment sample 0143	<0.04	<0.02	<0.02	<2	340	<0.04	<1	<0.002	9300	6.2	671	<0.02	<0.1	0.050	<0.1
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (December, 2007)				**0.073**	**0.025[5]**			**0.0010**		**0.0001**							**0.030**
Guidelines for Canadian Drinking Water Quality (May, 2008)			**0.05**					**0.01**			**200**						**5**
W2	Test Pit - South of East Barrel Cache	associated soil samples 0124 and 0125	<0.002	<0.001	<0.001	<0.1	0.66	<0.002	1.3	<0.0001	5.0	0.002	<0.5	<0.001	<0.005	<0.001	<0.005
W6	Test Pit - South of West Barrel Cache	associated soil samples 0140/41 and 0142	0.014	<0.002	0.004	0.11	2	<0.002	8.1	<0.0001	22.0	0.002	1.1	<0.001	0.12	0.01	<0.005
W7	Freshwater Lake	associated sediment sample 0144	<0.002	<0.001	<0.001	<0.1	0.45	<0.002	0.23	<0.0001	2.7	0.004	<0.5	<0.001	<0.005	<0.001	<0.005
FB	Collected at Freshwater Lake		<0.002	<0.001	<0.001	<0.1	<0.2	<0.002	<0.05	<0.0001	0.19	<0.001	<0.5	<0.001	<0.005	<0.001	<0.005

Notes:

(1) Chromium guideline for Trivalent chromium (Cr(III))

(2) Aluminum guideline for pH at ≥6.5

(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

(6) Sulphur results are from lab report B0B0720. All other results are from lab report B0E2456 where samples were reanalyzed to obtain lower detection limits.

Detection limit exceeds applicable guideline.

Table B8: Water PCB Results

AECOM

Sample #	Area	Comments	Aroclor 1242 [ug/L]	Aroclor 1254 [ug/L]	Aroclor 1260 [ug/L]	PCB Total [ug/L]
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine (December, 2007)						
W1	Ocean - East of East Barrel Cache	associated sediment sample 0137	<0.05	<0.05	<0.05	<0.05
W3	Ocean - South of East Barrel Cache	associated sediment sample 0138	<0.05	<0.05	<0.05	<0.05
W4	Ocean - South of Hamlet Area	associated sediment sample 0139	<0.05	<0.05	<0.05	<0.05
W5	Ocean - South of West Barrel Cache	associated sediment sample 0143	<0.05	<0.05	<0.05	<0.05
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (December, 2007)						
Guidelines for Canadian Drinking Water Quality (May, 2008)						
W2	Test Pit - South of East Barrel Cache	associated soil samples 0124 and 0125	<0.05	<0.05	<0.05	<0.05
W6	Test Pit - South of West Barrel Cache	associated soil samples 0140/41 and 0142	<0.05	0.28	<0.05	0.28
W7	Freshwater Lake	associated sediment sample 0144	<0.05	<0.05	<0.05	<0.05
FB	Collected at Freshwater Lake		<0.05	<0.05	<0.05	<0.05

Table B9: Water PHC Results

Sample #	Area	Comments	Benzene [ug/L]	Toluene [ug/L]	Ethylbenzene [ug/L]	Xylene [ug/L]	F1 [ug/L]	F1 minus BTEX [ug/L]	F2 [ug/L]	F3 [ug/L]	F4 [ug/L]
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine (December, 2007)			**0.110**	**0.215**	**0.025**						
W1	Ocean - East of East Barrel Cache	associated sediment sample 0137	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	<100
W3	Ocean - South of East Barrel Cache	associated sediment sample 0138	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	<100
W4	Ocean - South of Hamlet Area	associated sediment sample 0139	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	<100
W5	Ocean - South of West Barrel Cache	associated sediment sample 0143	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	<100
Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater (December, 2007)			**0.370**	**0.0020**	**0.090**						
Guidelines for Canadian Drinking Water Quality (May, 2008)			**5**	**24**	**2.4**	**300**					
W2	Test Pit - South of East Barrel Cache	associated soil samples 0124 and 0125	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	<100
W6	Test Pit - South of West Barrel Cache	associated soil samples 0140/41 and 0142	<0.2	<0.2	<0.2	<0.4	110	110	18000	2500	220
W7	Freshwater Lake	associated sediment sample 0144	<0.2	<0.2	<0.2	<0.4	<100	<100	<100	<100	<100
FB	Collected at Freshwater Lake		<0.2	<0.2	<0.2	<0.4	<100	<100	N/A	N/A	N/A

Table B10: QA/QC Results

Sample #	Area	Metals								PCBs				PHCs								
		As [mg/kg]	Cd [mg/kg]	Cr [mg/kg]	Co [mg/kg]	Cu [mg/kg]	Pb [mg/kg]	Ni [mg/kg]	Zn [mg/kg]	Aroclor 1242 [mg/kg]	Aroclor 1254 [mg/kg]	Aroclor 1260 [mg/kg]	PCB Total [mg/kg]	Benzene [mg/kg]	Toluene [mg/kg]	Ethylbenzene [mg/kg]	Xylene [mg/kg]	F1 [mg/kg]	F1 minus BTEX [mg/kg]	F2 [mg/kg]	F3 [mg/kg]	F4 [mg/kg]
Method Detection Limit		**1**	**0.1**	**1**	**0.1**	**0.5**	**1**	**0.5**	**5**	**0.01**	**0.01**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**	**0.04**	**10**	**10**	**10**	**10**	**10**
10-0020	Kitchen/Mess Hall	<1	<0.1	31	7.1	15	16	26	33													
10-0021	Kitchen/Mess Hall	<1	<0.1	29	6.4	16	19	23	44													
	RPD	N/A	N/A	7	10	6	17	12	**29**													
10-0030	Kitchen/Mess Hall	<1	0.2	45	8.9	23	73	37	78													
10-0031	Kitchen/Mess Hall	<1	0.2	46	8.8	24	64	36	80													
	RPD	N/A	**0**	2	1	4	13	3	3													
10-0040	Kitchen/Mess Hall	<1	<0.1	58	10	56	81	45	100	<0.01	<0.01	<0.01	<0.01									
10-0041	Kitchen/Mess Hall	<1	<0.1	53	9.6	49	60	45	96	<0.01	<0.01	<0.01	<0.01									
	RPD	N/A	N/A	9	4	13	30	0	4	N/A	N/A	N/A	N/A									
10-0050	Generator Building													<0.02	<0.02	<0.02	0.26	130	130	5500	26000	14000
10-0051	Generator Building													<0.02	<0.02	<0.02	0.23	110	110	6100	30000	16000
	RPD													N/A	N/A	N/A	**12**	17	17	10	14	13
10-0070	Maintenance Shed	<1	0.4	32	6.9	70	59	29	210					0.08	0.6	0.24	0.67	19	17	390	1900	680
10-0071	Maintenance Shed	<1	0.4	35	7.3	65	57	29	210					<0.02	0.21	0.09	0.34	76	75	430	1800	660
	RPD	N/A	**0**	9	6	7	3	0	0					N/A	**96**	**91**	**65**	**120**	**126**	10	5	3
10-0080	Boiler/Incinerator													<0.02	<0.02	<0.02	<0.04	<10	<10	73	77	<10
10-0081	Boiler/Incinerator													<0.02	<0.02	<0.02	<0.04	<10	<10	61	73	<10
	RPD													N/A	N/A	N/A	N/A	N/A	N/A	**18**	**5**	N/A
10-0090	Old Generator Building													<0.02	<0.02	<0.02	<0.04	42	42	2100	14000	3700
10-0091	Old Generator Building													<0.02	<0.02	<0.02	<0.04	95	95	1100	9100	2800
	RPD													N/A	N/A	N/A	N/A	**77**	**77**	**63**	42	28
10-0110	Metal Dump - Copper Wire	<1	0.2	47	7.9	29	5	30	56													
10-0111	Metal Dump - Copper Wire	<1	<0.1	47	8	25	4	31	45													
	RPD	N/A	N/A	0	1	15	**22**	3	**22**													
10-0120	Original Powerhouse						380		160													
10-0121	Original Powerhouse						10000		250													
	RPD						**185**		**44**													
10-0130	West Barrel Cache													<0.02	<0.02	<0.02	<0.04	<10	<10	<10	71	31
10-0131	West Barrel Cache													<0.02	<0.02	<0.02	<0.04	<10	<10	<10	96	31
	RPD													N/A	N/A	N/A	N/A	N/A	N/A	N/A	**30**	**0**
10-0140	Test Pit - South of West Barrel Cache	<1	<0.1	4	1.4	5.3	24	6	22	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.04	17	17	1200	400	42
10-0141	Test Pit - South of West Barrel Cache	<1	<0.1	6	1.8	6.8	21	7.1	25	<0.01	0.35	0.07	0.42	<0.02	<0.02	<0.02	<0.04	<10	<10	420	410	<10
	RPD	N/A	N/A	**40**	25	25	13	17	**13**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**96**	2	N/A
10-0150	Station Area South Mound - DGTP #2	<1	<0.1	24	6	14	2	19	24	<0.01	<0.01	<0.01	<0.01	<0.002	<0.002	<0.002	<0.002	<10	<10	110	46	<10
10-0151	Station Area South Mound - DGTP #2	<1	<0.1	29	6.6	19	2	23	30	<0.01	<0.01	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<10	<10	350	100	<10
	RPD	N/A	N/A	19	10	30	**0**	19	**22**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**104**	**74**	N/A
	Average RPD for the Site	N/A	0	12	8	14	**36**	8	17	N/A	N/A	N/A	N/A	N/A	**96**	**91**	39	**71**	**73**	**50**	25	11

Notes:

N/A RPD not calculated because results are less than method detection limit

RPD Relative Percent Difference

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

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

BOLD Indicates the RPD exceeds the recommended alert criteria (when the concentrations are at least ten times the method detection limit).

BOLD Indicates that concentrations are <10 times the method detection limit; therefore the calculated RPD is not strictly valid.

Appendix C

Photographs

PHOTOGRAPHIC LOG

Site Name: Padloping Island	Site Location: Padloping Island, NU	Project No. 60158472

Photo No.	Date:
IMG_0454	11-Aug-10

Direction Photo Taken:

West

Description:

Library /Shower and Washroom Building Foundation and Debris Area

Photo No.	Date:
IMG_3482	03-Aug-10

Direction Photo Taken:

North

Description:

Boiler/Incinerator Foundation and Debris Area: samples collected on south side of building remains

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
Padloping Island	Padloping Island, NU	60158472

Photo No.	Date:
IMG_3481	03-Aug-10

Direction Photo Taken:

North

Description:

Generator Building Foundation and Debris Areas: Type A TPH stain in forefront

Photo No.	Date:
IMG_3548	08-Aug-10

Direction Photo Taken:

South

Description:

Maintenance Garage Foundation and Debris Area: samples collected on south and west sides of building remains

PHOTOGRAPHIC LOG

AECOM

Site Name: Padloping Island	Site Location: Padloping Island, NU	Project No. 60158472

Photo No. IMG_0461 | **Date:** 11-Aug-10

Direction Photo Taken:

South

Description:

Debris Area 3: includes the Weather Building Foundation and Associated Debris: Contaminated soil area is delineated by debris extending northeast

Photo No. IMG_3515 | **Date:** 06-Aug-10

Direction Photo Taken:

Northeast

Description:

Kitchen/Mess Hall Foundation and Debris Area: fallen concrete chimney limited delineation sampling on southeast corner

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
Padloping Island	Padloping Island, NU	60158472

Photo No.	Date:
IMG_3529	08-Aug-10

Direction Photo Taken:

East

Description:

Storage Container and Debris Area

Photo No.	Date:
IMG_3525	08-Aug-10

Direction Photo Taken:

West

Description:

Shower/Washrooms Building Foundation and Debris Area: samples collected on east and west sides of metal framing

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
Padloping Island	Padloping Island, NU	60158472

Photo No.	Date:
IMG_3536	08-Aug-10

Direction Photo Taken:

Northwest

Description:

Accomodations Building Foundation and Debris Area.

Photo No.	Date:
IMG_0460	11-Aug-10

Direction Photo Taken:

Northeast

Description:

Supply Depot Foundation and Debris Area

PHOTOGRAPHIC LOG

AECOM

Site Name:	Site Location:	Project No.
Padloping Island	Padloping Island, NU	60158472

Photo No.	Date:
IMG_0472	11-Aug-10

Direction Photo Taken:

Northeast

Description:

Old Generator Building, batteries located southwest of the cement supports

Photo No.	Date:
IMG_3509	06-Aug-10

Direction Photo Taken:

Northwest

Description:

Freshwater Lake, water and sediment samples collected from nearest side of lake

PHOTOGRAPHIC LOG

Site Name: Padloping Island	Site Location: Padloping Island, NU	Project No. 60158472

Photo No. IMG_3475 **Date:** 03-Aug-10

Direction Photo Taken:

Southeast

Description:

Metal Dump Debris Area

Photo No. IMG_0464 **Date:** 11-Aug-10

Direction Photo Taken:

Northeast

Description:

Debris Area 1: East of Main Station

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
Padloping Island	Padloping Island, NU	60158472

Photo No.	Date:
IMG_0466	11-Aug-10

Direction Photo Taken:

Southwest

Description:

Debris Area 2: Main Station Area – South of Generator Building

Photo No.	Date:
IMG_0470	11-Aug-10

Direction Photo Taken:

West

Description:

Debris Area 4: Former Water Tank Building Site – South of Main Station Area

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
Padloping Island	Padloping Island, NU	60158472

Photo No.	Date:
IMG_0474	11-Aug-10

Direction Photo Taken:

Southeast

Description:

Debris Area 5: South of Main Station Area

Photo No.	Date:
IMG_0477	11-Aug-10

Direction Photo Taken:

Northeast

Description:

Debris Area 6: South of Main Station Area

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
Padloping Island	Padloping Island, NU	60158472

Photo No.	Date:
IMG_0480	11-Aug-10

Direction Photo Taken:

North

Description:

Debris Area 7: South of Main Station Area

Photo No.	Date:
IMG_0482	11-Aug-10

Direction Photo Taken:

Southwest

Description:

Debris Area 8: Metal Dump Area

PHOTOGRAPHIC LOG

Site Name: Padloping Island	**Site Location:** Padloping Island, NU	**Project No.** 60158472

Photo No. IMG_0483 / **Date:** 11-Aug-10 **Direction Photo Taken:** Southeast **Description:** Debris Area 9: Metal Dump Area	
Photo No. IMG_0484 / **Date:** 11-Aug-10 **Direction Photo Taken:** Northwest **Description:** Debris Area 9: Asbestos Floor Tiles	

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
Padloping Island	Padloping Island, NU	60158472

Photo No.	Date:
IMG_0491	11-Aug-10

Direction Photo Taken:

Southeast

Description:

Debris Area 10: West Beach Area - Main Crushed Barrel Pile

Photo No.	Date:
IMG-0485	11-Aug-10

Direction Photo Taken:

East

Description:

Debris Area 10: West Beach Area - West Crushed Barrel Pile

PHOTOGRAPHIC LOG

Site Name: Padloping Island	Site Location: Padloping Island, NU	Project No. 60158472

Photo No.	Date:
IMG_0489	11-Aug-10

Direction Photo Taken:

Northeast

Description:

Debris Area 11: West Beach Area – Submerged or Partial Submerged Barges (2) and Metal Chassis

Photo No.	Date:
IMG-3535	08-Aug-10

Direction Photo Taken:

West

Description:

Debris Area 11: West Beach Area – Partially Submerged Barge

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
Padloping Island	Padloping Island, NU	60158472

Photo No.	Date:
IMG_0498	11-Aug-10

Direction Photo Taken:

Southwest

Description:

Debris Area 12: South of Main Station Area

Photo No.	Date:
IMG-0504	12-Aug-10

Direction Photo Taken:

West

Description:

Debris Area 13: Old Hamlet Site – Concentrated Debris

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
Padloping Island	Padloping Island, NU	60158472

Photo No.	Date:	
IMG_0505	12-Aug-10	
Direction Photo Taken: Southwest		
Description: Debris Area 13: Old Hamlet Site – Overall Area		

Photo No.	Date:	
IMG-0509	12-Aug-10	
Direction Photo Taken: South		
Description: Debris Area 14: Original Station Site – Wet ground Conditions at Original Powerhouse.		

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
Padloping Island	Padloping Island, NU	60158472

Photo No.	Date:
IMG_3485	03-Aug-10

Direction Photo Taken:

Southeast

Description:

Debris Area 15: Original Station Site – Crushed Barrel Piles

Photo No.	Date:
IMG_3483	03-Aug-10

Direction Photo Taken:

Northwest

Description:

Site Roads Debris Corridor

PHOTOGRAPHIC LOG		
Site Name: Padloping Island	**Site Location:** Padloping Island, NU	**Project No.** 60158472

Photo No. 113	**Date:** 08-Aug-10
Direction Photo Taken: West	
Description: Debris Area West of Main Station and Metal Dump Roads	

Photo No. E2	**Date:** 11-Aug-10
Direction Photo Taken: N/A	
Description: Test Pit South of West Barrel Cache, soil is stained and water has a sheen	

PHOTOGRAPHIC LOG

Site Name:	Site Location:	Project No.
Padloping Island	Padloping Island, NU	60158472

Photo No.	Date:
E6	12-Aug-10

Direction Photo Taken:

North

Description:

Main Station South Mound, Lobes H and I

Photo No.	Date:
E16	12-Aug-10

Direction Photo Taken:

South

Description:

Old Hamlet Site, Lobe D

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No. G112	Date: 12-Aug-10

Direction Photo Taken:

NW

Description:

Borrow Area 1

Looking towards freshwater lake

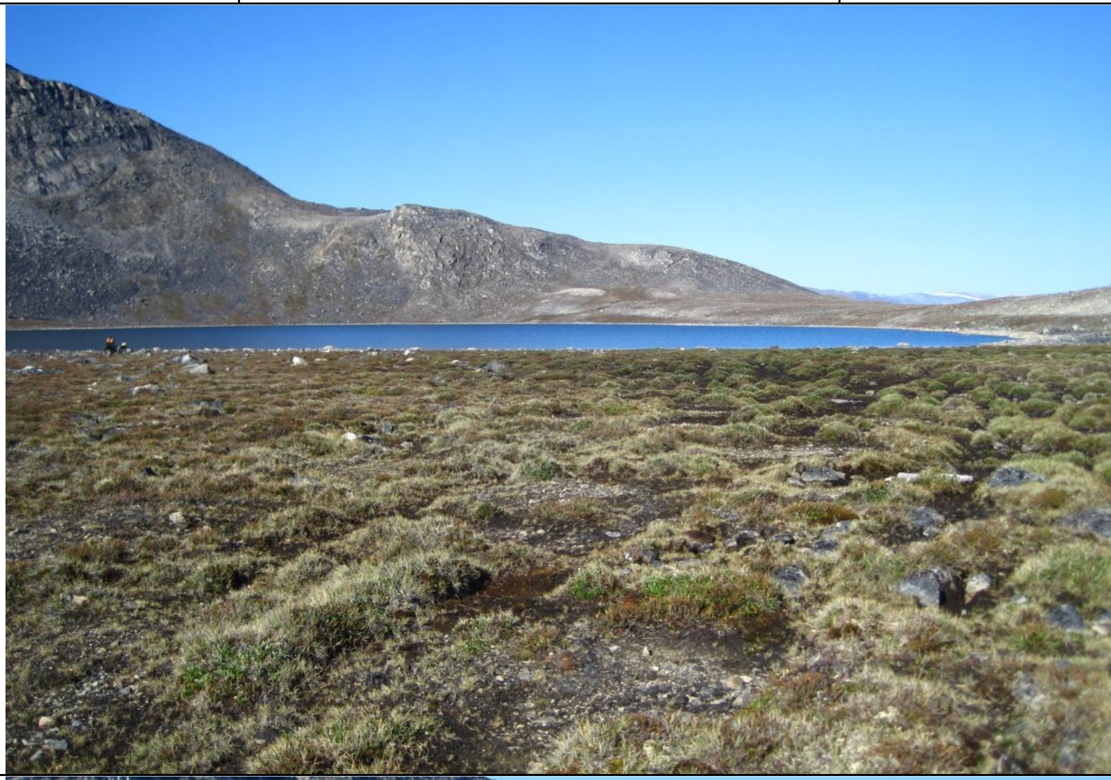


Photo No. G116	Date: 12-Aug-10

Direction Photo Taken:

SW

Description:

Borrow Area 1

Talus at toe of slope

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No. G118	Date: 12-Aug-10
Direction Photo Taken: NE	
Description: Borrow Area 1	

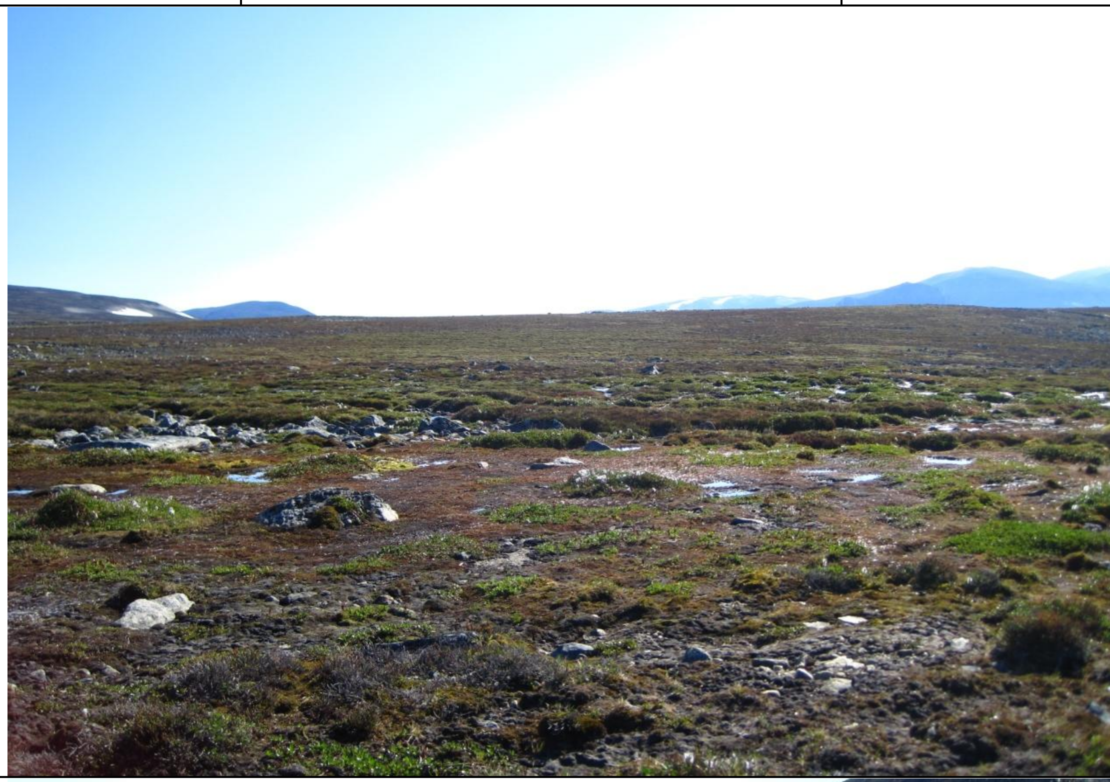


Photo No. G119	Date: 12-Aug-10
Direction Photo Taken: SE	
Description: Borrow Area 1 Drainage towards saltwater bay	

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No. G1	Date: 04-Aug-10
Direction Photo Taken:	
Description: Borrow Area 1 TP-01 Area	

Photo No. G4	Date: 04-Aug-10
Direction Photo Taken:	
Description: Borrow Area 1 TP-01	

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:
G7	04-Aug-10

Direction Photo Taken:

Description:

Borrow Area 1
TP-02 Profile

Photo No.	Date:
G8	08-Aug-10

Direction Photo Taken:

Description:

Borrow Area 1
TP-02 Seepage
(92 hours after digging)

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:
G9	04-Aug-10

Direction Photo Taken:

Description:

Borrow Area 1
TP-03 Area

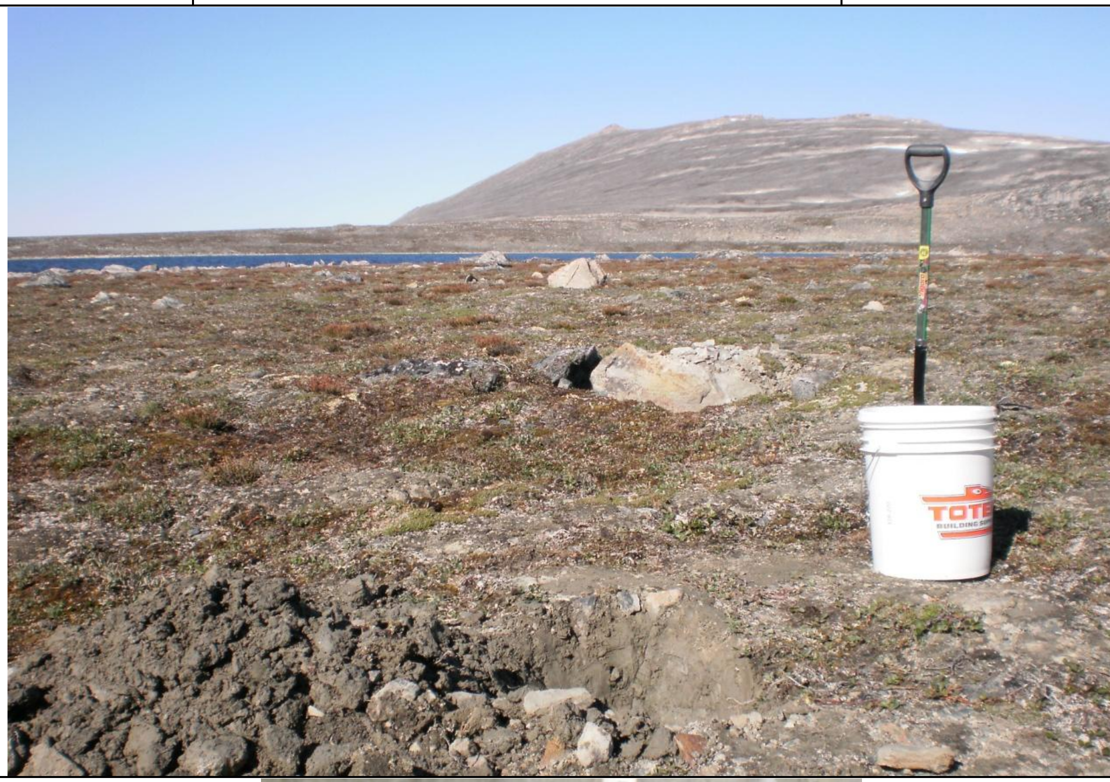


Photo No.	Date:
G11	04-Aug-10

Direction Photo Taken:

Description:

Borrow Area 1
TP-03 Profile

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No. G13	Date: 04-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 1 TP-04 Area		

Photo No. G14	Date: 04-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 1 TP-04 Profile		

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No. G72	**Date:** 11-Aug-10	
Direction Photo Taken: WNW		
Description: Borrow Area 2 Oversize material		
Photo No. G81	**Date:** 11-Aug-10	
Direction Photo Taken: N		
Description: Borrow Area 2 Small pond		

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

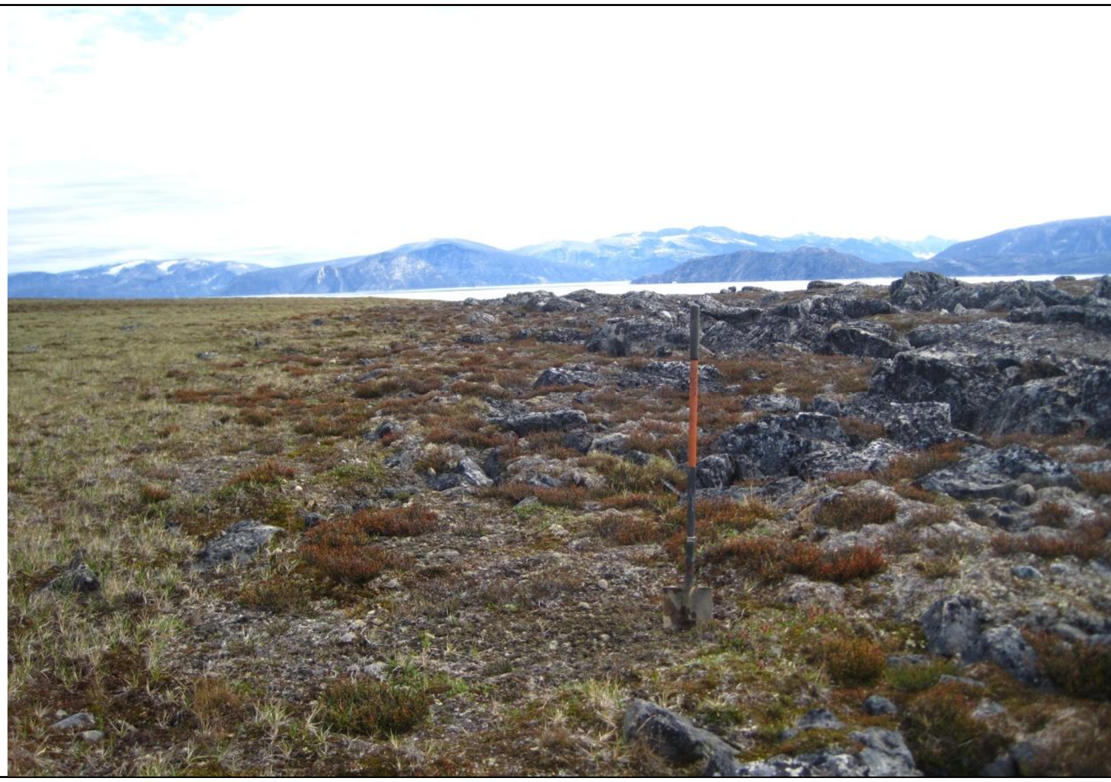
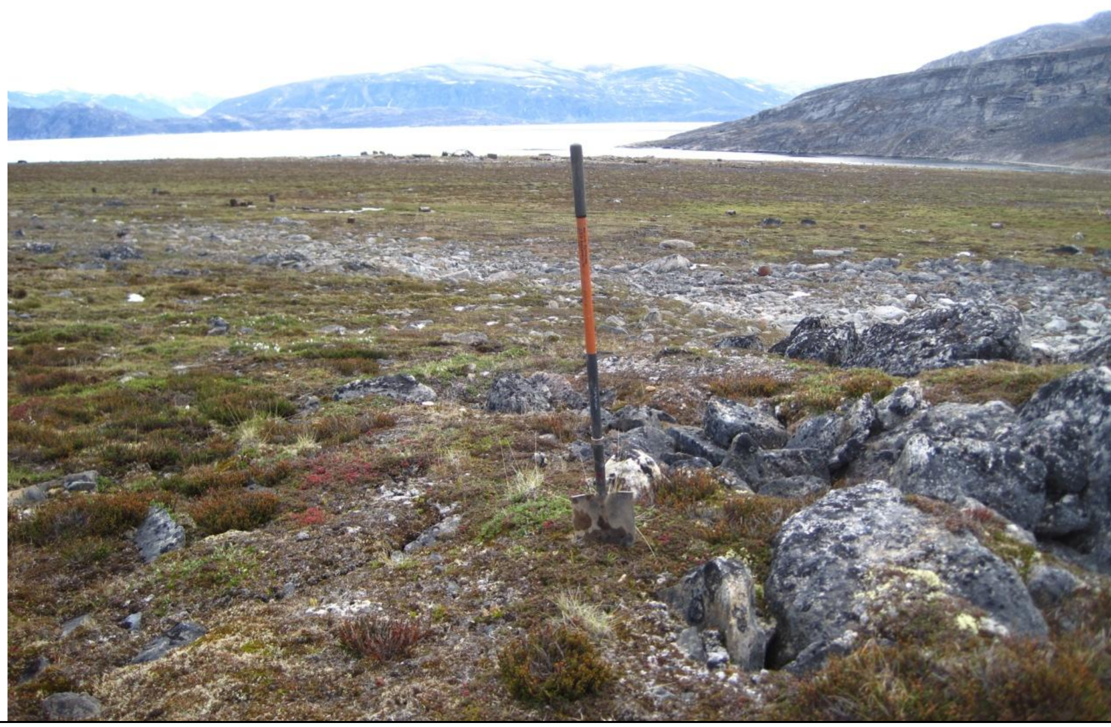
Photo No. G82	Date: 11-Aug-10	
Direction Photo Taken: E		
Description: Borrow Area 2		

Photo No. G85	Date: 11-Aug-10	
Direction Photo Taken: SSE		
Description: Borrow Area 2		

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No. G16	Date: 06-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 2 TP-05		

Photo No. G17	Date: 06-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 2 TP-05 Profile		

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:
G20	06-Aug-10

Direction Photo Taken:

Description:

Borrow Area 2
TP-06 Area

Photo No.	Date:
G21	06-Aug-10

Direction Photo Taken:

Description:

Borrow Area 2
TP-06 Profile

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:
G22	06-Aug-10

Direction Photo Taken:

Description:

Borrow Area 2
TP-07 Area

Photo No.	Date:
G23	06-Aug-10

Direction Photo Taken:

Description:

Borrow Area 2
TP-07 Profile

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:	
G37	08-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 2 TP-12 Profile		

Photo No.	Date:	
G38	08-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 2 TP-12 Area		

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No. G133	Date: 12-Aug-10
Direction Photo Taken: S	
Description: Borrow Area 3, Landfill 1 Drainage to ocean	

Photo No. G142	Date: 12-Aug-10
Direction Photo Taken: SW	
Description: Borrow Area 3, Landfill 1	

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:	
G32	06-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 3, Landfill 1 TP-10		

Photo No.	Date:	
G33	06-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 3, Landfill 1 TP-10 Profile		

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:
G34	06-Aug-10

Direction Photo Taken:

Description:

Borrow Area 3, Landfill 1
TP-11 Profile

Photo No.	Date:
G35	06-Aug-10

Direction Photo Taken:

Description:

Borrow Area 3, Landfill 1
TP-11 Area

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:
G44	10-Aug-10

Direction Photo Taken:

Description:

Borrow Area 3, Landfill 1
TP-15 Area

Photo No.	Date:
G45	10-Aug-10

Direction Photo Taken:

Description:

Borrow Area 3, Landfill 1
TP-15 Profile

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:	
G46	10-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 3, Landfill 1 TP-16 Area		

Photo No.	Date:	
G47	10-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 3, Landfill 1 TP-16 Profile		

PHOTOGRAPHIC LOG

AECOM

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No. G48 **Date:** 10-Aug-10

Direction Photo Taken:

Description:

Borrow Area 3, Landfill 1
TP-17 Profile

Photo No. G49 **Date:** 10-Aug-10

Direction Photo Taken:

Description:

Borrow Area 3, Landfill 1
TP-17 Area

PHOTOGRAPHIC LOG

AECOM

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:	
G40	08-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 4 TP-13 Profile		

Photo No.	Date:	
G41	08-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 4 TP-13		

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:	
G42	10-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 5, Landfill 3 TP-14 Profile		

Photo No.	Date:	
G43	10-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 5, Landfill 3 TP-14 Area		

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No. G26 **Date:** 06-Aug-10

Direction Photo Taken:

Description:

Borrow Area 6
TP-08

Photo No. G27 **Date:** 06-Aug-10

Direction Photo Taken:

Description:

Borrow Area 6
TP-08

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:	
G29	06-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 6 TP-09 Area		

Photo No.	Date:	
G30	06-Aug-10	
Direction Photo Taken:		
Description: Borrow Area 6 TP-09 Profile		

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No. G52 **Date:** 10-Aug-10

Direction Photo Taken:

Description:

Borrow Area 7, Landfill 2
TP-18 Profile

Photo No. G53 **Date:** 10-Aug-10

Direction Photo Taken:

Description:

Borrow Area 7, Landfill 2
TP-18 Area

PHOTOGRAPHIC LOG

Site Name: Padloping	Site Location: Padloping Island, Nunavut	Project No. 60158472

Photo No.	Date:
G55	10-Aug-10

Direction Photo Taken:

Description:

Borrow Area 7, Landfill 2
TP-19

Photo No.	Date:
G56	10-Aug-10

Direction Photo Taken:

Description:

Borrow Area 7, Landfill 2
TP-19 Material

Appendix D

Laboratory Reports

Your Project #: 60158472
Site#: 60158472
Site: PADLOPING SI
Your C.O.C. #: 20350401, 203504-0, 203504-1

Attention: Jenna Morrish - Calgary
AECOM Canada Ltd
17203-103 Ave
Edmonton, AB
T5S 1J4

Report Date: 2010/08/19

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0A9106
Received: 2010/08/12, 13:15

Sample Matrix: Soil
Samples Received: 74

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Petroleum Hydro. CCME F1 & BTEX in Soil [1]	11	2010/08/16	2010/08/16	CAM SOP-00315	CCME CWS
Petroleum Hydro. CCME F1 & BTEX in Soil [1]	17	2010/08/16	2010/08/17	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil [1]	10	2010/08/13	2010/08/16	CAM SOP-00316	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil [1]	17	2010/08/13	2010/08/17	CAM SOP-00316	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil [1]	1	2010/08/13	2010/08/18	CAM SOP-00316	CCME CWS
Total Metals in TCLP Leachate by ICPMS	2	2010/08/17	2010/08/17	CAM SOP-00447	EPA 6020
Acid Extr. Metals (aqua regia) by ICPMS [1]	60	2010/08/13	2010/08/17	CAM SOP-00447	EPA 6020
MOISTURE [1]	28	N/A	2010/08/16	CAM SOP-00445	MOE HANDBOOK(1983)
Moisture	3	N/A	2010/08/17	CAM SOP-00445	McKeague 2nd ed 1978
Polychlorinated Biphenyl in Soil	3	2010/08/16	2010/08/16	CAM SOP-00309	SW846 8082
Polychlorinated Biphenyl in Soil	2	2010/08/16	2010/08/17	CAM SOP-00309	SW846 8082
Polychlorinated Biphenyl in Soil	2	2010/08/16	2010/08/18	CAM SOP-00309	SW846 8082
Polychlorinated Biphenyl in Soil	4	2010/08/16	2010/08/19	CAM SOP-00309	SW846 8082
Sieve, 75um [2]	2	N/A	2010/08/17	CAM SOP-00467	
TCLP - % Solids	2	2010/08/16	2010/08/17	CAM SOP-00401	EPA 1311 modified
TCLP - EXTRACTION FLUID	2	N/A	2010/08/17	CAM SOP-00401	EPA 1311 modified
TCLP-INITIAL AND FINAL PH	2	N/A	2010/08/17	CAM SOP-00401	EPA 1311 modified

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Ottawa
(2) The Sieve test has been validated in accordance with ISO Guide 17025 requirements. SCC accreditation pending.

../2

Your Project #: 60158472
Site#: 60158472
Site: PADLOPING SI
Your C.O.C. #: 20350401, 203504-0, 203504-1

Attention: Jenna Morrish - Calgary
AECOM Canada Ltd
17203-103 Ave
Edmonton, AB
T5S 1J4

Report Date: 2010/08/19

CERTIFICATE OF ANALYSIS

-2-

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MARIJANE CRUZ, Project Manager
Email: Marijane.Cruz@maxxamanalytics.com
Phone# (905) 817-5756

==
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: 2

Driven by Service and Science

Maxxam Job #: B0A9106
Report Date: 2010/08/19

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

RESULTS OF ANALYSES OF SOIL

Maxxam ID		GU6989	GU7017	GU7018			GU7027	GU7035		
Sampling Date		2010/08/04	2010/08/06	2010/08/06			2010/08/06	2010/08/06		
COC Number		203504-0	203504-0	203504-0			203504-0	203504-0		
	Units	**10-0002**	**10-0024**	**10-0025**	**RDL**	**QC Batch**	**10-0032**	**10-0040**	**RDL**	**QC Batch**
Inorganics										
Moisture	%		13	13	0.2	2234418	15	20	1	2237148
Miscellaneous Parameters										
Grain Size	%	COARSE			N/A	2238017				
Sieve - #200 (<0.075mm)	%	17			N/A	2238017				
Sieve - #200 (>0.075mm)	%	83			N/A	2238017				

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GU7041			GU7043	GU7047	GU7048	GU7049		
Sampling Date		2010/08/06			2010/08/06	2010/08/06	2010/08/06	2010/08/06		
COC Number		203504-0			203504-0	203504-0	203504-0	203504-0		
	Units	**10-0041**	**RDL**	**QC Batch**	**10-0043**	**10-0047**	**10-0048**	**10-0049**	**RDL**	**QC Batch**
Inorganics										
Moisture	%	24	1	2237148	9.8	7.2	18	11	0.2	2234418

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GU7050	GU7069	GU7070	GU7071	GU7104	GU7112		
Sampling Date		2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06		
COC Number		203504-0	203504-0	203504-0	203504-0	203504-0	203504-0		
	Units	**10-0050**	**10-0051**	**10-0052**	**10-0053**	**10-0070**	**10-0068**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	15	12	13	9.7	11	15	0.2	2234418

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0A9106
Report Date: 2010/08/19

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

RESULTS OF ANALYSES OF SOIL

Maxxam ID		GU7113		GU7132	GU7133	GU7140	GU7141		
Sampling Date		2010/08/06		2010/08/06	2010/08/06	2010/08/08	2010/08/08		
COC Number		203504-0		203504-0	203504-0	203504-0	203504-0		
	Units	**10-0069**	**QC Batch**	**10-0071**	**10-0072**	**10-0079**	**10-0080**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	12	2234418	11	14	6.3	5.1	0.2	2234585

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GU7150	GU7151	GU7152	GU7156	GU7158	GU7159		
Sampling Date		2010/08/08	2010/08/08	2010/08/08	2010/08/08	2010/08/08	2010/08/08		
COC Number		203504-0	203504-0	203504-0	203504-0	203504-0	203504-0		
	Units	**10-0081**	**10-0082**	**10-0083**	**10-0087**	**10-0089**	**10-0090**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	7.2	11	13	15	20	15	0.2	2234585
Miscellaneous Parameters									
Grain Size	%						COARSE	N/A	2238017
Sieve - #200 (<0.075mm)	%						19	N/A	2238017
Sieve - #200 (>0.075mm)	%						81	N/A	2238017

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GU7165	GU7167	GU7168	GU7169	GU7173	GU7191		
Sampling Date		2010/08/08	2010/08/08	2010/08/08	2010/08/08	2010/08/08	2010/08/08		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0091**	**10-0093**	**10-0094**	**10-0095**	**10-0099**	**10-0112**	**RDL**	**QC Batch**
Inorganics									
Final pH	pH					4.97	4.97		2237310
Initial pH	pH					5.70	6.34		2237310
Moisture	%	12	14	15	11	20		0.2	2234585
TCLP - % Solids	%					100	100	0.2	2237303
TCLP Extraction Fluid	N/A					FLUID1	FLUID1		2237309

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0A9106
Report Date: 2010/08/19

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GU6988	GU6989	GU6990	GU6991	GU6993	GU6994		
Sampling Date		2010/08/04	2010/08/04	2010/08/04	2010/08/04	2010/08/04	2010/08/04		
COC Number		203504-0	203504-0	203504-0	203504-0	203504-0	203504-0		
	Units	**10-0001**	**10-0002**	**10-0003**	**10-0004**	**10-0006**	**10-0007**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	<1	<1	<1	1	2234436
Acid Extractable Cadmium (Cd)	ug/g	0.1	0.1	0.1	0.6	<0.1	<0.1	0.1	2234436
Acid Extractable Chromium (Cr)	ug/g	50	45	71	42	17	34	1	2234436
Acid Extractable Cobalt (Co)	ug/g	10	8.8	12	6.4	4.4	7.3	0.1	2234436
Acid Extractable Copper (Cu)	ug/g	150	130	130	580	15	26	0.5	2234436
Acid Extractable Lead (Pb)	ug/g	26	24	25	120	4	5	1	2234436
Acid Extractable Nickel (Ni)	ug/g	30	28	42	32	11	21	0.5	2234436
Acid Extractable Zinc (Zn)	ug/g	63	56	89	120	20	39	5	2234436

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GU6995	GU6996	GU7001	GU7002	GU7003	GU7004		
Sampling Date		2010/08/04	2010/08/04	2010/08/04	2010/08/04	2010/08/06	2010/08/06		
COC Number		203504-0	203504-0	203504-0	203504-0	203504-0	203504-0		
	Units	**10-0008**	**10-0009**	**10-0014**	**10-0015**	**10-0016**	**10-0017**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	<1	<1	<1	1	2234436
Acid Extractable Cadmium (Cd)	ug/g	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	2234436
Acid Extractable Chromium (Cr)	ug/g	26	37	16	20	19	21	1	2234436
Acid Extractable Cobalt (Co)	ug/g	5.7	7.8	3.4	4.7	4.1	4.9	0.1	2234436
Acid Extractable Copper (Cu)	ug/g	24	46	9.1	15	7.1	8.6	0.5	2234436
Acid Extractable Lead (Pb)	ug/g	8	31	2	4	3	4	1	2234436
Acid Extractable Nickel (Ni)	ug/g	16	24	9.8	13	15	16	0.5	2234436
Acid Extractable Zinc (Zn)	ug/g	33	58	18	24	19	35	5	2234436

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0A9106
Report Date: 2010/08/19

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GU7006	GU7007	GU7014	GU7015	GU7017	GU7018		
Sampling Date		2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06		
COC Number		203504-0	203504-0	203504-0	203504-0	203504-0	203504-0		
	Units	**10-0019**	**10-0020**	**10-0021**	**10-0022**	**10-0024**	**10-0025**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	<1	<1	<1	1	2234436
Acid Extractable Cadmium (Cd)	ug/g	1.1	<0.1	<0.1	<0.1	0.9	0.4	0.1	2234436
Acid Extractable Chromium (Cr)	ug/g	27	31	29	23	44	14	1	2234436
Acid Extractable Cobalt (Co)	ug/g	4.7	7.1	6.4	5.1	6.2	2.3	0.1	2234436
Acid Extractable Copper (Cu)	ug/g	20	15	16	11	42	11	0.5	2234436
Acid Extractable Lead (Pb)	ug/g	510	16	19	16	200	1500	1	2234436
Acid Extractable Nickel (Ni)	ug/g	20	26	23	19	31	8.6	0.5	2234436
Acid Extractable Zinc (Zn)	ug/g	290	33	44	24	110	220	5	2234436

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GU7019	GU7020		GU7022	GU7023	GU7026		
Sampling Date		2010/08/06	2010/08/06		2010/08/06	2010/08/06	2010/08/06		
COC Number		203504-0	203504-0		203504-0	203504-0	203504-0		
	Units	**10-0026**	**10-0027**	**QC Batch**	**10-0029**	**10-0030**	**10-0031**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	<1	<1	2234436	<1	<1	<1	1	2234583
Acid Extractable Cadmium (Cd)	ug/g	0.5	0.3	2234436	1.1	0.2	0.2	0.1	2234583
Acid Extractable Chromium (Cr)	ug/g	40	42	2234436	60	45	46	1	2234583
Acid Extractable Cobalt (Co)	ug/g	6.5	7.3	2234436	11	8.9	8.8	0.1	2234583
Acid Extractable Copper (Cu)	ug/g	24	20	2234436	63	23	24	0.5	2234583
Acid Extractable Lead (Pb)	ug/g	84	36	2234436	1300	73	64	1	2234583
Acid Extractable Nickel (Ni)	ug/g	30	32	2234436	40	37	36	0.5	2234583
Acid Extractable Zinc (Zn)	ug/g	140	79	2234436	560	78	80	5	2234583

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0A9106
Report Date: 2010/08/19

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GU7027	GU7028	GU7029	GU7030	GU7031	GU7032		
Sampling Date		2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06		
COC Number		203504-0	203504-0	203504-0	203504-0	203504-0	203504-0		
	Units	**10-0032**	**10-0033**	**10-0034**	**10-0035**	**10-0036**	**10-0037**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	<1	<1	<1	1	2234583
Acid Extractable Cadmium (Cd)	ug/g	0.4	7.2	<0.1	<0.1	0.3	<0.1	0.1	2234583
Acid Extractable Chromium (Cr)	ug/g	61	56	34	45	62	25	1	2234583
Acid Extractable Cobalt (Co)	ug/g	11	11	6.0	7.0	12	5.5	0.1	2234583
Acid Extractable Copper (Cu)	ug/g	21	51	12	15	27	16	0.5	2234583
Acid Extractable Lead (Pb)	ug/g	71	250	11	6	80	10	1	2234583
Acid Extractable Nickel (Ni)	ug/g	52	40	24	32	52	20	0.5	2234583
Acid Extractable Zinc (Zn)	ug/g	110	260	37	35	110	29	5	2234583

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GU7033	GU7035	GU7041	GU7043	GU7047	GU7049		
Sampling Date		2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06		
COC Number		203504-0	203504-0	203504-0	203504-0	203504-0	203504-0		
	Units	**10-0038**	**10-0040**	**10-0041**	**10-0043**	**10-0047**	**10-0049**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	<1	<1	<1	1	2234583
Acid Extractable Cadmium (Cd)	ug/g	<0.1	<0.1	<0.1	0.2	0.2	0.3	0.1	2234583
Acid Extractable Chromium (Cr)	ug/g	80	58	53	26	29	50	1	2234583
Acid Extractable Cobalt (Co)	ug/g	13	10	9.6	4.6	5.9	8.7	0.1	2234583
Acid Extractable Copper (Cu)	ug/g	23	56	49	18	15	37	0.5	2234583
Acid Extractable Lead (Pb)	ug/g	6	81	60	580	21	62	1	2234583
Acid Extractable Nickel (Ni)	ug/g	70	45	45	18	19	40	0.5	2234583
Acid Extractable Zinc (Zn)	ug/g	48	100	96	90	200	110	5	2234583

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0A9106
Report Date: 2010/08/19

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GU7070	GU7071	GU7075	GU7076	GU7104		
Sampling Date		2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06		
COC Number		203504-0	203504-0	203504-0	203504-0	203504-0		
	Units	**10-0052**	**10-0053**	**10-0057**	**10-0058**	**10-0070**	**RDL**	**QC Batch**
Metals								
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	<1	<1	1	2234583
Acid Extractable Cadmium (Cd)	ug/g	0.2	0.1	0.3	0.3	0.4	0.1	2234583
Acid Extractable Chromium (Cr)	ug/g	40	23	38	36	32	1	2234583
Acid Extractable Cobalt (Co)	ug/g	7.5	4.2	8.4	7.7	6.9	0.1	2234583
Acid Extractable Copper (Cu)	ug/g	23	10	48	99	70	0.5	2234583
Acid Extractable Lead (Pb)	ug/g	93	12	54	75	59	1	2234583
Acid Extractable Nickel (Ni)	ug/g	26	13	29	25	29	0.5	2234583
Acid Extractable Zinc (Zn)	ug/g	92	44	110	110	210	5	2234583

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GU7107	GU7108	GU7112	GU7113	GU7132	GU7135		
Sampling Date		2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06		
COC Number		203504-0	203504-0	203504-0	203504-0	203504-0	203504-0		
	Units	**10-0063**	**10-0064**	**10-0068**	**10-0069**	**10-0071**	**10-0074**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	<1	<1	<1	1	2234588
Acid Extractable Cadmium (Cd)	ug/g	0.4	<0.1	0.5	1.3	0.4	0.4	0.1	2234588
Acid Extractable Chromium (Cr)	ug/g	36	35	37	32	35	39	1	2234588
Acid Extractable Cobalt (Co)	ug/g	8.3	7.9	6.9	6.4	7.3	8.3	0.1	2234588
Acid Extractable Copper (Cu)	ug/g	19	18	17	110	65	56	0.5	2234588
Acid Extractable Lead (Pb)	ug/g	7	15	21	120	57	140	1	2234588
Acid Extractable Nickel (Ni)	ug/g	23	23	20	27	29	27	0.5	2234588
Acid Extractable Zinc (Zn)	ug/g	59	61	180	240	210	230	5	2234588

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0A9106
Report Date: 2010/08/19

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GU7158	GU7168	GU7173	GU7176	GU7177	GU7178		
Sampling Date		2010/08/08	2010/08/08	2010/08/08	2010/08/08	2010/08/08	2010/08/08		
COC Number		203504-0	203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0089**	**10-0094**	**10-0099**	**10-0102**	**10-0103**	**10-0104**	**RDL**	**QC Batch**
Metals									
Leachable Lead (Pb)	mg/L			<0.1				0.1	2237241
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	<1	<1	<1	1	2234588
Acid Extractable Cadmium (Cd)	ug/g	0.7	2.9	0.1	0.4	0.2	<0.1	0.1	2234588
Acid Extractable Chromium (Cr)	ug/g	37	41	39	25	18	13	1	2234588
Acid Extractable Cobalt (Co)	ug/g	7.1	8.0	7.6	5.3	4.2	3.2	0.1	2234588
Acid Extractable Copper (Cu)	ug/g	21	26	23	84	38	6.2	0.5	2234588
Acid Extractable Lead (Pb)	ug/g	34	52	26	87	6	6	1	2234588
Acid Extractable Nickel (Ni)	ug/g	26	28	25	18	13	9.6	0.5	2234588
Acid Extractable Zinc (Zn)	ug/g	77	180	62	130	45	15	5	2234588

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0A9106
Report Date: 2010/08/19

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GU7179	GU7181	GU7182	GU7184	GU7190	GU7191		
Sampling Date		2010/08/08	2010/08/08	2010/08/08	2010/08/08	2010/08/08	2010/08/08		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0105**	**10-0107**	**10-0108**	**10-0110**	**10-0111**	**10-0112**	**RDL**	**QC Batch**
Metals									
Leachable Lead (Pb)	mg/L						0.5	0.1	2237241
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	<1	<1	<1	1	2234588
Acid Extractable Cadmium (Cd)	ug/g	<0.1	<0.1	<0.1	0.2	<0.1	0.3	0.1	2234588
Acid Extractable Chromium (Cr)	ug/g	28	32	48	47	47	130	1	2234588
Acid Extractable Cobalt (Co)	ug/g	6.5	6.3	8.9	7.9	8.0	21	0.1	2234588
Acid Extractable Copper (Cu)	ug/g	12	12	18	29	25	360	0.5	2234588
Acid Extractable Lead (Pb)	ug/g	3	3	3	5	4	380	1	2234588
Acid Extractable Nickel (Ni)	ug/g	20	22	31	30	31	76	0.5	2234588
Acid Extractable Zinc (Zn)	ug/g	25	24	36	56	45	170	5	2234588

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GU7192	GU7195		
Sampling Date		2010/08/08	2010/08/08		
COC Number		203504-1	203504-1		
	Units	**10-0114**	**10-0117**	**RDL**	**QC Batch**
Metals					
Acid Extractable Arsenic (As)	ug/g	<1	<1	1	2234588
Acid Extractable Cadmium (Cd)	ug/g	<0.1	<0.1	0.1	2234588
Acid Extractable Chromium (Cr)	ug/g	2	1	1	2234588
Acid Extractable Cobalt (Co)	ug/g	0.4	0.2	0.1	2234588
Acid Extractable Copper (Cu)	ug/g	18	0.5	0.5	2234588
Acid Extractable Lead (Pb)	ug/g	25	<1	1	2234588
Acid Extractable Nickel (Ni)	ug/g	1.5	0.6	0.5	2234588
Acid Extractable Zinc (Zn)	ug/g	25	<5	5	2234588

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0A9106
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AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GU7017	GU7018	GU7043	GU7047	GU7048	GU7049		
Sampling Date		2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06	2010/08/06		
COC Number		203504-0	203504-0	203504-0	203504-0	203504-0	203504-0		
	Units	**10-0024**	**10-0025**	**10-0043**	**10-0047**	**10-0048**	**10-0049**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons									
Benzene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2236194
Toluene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2236194
Ethylbenzene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2236194
o-Xylene	ug/g	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	0.02	2236194
p+m-Xylene	ug/g	<0.04	<0.04	<0.04	0.05	<0.04	<0.04	0.04	2236194
Total Xylenes	ug/g	<0.04	<0.04	<0.04	0.09	<0.04	<0.04	0.04	2236194
F1 (C6-C10)	ug/g	<10	76	28	50	<10	19	10	2236194
F1 (C6-C10) - BTEX	ug/g	<10	76	28	50	<10	19	10	2236194
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	3400	32	2300	240	150	1900	10	2234427
F3 (C16-C34 Hydrocarbons)	ug/g	3800	140	1100	38000	25000	27000	10	2234427
F4 (C34-C50 Hydrocarbons)	ug/g	<10	32	<10	7200	6100	21000	10	2234427
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes	Yes		2234427
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	89	88	87	91	91	89		2236194
4-Bromofluorobenzene	%	101	97	100	95	98	99		2236194
D10-Ethylbenzene	%	75	93	96	102	100	104		2236194
D4-1,2-Dichloroethane	%	91	88	85	90	87	86		2236194
o-Terphenyl	%	107	80	90	85	87	105		2234427

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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AECOM Canada Ltd
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Project name: PADLOPING SI
Sampler Initials: JL

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GU7050	GU7069		GU7070		GU7071	GU7104		
Sampling Date		2010/08/06	2010/08/06		2010/08/06		2010/08/06	2010/08/06		
COC Number		203504-0	203504-0		203504-0		203504-0	203504-0		
	Units	**10-0050**	**10-0051**	**RDL**	**10-0052**	**RDL**	**10-0053**	**10-0070**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons										
Benzene	ug/g	<0.02	<0.02	0.02	<0.02	0.02	<0.02	0.08	0.02	2236194
Toluene	ug/g	<0.02	<0.02	0.02	0.06	0.02	<0.02	0.60	0.02	2236194
Ethylbenzene	ug/g	<0.02	<0.02	0.02	<0.02	0.02	<0.02	0.24	0.02	2236194
o-Xylene	ug/g	0.18	0.18	0.02	<0.02	0.02	<0.02	0.14	0.02	2236194
p+m-Xylene	ug/g	0.08	0.06	0.04	0.06	0.04	<0.04	0.53	0.04	2236194
Total Xylenes	ug/g	0.26	0.23	0.04	0.06	0.04	<0.04	0.67	0.04	2236194
F1 (C6-C10)	ug/g	130	110	10	<10	10	21	19	10	2236194
F1 (C6-C10) - BTEX	ug/g	130	110	10	<10	10	21	17	10	2236194
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/g	5500	6100	10	240	50	87	390	10	2234427
F3 (C16-C34 Hydrocarbons)	ug/g	26000	30000	10	21000	10	28000	1900	10	2234427
F4 (C34-C50 Hydrocarbons)	ug/g	14000	16000	10	25000	50	19000	680	10	2234427
Reached Baseline at C50	ug/g	Yes	Yes		Yes		Yes	Yes		2234427
Surrogate Recovery (%)										
1,4-Difluorobenzene	%	89	88		89		90	90		2236194
4-Bromofluorobenzene	%	100	101		96		96	100		2236194
D10-Ethylbenzene	%	93	97		84		97	95		2236194
D4-1,2-Dichloroethane	%	85	86		91		88	86		2236194
o-Terphenyl	%	93	101		87		94	94		2234427

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GU7112	GU7113		GU7132	GU7133		
Sampling Date		2010/08/06	2010/08/06		2010/08/06	2010/08/06		
COC Number		203504-0	203504-0		203504-0	203504-0		
	Units	**10-0068**	**10-0069**	**QC Batch**	**10-0071**	**10-0072**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons								
Benzene	ug/g	<0.02	0.04	2236194	<0.02	<0.02	0.02	2236194
Toluene	ug/g	<0.02	0.26	2236194	0.21	<0.02	0.02	2236194
Ethylbenzene	ug/g	<0.02	0.10	2236194	0.09	<0.02	0.02	2236194
o-Xylene	ug/g	0.03	0.05	2236194	0.07	<0.02	0.02	2236194
p+m-Xylene	ug/g	<0.04	0.24	2236194	0.27	<0.04	0.04	2236194
Total Xylenes	ug/g	<0.04	0.29	2236194	0.34	<0.04	0.04	2236194
F1 (C6-C10)	ug/g	42	<10	2236194	76	<10	10	2236194
F1 (C6-C10) - BTEX	ug/g	42	<10	2236194	75	<10	10	2236194
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	11	530	2234427	430	2500	10	2235042
F3 (C16-C34 Hydrocarbons)	ug/g	23	4600	2234427	1800	3000	10	2235042
F4 (C34-C50 Hydrocarbons)	ug/g	<10	2200	2234427	660	<10	10	2235042
Reached Baseline at C50	ug/g	Yes	No	2234427	Yes	Yes		2235042
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	88	90	2236194	86	86		2236194
4-Bromofluorobenzene	%	98	100	2236194	100	100		2236194
D10-Ethylbenzene	%	84	112	2236194	98	99		2236194
D4-1,2-Dichloroethane	%	85	87	2236194	90	87		2236194
o-Terphenyl	%	85	99	2234427	88	98		2235042

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0A9106
Report Date: 2010/08/19

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GU7140		GU7141	GU7150		GU7151		
Sampling Date		2010/08/08		2010/08/08	2010/08/08		2010/08/08		
COC Number		203504-0		203504-0	203504-0		203504-0		
	Units	**10-0079**	**QC Batch**	**10-0080**	**10-0081**	**QC Batch**	**10-0082**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons									
Benzene	ug/g	<0.02	2236194	<0.02	<0.02	2236300	<0.02	0.02	2236300
Toluene	ug/g	<0.02	2236194	<0.02	<0.02	2236300	0.02	0.02	2236300
Ethylbenzene	ug/g	<0.02	2236194	<0.02	<0.02	2236300	<0.02	0.02	2236300
o-Xylene	ug/g	<0.02	2236194	<0.02	<0.02	2236300	<0.02	0.02	2236300
p+m-Xylene	ug/g	<0.04	2236194	<0.04	<0.04	2236300	<0.04	0.04	2236300
Total Xylenes	ug/g	<0.04	2236194	<0.04	<0.04	2236300	<0.04	0.04	2236300
F1 (C6-C10)	ug/g	81	2236194	<10	<10	2236300	13	10	2236300
F1 (C6-C10) - BTEX	ug/g	81	2236194	<10	<10	2236300	13	10	2236300
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	30	2234427	73	61	2234427	2300	10	2235042
F3 (C16-C34 Hydrocarbons)	ug/g	18	2234427	77	73	2234427	1500	10	2235042
F4 (C34-C50 Hydrocarbons)	ug/g	<10	2234427	<10	<10	2234427	33	10	2235042
Reached Baseline at C50	ug/g	Yes	2234427	Yes	Yes	2234427	Yes		2235042
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	88	2236194	90	88	2236300	87		2236300
4-Bromofluorobenzene	%	94	2236194	97	95	2236300	97		2236300
D10-Ethylbenzene	%	100	2236194	103	105	2236300	101		2236300
D4-1,2-Dichloroethane	%	82	2236194	87	86	2236300	86		2236300
o-Terphenyl	%	85	2234427	88	83	2234427	101		2235042

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0A9106
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AECOM Canada Ltd
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PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GU7152	GU7156	GU7158	GU7159	GU7165	GU7167		
Sampling Date		2010/08/08	2010/08/08	2010/08/08	2010/08/08	2010/08/08	2010/08/08		
COC Number		203504-0	203504-0	203504-0	203504-0	203504-1	203504-1		
	Units	**10-0083**	**10-0087**	**10-0089**	**10-0090**	**10-0091**	**10-0093**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons									
Benzene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2236300
Toluene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2236300
Ethylbenzene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2236300
o-Xylene	ug/g	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	0.02	2236300
p+m-Xylene	ug/g	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	2236300
Total Xylenes	ug/g	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	2236300
F1 (C6-C10)	ug/g	99	100	48	42	95	29	10	2236300
F1 (C6-C10) - BTEX	ug/g	99	100	48	42	95	29	10	2236300
F2-F4 Hydrocarbons									
F2 (C10-C16 Hydrocarbons)	ug/g	1500	2800	2800	2100	1100	430	10	2235042
F3 (C16-C34 Hydrocarbons)	ug/g	890	2900	14000	14000	9100	27000	10	2235042
F4 (C34-C50 Hydrocarbons)	ug/g	<10	710	4500	3700	2800	7600	10	2235042
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes	Yes		2235042
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	85	85	88	87	85	89		2236300
4-Bromofluorobenzene	%	98	101	99	101	100	96		2236300
D10-Ethylbenzene	%	102	110	93	97	95	96		2236300
D4-1,2-Dichloroethane	%	82	80	84	80	80	84		2236300
o-Terphenyl	%	89	95	93	91	81	79		2235042

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0A9106
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AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GU7168	GU7169	GU7173		
Sampling Date		2010/08/08	2010/08/08	2010/08/08		
COC Number		203504-1	203504-1	203504-1		
	Units	**10-0094**	**10-0095**	**10-0099**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons						
Benzene	ug/g	<0.02	<0.02	<0.02	0.02	2236300
Toluene	ug/g	<0.02	<0.02	0.11	0.02	2236300
Ethylbenzene	ug/g	<0.02	<0.02	<0.02	0.02	2236300
o-Xylene	ug/g	<0.02	<0.02	<0.02	0.02	2236300
p+m-Xylene	ug/g	<0.04	<0.04	0.05	0.04	2236300
Total Xylenes	ug/g	<0.04	<0.04	0.05	0.04	2236300
F1 (C6-C10)	ug/g	14	<10	<10	10	2236300
F1 (C6-C10) - BTEX	ug/g	14	<10	<10	10	2236300
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	50	120	18	10	2235042
F3 (C16-C34 Hydrocarbons)	ug/g	24000	9900	220	10	2235042
F4 (C34-C50 Hydrocarbons)	ug/g	7000	3400	30	10	2235042
Reached Baseline at C50	ug/g	Yes	Yes	Yes		2235042
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	87	89	89		2236300
4-Bromofluorobenzene	%	98	97	97		2236300
D10-Ethylbenzene	%	96	102	100		2236300
D4-1,2-Dichloroethane	%	86	84	82		2236300
o-Terphenyl	%	76	84	87		2235042

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B0A9106
Report Date: 2010/08/19

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		GU7027	GU7035	GU7041		GU7047		GU7049		
Sampling Date		2010/08/06	2010/08/06	2010/08/06		2010/08/06		2010/08/06		
COC Number		203504-0	203504-0	203504-0		203504-0		203504-0		
	Units	**10-0032**	**10-0040**	**10-0041**	**QC Batch**	**10-0047**	**RDL**	**10-0049**	**RDL**	**QC Batch**
PCBs										
Aroclor 1016	ug/g	<0.01	<0.01	<0.01	2235756	<0.01	0.01	<0.05	0.05	2236505
Aroclor 1221	ug/g	<0.01	<0.01	<0.01	2235756	<0.01	0.01	<0.05	0.05	2236505
Aroclor 1232	ug/g	<0.01	<0.01	<0.01	2235756	<0.01	0.01	<0.05	0.05	2236505
Aroclor 1242	ug/g	<0.01	<0.01	<0.01	2235756	<0.01	0.01	<0.05	0.05	2236505
Aroclor 1248	ug/g	<0.01	<0.01	<0.01	2235756	<0.01	0.01	<0.05	0.05	2236505
Aroclor 1254	ug/g	<0.01	<0.01	<0.01	2235756	<0.01	0.01	<0.05	0.05	2236505
Aroclor 1260	ug/g	<0.01	<0.01	<0.01	2235756	<0.01	0.01	<0.05	0.05	2236505
Aroclor 1262	ug/g	<0.01	<0.01	<0.01	2235756	<0.01	0.01	<0.05	0.05	2236505
Aroclor 1268	ug/g	<0.01	<0.01	<0.01	2235756	<0.01	0.01	<0.05	0.05	2236505
Total PCB	ug/g	<0.01	<0.01	<0.01	2235756	<0.01	0.01	<0.05	0.05	2236505
Surrogate Recovery (%)										
2,4,5,6-Tetrachloro-m-xylene	%	69	86	96	2235756	82		72		2236505
Decachlorobiphenyl	%	86	138 (1)	151 (1)	2235756	100		88		2236505

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Surrogate recovery was above the upper control limit due to matrix interference. This may represent a high bias in some results.

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AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		GU7070			GU7071		GU7151		
Sampling Date		2010/08/06			2010/08/06		2010/08/08		
COC Number		203504-0			203504-0		203504-0		
	Units	**10-0052**	**RDL**	**QC Batch**	**10-0053**	**QC Batch**	**10-0082**	**RDL**	**QC Batch**
PCBs									
Aroclor 1016	ug/g	<0.05	0.05	2236505	<0.01	2235756	<0.01	0.01	2236505
Aroclor 1221	ug/g	<0.05	0.05	2236505	<0.01	2235756	<0.01	0.01	2236505
Aroclor 1232	ug/g	<0.05	0.05	2236505	<0.01	2235756	<0.01	0.01	2236505
Aroclor 1242	ug/g	<0.05	0.05	2236505	<0.01	2235756	<0.01	0.01	2236505
Aroclor 1248	ug/g	<0.05	0.05	2236505	<0.01	2235756	<0.01	0.01	2236505
Aroclor 1254	ug/g	<0.05	0.05	2236505	<0.01	2235756	<0.01	0.01	2236505
Aroclor 1260	ug/g	<0.05	0.05	2236505	<0.01	2235756	<0.01	0.01	2236505
Aroclor 1262	ug/g	<0.05	0.05	2236505	<0.01	2235756	<0.01	0.01	2236505
Aroclor 1268	ug/g	<0.05	0.05	2236505	<0.01	2235756	<0.01	0.01	2236505
Total PCB	ug/g	<0.05	0.05	2236505	<0.01	2235756	<0.01	0.01	2236505
Surrogate Recovery (%)									
2,4,5,6-Tetrachloro-m-xylene	%	78		2236505	71	2235756	78		2236505
Decachlorobiphenyl	%	94		2236505	69	2235756	96		2236505

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0A9106
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AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JL

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		GU7152			GU7158		GU7168		
Sampling Date		2010/08/08			2010/08/08		2010/08/08		
COC Number		203504-0			203504-0		203504-1		
	Units	**10-0083**	**RDL**	**QC Batch**	**10-0089**	**RDL**	**10-0094**	**RDL**	**QC Batch**
PCBs									
Aroclor 1016	ug/g	<0.01	0.01	2235756	<0.05	0.05	<0.01	0.01	2236505
Aroclor 1221	ug/g	<0.01	0.01	2235756	<0.05	0.05	<0.01	0.01	2236505
Aroclor 1232	ug/g	<0.01	0.01	2235756	<0.05	0.05	<0.01	0.01	2236505
Aroclor 1242	ug/g	<0.01	0.01	2235756	<0.05	0.05	<0.01	0.01	2236505
Aroclor 1248	ug/g	<0.01	0.01	2235756	<0.05	0.05	<0.01	0.01	2236505
Aroclor 1254	ug/g	<0.01	0.01	2235756	<0.05	0.05	<0.01	0.01	2236505
Aroclor 1260	ug/g	<0.01	0.01	2235756	<0.05	0.05	<0.01	0.01	2236505
Aroclor 1262	ug/g	<0.01	0.01	2235756	<0.05	0.05	<0.01	0.01	2236505
Aroclor 1268	ug/g	<0.01	0.01	2235756	<0.05	0.05	<0.01	0.01	2236505
Total PCB	ug/g	<0.01	0.01	2235756	<0.05	0.05	<0.01	0.01	2236505
Surrogate Recovery (%)									
2,4,5,6-Tetrachloro-m-xylene	%	69		2235756	77		69		2236505
Decachlorobiphenyl	%	83		2235756	95		79		2236505

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

GENERAL COMMENTS

PCB Analysis: Due to the sample matrix, some samples required dilution. Detection limit was adjusted accordingly.

Results relate only to the items tested.

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2234418 LHR	RPD	Moisture	2010/08/16	0.7		%	50
2234427 LHR	Matrix Spike	o-Terphenyl	2010/08/16		69	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/16		118	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/08/16		118	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/08/16		118	%	60 - 130
	Spiked Blank	o-Terphenyl	2010/08/16		73	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/16		110	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/08/16		110	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/08/16		110	%	60 - 130
	Method Blank	o-Terphenyl	2010/08/16		73	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/16	<10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2010/08/16	<10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2010/08/16	<10		ug/g	
	RPD	F2 (C10-C16 Hydrocarbons)	2010/08/16	31.7		%	50
		F3 (C16-C34 Hydrocarbons)	2010/08/16	25.0		%	50
		F4 (C34-C50 Hydrocarbons)	2010/08/16	NC		%	50
2234436 RAI	Matrix Spike						
	[GU6988-01]	Acid Extractable Arsenic (As)	2010/08/17		104	%	75 - 125
		Acid Extractable Cadmium (Cd)	2010/08/17		104	%	75 - 125
		Acid Extractable Chromium (Cr)	2010/08/17		NC	%	75 - 125
		Acid Extractable Cobalt (Co)	2010/08/17		109	%	75 - 125
		Acid Extractable Copper (Cu)	2010/08/17		NC	%	75 - 125
		Acid Extractable Lead (Pb)	2010/08/17		NC	%	75 - 125
		Acid Extractable Nickel (Ni)	2010/08/17		NC	%	75 - 125
		Acid Extractable Zinc (Zn)	2010/08/17		NC	%	75 - 125
	QC Standard	Acid Extractable Arsenic (As)	2010/08/17		104	%	75 - 125
		Acid Extractable Cadmium (Cd)	2010/08/17		108	%	75 - 125
		Acid Extractable Chromium (Cr)	2010/08/17		104	%	75 - 125
		Acid Extractable Cobalt (Co)	2010/08/17		106	%	75 - 125
		Acid Extractable Copper (Cu)	2010/08/17		111	%	75 - 125
		Acid Extractable Lead (Pb)	2010/08/17		108	%	75 - 125
		Acid Extractable Nickel (Ni)	2010/08/17		105	%	75 - 125
		Acid Extractable Zinc (Zn)	2010/08/17		108	%	75 - 125
	Method Blank	Acid Extractable Arsenic (As)	2010/08/17	<1		ug/g	
		Acid Extractable Cadmium (Cd)	2010/08/17	<0.1		ug/g	
		Acid Extractable Chromium (Cr)	2010/08/17	<1		ug/g	
		Acid Extractable Cobalt (Co)	2010/08/17	<0.1		ug/g	
		Acid Extractable Copper (Cu)	2010/08/17	<0.5		ug/g	
		Acid Extractable Lead (Pb)	2010/08/17	<1		ug/g	
		Acid Extractable Nickel (Ni)	2010/08/17	<0.5		ug/g	
		Acid Extractable Zinc (Zn)	2010/08/17	<5		ug/g	
	RPD [GU6988-01]	Acid Extractable Arsenic (As)	2010/08/17	NC		%	35
		Acid Extractable Cadmium (Cd)	2010/08/17	NC		%	35
		Acid Extractable Chromium (Cr)	2010/08/17	1.4		%	35
		Acid Extractable Cobalt (Co)	2010/08/17	0.5		%	35
		Acid Extractable Copper (Cu)	2010/08/17	1.4		%	35
		Acid Extractable Lead (Pb)	2010/08/17	9.7		%	35
		Acid Extractable Nickel (Ni)	2010/08/17	3.2		%	35
		Acid Extractable Zinc (Zn)	2010/08/17	2.5		%	35
2234583 RAI	Matrix Spike						
	[GU7022-01]	Acid Extractable Arsenic (As)	2010/08/17		101	%	75 - 125
		Acid Extractable Cadmium (Cd)	2010/08/17		104	%	75 - 125
		Acid Extractable Chromium (Cr)	2010/08/17		NC	%	75 - 125
		Acid Extractable Cobalt (Co)	2010/08/17		106	%	75 - 125
		Acid Extractable Copper (Cu)	2010/08/17		NC	%	75 - 125

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2234583 RAI	Matrix Spike						
	[GU7022-01]	Acid Extractable Lead (Pb)	2010/08/17		NC	%	75 - 125
		Acid Extractable Nickel (Ni)	2010/08/17		NC	%	75 - 125
		Acid Extractable Zinc (Zn)	2010/08/17		NC	%	75 - 125
	QC Standard	Acid Extractable Arsenic (As)	2010/08/17		104	%	75 - 125
		Acid Extractable Cadmium (Cd)	2010/08/17		105	%	75 - 125
		Acid Extractable Chromium (Cr)	2010/08/17		106	%	75 - 125
		Acid Extractable Cobalt (Co)	2010/08/17		105	%	75 - 125
		Acid Extractable Copper (Cu)	2010/08/17		110	%	75 - 125
		Acid Extractable Lead (Pb)	2010/08/17		110	%	75 - 125
		Acid Extractable Nickel (Ni)	2010/08/17		104	%	75 - 125
		Acid Extractable Zinc (Zn)	2010/08/17		108	%	75 - 125
	Method Blank	Acid Extractable Arsenic (As)	2010/08/17	<1		ug/g	
		Acid Extractable Cadmium (Cd)	2010/08/17	<0.1		ug/g	
		Acid Extractable Chromium (Cr)	2010/08/17	<1		ug/g	
		Acid Extractable Cobalt (Co)	2010/08/17	<0.1		ug/g	
		Acid Extractable Copper (Cu)	2010/08/17	<0.5		ug/g	
		Acid Extractable Lead (Pb)	2010/08/17	<1		ug/g	
		Acid Extractable Nickel (Ni)	2010/08/17	<0.5		ug/g	
		Acid Extractable Zinc (Zn)	2010/08/17	<5		ug/g	
	RPD [GU7022-01]	Acid Extractable Arsenic (As)	2010/08/17	NC		%	35
		Acid Extractable Cadmium (Cd)	2010/08/17	0.3		%	35
		Acid Extractable Chromium (Cr)	2010/08/17	0.2		%	35
		Acid Extractable Cobalt (Co)	2010/08/17	3.8		%	35
		Acid Extractable Copper (Cu)	2010/08/17	2.2		%	35
		Acid Extractable Lead (Pb)	2010/08/17	18.5		%	35
		Acid Extractable Nickel (Ni)	2010/08/17	1.7		%	35
		Acid Extractable Zinc (Zn)	2010/08/17	7.4		%	35
2234585 LHR	RPD [GU7132-02]	Moisture	2010/08/16	24.6		%	50
2234588 RAI	Matrix Spike						
	[GU7107-01]	Acid Extractable Arsenic (As)	2010/08/17		101	%	75 - 125
		Acid Extractable Cadmium (Cd)	2010/08/17		102	%	75 - 125
		Acid Extractable Chromium (Cr)	2010/08/17		NC	%	75 - 125
		Acid Extractable Cobalt (Co)	2010/08/17		109	%	75 - 125
		Acid Extractable Copper (Cu)	2010/08/17		104	%	75 - 125
		Acid Extractable Lead (Pb)	2010/08/17		104	%	75 - 125
		Acid Extractable Nickel (Ni)	2010/08/17		100	%	75 - 125
		Acid Extractable Zinc (Zn)	2010/08/17		NC	%	75 - 125
	QC Standard	Acid Extractable Arsenic (As)	2010/08/17		99	%	75 - 125
		Acid Extractable Cadmium (Cd)	2010/08/17		106	%	75 - 125
		Acid Extractable Chromium (Cr)	2010/08/17		108	%	75 - 125
		Acid Extractable Cobalt (Co)	2010/08/17		107	%	75 - 125
		Acid Extractable Copper (Cu)	2010/08/17		107	%	75 - 125
		Acid Extractable Lead (Pb)	2010/08/17		111	%	75 - 125
		Acid Extractable Nickel (Ni)	2010/08/17		106	%	75 - 125
		Acid Extractable Zinc (Zn)	2010/08/17		106	%	75 - 125
	Method Blank	Acid Extractable Arsenic (As)	2010/08/17	<1		ug/g	
		Acid Extractable Cadmium (Cd)	2010/08/17	<0.1		ug/g	
		Acid Extractable Chromium (Cr)	2010/08/17	<1		ug/g	
		Acid Extractable Cobalt (Co)	2010/08/17	<0.1		ug/g	
		Acid Extractable Copper (Cu)	2010/08/17	<0.5		ug/g	
		Acid Extractable Lead (Pb)	2010/08/17	<1		ug/g	
		Acid Extractable Nickel (Ni)	2010/08/17	<0.5		ug/g	
		Acid Extractable Zinc (Zn)	2010/08/17	<5		ug/g	
	RPD [GU7107-01]	Acid Extractable Arsenic (As)	2010/08/17	NC		%	35

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2234588 RAI	RPD [GU7107-01]	Acid Extractable Cadmium (Cd)	2010/08/17	NC		%	35
		Acid Extractable Chromium (Cr)	2010/08/17	3.9		%	35
		Acid Extractable Cobalt (Co)	2010/08/17	6.2		%	35
		Acid Extractable Copper (Cu)	2010/08/17	7.0		%	35
		Acid Extractable Lead (Pb)	2010/08/17	4.1		%	35
		Acid Extractable Nickel (Ni)	2010/08/17	3.6		%	35
		Acid Extractable Zinc (Zn)	2010/08/17	0.7		%	35
2235042 LHR	Matrix Spike [GU7133-02]	o-Terphenyl	2010/08/17		104	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/17		99	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/08/17		99	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/08/17		99	%	60 - 130
	Spiked Blank	o-Terphenyl	2010/08/17		80	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/17		89	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/08/17		89	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/08/17		89	%	60 - 130
	Method Blank	o-Terphenyl	2010/08/17		77	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/17	<10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2010/08/17	<10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2010/08/17	<10		ug/g	
	RPD [GU7132-02]	F2 (C10-C16 Hydrocarbons)	2010/08/17	19.1		%	50
		F3 (C16-C34 Hydrocarbons)	2010/08/17	20.5		%	50
		F4 (C34-C50 Hydrocarbons)	2010/08/17	6.6		%	50
2235756 JZ	Matrix Spike	2,4,5,6-Tetrachloro-m-xylene	2010/08/16		68	%	40 - 130
		Decachlorobiphenyl	2010/08/16		92	%	40 - 130
		Aroclor 1260	2010/08/16		102	%	30 - 130
		Total PCB	2010/08/16		102	%	30 - 130
	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/16		81	%	40 - 130
		Decachlorobiphenyl	2010/08/16		94	%	40 - 130
		Aroclor 1260	2010/08/16		102	%	30 - 130
		Total PCB	2010/08/16		102	%	30 - 130
	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/16		82	%	40 - 130
		Decachlorobiphenyl	2010/08/16		83	%	40 - 130
		Aroclor 1016	2010/08/16	<0.01		ug/g	
		Aroclor 1221	2010/08/16	<0.01		ug/g	
		Aroclor 1232	2010/08/16	<0.01		ug/g	
		Aroclor 1242	2010/08/16	<0.01		ug/g	
		Aroclor 1248	2010/08/16	<0.01		ug/g	
		Aroclor 1254	2010/08/16	<0.01		ug/g	
		Aroclor 1260	2010/08/16	<0.01		ug/g	
		Aroclor 1262	2010/08/16	<0.01		ug/g	
		Aroclor 1268	2010/08/16	<0.01		ug/g	
		Total PCB	2010/08/16	<0.01		ug/g	
	RPD	Total PCB	2010/08/16	NC		%	50
2236194 PRB	Matrix Spike	1,4-Difluorobenzene	2010/08/16		94	%	60 - 140
		4-Bromofluorobenzene	2010/08/16		99	%	60 - 140
		D10-Ethylbenzene	2010/08/16		102	%	30 - 130
		D4-1,2-Dichloroethane	2010/08/16		93	%	60 - 140
		Benzene	2010/08/16		94	%	60 - 140
		Toluene	2010/08/16		93	%	60 - 140
		Ethylbenzene	2010/08/16		104	%	60 - 140
		o-Xylene	2010/08/16		107	%	60 - 140
		p+m-Xylene	2010/08/16		93	%	60 - 140
		F1 (C6-C10)	2010/08/16		84	%	60 - 140
	Spiked Blank	1,4-Difluorobenzene	2010/08/16		92	%	60 - 140

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2236194 PRB	Spiked Blank	4-Bromofluorobenzene	2010/08/16		99	%	60 - 140
		D10-Ethylbenzene	2010/08/16		106	%	30 - 130
		D4-1,2-Dichloroethane	2010/08/16		95	%	60 - 140
		Benzene	2010/08/16		98	%	60 - 140
		Toluene	2010/08/16		95	%	60 - 140
		Ethylbenzene	2010/08/16		104	%	60 - 140
		o-Xylene	2010/08/16		109	%	60 - 140
		p+m-Xylene	2010/08/16		94	%	60 - 140
		F1 (C6-C10)	2010/08/16		107	%	60 - 140
	Method Blank	1,4-Difluorobenzene	2010/08/16		92	%	60 - 140
		4-Bromofluorobenzene	2010/08/16		97	%	60 - 140
		D10-Ethylbenzene	2010/08/16		103	%	30 - 130
		D4-1,2-Dichloroethane	2010/08/16		94	%	60 - 140
		Benzene	2010/08/16	<0.02		ug/g	
		Toluene	2010/08/16	<0.02		ug/g	
		Ethylbenzene	2010/08/16	<0.02		ug/g	
		o-Xylene	2010/08/16	<0.02		ug/g	
		p+m-Xylene	2010/08/16	<0.04		ug/g	
		Total Xylenes	2010/08/16	<0.04		ug/g	
		F1 (C6-C10)	2010/08/16	<10		ug/g	
		F1 (C6-C10) - BTEX	2010/08/16	<10		ug/g	
	RPD	F1 (C6-C10)	2010/08/16	NC		%	50
		F1 (C6-C10) - BTEX	2010/08/16	NC		%	50
2236300 PRB	Matrix Spike						
	[GU7150-02]	1,4-Difluorobenzene	2010/08/17		89	%	60 - 140
		4-Bromofluorobenzene	2010/08/17		98	%	60 - 140
		D10-Ethylbenzene	2010/08/17		101	%	30 - 130
		D4-1,2-Dichloroethane	2010/08/17		86	%	60 - 140
		Benzene	2010/08/17		90	%	60 - 140
		Toluene	2010/08/17		91	%	60 - 140
		Ethylbenzene	2010/08/17		102	%	60 - 140
		o-Xylene	2010/08/17		102	%	60 - 140
		p+m-Xylene	2010/08/17		90	%	60 - 140
		F1 (C6-C10)	2010/08/17		101	%	60 - 140
	Spiked Blank	1,4-Difluorobenzene	2010/08/17		88	%	60 - 140
		4-Bromofluorobenzene	2010/08/17		99	%	60 - 140
		D10-Ethylbenzene	2010/08/17		96	%	30 - 130
		D4-1,2-Dichloroethane	2010/08/17		87	%	60 - 140
		Benzene	2010/08/17		90	%	60 - 140
		Toluene	2010/08/17		92	%	60 - 140
		Ethylbenzene	2010/08/17		101	%	60 - 140
		o-Xylene	2010/08/17		104	%	60 - 140
		p+m-Xylene	2010/08/17		91	%	60 - 140
		F1 (C6-C10)	2010/08/17		105	%	60 - 140
	Method Blank	1,4-Difluorobenzene	2010/08/17		88	%	60 - 140
		4-Bromofluorobenzene	2010/08/17		95	%	60 - 140
		D10-Ethylbenzene	2010/08/17		105	%	30 - 130
		D4-1,2-Dichloroethane	2010/08/17		85	%	60 - 140
		Benzene	2010/08/17	<0.02		ug/g	
		Toluene	2010/08/17	<0.02		ug/g	
		Ethylbenzene	2010/08/17	<0.02		ug/g	
		o-Xylene	2010/08/17	<0.02		ug/g	
		p+m-Xylene	2010/08/17	<0.04		ug/g	
		Total Xylenes	2010/08/17	<0.04		ug/g	
		F1 (C6-C10)	2010/08/17	<10		ug/g	

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2236300 PRB	Method Blank	F1 (C6-C10) - BTEX	2010/08/17	<10		ug/g	
	RPD [GU7141-02]	Benzene	2010/08/17	NC		%	50
		Toluene	2010/08/17	NC		%	50
		Ethylbenzene	2010/08/17	NC		%	50
		o-Xylene	2010/08/17	NC		%	50
		p+m-Xylene	2010/08/17	NC		%	50
		Total Xylenes	2010/08/17	NC		%	50
		F1 (C6-C10)	2010/08/17	NC		%	50
		F1 (C6-C10) - BTEX	2010/08/17	NC		%	50
2236505 JZ	Matrix Spike						
	[GU7151-01]	2,4,5,6-Tetrachloro-m-xylene	2010/08/17		84	%	40 - 130
		Decachlorobiphenyl	2010/08/17		103	%	40 - 130
		Aroclor 1260	2010/08/17		98	%	30 - 130
		Total PCB	2010/08/17		98	%	30 - 130
	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/17		97	%	40 - 130
		Decachlorobiphenyl	2010/08/17		94	%	40 - 130
		Aroclor 1260	2010/08/17		99	%	30 - 130
		Total PCB	2010/08/17		99	%	30 - 130
	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/17		102	%	40 - 130
		Decachlorobiphenyl	2010/08/17		101	%	40 - 130
		Aroclor 1016	2010/08/17	<0.01		ug/g	
		Aroclor 1221	2010/08/17	<0.01		ug/g	
		Aroclor 1232	2010/08/17	<0.01		ug/g	
		Aroclor 1242	2010/08/17	<0.01		ug/g	
		Aroclor 1248	2010/08/17	<0.01		ug/g	
		Aroclor 1254	2010/08/17	<0.01		ug/g	
		Aroclor 1260	2010/08/17	<0.01		ug/g	
		Aroclor 1262	2010/08/17	<0.01		ug/g	
		Aroclor 1268	2010/08/17	<0.01		ug/g	
		Total PCB	2010/08/17	<0.01		ug/g	
	RPD [GU7151-01]	Aroclor 1016	2010/08/17	NC		%	50
		Aroclor 1221	2010/08/17	NC		%	50
		Aroclor 1232	2010/08/17	NC		%	50
		Aroclor 1242	2010/08/17	NC		%	50
		Aroclor 1248	2010/08/17	NC		%	50
		Aroclor 1254	2010/08/17	NC		%	50
		Aroclor 1260	2010/08/17	NC		%	50
		Aroclor 1262	2010/08/17	NC		%	50
		Aroclor 1268	2010/08/17	NC		%	50
		Total PCB	2010/08/17	NC		%	50
2237148 LKA	RPD	Moisture	2010/08/17	0.6		%	20
2237241 VIV	Matrix Spike	Leachable Lead (Pb)	2010/08/17		94	%	75 - 125
	Leachate Blank	Leachable Lead (Pb)	2010/08/17	<0.1		mg/L	
	Spiked Blank	Leachable Lead (Pb)	2010/08/17		96	%	85 - 115
	Method Blank	Leachable Lead (Pb)	2010/08/17	<0.1		mg/L	
	RPD	Leachable Lead (Pb)	2010/08/17	NC		%	25
2238017 DEE	QC Standard	Sieve - #200 (<0.075mm)	2010/08/17		66	%	N/A
		Sieve - #200 (>0.075mm)	2010/08/17		34	%	N/A
	RPD [GU7159-01]	Sieve - #200 (<0.075mm)	2010/08/17	6.5		%	20
		Sieve - #200 (>0.075mm)	2010/08/17	1.6		%	20

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.
Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.
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.

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Project name: PADLOPING SI

Quality Assurance Report (Continued)

Maxxam Job Number: TB0A9106

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
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 #: B0A9106

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

CHARTERED
Eva Pranjic
CHEMIST

EWA PRANJIC, M.Sc., C.Chem, Scientific Specialist

PAUL RUBINATO, Analyst, Maxxam Analytics

CHARLES ANCKER, B.Sc., M.Sc., C.Chem, Senior Analyst

STEVE ROBERTS, Lab Supervisor, Ottawa

==

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Your Project #: 60158472
Site Location: SOIL/SEDIMENT PADLOPING ISLAND
Your C.O.C. #: 20350413, 203504-1

Attention: Jenna Morrish - Calgary
AECOM Canada Ltd
17203-103 Ave
Edmonton, AB
T5S 1J4

Report Date: 2010/08/24

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0B0810
Received: 2010/08/16, 11:26

Sample Matrix: Soil
Samples Received: 37

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Petroleum Hydro. CCME F1 & BTEX in Soil (1)	13	2010/08/19	2010/08/19	CAM SOP-00315	CCME CWS
Petroleum Hydro. CCME F1 & BTEX in Soil (1)	8	2010/08/19	2010/08/20	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil (1)	10	2010/08/18	2010/08/19	CAM SOP-00316	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil (1)	11	2010/08/18	2010/08/20	CAM SOP-00316	CCME CWS
F4G (CCME Hydrocarbons Gravimetric) (1)	1	2010/08/20	2010/08/24	CAM SOP-00316	CCME CWS
Acid Extr. Metals (aqua regia) by ICPMS (1)	30	2010/08/20	2010/08/23	CAM SOP-00447	EPA 6020
MOISTURE (1)	21	N/A	2010/08/20	CAM SOP-00445	MOE HANDBOOK(1983)
Moisture	13	N/A	2010/08/19	CAM SOP-00445	McKeague 2nd ed 1978
Moisture	9	N/A	2010/08/21	CAM SOP-00445	McKeague 2nd ed 1978
Polychlorinated Biphenyl in Soil	13	2010/08/18	2010/08/19	CAM SOP-00309	SW846 8082
Volatile Organic Compounds in Soil	9	2010/08/20	2010/08/23	CAM SOP-00226	EPA 8260 modified

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Ottawa

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MARIJANE CRUZ, Project Manager
Email: Marijane.Cruz@maxxamanalytics.com
Phone# (905) 817-5756

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Total cover pages: 1

Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

RESULTS OF ANALYSES OF SOIL

Maxxam ID		GV5320	GV5321	GV5322		GV5323	GV5324		
Sampling Date		2010/08/10	2010/08/10	2010/08/10		2010/08/10	2010/08/10		
COC Number		203504-1	203504-1	203504-1		203504-1	203504-1		
	Units	**10-0123**	**10-0124**	**10-0125**	**QC Batch**	**10-0126**	**10-0127**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	17	12	17	2240634	25	16	1	2242209

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GV5347	GV5348		GV5349	GV5350	GV5351	GV5352		
Sampling Date		2010/08/10	2010/08/10		2010/08/10	2010/08/10	2010/08/10	2010/08/10		
COC Number		203504-1	203504-1		203504-1	203504-1	203504-1	203504-1		
	Units	**10-0128**	**10-0129**	**QC Batch**	**10-0130**	**10-0131**	**10-0132**	**10-0133**	**RDL**	**QC Batch**
Inorganics										
Moisture	%	19	29	2240634	17	16	30	12	1	2242209

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GV5353	GV5354	GV5355		GV5362	GV5363	GV5364		
Sampling Date		2010/08/10	2010/08/10	2010/08/10		2010/08/11	2010/08/11	2010/08/11		
COC Number		203504-1	203504-1	203504-1		203504-1	203504-1	203504-1		
	Units	**10-0134**	**10-0135**	**10-0136**	**QC Batch**	**10-0137**	**10-0138**	**10-0139**	**RDL**	**QC Batch**
Inorganics										
Moisture	%	25	33	17	2242209	14	4	19	1	2240634

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GV5365	GV5366	GV5367	GV5368	GV5369		
Sampling Date		2010/08/11	2010/08/11	2010/08/11	2010/08/11	2010/08/11		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0140**	**10-0141**	**10-0142**	**10-0143**	**10-0144**	**RDL**	**QC Batch**
Inorganics								
Moisture	%	13	13	21	23	18	1	2240634

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GV5315	GV5316	GV5320	GV5321	GV5322	GV5347		
Sampling Date		2010/08/10	2010/08/10	2010/08/10	2010/08/10	2010/08/10	2010/08/10		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0118**	**10-0119**	**10-0123**	**10-0124**	**10-0125**	**10-0128**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	<1	<1	<1	1	2241194
Acid Extractable Cadmium (Cd)	ug/g	1.9	1.5	0.5	<0.1	<0.1	<0.1	0.1	2241194
Acid Extractable Chromium (Cr)	ug/g	20	28	9	<1	<1	40	1	2241194
Acid Extractable Cobalt (Co)	ug/g	3.8	5.5	1.8	0.6	0.7	6.5	0.1	2241194
Acid Extractable Copper (Cu)	ug/g	82	21	14	1.4	1.5	16	0.5	2241194
Acid Extractable Lead (Pb)	ug/g	700	29	200	<1	2	12	1	2241194
Acid Extractable Nickel (Ni)	ug/g	13	19	6.7	2.1	2.3	26	0.5	2241194
Acid Extractable Strontium (Sr)	ug/g	16	10	2	1	1	5	1	2241194
Acid Extractable Zinc (Zn)	ug/g	350	530	120	<5	<5	38	5	2241194

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GV5348	GV5351	GV5352	GV5362	GV5363	GV5364		
Sampling Date		2010/08/10	2010/08/10	2010/08/10	2010/08/11	2010/08/11	2010/08/11		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0129**	**10-0132**	**10-0133**	**10-0137**	**10-0138**	**10-0139**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	<1	6	<1	<1	<1	<1	1	2241194
Acid Extractable Cadmium (Cd)	ug/g	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	0.1	2241194
Acid Extractable Chromium (Cr)	ug/g	41	59	38	<1	<1	2	1	2241194
Acid Extractable Cobalt (Co)	ug/g	6.1	8.9	5.5	0.7	0.8	1.0	0.1	2241194
Acid Extractable Copper (Cu)	ug/g	17	42	13	1.6	1.9	1.7	0.5	2241194
Acid Extractable Lead (Pb)	ug/g	12	160	16	2	3	4	1	2241194
Acid Extractable Nickel (Ni)	ug/g	26	38	24	1.9	3.1	2.9	0.5	2241194
Acid Extractable Strontium (Sr)	ug/g	6	5	4	2	4	4	1	2241194
Acid Extractable Zinc (Zn)	ug/g	37	110	34	5	6	<5	5	2241194

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GV5365	GV5366	GV5367		GV5368	GV5369		
Sampling Date		2010/08/11	2010/08/11	2010/08/11		2010/08/11	2010/08/11		
COC Number		203504-1	203504-1	203504-1		203504-1	203504-1		
	Units	**10-0140**	**10-0141**	**10-0142**	**QC Batch**	**10-0143**	**10-0144**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	2241194	<1	<1	1	2241205
Acid Extractable Cadmium (Cd)	ug/g	<0.1	<0.1	0.1	2241194	<0.1	<0.1	0.1	2241205
Acid Extractable Chromium (Cr)	ug/g	4	6	41	2241194	3	12	1	2241205
Acid Extractable Cobalt (Co)	ug/g	1.4	1.8	6.4	2241194	1.4	3.8	0.1	2241205
Acid Extractable Copper (Cu)	ug/g	5.3	6.8	16	2241194	3.0	6.9	0.5	2241205
Acid Extractable Lead (Pb)	ug/g	24	21	8	2241194	3	2	1	2241205
Acid Extractable Nickel (Ni)	ug/g	6.0	7.1	31	2241194	5.3	9.6	0.5	2241205
Acid Extractable Strontium (Sr)	ug/g	2	2	5	2241194	3	3	1	2241205
Acid Extractable Zinc (Zn)	ug/g	22	25	37	2241194	10	18	5	2241205

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GV5370	GV5371	GV5377	GV5378	GV5379	GV5380		
Sampling Date		2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0145**	**10-0146**	**10-0147**	**10-0148**	**10-0149**	**10-0150**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	<1	<1	<1	1	2241205
Acid Extractable Cadmium (Cd)	ug/g	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	2241205
Acid Extractable Chromium (Cr)	ug/g	33	21	79	49	37	24	1	2241205
Acid Extractable Cobalt (Co)	ug/g	6.9	4.8	14	8.7	7.3	6.0	0.1	2241205
Acid Extractable Copper (Cu)	ug/g	17	9.2	39	19	18	14	0.5	2241205
Acid Extractable Lead (Pb)	ug/g	3	2	12	3	18	2	1	2241205
Acid Extractable Nickel (Ni)	ug/g	25	19	66	42	28	19	0.5	2241205
Acid Extractable Strontium (Sr)	ug/g	6	4	13	6	7	4	1	2241205
Acid Extractable Zinc (Zn)	ug/g	33	18	77	36	47	24	5	2241205

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		GV5381	GV5382	GV5383	GV5384	GV5385	GV5386		
Sampling Date		2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0151**	**10-0152**	**10-0153**	**10-0154**	**10-0155**	**10-0156**	**RDL**	**QC Batch**
Metals									
Acid Extractable Arsenic (As)	ug/g	<1	<1	<1	<1	<1	<1	1	2241205
Acid Extractable Cadmium (Cd)	ug/g	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	2241205
Acid Extractable Chromium (Cr)	ug/g	29	30	50	44	23	32	1	2241205
Acid Extractable Cobalt (Co)	ug/g	6.6	6.0	9.5	8.5	5.5	7.3	0.1	2241205
Acid Extractable Copper (Cu)	ug/g	19	12	23	25	12	20	0.5	2241205
Acid Extractable Lead (Pb)	ug/g	2	2	4	4	2	4	1	2241205
Acid Extractable Nickel (Ni)	ug/g	23	25	37	31	17	23	0.5	2241205
Acid Extractable Strontium (Sr)	ug/g	4	5	7	6	4	5	1	2241205
Acid Extractable Zinc (Zn)	ug/g	30	27	45	44	23	37	5	2241205

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GV5390		
Sampling Date		2010/08/12		
COC Number		203504-1		
	Units	**10-0157**	**RDL**	**QC Batch**
Metals				
Acid Extractable Arsenic (As)	ug/g	<1	1	2241205
Acid Extractable Cadmium (Cd)	ug/g	<0.1	0.1	2241205
Acid Extractable Chromium (Cr)	ug/g	14	1	2241205
Acid Extractable Cobalt (Co)	ug/g	4.8	0.1	2241205
Acid Extractable Copper (Cu)	ug/g	9.0	0.5	2241205
Acid Extractable Lead (Pb)	ug/g	2	1	2241205
Acid Extractable Nickel (Ni)	ug/g	13	0.5	2241205
Acid Extractable Strontium (Sr)	ug/g	3	1	2241205
Acid Extractable Zinc (Zn)	ug/g	19	5	2241205

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		GV5323	GV5324	GV5349	GV5350	GV5351	GV5352		
Sampling Date		2010/08/10	2010/08/10	2010/08/10	2010/08/10	2010/08/10	2010/08/10		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0126**	**10-0127**	**10-0130**	**10-0131**	**10-0132**	**10-0133**	**RDL**	**QC Batch**
Volatile Organics									
Benzene	ug/g	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2242377
Ethylbenzene	ug/g	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2242377
Toluene	ug/g	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2242377
p+m-Xylene	ug/g	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2242377
o-Xylene	ug/g	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2242377
Xylene (Total)	ug/g	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2242377
Surrogate Recovery (%)									
4-Bromofluorobenzene	%	87	91	98	92	83	94	N/A	2242377
D4-1,2-Dichloroethane	%	96	96	96	96	101	96	N/A	2242377
D8-Toluene	%	106	101	96	100	101	98	N/A	2242377

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		GV5353	GV5354	GV5355		
Sampling Date		2010/08/10	2010/08/10	2010/08/10		
COC Number		203504-1	203504-1	203504-1		
	Units	**10-0134**	**10-0135**	**10-0136**	**RDL**	**QC Batch**
Volatile Organics						
Benzene	ug/g	<0.002	<0.002	<0.002	0.002	2242377
Ethylbenzene	ug/g	<0.002	<0.002	<0.002	0.002	2242377
Toluene	ug/g	<0.002	<0.002	<0.002	0.002	2242377
p+m-Xylene	ug/g	<0.002	<0.002	<0.002	0.002	2242377
o-Xylene	ug/g	<0.002	<0.002	<0.002	0.002	2242377
Xylene (Total)	ug/g	<0.002	<0.002	<0.002	0.002	2242377
Surrogate Recovery (%)						
4-Bromofluorobenzene	%	97	83	93	N/A	2242377
D4-1,2-Dichloroethane	%	96	95	95	N/A	2242377
D8-Toluene	%	98	110	99	N/A	2242377

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

AECOM Canada Ltd
Maxxam Job #: B0B0810
Client Project #: 60158472
Report Date: 2010/08/24
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GV5320		GV5322	GV5323	GV5324	GV5347		
Sampling Date		2010/08/10		2010/08/10	2010/08/10	2010/08/10	2010/08/10		
COC Number		203504-1		203504-1	203504-1	203504-1	203504-1		
	Units	**10-0123**	**RDL**	**10-0125**	**10-0126**	**10-0127**	**10-0128**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons									
Benzene	ug/g	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
Toluene	ug/g	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
Ethylbenzene	ug/g	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
o-Xylene	ug/g	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
p+m-Xylene	ug/g	<0.04	0.04	<0.04	<0.04	<0.04	<0.04	0.04	2239963
Total Xylenes	ug/g	<0.04	0.04	<0.04	<0.04	<0.04	<0.04	0.04	2239963
F1 (C6-C10)	ug/g	<10	10	<10	<10	<10	<10	10	2239963
F1 (C6-C10) - BTEX	ug/g	<10	10	<10	<10	<10	<10	10	2239963
F2-F4 Hydrocarbons									
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	6200	100	N/A	N/A	N/A	N/A	100	2241869
F2 (C10-C16 Hydrocarbons)	ug/g	<100	100	<10	<10	45	23	10	2238474
F3 (C16-C34 Hydrocarbons)	ug/g	930	100	<10	55	520	170	10	2238474
F4 (C34-C50 Hydrocarbons)	ug/g	1800	100	<10	56	26	30	10	2238474
Reached Baseline at C50	ug/g	No	N/A	Yes	Yes	Yes	Yes	N/A	2238474
Surrogate Recovery (%)									
1,4-Difluorobenzene	%	105	N/A	104	104	105	103	N/A	2239963
4-Bromofluorobenzene	%	88	N/A	88	87	87	88	N/A	2239963
D10-Ethylbenzene	%	92	N/A	96	98	102	96	N/A	2239963
D4-1,2-Dichloroethane	%	107	N/A	105	106	107	102	N/A	2239963
o-Terphenyl	%	118	N/A	116	104	117	110	N/A	2238474

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GV5348	GV5349	GV5350	GV5351	GV5352		
Sampling Date		2010/08/10	2010/08/10	2010/08/10	2010/08/10	2010/08/10		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0129**	**10-0130**	**10-0131**	**10-0132**	**10-0133**	**RDL**	**QC Batch**

BTEX & F1 Hydrocarbons								
Benzene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
Toluene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
Ethylbenzene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
o-Xylene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
p+m-Xylene	ug/g	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	2239963
Total Xylenes	ug/g	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	2239963
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	10	2239963
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	10	2239963
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	31	<10	<10	16	<10	10	2238474
F3 (C16-C34 Hydrocarbons)	ug/g	120	71	96	470	<10	10	2238474
F4 (C34-C50 Hydrocarbons)	ug/g	<10	31	31	170	<10	10	2238474
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes	N/A	2238474
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	103	101	103	104	102	N/A	2239963
4-Bromofluorobenzene	%	84	85	88	91	89	N/A	2239963
D10-Ethylbenzene	%	97	91	97	90	94	N/A	2239963
D4-1,2-Dichloroethane	%	105	99	104	105	104	N/A	2239963
o-Terphenyl	%	109	101	111	114	101	N/A	2238474

N/A = Not Applicable
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QC Batch = Quality Control Batch

Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GV5353	GV5354	GV5355	GV5362	GV5363		
Sampling Date		2010/08/10	2010/08/10	2010/08/10	2010/08/11	2010/08/11		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0134**	**10-0135**	**10-0136**	**10-0137**	**10-0138**	**RDL**	**QC Batch**

BTEX & F1 Hydrocarbons								
Benzene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
Toluene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
Ethylbenzene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
o-Xylene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
p+m-Xylene	ug/g	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	2239963
Total Xylenes	ug/g	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	2239963
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	10	2239963
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	10	2239963
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	<10	10	2238474
F3 (C16-C34 Hydrocarbons)	ug/g	61	230	21	<10	<10	10	2238474
F4 (C34-C50 Hydrocarbons)	ug/g	21	120	<10	<10	<10	10	2238474
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes	N/A	2238474
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	102	103	103	104	104	N/A	2239963
4-Bromofluorobenzene	%	88	92	89	90	90	N/A	2239963
D10-Ethylbenzene	%	98	89	92	105	97	N/A	2239963
D4-1,2-Dichloroethane	%	103	105	105	105	106	N/A	2239963
o-Terphenyl	%	99	102	117	125	94	N/A	2238474

N/A = Not Applicable
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QC Batch = Quality Control Batch

Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GV5364	GV5365	GV5366	GV5367	GV5368		
Sampling Date		2010/08/11	2010/08/11	2010/08/11	2010/08/11	2010/08/11		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0139**	**10-0140**	**10-0141**	**10-0142**	**10-0143**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons								
Benzene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
Toluene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
Ethylbenzene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
o-Xylene	ug/g	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	2239963
p+m-Xylene	ug/g	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	2239963
Total Xylenes	ug/g	<0.04	<0.04	<0.04	<0.04	<0.04	0.04	2239963
F1 (C6-C10)	ug/g	<10	17	<10	330	<10	10	2239963
F1 (C6-C10) - BTEX	ug/g	<10	17	<10	330	<10	10	2239963
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	<10	1200	420	4200	<10	10	2238474
F3 (C16-C34 Hydrocarbons)	ug/g	<10	400	410	1300	<10	10	2238474
F4 (C34-C50 Hydrocarbons)	ug/g	<10	42	<10	110	<10	10	2238474
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	Yes	N/A	2238474
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	103	104	102	101	101	N/A	2239963
4-Bromofluorobenzene	%	90	95	94	88	91	N/A	2239963
D10-Ethylbenzene	%	94	93	92	109	93	N/A	2239963
D4-1,2-Dichloroethane	%	107	107	100	102	99	N/A	2239963
o-Terphenyl	%	102	120	118	115	110	N/A	2238474

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GV5369		
Sampling Date		2010/08/11		
COC Number		203504-1		
	Units	**10-0144**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons				
Benzene	ug/g	<0.02	0.02	2237726
Toluene	ug/g	<0.02	0.02	2237726
Ethylbenzene	ug/g	<0.02	0.02	2237726
o-Xylene	ug/g	<0.02	0.02	2237726
p+m-Xylene	ug/g	<0.04	0.04	2237726
Total Xylenes	ug/g	<0.04	0.04	2237726
F1 (C6-C10)	ug/g	<10	10	2237726
F1 (C6-C10) - BTEX	ug/g	<10	10	2237726
F2-F4 Hydrocarbons				
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	2238480
F3 (C16-C34 Hydrocarbons)	ug/g	<10	10	2238480
F4 (C34-C50 Hydrocarbons)	ug/g	<10	10	2238480
Reached Baseline at C50	ug/g	Yes	N/A	2238480
Surrogate Recovery (%)				
1,4-Difluorobenzene	%	106	N/A	2237726
4-Bromofluorobenzene	%	89	N/A	2237726
D10-Ethylbenzene	%	98	N/A	2237726
D4-1,2-Dichloroethane	%	107	N/A	2237726
o-Terphenyl	%	83	N/A	2238480

N/A = Not Applicable
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Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		GV5320	GV5321	GV5322	GV5347	GV5348	GV5362		
Sampling Date		2010/08/10	2010/08/10	2010/08/10	2010/08/10	2010/08/10	2010/08/11		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0123**	**10-0124**	**10-0125**	**10-0128**	**10-0129**	**10-0137**	**RDL**	**QC Batch**
PCBs									
Aroclor 1016	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1221	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1232	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1242	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1248	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1254	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1260	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1262	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1268	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Total PCB	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Surrogate Recovery (%)									
2,4,5,6-Tetrachloro-m-xylene	%	84	78	77	84	96	78	N/A	2238835
Decachlorobiphenyl	%	105	104	97	102	121	101	N/A	2238835

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		GV5363	GV5364	GV5365	GV5366	GV5367	GV5368		
Sampling Date		2010/08/11	2010/08/11	2010/08/11	2010/08/11	2010/08/11	2010/08/11		
COC Number		203504-1	203504-1	203504-1	203504-1	203504-1	203504-1		
	Units	**10-0138**	**10-0139**	**10-0140**	**10-0141**	**10-0142**	**10-0143**	**RDL**	**QC Batch**
PCBs									
Aroclor 1016	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1221	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1232	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1242	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1248	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1254	ug/g	<0.01	<0.01	<0.01	0.35	0.05	<0.01	0.01	2238835
Aroclor 1260	ug/g	<0.01	<0.01	<0.01	0.07	<0.01	<0.01	0.01	2238835
Aroclor 1262	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Aroclor 1268	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2238835
Total PCB	ug/g	<0.01	<0.01	<0.01	0.42	0.05	<0.01	0.01	2238835
Surrogate Recovery (%)									
2,4,5,6-Tetrachloro-m-xylene	%	80	83	89	85	88	84	N/A	2238835
Decachlorobiphenyl	%	102	102	109	100	108	100	N/A	2238835

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0810
Report Date: 2010/08/24

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND
Sampler Initials: LDF

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		GV5369		
Sampling Date		2010/08/11		
COC Number		203504-1		
	Units	**10-0144**	**RDL**	**QC Batch**
PCBs				
Aroclor 1016	ug/g	<0.01	0.01	2238835
Aroclor 1221	ug/g	<0.01	0.01	2238835
Aroclor 1232	ug/g	<0.01	0.01	2238835
Aroclor 1242	ug/g	<0.01	0.01	2238835
Aroclor 1248	ug/g	<0.01	0.01	2238835
Aroclor 1254	ug/g	<0.01	0.01	2238835
Aroclor 1260	ug/g	<0.01	0.01	2238835
Aroclor 1262	ug/g	<0.01	0.01	2238835
Aroclor 1268	ug/g	<0.01	0.01	2238835
Total PCB	ug/g	<0.01	0.01	2238835
Surrogate Recovery (%)				
2,4,5,6-Tetrachloro-m-xylene	%	85	N/A	2238835
Decachlorobiphenyl	%	103	N/A	2238835

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

GENERAL COMMENTS

Sample GV5320-01: F2-F4 Analysis:
Sample was diluted due to high concentration of target compounds. Reporting limits were adjusted accordingly.

Results relate only to the items tested.

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Site Location: SOIL/SEDIMENT PADLOPING ISLAND

Quality Assurance Report

Maxxam Job Number: TB0B0810

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2237726 PRB	Matrix Spike	1,4-Difluorobenzene	2010/08/19		103	%	60 - 140
		4-Bromofluorobenzene	2010/08/19		96	%	60 - 140
		D10-Ethylbenzene	2010/08/19		87	%	30 - 130
		D4-1,2-Dichloroethane	2010/08/19		102	%	60 - 140
		Benzene	2010/08/19		78	%	60 - 140
		Toluene	2010/08/19		78	%	60 - 140
		Ethylbenzene	2010/08/19		86	%	60 - 140
		o-Xylene	2010/08/19		89	%	60 - 140
		p+m-Xylene	2010/08/19		78	%	60 - 140
		F1 (C6-C10)	2010/08/19		93	%	60 - 140
	Spiked Blank	1,4-Difluorobenzene	2010/08/19		104	%	60 - 140
		4-Bromofluorobenzene	2010/08/19		97	%	60 - 140
		D10-Ethylbenzene	2010/08/19		94	%	30 - 130
		D4-1,2-Dichloroethane	2010/08/19		104	%	60 - 140
		Benzene	2010/08/19		81	%	60 - 140
		Toluene	2010/08/19		81	%	60 - 140
		Ethylbenzene	2010/08/19		90	%	60 - 140
		o-Xylene	2010/08/19		94	%	60 - 140
		p+m-Xylene	2010/08/19		81	%	60 - 140
		F1 (C6-C10)	2010/08/19		99	%	60 - 140
	Method Blank	1,4-Difluorobenzene	2010/08/19		104	%	60 - 140
		4-Bromofluorobenzene	2010/08/19		92	%	60 - 140
		D10-Ethylbenzene	2010/08/19		94	%	30 - 130
		D4-1,2-Dichloroethane	2010/08/19		105	%	60 - 140
		Benzene	2010/08/19	<0.02		ug/g	
		Toluene	2010/08/19	<0.02		ug/g	
		Ethylbenzene	2010/08/19	<0.02		ug/g	
		o-Xylene	2010/08/19	<0.02		ug/g	
		p+m-Xylene	2010/08/19	<0.04		ug/g	
		Total Xylenes	2010/08/19	<0.04		ug/g	
		F1 (C6-C10)	2010/08/19	<10		ug/g	
		F1 (C6-C10) - BTEX	2010/08/19	<10		ug/g	
	RPD	F1 (C6-C10)	2010/08/19	NC		%	50
		F1 (C6-C10) - BTEX	2010/08/19	NC		%	50
2238457 S_N	RPD [GV5320-01]	Moisture	2010/08/20	22.8		%	50
2238474 PRB	Matrix Spike [GV5322-01]	o-Terphenyl	2010/08/19		102	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/19		91	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/08/19		91	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/08/19		91	%	60 - 130
	Spiked Blank	o-Terphenyl	2010/08/19		106	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/19		95	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/08/19		95	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/08/19		95	%	60 - 130
	Method Blank	o-Terphenyl	2010/08/19		112	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/19	<10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2010/08/19	<10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2010/08/19	<10		ug/g	
	RPD [GV5320-01]	F2 (C10-C16 Hydrocarbons)	2010/08/19	NC		%	50
		F3 (C16-C34 Hydrocarbons)	2010/08/19	11.5		%	50
		F4 (C34-C50 Hydrocarbons)	2010/08/19	33.6		%	50
2238480 PRB	Matrix Spike	o-Terphenyl	2010/08/19		87	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/19		120	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/08/19		120	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/08/19		120	%	60 - 130

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Site Location: SOIL/SEDIMENT PADLOPING ISLAND

Quality Assurance Report (Continued)

Maxxam Job Number: TB0B0810

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2238480 PRB	Spiked Blank	o-Terphenyl	2010/08/19		79	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/19		116	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/08/19		116	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/08/19		116	%	60 - 130
	Method Blank	o-Terphenyl	2010/08/19		82	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/19	<10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2010/08/19	<10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2010/08/19	<10		ug/g	
	RPD	F2 (C10-C16 Hydrocarbons)	2010/08/19	NC		%	50
		F3 (C16-C34 Hydrocarbons)	2010/08/19	NC		%	50
		F4 (C34-C50 Hydrocarbons)	2010/08/19	NC		%	50
2238835 LPG	Matrix Spike	2,4,5,6-Tetrachloro-m-xylene	2010/08/19		82	%	40 - 130
		Decachlorobiphenyl	2010/08/19		95	%	40 - 130
		Aroclor 1260	2010/08/19		93	%	30 - 130
		Total PCB	2010/08/19		93	%	30 - 130
	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/19		94	%	40 - 130
		Decachlorobiphenyl	2010/08/19		101	%	40 - 130
		Aroclor 1260	2010/08/19		102	%	30 - 130
		Total PCB	2010/08/19		102	%	30 - 130
	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/19		96	%	40 - 130
		Decachlorobiphenyl	2010/08/19		105	%	40 - 130
		Aroclor 1016	2010/08/19	<0.01		ug/g	
		Aroclor 1221	2010/08/19	<0.01		ug/g	
		Aroclor 1232	2010/08/19	<0.01		ug/g	
		Aroclor 1242	2010/08/19	<0.01		ug/g	
		Aroclor 1248	2010/08/19	<0.01		ug/g	
		Aroclor 1254	2010/08/19	<0.01		ug/g	
		Aroclor 1260	2010/08/19	<0.01		ug/g	
		Aroclor 1262	2010/08/19	<0.01		ug/g	
		Aroclor 1268	2010/08/19	<0.01		ug/g	
		Total PCB	2010/08/19	<0.01		ug/g	
	RPD	Aroclor 1016	2010/08/19	NC		%	50
		Aroclor 1221	2010/08/19	NC		%	50
		Aroclor 1232	2010/08/19	NC		%	50
		Aroclor 1242	2010/08/19	NC		%	50
		Aroclor 1248	2010/08/19	NC		%	50
		Aroclor 1254	2010/08/19	NC		%	50
		Aroclor 1260	2010/08/19	NC		%	50
		Aroclor 1262	2010/08/19	NC		%	50
		Aroclor 1268	2010/08/19	NC		%	50
		Total PCB	2010/08/19	NC		%	50
2239963 STE	Matrix Spike						
	[GV5322-01]	1,4-Difluorobenzene	2010/08/19		105	%	60 - 140
		4-Bromofluorobenzene	2010/08/19		92	%	60 - 140
		D10-Ethylbenzene	2010/08/19		102	%	30 - 130
		D4-1,2-Dichloroethane	2010/08/19		107	%	60 - 140
		Benzene	2010/08/19		81	%	60 - 140
		Toluene	2010/08/19		80	%	60 - 140
		Ethylbenzene	2010/08/19		88	%	60 - 140
		o-Xylene	2010/08/19		92	%	60 - 140
		p+m-Xylene	2010/08/19		79	%	60 - 140
		F1 (C6-C10)	2010/08/19		80	%	60 - 140
	Spiked Blank	1,4-Difluorobenzene	2010/08/19		104	%	60 - 140
		4-Bromofluorobenzene	2010/08/19		92	%	60 - 140
		D10-Ethylbenzene	2010/08/19		105	%	30 - 130

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Site Location: SOIL/SEDIMENT PADLOPING ISLAND

Quality Assurance Report (Continued)

Maxxam Job Number: TB0B0810

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2239963 STE	Spiked Blank	D4-1,2-Dichloroethane	2010/08/19		108	%	60 - 140
		Benzene	2010/08/19		81	%	60 - 140
		Toluene	2010/08/19		80	%	60 - 140
		Ethylbenzene	2010/08/19		87	%	60 - 140
		o-Xylene	2010/08/19		91	%	60 - 140
		p+m-Xylene	2010/08/19		78	%	60 - 140
		F1 (C6-C10)	2010/08/19		78	%	60 - 140
	Method Blank	1,4-Difluorobenzene	2010/08/19		105	%	60 - 140
		4-Bromofluorobenzene	2010/08/19		86	%	60 - 140
		D10-Ethylbenzene	2010/08/19		99	%	30 - 130
		D4-1,2-Dichloroethane	2010/08/19		107	%	60 - 140
		Benzene	2010/08/19	<0.02		ug/g	
		Toluene	2010/08/19	<0.02		ug/g	
		Ethylbenzene	2010/08/19	<0.02		ug/g	
		o-Xylene	2010/08/19	<0.02		ug/g	
		p+m-Xylene	2010/08/19	<0.04		ug/g	
		Total Xylenes	2010/08/19	<0.04		ug/g	
		F1 (C6-C10)	2010/08/19	<10		ug/g	
		F1 (C6-C10) - BTEX	2010/08/19	<10		ug/g	
	RPD [GV5320-01]	Benzene	2010/08/19	NC		%	50
		Toluene	2010/08/19	NC		%	50
		Ethylbenzene	2010/08/19	NC		%	50
		o-Xylene	2010/08/19	NC		%	50
		p+m-Xylene	2010/08/19	NC		%	50
		Total Xylenes	2010/08/19	NC		%	50
		F1 (C6-C10)	2010/08/19	NC		%	50
		F1 (C6-C10) - BTEX	2010/08/19	NC		%	50
2240634 DEE	RPD	Moisture	2010/08/19	3.9		%	20
2241194 RAI	Matrix Spike						
	[GV5315-03]	Acid Extractable Arsenic (As)	2010/08/23		107	%	75 - 125
		Acid Extractable Cadmium (Cd)	2010/08/23		105	%	75 - 125
		Acid Extractable Chromium (Cr)	2010/08/23		114	%	75 - 125
		Acid Extractable Cobalt (Co)	2010/08/23		102	%	75 - 125
		Acid Extractable Copper (Cu)	2010/08/23		NC	%	75 - 125
		Acid Extractable Lead (Pb)	2010/08/23		NC	%	75 - 125
		Acid Extractable Nickel (Ni)	2010/08/23		111	%	75 - 125
		Acid Extractable Strontium (Sr)	2010/08/23		106	%	75 - 125
		Acid Extractable Zinc (Zn)	2010/08/23		NC	%	75 - 125
	QC Standard	Acid Extractable Arsenic (As)	2010/08/23		103	%	75 - 125
		Acid Extractable Cadmium (Cd)	2010/08/23		102	%	75 - 125
		Acid Extractable Chromium (Cr)	2010/08/23		99	%	75 - 125
		Acid Extractable Cobalt (Co)	2010/08/23		106	%	75 - 125
		Acid Extractable Copper (Cu)	2010/08/23		102	%	75 - 125
		Acid Extractable Lead (Pb)	2010/08/23		110	%	75 - 125
		Acid Extractable Nickel (Ni)	2010/08/23		105	%	75 - 125
		Acid Extractable Strontium (Sr)	2010/08/23		100	%	75 - 125
		Acid Extractable Zinc (Zn)	2010/08/23		111	%	75 - 125
	Method Blank	Acid Extractable Arsenic (As)	2010/08/23	<1		ug/g	
		Acid Extractable Cadmium (Cd)	2010/08/23	<0.1		ug/g	
		Acid Extractable Chromium (Cr)	2010/08/23	<1		ug/g	
		Acid Extractable Cobalt (Co)	2010/08/23	<0.1		ug/g	
		Acid Extractable Copper (Cu)	2010/08/23	<0.5		ug/g	
		Acid Extractable Lead (Pb)	2010/08/23	<1		ug/g	
		Acid Extractable Nickel (Ni)	2010/08/23	<0.5		ug/g	
		Acid Extractable Strontium (Sr)	2010/08/23	<1		ug/g	

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Site Location: SOIL/SEDIMENT PADLOPING ISLAND

Quality Assurance Report (Continued)

Maxxam Job Number: TB0B0810

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2241194 RAI	Method Blank	Acid Extractable Zinc (Zn)	2010/08/23	<5		ug/g	
	RPD [GV5315-03]	Acid Extractable Arsenic (As)	2010/08/23	NC		%	35
		Acid Extractable Cadmium (Cd)	2010/08/23	1.3		%	35
		Acid Extractable Chromium (Cr)	2010/08/23	15.4		%	35
		Acid Extractable Cobalt (Co)	2010/08/23	5.1		%	35
		Acid Extractable Copper (Cu)	2010/08/23	6.6		%	35
		Acid Extractable Lead (Pb)	2010/08/23	7.6		%	35
		Acid Extractable Nickel (Ni)	2010/08/23	3.0		%	35
		Acid Extractable Zinc (Zn)	2010/08/23	4.3		%	35
2241205 RAI	Matrix Spike						
	[GV5368-03]	Acid Extractable Arsenic (As)	2010/08/23		106	%	75 - 125
		Acid Extractable Cadmium (Cd)	2010/08/23		103	%	75 - 125
		Acid Extractable Chromium (Cr)	2010/08/23		104	%	75 - 125
		Acid Extractable Cobalt (Co)	2010/08/23		101	%	75 - 125
		Acid Extractable Copper (Cu)	2010/08/23		109	%	75 - 125
		Acid Extractable Lead (Pb)	2010/08/23		105	%	75 - 125
		Acid Extractable Nickel (Ni)	2010/08/23		106	%	75 - 125
		Acid Extractable Strontium (Sr)	2010/08/23		107	%	75 - 125
		Acid Extractable Zinc (Zn)	2010/08/23		109	%	75 - 125
	QC Standard	Acid Extractable Arsenic (As)	2010/08/23		108	%	75 - 125
		Acid Extractable Cadmium (Cd)	2010/08/23		103	%	75 - 125
		Acid Extractable Chromium (Cr)	2010/08/23		98	%	75 - 125
		Acid Extractable Cobalt (Co)	2010/08/23		103	%	75 - 125
		Acid Extractable Copper (Cu)	2010/08/23		111	%	75 - 125
		Acid Extractable Lead (Pb)	2010/08/23		108	%	75 - 125
		Acid Extractable Nickel (Ni)	2010/08/23		105	%	75 - 125
		Acid Extractable Strontium (Sr)	2010/08/23		110	%	75 - 125
		Acid Extractable Zinc (Zn)	2010/08/23		109	%	75 - 125
	Method Blank	Acid Extractable Arsenic (As)	2010/08/23	<1		ug/g	
		Acid Extractable Cadmium (Cd)	2010/08/23	<0.1		ug/g	
		Acid Extractable Chromium (Cr)	2010/08/23	<1		ug/g	
		Acid Extractable Cobalt (Co)	2010/08/23	<0.1		ug/g	
		Acid Extractable Copper (Cu)	2010/08/23	<0.5		ug/g	
		Acid Extractable Lead (Pb)	2010/08/23	<1		ug/g	
		Acid Extractable Nickel (Ni)	2010/08/23	<0.5		ug/g	
		Acid Extractable Strontium (Sr)	2010/08/23	<1		ug/g	
		Acid Extractable Zinc (Zn)	2010/08/23	<5		ug/g	
	RPD [GV5368-03]	Acid Extractable Arsenic (As)	2010/08/23	NC		%	35
		Acid Extractable Cadmium (Cd)	2010/08/23	NC		%	35
		Acid Extractable Chromium (Cr)	2010/08/23	NC		%	35
		Acid Extractable Cobalt (Co)	2010/08/23	5.2		%	35
		Acid Extractable Copper (Cu)	2010/08/23	2.7		%	35
		Acid Extractable Lead (Pb)	2010/08/23	NC		%	35
		Acid Extractable Nickel (Ni)	2010/08/23	7.4		%	35
		Acid Extractable Zinc (Zn)	2010/08/23	NC		%	35
2241869 PRB	Spiked Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2010/08/24		91	%	65 - 135
	RPD	F4G-sg (Grav. Heavy Hydrocarbons)	2010/08/24	4.3		%	50
	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2010/08/24	<100		ug/g	
2242209 DEE	RPD	Moisture	2010/08/21	1.7		%	20
2242377 DRA	Matrix Spike						
	[GV5324-02]	4-Bromofluorobenzene	2010/08/23		92	%	60 - 140
		D4-1,2-Dichloroethane	2010/08/23		98	%	60 - 140
		D8-Toluene	2010/08/23		105	%	60 - 140
		Benzene	2010/08/23		101	%	39 - 137
		Ethylbenzene	2010/08/23		95	%	46 - 150

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Site Location: SOIL/SEDIMENT PADLOPING ISLAND

Quality Assurance Report (Continued)

Maxxam Job Number: TB0B0810

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2242377 DRA	Matrix Spike						
	[GV5324-02]	Toluene	2010/08/23		104	%	30 - 158
		p+m-Xylene	2010/08/23		95	%	29 - 161
		o-Xylene	2010/08/23		96	%	45 - 150
	Spiked Blank	4-Bromofluorobenzene	2010/08/23		102	%	60 - 140
		D4-1,2-Dichloroethane	2010/08/23		100	%	60 - 140
		D8-Toluene	2010/08/23		99	%	60 - 140
		Benzene	2010/08/23		104	%	60 - 140
		Ethylbenzene	2010/08/23		104	%	60 - 140
		Toluene	2010/08/23		100	%	60 - 140
		p+m-Xylene	2010/08/23		106	%	60 - 140
		o-Xylene	2010/08/23		107	%	60 - 140
	Method Blank	4-Bromofluorobenzene	2010/08/23		102	%	60 - 140
		D4-1,2-Dichloroethane	2010/08/23		101	%	60 - 140
		D8-Toluene	2010/08/23		97	%	60 - 140
		Benzene	2010/08/23	<0.002		ug/g	
		Ethylbenzene	2010/08/23	<0.002		ug/g	
		Toluene	2010/08/23	<0.002		ug/g	
		p+m-Xylene	2010/08/23	<0.002		ug/g	
		o-Xylene	2010/08/23	<0.002		ug/g	
		Xylene (Total)	2010/08/23	<0.002		ug/g	
	RPD [GV5324-02]	Benzene	2010/08/23	NC		%	50
		Ethylbenzene	2010/08/23	NC		%	50
		Toluene	2010/08/23	NC		%	50
		p+m-Xylene	2010/08/23	NC		%	50
		o-Xylene	2010/08/23	NC		%	50
		Xylene (Total)	2010/08/23	NC		%	50

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.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
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 #: B0B0810

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

CHARTERED
Eva Pranjic
CHEMIST

EWA PRANJIC, M.Sc., C.Chem, Scientific Specialist

PAUL RUBINATO, Analyst, Maxxam Analytics

CHARLES ANCKER, B.Sc., M.Sc., C.Chem, Senior Analyst

STEVE ROBERTS, Lab Supervisor, Ottawa

CRISTINA CARRIERE, Scientific Services

==

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.

Your Project #: 60158472
Site#: 60158472
Site: PADLOPING SI
Your C.O.C. #: N/A

Attention: Jenna Morrish - Calgary
AECOM Canada Ltd
17203-103 Ave
Edmonton, AB
T5S 1J4

Report Date: 2010/09/30

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0D3344
Received: 2010/09/23, 17:24

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Acid Extr. Metals (aqua regia) by ICPMS (1)	1	2010/09/28	2010/09/30	CAM SOP-00447	EPA 6020

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Ottawa

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MARIJANE CRUZ, Project Manager
Email: Marijane.Cruz@maxxamanalytics.com
Phone# (905) 817-5756

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Total cover pages: 1

Maxxam Job #: B0D3344
Report Date: 2010/09/30

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		HG5001		
Sampling Date		2010/08/04		
COC Number		N/A		
	Units	**10-0072**	**RDL**	**QC Batch**
Metals				
Acid Extractable Copper (Cu)	ug/g	13	0.5	2279999

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

GENERAL COMMENTS

Results relate only to the items tested.

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Project name: PADLOPING SI

Quality Assurance Report

Maxxam Job Number: TB0D3344

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2279999	RAI	Matrix Spike	Acid Extractable Copper (Cu)	2010/09/30		NC	%	75 - 125
		QC Standard	Acid Extractable Copper (Cu)	2010/09/30		103	%	75 - 125
		Method Blank	Acid Extractable Copper (Cu)	2010/09/30	<0.5		ug/g	

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.
Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.

Validation Signature Page

Maxxam Job #: B0D3344

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

STEVE ROBERTS, Lab Supervisor, Ottawa

==

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Your Project #: 60158472
Site: SOIL/SEDIMENT PADLOPING
Your C.O.C. #: N/A

Attention: Jenna Morrish - Calgary
AECOM Canada Ltd
17203-103 Ave
Edmonton, AB
T5S 1J4

Report Date: 2010/09/30

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0D3298
Received: 2010/09/23, 16:33

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Petroleum Hydro. CCME F1 & BTEX in Soil	1	2010/09/25	2010/09/27	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil	1	2010/09/25	2010/09/27	CAM SOP-00316	CCME CWS
Acid Extr. Metals (aqua regia) by ICPMS (1)	3	2010/09/28	2010/09/30	CAM SOP-00447	EPA 6020
Moisture	1	N/A	2010/09/25	CAM SOP-00445	McKeague 2nd ed 1978
Volatile Organic Compounds in Soil	1	2010/09/24	2010/09/28	CAM SOP-00226	EPA 8260 modified

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Ottawa

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MARIJANE CRUZ, Project Manager
Email: Marijane.Cruz@maxxamanalytics.com
Phone# (905) 817-5756

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Total cover pages: 1

AECOM Canada Ltd
Maxxam Job #: B0D3298
Client Project #: 60158472
Report Date: 2010/09/30
Project name: SOIL/SEDIMENT PADLOPING

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HG4875		
Sampling Date		2010/08/10		
COC Number		N/A		
	Units	**10-0124**	**RDL**	**QC Batch**

Inorganics				
Moisture	%	8	1	2278118

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0D3298
Report Date: 2010/09/30

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		HG4872	HG4873	HG4874		
Sampling Date		2010/08/10	2010/08/10	2010/08/10		
COC Number		N/A	N/A	N/A		
	Units	**10-0120**	**10-0121**	**10-0122**	**RDL**	**QC Batch**
Metals						
Acid Extractable Lead (Pb)	ug/g	380	10000	69	1	2279999
Acid Extractable Zinc (Zn)	ug/g	160	250	56	5	2279999

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

AECOM Canada Ltd
Maxxam Job #: B0D3298
Client Project #: 60158472
Report Date: 2010/09/30
Project name: SOIL/SEDIMENT PADLOPING

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		HG4875		
Sampling Date		2010/08/10		
COC Number		N/A		
	Units	**10-0124**	**RDL**	**QC Batch**
Volatile Organics				
Benzene	ug/g	<0.002	0.002	2278025
Ethylbenzene	ug/g	<0.002	0.002	2278025
Toluene	ug/g	<0.002	0.002	2278025
p+m-Xylene	ug/g	<0.002	0.002	2278025
o-Xylene	ug/g	<0.002	0.002	2278025
Xylene (Total)	ug/g	<0.002	0.002	2278025
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	98	N/A	2278025
D4-1,2-Dichloroethane	%	92	N/A	2278025
D8-Toluene	%	96	N/A	2278025

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

AECOM Canada Ltd
Maxxam Job #: B0D3298 Client Project #: 60158472
Report Date: 2010/09/30 Project name: SOIL/SEDIMENT PADLOPING

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		HG4875		
Sampling Date		2010/08/10		
COC Number		N/A		
	Units	**10-0124**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons				
Benzene	ug/g	<0.02	0.02	2278123
Toluene	ug/g	<0.02	0.02	2278123
Ethylbenzene	ug/g	<0.02	0.02	2278123
o-Xylene	ug/g	<0.02	0.02	2278123
p+m-Xylene	ug/g	<0.04	0.04	2278123
Total Xylenes	ug/g	<0.04	0.04	2278123
F1 (C6-C10)	ug/g	<10	10	2278123
F1 (C6-C10) - BTEX	ug/g	<10	10	2278123
F2-F4 Hydrocarbons				
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	2278115
F3 (C16-C34 Hydrocarbons)	ug/g	<10	10	2278115
F4 (C34-C50 Hydrocarbons)	ug/g	<10	10	2278115
Reached Baseline at C50	ug/g	Yes	N/A	2278115
Surrogate Recovery (%)				
1,4-Difluorobenzene	%	104	N/A	2278123
4-Bromofluorobenzene	%	97	N/A	2278123
D10-Ethylbenzene	%	88	N/A	2278123
D4-1,2-Dichloroethane	%	98	N/A	2278123
o-Terphenyl	%	90	N/A	2278115

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

GENERAL COMMENTS

Sample HG4875-01: F1/BTEX and F2-F4 Analysis:Analysis was performed past sample holding time. This may increase the variability associated with these results.

VOC Analysis: The sample was analyzed after the 14 day holding time specified by the method had expired.

Results relate only to the items tested.

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Project name: SOIL/SEDIMENT PADLOPING

Quality Assurance Report

Maxxam Job Number: TB0D3298

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2278025 RZH	Matrix Spike	4-Bromofluorobenzene	2010/09/27		98	%	60 - 140
		D4-1,2-Dichloroethane	2010/09/27		97	%	60 - 140
		D8-Toluene	2010/09/27		104	%	60 - 140
		Benzene	2010/09/27		102	%	39 - 137
		Ethylbenzene	2010/09/27		74	%	46 - 150
		Toluene	2010/09/27		104	%	30 - 158
		p+m-Xylene	2010/09/27		NC (1)	%	29 - 161
		o-Xylene	2010/09/27		104	%	45 - 150
	Spiked Blank	4-Bromofluorobenzene	2010/09/27		98	%	60 - 140
		D4-1,2-Dichloroethane	2010/09/27		92	%	60 - 140
		D8-Toluene	2010/09/27		100	%	60 - 140
		Benzene	2010/09/27		100	%	60 - 140
		Ethylbenzene	2010/09/27		110	%	60 - 140
		Toluene	2010/09/27		100	%	60 - 140
		p+m-Xylene	2010/09/27		114	%	60 - 140
		o-Xylene	2010/09/27		99	%	60 - 140
	Method Blank	4-Bromofluorobenzene	2010/09/27		99	%	60 - 140
		D4-1,2-Dichloroethane	2010/09/27		93	%	60 - 140
		D8-Toluene	2010/09/27		98	%	60 - 140
		Benzene	2010/09/27	<0.002		ug/g	
		Ethylbenzene	2010/09/27	<0.002		ug/g	
		Toluene	2010/09/27	<0.002		ug/g	
		p+m-Xylene	2010/09/27	<0.002		ug/g	
		o-Xylene	2010/09/27	<0.002		ug/g	
		Xylene (Total)	2010/09/27	<0.002		ug/g	
	RPD	Benzene	2010/09/27	NC		%	50
		Ethylbenzene	2010/09/27	NC (2)		%	50
		Toluene	2010/09/27	NC		%	50
		p+m-Xylene	2010/09/27	65.7 (2)		%	50
		o-Xylene	2010/09/27	NC		%	50
		Xylene (Total)	2010/09/27	65.7 (2)		%	50
2278115 RGA	Matrix Spike	o-Terphenyl	2010/09/27		102	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/09/27		101	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/09/27		101	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/09/27		101	%	60 - 130
	Spiked Blank	o-Terphenyl	2010/09/27		99	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/09/27		89	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/09/27		89	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/09/27		89	%	60 - 130
	Method Blank	o-Terphenyl	2010/09/27		97	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/09/27	<10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2010/09/27	<10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2010/09/27	<10		ug/g	
	RPD	F2 (C10-C16 Hydrocarbons)	2010/09/27	NC		%	50
		F3 (C16-C34 Hydrocarbons)	2010/09/27	17.9		%	50
		F4 (C34-C50 Hydrocarbons)	2010/09/27	11.7		%	50
2278118 DEE	RPD [HG4875-01]	Moisture	2010/09/25	18.0		%	20
2278123 SPV	Matrix Spike	1,4-Difluorobenzene	2010/09/27		103	%	60 - 140
		4-Bromofluorobenzene	2010/09/27		98	%	60 - 140
		D10-Ethylbenzene	2010/09/27		90	%	30 - 130
		D4-1,2-Dichloroethane	2010/09/27		100	%	60 - 140
		Benzene	2010/09/27		80	%	60 - 140
		Toluene	2010/09/27		91	%	60 - 140
		Ethylbenzene	2010/09/27		93	%	60 - 140
		o-Xylene	2010/09/27		96	%	60 - 140

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Project name: SOIL/SEDIMENT PADLOPING

Quality Assurance Report (Continued)

Maxxam Job Number: TB0D3298

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2278123 SPV	Matrix Spike	p+m-Xylene	2010/09/27		92	%	60 - 140
		F1 (C6-C10)	2010/09/27		92	%	60 - 140
	Spiked Blank	1,4-Difluorobenzene	2010/09/27		101	%	60 - 140
		4-Bromofluorobenzene	2010/09/27		97	%	60 - 140
		D10-Ethylbenzene	2010/09/27		93	%	30 - 130
		D4-1,2-Dichloroethane	2010/09/27		99	%	60 - 140
		Benzene	2010/09/27		87	%	60 - 140
		Toluene	2010/09/27		98	%	60 - 140
		Ethylbenzene	2010/09/27		100	%	60 - 140
		o-Xylene	2010/09/27		105	%	60 - 140
		p+m-Xylene	2010/09/27		99	%	60 - 140
		F1 (C6-C10)	2010/09/27		80	%	60 - 140
	Method Blank	1,4-Difluorobenzene	2010/09/27		105	%	60 - 140
		4-Bromofluorobenzene	2010/09/27		97	%	60 - 140
		D10-Ethylbenzene	2010/09/27		91	%	30 - 130
		D4-1,2-Dichloroethane	2010/09/27		97	%	60 - 140
		Benzene	2010/09/27	<0.02		ug/g	
		Toluene	2010/09/27	<0.02		ug/g	
		Ethylbenzene	2010/09/27	<0.02		ug/g	
		o-Xylene	2010/09/27	<0.02		ug/g	
		p+m-Xylene	2010/09/27	<0.04		ug/g	
		Total Xylenes	2010/09/27	<0.04		ug/g	
		F1 (C6-C10)	2010/09/27	<10		ug/g	
		F1 (C6-C10) - BTEX	2010/09/27	<10		ug/g	
	RPD	F1 (C6-C10)	2010/09/27	NC		%	50
		F1 (C6-C10) - BTEX	2010/09/27	NC		%	50
2279999 RAI	Matrix Spike						
	[HG4872-01]	Acid Extractable Lead (Pb)	2010/09/30		NC	%	75 - 125
		Acid Extractable Zinc (Zn)	2010/09/30		NC	%	75 - 125
	QC Standard	Acid Extractable Lead (Pb)	2010/09/30		105	%	75 - 125
		Acid Extractable Zinc (Zn)	2010/09/30		105	%	75 - 125
	Method Blank	Acid Extractable Lead (Pb)	2010/09/30	<1		ug/g	
		Acid Extractable Zinc (Zn)	2010/09/30	<5		ug/g	
	RPD [HG4872-01]	Acid Extractable Lead (Pb)	2010/09/30	13.1		%	35
		Acid Extractable Zinc (Zn)	2010/09/30	17.2		%	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.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
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.
(1) The recovery in the matrix spike was not calculated (NC). Spiked concentration was less than 2x that native to the sample.
(2) Duplicate results exceeded RPD acceptance criteria. This may be due to sample heterogeneity.

Validation Signature Page

Maxxam Job #: B0D3298

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Eva Pranjic

CHARTERED
Eva Pranjic
CHEMIST

EWA PRANJIC, M.Sc., C.Chem, Scientific Specialist

M. Riskallah

MEDHAT RISKALLAH, Manager, Hydrocarbon Department

Steve Roberts

STEVE ROBERTS, Lab Supervisor, Ottawa

==

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.

Your Project #: 60158472
Site#: 60158472
Site: PADLOPING SI

Attention: Jenna Morrish - Calgary
AECOM Canada Ltd
17203-103 Ave
Edmonton, AB
T5S 1J4

Report Date: 2010/10/05

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0D3430
Received: 2010/09/23, 19:35

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Petroleum Hydro. CCME F1 & BTEX in Soil	3	2010/09/25	2010/09/28	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil	3	2010/09/28	2010/09/28	CAM SOP-00316	CCME CWS
Total Metals Analysis by ICP	3	2010/09/30	2010/09/30	CAM SOP-00408	EPA 6010
Moisture	3	N/A	2010/09/27	CAM SOP-00445	McKeague 2nd ed 1978
Volatile Organic Compounds in Soil	3	2010/09/25	2010/09/30	CAM SOP-00226	EPA 8260 modified

* 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.

MARIJANE CRUZ, Project Manager
Email: Marijane.Cruz@maxxamanalytics.com
Phone# (905) 817-5756

==
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

Maxxam Job #: B0D3430
Report Date: 2010/10/05

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HG5236	HG5237	HG5238		
Sampling Date		2010/08/04	2010/08/04	2010/08/04		
	Units	**10-0023**	**10-0044**	**10-0086**	**RDL**	**QC Batch**
Inorganics						
Moisture	%	15	12	12	1	2279608

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

AECOM Canada Ltd
Maxxam Job #: B0D3430
Client Project #: 60158472
Report Date: 2010/10/05
Project name: PADLOPING SI

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		HG5235	HG5236	HG5237		
Sampling Date		2010/08/04	2010/08/04	2010/08/04		
	Units	**10-0005**	**10-0023**	**10-0044**	**RDL**	**QC Batch**
Metals						
Acid Extractable Copper (Cu)	ug/g	230	N/A	N/A	2	2283035
Acid Extractable Lead (Pb)	ug/g	N/A	230	120	5	2283035

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0D3430
Report Date: 2010/10/05

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		HG5236	HG5237	HG5238		
Sampling Date		2010/08/04	2010/08/04	2010/08/04		
	Units	**10-0023**	**10-0044**	**10-0086**	**RDL**	**QC Batch**
Volatile Organics						
Benzene	ug/g	<0.002	<0.002	<0.002	0.002	2279975
Ethylbenzene	ug/g	<0.002	<0.002	<0.002	0.002	2279975
Toluene	ug/g	0.009	0.009	0.007	0.002	2279975
p+m-Xylene	ug/g	<0.002	<0.002	<0.002	0.002	2279975
o-Xylene	ug/g	<0.002	<0.002	<0.002	0.002	2279975
Xylene (Total)	ug/g	<0.002	<0.002	<0.002	0.002	2279975
Surrogate Recovery (%)						
4-Bromofluorobenzene	%	78	96	87	N/A	2279975
D4-1,2-Dichloroethane	%	121	116	117	N/A	2279975
D8-Toluene	%	116	108	109	N/A	2279975

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

AECOM Canada Ltd
Maxxam Job #: B0D3430 Client Project #: 60158472
Report Date: 2010/10/05 Project name: PADLOPING SI

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		HG5236	HG5237	HG5238		
Sampling Date		2010/08/04	2010/08/04	2010/08/04		
	Units	**10-0023**	**10-0044**	**10-0086**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons						
F1 (C6-C10)	ug/g	<10	<10	<10	10	2279726
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	10	2279726
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	120	21	49	10	2279717
F3 (C16-C34 Hydrocarbons)	ug/g	900	380	170	10	2279717
F4 (C34-C50 Hydrocarbons)	ug/g	110	110	40	10	2279717
Reached Baseline at C50	ug/g	Yes	Yes	Yes	N/A	2279717
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	100	99	99	N/A	2279726
4-Bromofluorobenzene	%	102	102	101	N/A	2279726
D10-Ethylbenzene	%	113	116	112	N/A	2279726
D4-1,2-Dichloroethane	%	114	115	116	N/A	2279726
o-Terphenyl	%	107	98	100	N/A	2279717

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

GENERAL COMMENTS

F1-F4 Analysis: Analysis was performed past sample holding time. This may increase the variability associated with these results.

VOC Analysis: The samples were analyzed after the 14 day holding time specified by the method had expired.

Results relate only to the items tested.

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Project name: PADLOPING SI

Quality Assurance Report

Maxxam Job Number: MB0D3430

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2279608 DEE	RPD	Moisture	2010/09/27	3.1		%	20
2279717 NCI	Matrix Spike	o-Terphenyl	2010/09/29		91	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/09/29		68	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/09/29		68	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/09/29		68	%	60 - 130
	Spiked Blank	o-Terphenyl	2010/09/29		90	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/09/29		77	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/09/29		77	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/09/29		77	%	60 - 130
	Method Blank	o-Terphenyl	2010/09/28		95	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/09/28	<10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2010/09/28	<10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2010/09/28	<10		ug/g	
	RPD	F2 (C10-C16 Hydrocarbons)	2010/09/28	NC		%	50
		F3 (C16-C34 Hydrocarbons)	2010/09/28	NC		%	50
		F4 (C34-C50 Hydrocarbons)	2010/09/28	48.8		%	50
2279726 SHK	Matrix Spike	1,4-Difluorobenzene	2010/09/28		99	%	60 - 140
		4-Bromofluorobenzene	2010/09/28		100	%	60 - 140
		D10-Ethylbenzene	2010/09/28		109	%	30 - 130
		D4-1,2-Dichloroethane	2010/09/28		115	%	60 - 140
		F1 (C6-C10)	2010/09/28		84	%	60 - 140
	Spiked Blank	1,4-Difluorobenzene	2010/09/28		102	%	60 - 140
		4-Bromofluorobenzene	2010/09/28		102	%	60 - 140
		D10-Ethylbenzene	2010/09/28		111	%	30 - 130
		D4-1,2-Dichloroethane	2010/09/28		116	%	60 - 140
		F1 (C6-C10)	2010/09/28		78	%	60 - 140
	Method Blank	1,4-Difluorobenzene	2010/09/28		99	%	60 - 140
		4-Bromofluorobenzene	2010/09/28		101	%	60 - 140
		D10-Ethylbenzene	2010/09/28		108	%	30 - 130
		D4-1,2-Dichloroethane	2010/09/28		116	%	60 - 140
		F1 (C6-C10)	2010/09/28	<10		ug/g	
		F1 (C6-C10) - BTEX	2010/09/28	<10		ug/g	
	RPD	F1 (C6-C10)	2010/09/28	NC		%	50
		F1 (C6-C10) - BTEX	2010/09/28	NC		%	50
2279975 FS	Matrix Spike	4-Bromofluorobenzene	2010/10/01		97	%	60 - 140
		D4-1,2-Dichloroethane	2010/10/01		118	%	60 - 140
		D8-Toluene	2010/10/01		107	%	60 - 140
		Benzene	2010/10/01		97	%	39 - 137
		Ethylbenzene	2010/10/01		79	%	46 - 150
		Toluene	2010/10/01		81	%	30 - 158
		p+m-Xylene	2010/10/01		85	%	29 - 161
		o-Xylene	2010/10/01		92	%	45 - 150
	Spiked Blank	4-Bromofluorobenzene	2010/09/30		107	%	60 - 140
		D4-1,2-Dichloroethane	2010/09/30		118	%	60 - 140
		D8-Toluene	2010/09/30		102	%	60 - 140
		Benzene	2010/09/30		102	%	60 - 140
		Ethylbenzene	2010/09/30		99	%	60 - 140
		Toluene	2010/09/30		97	%	60 - 140
		p+m-Xylene	2010/09/30		98	%	60 - 140
		o-Xylene	2010/09/30		98	%	60 - 140
	Method Blank	4-Bromofluorobenzene	2010/09/30		101	%	60 - 140
		D4-1,2-Dichloroethane	2010/09/30		97	%	60 - 140
		D8-Toluene	2010/09/30		97	%	60 - 140
		Benzene	2010/09/30	<0.002		ug/g	
		Ethylbenzene	2010/09/30	<0.002		ug/g	

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Project name: PADLOPING SI

Quality Assurance Report (Continued)

Maxxam Job Number: MB0D3430

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2279975 FS	Method Blank	Toluene	2010/09/30	<0.002		ug/g	
		p+m-Xylene	2010/09/30	<0.002		ug/g	
		o-Xylene	2010/09/30	<0.002		ug/g	
		Xylene (Total)	2010/09/30	<0.002		ug/g	
	RPD	Benzene	2010/10/02	NC		%	50
		Ethylbenzene	2010/10/02	NC		%	50
		Toluene	2010/10/02	NC		%	50
		p+m-Xylene	2010/10/02	NC		%	50
		o-Xylene	2010/10/02	NC		%	50
		Xylene (Total)	2010/10/02	NC		%	50
2283035 APT	Matrix Spike	Acid Extractable Copper (Cu)	2010/09/30		93	%	75 - 125
		Acid Extractable Lead (Pb)	2010/09/30		95	%	75 - 125
	QC Standard	Acid Extractable Copper (Cu)	2010/09/30		99	%	75 - 125
		Acid Extractable Lead (Pb)	2010/09/30		104	%	75 - 125
	Method Blank	Acid Extractable Copper (Cu)	2010/09/30	<2		ug/g	
		Acid Extractable Lead (Pb)	2010/09/30	<5		ug/g	
	RPD	Acid Extractable Lead (Pb)	2010/09/30	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.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
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.

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Validation Signature Page

Maxxam Job #: B0D3430

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Cristina Carriere

CRISTINA CARRIERE, Scientific Services

Suzana Popović

SUZANA POPOVIC, Supervisor, Hydrocarbons

==

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Your Project #: 60158472
Site#: 60158472
Site: PADLOPING SI
Your C.O.C. #: N/A

Attention: Jenna Morrish
AECOM Canada Ltd
2540 Kensington Rd NW
Calgary, AB
CANADA T2N3S3

Report Date: 2010/10/07

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0E0367
Received: 2010/10/05, 16:15

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
F4G (CCME Hydrocarbons Gravimetric) (1)	1	2010/10/06	2010/10/06	CAM SOP-00316	CCME CWS
MOISTURE (1)	1	N/A	2010/10/07	CAM SOP-00445	MOE HANDBOOK(1983)

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Ottawa

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MARIJANE CRUZ, Project Manager
Email: Marijane.Cruz@maxxamanalytics.com
Phone# (905) 817-5756

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Total cover pages: 1

Maxxam Job #: B0E0367
Report Date: 2010/10/07

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JM

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HK2176		
Sampling Date		2010/08/06		
COC Number		N/A		
	Units	**10-0069**	**RDL**	**QC Batch**
Inorganics				
Moisture	%	12	0.2	2289324

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0E0367
Report Date: 2010/10/07

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JM

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		HK2176		
Sampling Date		2010/08/06		
COC Number		N/A		
	Units	**10-0069**	**RDL**	**QC Batch**
F2-F4 Hydrocarbons				
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	9300	100	2289356

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0E0367
Report Date: 2010/10/07

AECOM Canada Ltd
Client Project #: 60158472
Project name: PADLOPING SI
Sampler Initials: JM

GENERAL COMMENTS

Results relate only to the items tested.

AECOM Canada Ltd
Attention: Jenna Morrish
Client Project #: 60158472
P.O. #:
Project name: PADLOPING SI

Quality Assurance Report

Maxxam Job Number: TB0E0367

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2289324	LHR	RPD	Moisture		TBA		%	50
2289356	PRB	Spiked Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2010/10/06		92	%	65 - 135
		RPD	F4G-sg (Grav. Heavy Hydrocarbons)	2010/10/06	0		%	50
		Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2010/10/06	<100		ug/g	

TBA = Result to follow
Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.
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.

Validation Signature Page

Maxxam Job #: B0E0367

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

STEVE ROBERTS, Lab Supervisor, Ottawa

==

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Your Project #: 60158472
Site: SOIL/SED PADLOPING ISLAND
Your C.O.C. #: N/A

Attention: Jenna Morrish
AECOM Canada Ltd
2540 Kensington Rd NW
Calgary, AB
CANADA T2N3S3

Report Date: 2010/10/14

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0E1678
Received: 2010/10/07, 11:48

Sample Matrix: Soil
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Total Metals in TCLP Leachate by ICPMS	1	2010/10/13	2010/10/13	CAM SOP-00447	EPA 6020
TCLP - % Solids	1	2010/10/12	2010/10/13	CAM SOP-00401	EPA 1311 modified
TCLP - EXTRACTION FLUID	1	N/A	2010/10/13	CAM SOP-00401	EPA 1311 modified
TCLP-INITIAL AND FINAL PH	1	N/A	2010/10/13	CAM SOP-00401	EPA 1311 modified

* 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.

MARIJANE CRUZ, Project Manager
Email: MCruz@maxxam.ca
Phone# (905) 817-5756

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Total cover pages: 1

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HK8779		
Sampling Date		2010/08/10		
COC Number		N/A		
	Units	**10-0121**	**RDL**	**QC Batch**

Inorganics				
Final pH	pH	5.00	N/A	2297720
Initial pH	pH	5.51	N/A	2297720
TCLP - % Solids	%	100	0.2	2297718
TCLP Extraction Fluid	N/A	FLUID1	N/A	2297719

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0E1678
Report Date: 2010/10/14

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SED PADLOPING ISLAND

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID		HK8779		
Sampling Date		2010/08/10		
COC Number		N/A		
	Units	**10-0121**	**RDL**	**QC Batch**
Metals				
Leachable Lead (Pb)	mg/L	41.6	0.1	2295614

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

GENERAL COMMENTS

Results relate only to the items tested.

AECOM Canada Ltd
Attention: Jenna Morrish
Client Project #: 60158472
P.O. #:
Project name: SOIL/SED PADLOPING ISLAND

Quality Assurance Report

Maxxam Job Number: MB0E1678

QA/QC Batch Num	Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2295614	JBW	Matrix Spike	Leachable Lead (Pb)	2010/10/13		98	%	75 - 125
		Leachate Blank	Leachable Lead (Pb)	2010/10/13	<0.1		mg/L	
		Spiked Blank	Leachable Lead (Pb)	2010/10/13		103	%	85 - 115
		RPD	Leachable Lead (Pb)	2010/10/13	NC		%	25

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.
Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.
Spiked Blank: A blank matrix to which a known amount of the analyte has been added. Used to evaluate analyte recovery.
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.

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Validation Signature Page

Maxxam Job #: B0E1678

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

CHARTERED
Eva Pranjic
CHEMIST

EWA PRANJIC, M.Sc., C.Chem, Scientific Specialist

==

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Maxxam

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Your Project #: 60158472
Site Location: SOIL/SEDIMENT PADLOPING ISLAND
Your C.O.C. #: n/a

Attention: Jenna Morrish
AECOM Canada Ltd
2540 Kensington Rd NW
Calgary, AB
CANADA T2N3S3

Report Date: 2010/10/26

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0E9106
Received: 2010/10/21, 10:54

Sample Matrix: Soil
Samples Received: 13

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Petroleum Hydro. CCME F1 & BTEX in Soil	13	2010/10/21	2010/10/22	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Soil	13	2010/10/21	2010/10/22	CAM SOP-00316	CCME CWS
F4G (CCME Hydrocarbons Gravimetric)	2	2010/10/25	2010/10/26	CAM SOP-00316	CCME CWS
Moisture	13	N/A	2010/10/22	CAM SOP-00445	McKeague 2nd ed 1978
Polychlorinated Biphenyl in Soil	13	2010/10/21	2010/10/22	CAM SOP-00309	SW846 8082
Volatile Organic Compounds in Soil	7	2010/10/21	2010/10/22	CAM SOP-00226	EPA 8260 modified
Volatile Organic Compounds in Soil	6	2010/10/21	2010/10/23	CAM SOP-00226	EPA 8260 modified

* 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.

MARIJANE CRUZ, Project Manager
Email: MCruz@maxxam.ca
Phone# (905) 817-5756

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Total cover pages: 1

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Maxxam Job #: B0E9106
Report Date: 2010/10/26

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND

RESULTS OF ANALYSES OF SOIL

Maxxam ID		HO4459	HO4460	HO4461	HO4462	HO4463	HO4464	HO4465		
Sampling Date		2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a	n/a		
	Units	**10-0145**	**10-0146**	**10-0147**	**10-0148**	**10-0149**	**10-0150**	**10-0151**	**RDL**	**QC Batch**
Inorganics										
Moisture	%	16	11	26	4	16	10	11	1	2306043

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		HO4466	HO4467	HO4468	HO4469	HO4470	HO4471		
Sampling Date		2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	Units	**10-0152**	**10-0153**	**10-0154**	**10-0155**	**10-0156**	**10-0157**	**RDL**	**QC Batch**
Inorganics									
Moisture	%	11	11	21	8	11	8	1	2306043

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

AECOM Canada Ltd
Maxxam Job #: B0E9106 Client Project #: 60158472
Report Date: 2010/10/26 Project name: SOIL/SEDIMENT PADLOPING ISLAND

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		HO4459	HO4460	HO4461	HO4462	HO4463	HO4464		
Sampling Date		2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	Units	**10-0145**	**10-0146**	**10-0147**	**10-0148**	**10-0149**	**10-0150**	**RDL**	**QC Batch**
Volatile Organics									
Benzene	ug/g	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2305420
Ethylbenzene	ug/g	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2305420
Toluene	ug/g	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2305420
p+m-Xylene	ug/g	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2305420
o-Xylene	ug/g	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2305420
Xylene (Total)	ug/g	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	2305420
Surrogate Recovery (%)									
4-Bromofluorobenzene	%	85	92	72	85	81	96	N/A	2305420
D4-1,2-Dichloroethane	%	92	90	90	90	90	93	N/A	2305420
D8-Toluene	%	105	98	112	101	105	99	N/A	2305420

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0E9106
Report Date: 2010/10/26

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		HO4465		HO4466	HO4467	HO4468	HO4469		
Sampling Date		2010/08/12		2010/08/12	2010/08/12	2010/08/12	2010/08/12		
COC Number		n/a		n/a	n/a	n/a	n/a		
	Units	**10-0151**	**RDL**	**10-0152**	**10-0153**	**10-0154**	**10-0155**	**RDL**	**QC Batch**
Volatile Organics									
Benzene	ug/g	<0.1	0.1	<0.002	<0.002	<0.002	<0.002	0.002	2305420
Ethylbenzene	ug/g	<0.1	0.1	<0.002	<0.002	<0.002	<0.002	0.002	2305420
Toluene	ug/g	<0.1	0.1	<0.002	<0.002	<0.002	<0.002	0.002	2305420
p+m-Xylene	ug/g	<0.1	0.1	<0.002	<0.002	<0.002	<0.002	0.002	2305420
o-Xylene	ug/g	<0.1	0.1	<0.002	<0.002	<0.002	<0.002	0.002	2305420
Xylene (Total)	ug/g	<0.1	0.1	<0.002	<0.002	<0.002	<0.002	0.002	2305420
Surrogate Recovery (%)									
4-Bromofluorobenzene	%	103	N/A	84	82	73	88	N/A	2305420
D4-1,2-Dichloroethane	%	114	N/A	89	89	91	89	N/A	2305420
D8-Toluene	%	95	N/A	100	101	122	97	N/A	2305420

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

AECOM Canada Ltd
Maxxam Job #: B0E9106
Client Project #: 60158472
Report Date: 2010/10/26
Project name: SOIL/SEDIMENT PADLOPING ISLAND

VOLATILE ORGANICS BY GC/MS (SOIL)

Maxxam ID		HO4470	HO4471		
Sampling Date		2010/08/12	2010/08/12		
COC Number		n/a	n/a		
	Units	**10-0156**	**10-0157**	**RDL**	**QC Batch**
Volatile Organics					
Benzene	ug/g	<0.002	<0.002	0.002	2305420
Ethylbenzene	ug/g	<0.002	<0.002	0.002	2305420
Toluene	ug/g	<0.002	<0.002	0.002	2305420
p+m-Xylene	ug/g	<0.002	<0.002	0.002	2305420
o-Xylene	ug/g	<0.002	<0.002	0.002	2305420
Xylene (Total)	ug/g	<0.002	<0.002	0.002	2305420
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	86	89	N/A	2305420
D4-1,2-Dichloroethane	%	92	91	N/A	2305420
D8-Toluene	%	96	98	N/A	2305420

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0E9106
Report Date: 2010/10/26

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		HO4459	HO4460	HO4461	HO4462	HO4463		
Sampling Date		2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12		
COC Number		n/a	n/a	n/a	n/a	n/a		
	Units	**10-0145**	**10-0146**	**10-0147**	**10-0148**	**10-0149**	**RDL**	**QC Batch**

BTEX & F1 Hydrocarbons								
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	10	2305847
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	10	2305847
F2-F4 Hydrocarbons								
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	N/A	N/A	<100	N/A	N/A	100	2308330
F2 (C10-C16 Hydrocarbons)	ug/g	93	16	<10	<10	130	10	2305366
F3 (C16-C34 Hydrocarbons)	ug/g	54	<10	150	<10	300	10	2305366
F4 (C34-C50 Hydrocarbons)	ug/g	14	<10	83	<10	21	10	2305366
Reached Baseline at C50	ug/g	Yes	Yes	No	Yes	Yes	N/A	2305366
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	100	101	99	99	100	N/A	2305847
4-Bromofluorobenzene	%	103	104	102	96	98	N/A	2305847
D10-Ethylbenzene	%	98	97	99	94	95	N/A	2305847
D4-1,2-Dichloroethane	%	104	105	103	103	103	N/A	2305847
o-Terphenyl	%	94	99	96	96	97	N/A	2305366

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0E9106
Report Date: 2010/10/26

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		HO4464	HO4465	HO4466	HO4467	HO4468		
Sampling Date		2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12		
COC Number		n/a	n/a	n/a	n/a	n/a		
	Units	**10-0150**	**10-0151**	**10-0152**	**10-0153**	**10-0154**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons								
F1 (C6-C10)	ug/g	<10	<10	<10	<10	<10	10	2305847
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	<10	10	2305847
F2-F4 Hydrocarbons								
F4G-sg (Grav. Heavy Hydrocarbons)	ug/g	N/A	N/A	N/A	N/A	300	100	2308330
F2 (C10-C16 Hydrocarbons)	ug/g	110	350	<10	<10	<10	10	2305366
F3 (C16-C34 Hydrocarbons)	ug/g	46	100	15	<10	75	10	2305366
F4 (C34-C50 Hydrocarbons)	ug/g	<10	<10	<10	<10	66	10	2305366
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes	No	N/A	2305366
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	100	99	99	100	101	N/A	2305847
4-Bromofluorobenzene	%	103	103	98	101	97	N/A	2305847
D10-Ethylbenzene	%	104	98	99	101	97	N/A	2305847
D4-1,2-Dichloroethane	%	103	103	102	102	104	N/A	2305847
o-Terphenyl	%	98	90	91	95	98	N/A	2305366

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B0E9106
Report Date: 2010/10/26

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		HO4469	HO4470	HO4471		
Sampling Date		2010/08/12	2010/08/12	2010/08/12		
COC Number		n/a	n/a	n/a		
	Units	**10-0155**	**10-0156**	**10-0157**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons						
F1 (C6-C10)	ug/g	<10	<10	<10	10	2305847
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	10	2305847
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	10	2305366
F3 (C16-C34 Hydrocarbons)	ug/g	<10	25	<10	10	2305366
F4 (C34-C50 Hydrocarbons)	ug/g	<10	20	<10	10	2305366
Reached Baseline at C50	ug/g	Yes	Yes	Yes	N/A	2305366
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	100	101	100	N/A	2305847
4-Bromofluorobenzene	%	102	95	95	N/A	2305847
D10-Ethylbenzene	%	101	99	100	N/A	2305847
D4-1,2-Dichloroethane	%	105	103	104	N/A	2305847
o-Terphenyl	%	93	96	93	N/A	2305366

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0E9106
Report Date: 2010/10/26

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		HO4459	HO4460	HO4461	HO4462	HO4463	HO4464		
Sampling Date		2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	Units	**10-0145**	**10-0146**	**10-0147**	**10-0148**	**10-0149**	**10-0150**	**RDL**	**QC Batch**
PCBs									
Aroclor 1016	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1221	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1232	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1242	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1248	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1254	ug/g	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1260	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1262	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1268	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Total PCB	ug/g	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	0.01	2305128
Surrogate Recovery (%)									
2,4,5,6-Tetrachloro-m-xylene	%	78	64	71	59	75	69	N/A	2305128
Decachlorobiphenyl	%	89	89	88	81	90	85	N/A	2305128

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam

Success Through Science®

Maxxam Job #: B0E9106
Report Date: 2010/10/26

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		HO4465	HO4466	HO4467	HO4468	HO4469	HO4470		
Sampling Date		2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12	2010/08/12		
COC Number		n/a	n/a	n/a	n/a	n/a	n/a		
	Units	**10-0151**	**10-0152**	**10-0153**	**10-0154**	**10-0155**	**10-0156**	**RDL**	**QC Batch**
PCBs									
Aroclor 1016	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1221	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1232	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1242	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1248	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1254	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1260	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1262	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Aroclor 1268	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Total PCB	ug/g	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2305128
Surrogate Recovery (%)									
2,4,5,6-Tetrachloro-m-xylene	%	61	70	64	70	61	69	N/A	2305128
Decachlorobiphenyl	%	83	86	89	84	82	88	N/A	2305128

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0E9106
Report Date: 2010/10/26

AECOM Canada Ltd
Client Project #: 60158472
Project name: SOIL/SEDIMENT PADLOPING ISLAND

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOIL)

Maxxam ID		HO4471		
Sampling Date		2010/08/12		
COC Number		n/a		
	Units	**10-0157**	**RDL**	**QC Batch**
PCBs				
Aroclor 1016	ug/g	<0.01	0.01	2305128
Aroclor 1221	ug/g	<0.01	0.01	2305128
Aroclor 1232	ug/g	<0.01	0.01	2305128
Aroclor 1242	ug/g	<0.01	0.01	2305128
Aroclor 1248	ug/g	<0.01	0.01	2305128
Aroclor 1254	ug/g	<0.01	0.01	2305128
Aroclor 1260	ug/g	<0.01	0.01	2305128
Aroclor 1262	ug/g	<0.01	0.01	2305128
Aroclor 1268	ug/g	<0.01	0.01	2305128
Total PCB	ug/g	<0.01	0.01	2305128
Surrogate Recovery (%)				
2,4,5,6-Tetrachloro-m-xylene	%	63	N/A	2305128
Decachlorobiphenyl	%	82	N/A	2305128

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

GENERAL COMMENTS

F1-BTEX & F2-F4 Analysis;
Analysis was performed past sample holding time. This may increase the variability associated with these results.

VOC Analysis: The samples were analyzed after the 14 day holding time specified by the method had expired.

Sample HO4465-01: VOC Analysis: Due to a level of petroleum hydrocarbon compounds beyond the appropriate range, the sample could not be analysed by the low level direct purge method. The sample was preextracted in methanol and the extract analysed by high level purge & trap (US EPA Method 5035) gas chromatography/mass spectrometry using US EPA Method 8260C (modified). The DLs were adjusted accordingly.

Results relate only to the items tested.

AECOM Canada Ltd
Attention: Jenna Morrish
Client Project #: 60158472
P.O. #:
Site Location: SOIL/SEDIMENT PADLOPING ISLAND

Quality Assurance Report

Maxxam Job Number: MB0E9106

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2305128 LPG	Matrix Spike	2,4,5,6-Tetrachloro-m-xylene	2010/10/22		72	%	40 - 130
		Decachlorobiphenyl	2010/10/22		84	%	40 - 130
		Aroclor 1260	2010/10/22		93	%	30 - 130
		Total PCB	2010/10/22		93	%	30 - 130
	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2010/10/21		85	%	40 - 130
		Decachlorobiphenyl	2010/10/21		89	%	40 - 130
		Aroclor 1260	2010/10/21		101	%	30 - 130
		Total PCB	2010/10/21		101	%	30 - 130
	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2010/10/21		71	%	40 - 130
		Decachlorobiphenyl	2010/10/21		73	%	40 - 130
		Aroclor 1016	2010/10/21	<0.01		ug/g	
		Aroclor 1221	2010/10/21	<0.01		ug/g	
		Aroclor 1232	2010/10/21	<0.01		ug/g	
		Aroclor 1242	2010/10/21	<0.01		ug/g	
		Aroclor 1248	2010/10/21	<0.01		ug/g	
		Aroclor 1254	2010/10/21	<0.01		ug/g	
		Aroclor 1260	2010/10/21	<0.01		ug/g	
		Aroclor 1262	2010/10/21	<0.01		ug/g	
		Aroclor 1268	2010/10/21	<0.01		ug/g	
		Total PCB	2010/10/21	<0.01		ug/g	
	RPD	Aroclor 1016	2010/10/21	NC		%	50
		Aroclor 1221	2010/10/21	NC		%	50
		Aroclor 1232	2010/10/21	NC		%	50
		Aroclor 1242	2010/10/21	NC		%	50
		Aroclor 1248	2010/10/21	NC		%	50
		Aroclor 1254	2010/10/21	NC		%	50
		Aroclor 1260	2010/10/21	NC		%	50
		Aroclor 1262	2010/10/21	NC		%	50
		Aroclor 1268	2010/10/21	NC		%	50
		Total PCB	2010/10/21	NC		%	50
2305366 JKA	Matrix Spike [HO4460-01]	o-Terphenyl	2010/10/25		95	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/10/25		88	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/10/25		88	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/10/25		88	%	60 - 130
	Spiked Blank	o-Terphenyl	2010/10/25		97	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/10/25		93	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/10/25		93	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/10/25		93	%	60 - 130
	Method Blank	o-Terphenyl	2010/10/22		95	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/10/22	<10		ug/g	
		F3 (C16-C34 Hydrocarbons)	2010/10/22	<10		ug/g	
		F4 (C34-C50 Hydrocarbons)	2010/10/22	<10		ug/g	
	RPD [HO4460-01]	F2 (C10-C16 Hydrocarbons)	2010/10/22	NC		%	50
		F3 (C16-C34 Hydrocarbons)	2010/10/22	NC		%	50
		F4 (C34-C50 Hydrocarbons)	2010/10/22	NC		%	50
2305420 JZO	Matrix Spike [HO4459-01]	4-Bromofluorobenzene	2010/10/22		94	%	60 - 140
		D4-1,2-Dichloroethane	2010/10/22		97	%	60 - 140
		D8-Toluene	2010/10/22		104	%	60 - 140
		Benzene	2010/10/22		103	%	39 - 137
		Ethylbenzene	2010/10/22		105	%	46 - 150
		Toluene	2010/10/22		105	%	30 - 158
		p+m-Xylene	2010/10/22		107	%	29 - 161
		o-Xylene	2010/10/22		88	%	45 - 150

AECOM Canada Ltd
Attention: Jenna Morrish
Client Project #: 60158472
P.O. #:
Site Location: SOIL/SEDIMENT PADLOPING ISLAND

Quality Assurance Report (Continued)

Maxxam Job Number: MB0E9106

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2305420 JZO	Spiked Blank	4-Bromofluorobenzene	2010/10/22		102	%	60 - 140
		D4-1,2-Dichloroethane	2010/10/22		100	%	60 - 140
		D8-Toluene	2010/10/22		99	%	60 - 140
		Benzene	2010/10/22		101	%	60 - 140
		Ethylbenzene	2010/10/22		102	%	60 - 140
		Toluene	2010/10/22		96	%	60 - 140
		p+m-Xylene	2010/10/22		105	%	60 - 140
		o-Xylene	2010/10/22		87	%	60 - 140
	Method Blank	4-Bromofluorobenzene	2010/10/22		95	%	60 - 140
		D4-1,2-Dichloroethane	2010/10/22		97	%	60 - 140
		D8-Toluene	2010/10/22		103	%	60 - 140
		Benzene	2010/10/22	<0.002		ug/g	
		Ethylbenzene	2010/10/22	<0.002		ug/g	
		Toluene	2010/10/22	<0.002		ug/g	
		p+m-Xylene	2010/10/22	<0.002		ug/g	
		o-Xylene	2010/10/22	<0.002		ug/g	
		Xylene (Total)	2010/10/22	<0.002		ug/g	
	RPD [HO4459-01]	Benzene	2010/10/22	NC		%	50
		Ethylbenzene	2010/10/22	NC		%	50
		Toluene	2010/10/22	NC		%	50
		p+m-Xylene	2010/10/22	NC		%	50
		o-Xylene	2010/10/22	NC		%	50
		Xylene (Total)	2010/10/22	NC		%	50
2305847 AAI	Matrix Spike						
	[HO4460-01]	1,4-Difluorobenzene	2010/10/22		100	%	60 - 140
		4-Bromofluorobenzene	2010/10/22		104	%	60 - 140
		D10-Ethylbenzene	2010/10/22		98	%	30 - 130
		D4-1,2-Dichloroethane	2010/10/22		104	%	60 - 140
		F1 (C6-C10)	2010/10/22		80	%	60 - 140
	Spiked Blank	1,4-Difluorobenzene	2010/10/22		100	%	60 - 140
		4-Bromofluorobenzene	2010/10/22		101	%	60 - 140
		D10-Ethylbenzene	2010/10/22		99	%	30 - 130
		D4-1,2-Dichloroethane	2010/10/22		103	%	60 - 140
		F1 (C6-C10)	2010/10/22		90	%	60 - 140
	Method Blank	1,4-Difluorobenzene	2010/10/22		98	%	60 - 140
		4-Bromofluorobenzene	2010/10/22		98	%	60 - 140
		D10-Ethylbenzene	2010/10/22		94	%	30 - 130
		D4-1,2-Dichloroethane	2010/10/22		103	%	60 - 140
		F1 (C6-C10)	2010/10/22	<10		ug/g	
		F1 (C6-C10) - BTEX	2010/10/22	<10		ug/g	
	RPD [HO4460-01]	F1 (C6-C10)	2010/10/22	NC		%	50
		F1 (C6-C10) - BTEX	2010/10/22	NC		%	50
2306043 NKO	RPD	Moisture	2010/10/22	5.9		%	20
2308330 RUS	Matrix Spike						
	[HO4461-01]	F4G-sg (Grav. Heavy Hydrocarbons)	2010/10/26		89	%	65 - 135
	Spiked Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2010/10/26		95	%	65 - 135
	Method Blank	F4G-sg (Grav. Heavy Hydrocarbons)	2010/10/26	<100		ug/g	
	RPD [HO4461-01]	F4G-sg (Grav. Heavy Hydrocarbons)	2010/10/26	NC		%	50

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.
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.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
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 #: B0E9106

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

CHARLES ANCKER, B.Sc., M.Sc., C.Chem, Senior Analyst

CRISTINA CARRIERE, Scientific Services

JEEVARAJ JEEVARATRNAM, Senior Analyst

MAMDOUH SALIB, Analyst, Hydrocarbons

==

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.

Your Project #: 60158472
Site#: 6015 8472
Site: BARREL PADLOPING ST
Your C.O.C. #: 20350601, 203506-0

Attention: Jenna Morrish - Calgary
AECOM Canada Ltd
17203-103 Ave
Edmonton, AB
T5S 1J4

Report Date: 2010/08/27

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0B0619
Received: 2010/08/16, 11:26

Sample Matrix: LIQUID
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Total Metals Analysis by Axial ICP	8	2010/08/19	2010/08/19	CAM SOP-00408	EPA 6010C
Polychlorinated Biphenyl in Liquids (1)	7	2010/08/18	2010/08/20	CAM SOP-00307	EPA 8081 modified
Polychlorinated Biphenyl in Liquids (1)	1	2010/08/18	2010/08/21	CAM SOP-00307	EPA 8081 modified

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Sample(s) analyzed using methodologies that have not been subjected to Maxxam's standard validation process for the submitted matrix and is not an Accredited method. Analysis performed with client consent, however results should be viewed with discretion

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MARIJANE CRUZ, Project Manager
Email: Marijane.Cruz@maxxamanalytics.com
Phone# (905) 817-5756

==
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

Maxxam Job #: B0B0619
Report Date: 2010/08/27

AECOM Canada Ltd
Client Project #: 60158472
Project name: BARREL PADLOPING ST
Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (LIQUID)

Maxxam ID		GV4624		GV4625	GV4626		GV4627		GV4628		
Sampling Date		2010/08/11		2010/08/11	2010/08/11		2010/08/11		2010/08/11		
COC Number		203506-0		203506-0	203506-0		203506-0		203506-0		
	Units	**B1**	**RDL**	**B22**	**B201**	**RDL**	**B204**	**RDL**	**B219**	**RDL**	**QC Batch**
Metals											
Total Cadmium (Cd)	mg/L	<0.02	0.02	<0.2	<0.2	0.2	<0.02	0.02	<0.2	0.2	2239902
Total Chromium (Cr)	mg/L	<0.05	0.05	0.8	0.7	0.5	0.06	0.05	3.0	0.5	2239902
Total Lead (Pb)	mg/L	<0.1	0.1	<1	<1	1	<0.1	0.1	<1	1	2239902

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam ID		GV4629		GV4630	GV4631		
Sampling Date		2010/08/12		2010/08/12	2010/08/12		
COC Number		203506-0		203506-0	203506-0		
	Units	**B291**	**RDL**	**B301**	**B303**	**RDL**	**QC Batch**
Metals							
Total Cadmium (Cd)	mg/L	<0.02	0.02	<0.2	<0.2	0.2	2239902
Total Chromium (Cr)	mg/L	<0.05	0.05	1.2	3.5	0.5	2239902
Total Lead (Pb)	mg/L	<0.1	0.1	<1	<1	1	2239902

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B0B0619
Report Date: 2010/08/27

AECOM Canada Ltd
Client Project #: 60158472
Project name: BARREL PADLOPING ST
Sampler Initials: JL

POLYCHLORINATED BIPHENYLS BY GC-ECD (LIQUID)

Maxxam ID		GV4624			GV4625			GV4626	GV4627		
Sampling Date		2010/08/11			2010/08/11			2010/08/11	2010/08/11		
COC Number		203506-0			203506-0			203506-0	203506-0		
	Units	**B1**	**RDL**	**QC Batch**	**B22**	**RDL**	**QC Batch**	**B201**	**B204**	**RDL**	**QC Batch**
PCBs											
Aroclor 1016	ug/L	<0.5	0.5	2238268	<1	1	2241351	<0.5	<0.5	0.5	2238268
Aroclor 1221	ug/L	<0.5	0.5	2238268	<1	1	2241351	<0.5	<0.5	0.5	2238268
Aroclor 1232	ug/L	<0.5	0.5	2238268	<1	1	2241351	<0.5	<0.5	0.5	2238268
Aroclor 1242	ug/L	<0.5	0.5	2238268	<1	1	2241351	<0.5	<0.5	0.5	2238268
Aroclor 1248	ug/L	<0.5	0.5	2238268	<1	1	2241351	<0.5	<0.5	0.5	2238268
Aroclor 1254	ug/L	<0.5	0.5	2238268	<1	1	2241351	<0.5	<0.5	0.5	2238268
Aroclor 1260	ug/L	<0.5	0.5	2238268	<1	1	2241351	<0.5	<0.5	0.5	2238268
Aroclor 1262	ug/L	<0.5	0.5	2238268	<1	1	2241351	<0.5	<0.5	0.5	2238268
Aroclor 1268	ug/L	<0.5	0.5	2238268	<1	1	2241351	<0.5	<0.5	0.5	2238268
Total PCB	ug/L	<0.5	0.5	2238268	<1	1	2241351	<0.5	<0.5	0.5	2238268
Surrogate Recovery (%)											
2,4,5,6-Tetrachloro-m-xylene	%	69	N/A	2238268	58	N/A	2241351	53	65	N/A	2238268
Decachlorobiphenyl	%	85	N/A	2238268	71	N/A	2241351	75	79	N/A	2238268

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0619
Report Date: 2010/08/27

AECOM Canada Ltd
Client Project #: 60158472
Project name: BARREL PADLOPING ST
Sampler Initials: JL

POLYCHLORINATED BIPHENYLS BY GC-ECD (LIQUID)

Maxxam ID		GV4628	GV4629	GV4630	GV4631		
Sampling Date		2010/08/11	2010/08/12	2010/08/12	2010/08/12		
COC Number		203506-0	203506-0	203506-0	203506-0		
	Units	**B219**	**B291**	**B301**	**B303**	**RDL**	**QC Batch**
PCBs							
Aroclor 1016	ug/L	<0.5	<0.5	<0.5	<0.5	0.5	2238268
Aroclor 1221	ug/L	<0.5	<0.5	<0.5	<0.5	0.5	2238268
Aroclor 1232	ug/L	<0.5	<0.5	<0.5	<0.5	0.5	2238268
Aroclor 1242	ug/L	<0.5	<0.5	<0.5	<0.5	0.5	2238268
Aroclor 1248	ug/L	<0.5	<0.5	<0.5	<0.5	0.5	2238268
Aroclor 1254	ug/L	<0.5	<0.5	<0.5	<0.5	0.5	2238268
Aroclor 1260	ug/L	<0.5	<0.5	<0.5	<0.5	0.5	2238268
Aroclor 1262	ug/L	<0.5	<0.5	<0.5	<0.5	0.5	2238268
Aroclor 1268	ug/L	<0.5	<0.5	<0.5	<0.5	0.5	2238268
Total PCB	ug/L	<0.5	<0.5	<0.5	<0.5	0.5	2238268
Surrogate Recovery (%)							
2,4,5,6-Tetrachloro-m-xylene	%	59	64	65	68	N/A	2238268
Decachlorobiphenyl	%	82	76	77	81	N/A	2238268

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0619
Report Date: 2010/08/27

AECOM Canada Ltd
Client Project #: 60158472
Project name: BARREL PADLOPING ST
Sampler Initials: JL

GENERAL COMMENTS

PCB Analysis: Due to limited amount of sample available for analysis, a smaller than usual portion of the sample was used. Detection limits were adjusted accordingly.

Metals analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Sample GV4625-01: PCB Analysis: Two vials of the same sample have different color and appearance. Due to limited amount of sample available for analysis, a smaller than usual portion of the sample was used. Detection limits were adjusted accordingly.

Results relate only to the items tested.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Project name: BARREL PADLOPING ST

Quality Assurance Report

Maxxam Job Number: TB0B0619

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2238268 JZ	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/20		74	%	30 - 150
		Decachlorobiphenyl	2010/08/20		71	%	29 - 139
		Aroclor 1260	2010/08/20		90	%	30 - 130
	RPD	Aroclor 1260	2010/08/20	7.1		%	40
	Spiked Blank	Total PCB	2010/08/20		90	%	30 - 130
	RPD	Total PCB	2010/08/20	7.1		%	40
	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/20		60	%	30 - 150
		Decachlorobiphenyl	2010/08/20		71	%	29 - 139
		Aroclor 1016	2010/08/20	<0.05		ug/L	
		Aroclor 1221	2010/08/20	<0.05		ug/L	
		Aroclor 1232	2010/08/20	<0.05		ug/L	
		Aroclor 1242	2010/08/20	<0.05		ug/L	
		Aroclor 1248	2010/08/20	<0.05		ug/L	
		Aroclor 1254	2010/08/20	<0.05		ug/L	
		Aroclor 1260	2010/08/20	<0.05		ug/L	
		Aroclor 1262	2010/08/20	<0.05		ug/L	
		Aroclor 1268	2010/08/20	<0.05		ug/L	
		Total PCB	2010/08/20	<0.05		ug/L	
2239902 BGI	Matrix Spike	Total Cadmium (Cd)	2010/08/20		97	%	75 - 125
		Total Chromium (Cr)	2010/08/20		95	%	75 - 125
		Total Lead (Pb)	2010/08/20		97	%	75 - 125
	Spiked Blank	Total Cadmium (Cd)	2010/08/19		97	%	85 - 115
		Total Chromium (Cr)	2010/08/19		93	%	85 - 115
		Total Lead (Pb)	2010/08/19		95	%	85 - 115
	Method Blank	Total Cadmium (Cd)	2010/08/19	<0.002		mg/L	
		Total Chromium (Cr)	2010/08/19	<0.005		mg/L	
		Total Lead (Pb)	2010/08/19	<0.01		mg/L	
2241351 JZ	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/21		47	%	30 - 150
		Decachlorobiphenyl	2010/08/21		59	%	29 - 139
		Aroclor 1260	2010/08/21		72	%	30 - 130
	RPD	Aroclor 1260	2010/08/21	9.6		%	40
	Spiked Blank	Total PCB	2010/08/21		72	%	30 - 130
	RPD	Total PCB	2010/08/21	9.6		%	40
	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/21		52	%	30 - 150
		Decachlorobiphenyl	2010/08/21		69	%	29 - 139
		Aroclor 1016	2010/08/21	<0.05		ug/L	
		Aroclor 1221	2010/08/21	<0.05		ug/L	
		Aroclor 1232	2010/08/21	<0.05		ug/L	
		Aroclor 1242	2010/08/21	<0.05		ug/L	
		Aroclor 1248	2010/08/21	<0.05		ug/L	
		Aroclor 1254	2010/08/21	<0.05		ug/L	
		Aroclor 1260	2010/08/21	<0.05		ug/L	
		Aroclor 1262	2010/08/21	<0.05		ug/L	
		Aroclor 1268	2010/08/21	<0.05		ug/L	
		Total PCB	2010/08/21	<0.05		ug/L	

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.
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.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

Validation Signature Page

Maxxam Job #: B0B0619

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

C. Ancker

CHARLES ANCKER, B.Sc., M.Sc., C.Chem, Senior Analyst

Cristina Carriere

CRISTINA CARRIERE, Scientific Services

ALINA SEGAL, Manager Main Lab - Organics

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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.

Petro Laboratories Inc.

1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
E-mail: petrolab@gmail.com

Laboratory Report

Maxxam Analytics Inc.
4000-19 St. NE.
Calgary, AB
T2E 6P8

Lab no.: 10835 - 1 to 8 (Part A)
Date report: Aug 19, 2010
Sample in : Aug 17 2010
Project No.: B0B0619

Attention: Lisa McManes

Re: Liquid samples taken on August 11, 2010 for testing.

TEST - 1. Chlorine Content, in mg/l or ppm by ASTM D808, bomb method

Lab No. 10835 -	Sample ID	Results
-1	GV4624-01R/B1	5
-2	GV4625-01R/B22	3
-3	GV4626-01R/B201	97
-4	GV4627-01r/B204	8
-5	GV4628-01R/B219	7
-6	GV4629-01R/B291	9
-7	GV4630-01R/B301	6
-8	GV4631-01R/B303	8

Method detection limit - 1 mg/l
Control sample - CONOCO Conostain chlorine standard
Expected Conc., mg/l - 5, Found Conc. - 4, Recovery - 94 %
Expected Conc, mg/l - 95 Found Conc. - 94 Recovery - 95%

Test by: A.C. (Chemist)

Approved by: James Szeto

Member of ASTM
JS:LN

James Szeto, B.Sc.
Chief Chemist

Petro Laboratories Inc.

1295 Matheson Blvd. East, Mississauga, Ontario, L4W 1R1 Tel: (905) 361-2388 Fax: (905) 361-2411
E-mail: petrolab@gmail.com

Laboratory Report

Maxxam Analytics Inc.
4000-19 St. NE.
Calgary, AB
T2E 6P8

Lab no.: 10835 - 1 to 8 (Part B)
Date report: Aug 19, 2010
Sample in : Aug 17 2010
Project No.: B0B0619

Attention: Lisa McManes

Re: Liquid samples taken on August 11, 2010 for testing.

TEST - Alcohol and Glycol content in % wt. by GC/FID method. ASTM D4815 Modified

Parameter	Lab No.	10835 - 1	10835 - 2	10835 - 3	10835 - 4	10835 - 5	10835 - 6	10835 -7	10835 - 8
	Sample ID:	GV4624-01R/B1	GV4625-01R/B22	GV4626-01R/B201	GV4627-01R/B204	GV4628-01R/B219	GV4629-01R/B291	GV4630-01R/B301	GV4631-01R/B303
Alcohol Content					Results				
Methanol		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethanol		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-Propanol		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
n-Propanol		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-Butanol		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
n-Butanol		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Glycol Content									
Ethylene Glycol		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Propylene Glycol		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Triethylene Glycol		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Control sample - Standard Alcohol and Glycol
Expected Conc., in % wt. - 0.1 Found Conc. - 0.1 Recovery - 99%
Method detection limit - 0.1%

Test by: Z.H. (Chemist)

Approved by: James Szeto

Member of ASTM
JS:LN

James Szeto, B.Sc.
Chief Chemist

Your Project #: 60158472
Site: PAINT/CONCRETE PADLOPING SI
Your C.O.C. #: 20350602, 203506-0

Attention: Jenna Morrish - Calgary
AECOM Canada Ltd
17203-103 Ave
Edmonton, AB
T5S 1J4

Report Date: 2010/08/28

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0B0583
Received: 2010/08/16, 11:26

Sample Matrix: Paint
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Total Metals in TCLP Leachate by ICPMS	1	2010/08/19	2010/08/19	CAM SOP-00447	EPA 6020
Lead In Paint	1	2010/08/19	2010/08/24	CAM SOP-00408	EPA 6010
Lead In Paint	2	2010/08/23	2010/08/24	CAM SOP-00408	EPA 6010
Polychlorinated Biphenyl in Solids (1)	2	2010/08/18	2010/08/20	CAM SOP-00307	EPA 8082
Polychlorinated Biphenyl in Solids (1)	1	2010/08/18	2010/08/24	CAM SOP-00307	EPA 8082
Moisture	1	N/A	2010/08/23	CAM SOP-00445	McKeague 2nd ed 1978
TCLP - % Solids	1	2010/08/18	2010/08/19	CAM SOP-00401	EPA 1311 modified
TCLP - EXTRACTION FLUID	1	N/A	2010/08/19	CAM SOP-00401	EPA 1311 modified
TCLP-INITIAL AND FINAL PH	1	N/A	2010/08/19	CAM SOP-00401	EPA 1311 modified

Sample Matrix: SOLID
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Polychlorinated Biphenyl in Solids (1)	2	2010/08/18	2010/08/20	CAM SOP-00307	EPA 8082
Moisture	2	N/A	2010/08/24	CAM SOP-00445	McKeague 2nd ed 1978

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Sample(s) analyzed using methodologies that have not been subjected to Maxxam's standard validation process for the submitted matrix and is not an Accredited method. Analysis performed with client consent, however results should be viewed with discretion

../2

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Your Project #: 60158472
Site: PAINT/CONCRETE PADLOPING SI
Your C.O.C. #: 20350602, 203506-0

Attention: Jenna Morrish - Calgary
AECOM Canada Ltd
17203-103 Ave
Edmonton, AB
T5S 1J4

Report Date: 2010/08/28

CERTIFICATE OF ANALYSIS

-2-

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MARIJANE CRUZ, Project Manager
Email: Marijane.Cruz@maxxamanalytics.com
Phone# (905) 817-5756

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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: 2

Maxxam Job #: B0B0583
Report Date: 2010/08/28

AECOM Canada Ltd
Client Project #: 60158472
Project name: PAINT/CONCRETE PADLOPING SI
Sampler Initials: JL

RESULTS OF ANALYSES OF PAINT

Maxxam ID		GV4462		
Sampling Date		2010/08/10		
COC Number		203506-0		
	Units	**P3**	**RDL**	**QC Batch**
Inorganics				
Final pH	pH	6.05	N/A	2239890
Initial pH	pH	7.72	N/A	2239890
Moisture	%	14	1	2243669
TCLP - % Solids	%	100	0.2	2239882
TCLP Extraction Fluid	N/A	FLUID1	N/A	2239889

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B0B0583
Report Date: 2010/08/28

AECOM Canada Ltd
Client Project #: 60158472
Project name: PAINT/CONCRETE PADLOPING SI
Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (PAINT)

Maxxam ID		GV4460	GV4461		GV4462		
Sampling Date		2010/08/10	2010/08/10		2010/08/10		
COC Number		203506-0	203506-0		203506-0		
	Units	**P1**	**P2**	**RDL**	**P3**	**RDL**	**QC Batch**
Metals							
Lead (Pb)	%	26	35	0.1	0.99	0.01	2243402
Leachable Lead (Pb)	mg/L	N/A	N/A	N/A	<0.1	0.1	2239844

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0583
Report Date: 2010/08/28

AECOM Canada Ltd
Client Project #: 60158472
Project name: PAINT/CONCRETE PADLOPING SI
Sampler Initials: JL

POLYCHLORINATED BIPHENYLS BY GC-ECD (PAINT)

Maxxam ID		GV4460		GV4461		GV4462		
Sampling Date		2010/08/10		2010/08/10		2010/08/10		
COC Number		203506-0		203506-0		203506-0		
	Units	**P1**	**RDL**	**P2**	**RDL**	**P3**	**RDL**	**QC Batch**
PCBs								
Aroclor 1262	ug/g	<0.1	0.1	<0.3	0.3	<0.1	0.1	2238130
Aroclor 1016	ug/g	<0.1	0.1	<0.3	0.3	<0.1	0.1	2238130
Aroclor 1221	ug/g	<0.1	0.1	<0.3	0.3	<0.1	0.1	2238130
Aroclor 1232	ug/g	<0.1	0.1	<0.3	0.3	<0.1	0.1	2238130
Aroclor 1242	ug/g	<0.1	0.1	<0.3	0.3	<0.1	0.1	2238130
Aroclor 1248	ug/g	<0.1	0.1	<0.3	0.3	<0.1	0.1	2238130
Aroclor 1254	ug/g	0.7	0.1	<0.3	0.3	<0.1	0.1	2238130
Aroclor 1260	ug/g	0.1	0.1	<0.3	0.3	<0.1	0.1	2238130
Aroclor 1268	ug/g	<0.1	0.1	<0.3	0.3	<0.1	0.1	2238130
Total PCB	ug/g	0.8	0.1	<0.3	0.3	<0.1	0.1	2238130
Surrogate Recovery (%)								
2,4,5,6-Tetrachloro-m-xylene	%	86	N/A	92	N/A	105	N/A	2238130
Decachlorobiphenyl	%	87	N/A	139 (1)	N/A	114	N/A	2238130

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Surrogate recovery was above the upper control limit due to matrix interference. This may represent a high bias in the result.

Maxxam Job #: B0B0583
Report Date: 2010/08/28

AECOM Canada Ltd
Client Project #: 60158472
Project name: PAINT/CONCRETE PADLOPING SI
Sampler Initials: JL

RESULTS OF ANALYSES OF SOLID

Maxxam ID		GV4463	GV4464		
Sampling Date		2010/08/10	2010/08/10		
COC Number		203506-0	203506-0		
	Units	**C1**	**C2**	**RDL**	**QC Batch**
Inorganics					
Moisture	%	5	5	1	2243994

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Maxxam Job #: B0B0583
Report Date: 2010/08/28

AECOM Canada Ltd
Client Project #: 60158472
Project name: PAINT/CONCRETE PADLOPING SI
Sampler Initials: JL

POLYCHLORINATED BIPHENYLS BY GC-ECD (SOLID)

Maxxam ID		GV4463	GV4464		
Sampling Date		2010/08/10	2010/08/10		
COC Number		203506-0	203506-0		
	Units	**C1**	**C2**	**RDL**	**QC Batch**
PCBs					
Aroclor 1262	ug/g	<0.1	<0.1	0.1	2238130
Aroclor 1016	ug/g	<0.1	<0.1	0.1	2238130
Aroclor 1221	ug/g	<0.1	<0.1	0.1	2238130
Aroclor 1232	ug/g	<0.1	<0.1	0.1	2238130
Aroclor 1242	ug/g	<0.1	<0.1	0.1	2238130
Aroclor 1248	ug/g	<0.1	<0.1	0.1	2238130
Aroclor 1254	ug/g	<0.1	0.2	0.1	2238130
Aroclor 1260	ug/g	<0.1	<0.1	0.1	2238130
Aroclor 1268	ug/g	<0.1	<0.1	0.1	2238130
Total PCB	ug/g	<0.1	0.2	0.1	2238130
Surrogate Recovery (%)					
2,4,5,6-Tetrachloro-m-xylene	%	81	91	N/A	2238130
Decachlorobiphenyl	%	89	99	N/A	2238130

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0583
Report Date: 2010/08/28

AECOM Canada Ltd
Client Project #: 60158472
Project name: PAINT/CONCRETE PADLOPING SI
Sampler Initials: JL

GENERAL COMMENTS

Leachable lead for samples P1 and P2 not performed due to insufficient sample.

PCB Analysis:Samples reported based on wet weight.

Sample GV4461-01: PCB Analysis:Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Results relate only to the items tested.

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Project name: PAINT/CONCRETE PADLOPING SI

Quality Assurance Report

Maxxam Job Number: TB0B0583

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2238130 LPG	Matrix Spike						
	[GV4461-01]	2,4,5,6-Tetrachloro-m-xylene	2010/08/20		78	%	40 - 130
		Decachlorobiphenyl	2010/08/20		112	%	40 - 130
		Aroclor 1260	2010/08/20		62	%	30 - 130
		Total PCB	2010/08/20		62	%	30 - 130
	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/20		91	%	40 - 130
		Decachlorobiphenyl	2010/08/20		90	%	40 - 130
		Aroclor 1260	2010/08/20		97	%	30 - 130
	RPD	Aroclor 1260	2010/08/20	0.4		%	50
	Spiked Blank	Total PCB	2010/08/20		97	%	30 - 130
	RPD	Total PCB	2010/08/20	0.4		%	50
	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/20		97	%	40 - 130
		Decachlorobiphenyl	2010/08/20		102	%	40 - 130
		Aroclor 1262	2010/08/20	<0.01		ug/g	
		Aroclor 1016	2010/08/20	<0.01		ug/g	
		Aroclor 1221	2010/08/20	<0.01		ug/g	
		Aroclor 1232	2010/08/20	<0.01		ug/g	
		Aroclor 1242	2010/08/20	<0.01		ug/g	
		Aroclor 1248	2010/08/20	<0.01		ug/g	
		Aroclor 1254	2010/08/20	<0.01		ug/g	
		Aroclor 1260	2010/08/20	<0.01		ug/g	
		Aroclor 1268	2010/08/20	<0.01		ug/g	
		Total PCB	2010/08/20	<0.01		ug/g	
2239844 VIV	Matrix Spike	Leachable Lead (Pb)	2010/08/19		97	%	75 - 125
	Leachate Blank	Leachable Lead (Pb)	2010/08/19	<0.1		mg/L	
	Spiked Blank	Leachable Lead (Pb)	2010/08/19		97	%	85 - 115
	Method Blank	Leachable Lead (Pb)	2010/08/19	<0.1		mg/L	
	RPD	Leachable Lead (Pb)	2010/08/19	NC		%	25
2243402 JOH	Matrix Spike						
	[GV4462-01]	Lead (Pb)	2010/08/24		96	%	75 - 125
	QC Standard	Lead (Pb)	2010/08/24		111	%	75 - 125
	Method Blank	Lead (Pb)	2010/08/24	<0.01		%	
	RPD [GV4462-01]	Lead (Pb)	2010/08/24	1.6		%	35
2243669 DEE	RPD	Moisture	2010/08/23	1.9		%	20
2243994 DEE	RPD	Moisture	2010/08/24	3.3		%	20

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.
Leachate Blank: A blank matrix containing all reagents used in the leaching procedure. Used to determine any process contamination.
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.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
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 #: B0B0583

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

CHARLES ANCKER, B.Sc., M.Sc., C.Chem, Senior Analyst

CHARTERED
Eva Pranjic
CHEMIST

EWA PRANJIC, M.Sc., C.Chem, Scientific Specialist

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Your Project #: 60158472
Site#: 60158472
Site: SURFACE WATER PADLOPING SI
Your C.O.C. #: 20350501, 203505-0

Attention: Jenna Morrish - Calgary
AECOM Canada Ltd
17203-103 Ave
Edmonton, AB
T5S 1J4

Report Date: 2010/08/23

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0B0720
Received: 2010/08/16, 11:26

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Alkalinity	8	N/A	2010/08/18	CAM SOP-00448	SM 2320B
Carbonate, Bicarbonate and Hydroxide	8	N/A	2010/08/19		
Chloride by Automated Colourimetry	8	N/A	2010/08/19	CAM SOP-00463	SM 4500 Cl E
Conductivity	8	N/A	2010/08/18	CAM SOP-00448	SM 2510
Petroleum Hydro. CCME F1 & BTEX in Water (1)	4	N/A	2010/08/19	CAM SOP-00315	CCME CWS
Petroleum Hydro. CCME F1 & BTEX in Water (1)	4	N/A	2010/08/20	CAM SOP-00315	CCME CWS
Petroleum Hydrocarbons F2-F4 in Water (1)	7	2010/08/17	2010/08/17	CAM SOP-00316	CCME Hydrocarbons
Hardness (calculated as CaCO3)	8	N/A	2010/08/20	CAM SOP 00102	SM 2340 B
Lab Filtered Metals Analysis by ICP	8	2010/08/19	2010/08/20	CAM SOP-00408	EPA 6010
Ion Balance (% Difference)	8	N/A	2010/08/20		
Anion and Cation Sum	8	N/A	2010/08/20		
Nitrate (NO3) and Nitrite (NO2) in Water (2)	8	N/A	2010/08/19	CAM SOP-00440	SM 4500 NO3I/NO2B
Polychlorinated Biphenyl in Water	6	2010/08/17	2010/08/18	CAM SOP-00309	SW846 8082
Polychlorinated Biphenyl in Water	1	2010/08/17	2010/08/20	CAM SOP-00309	SW846 8082
Polychlorinated Biphenyl in Water	1	2010/08/18	2010/08/19	CAM SOP-00309	SW846 8082
pH	8	N/A	2010/08/18	CAM SOP-00448	SM 4500H
Orthophosphate	8	N/A	2010/08/19	CAM SOP-00461	SM 4500 P-F
Sat. pH and Langelier Index (@ 20C)	8	N/A	2010/08/20		
Sat. pH and Langelier Index (@ 4C)	8	N/A	2010/08/20		
Sulphate by Automated Colourimetry	8	N/A	2010/08/19	CAM SOP-00464	EPA 375.4
Total Dissolved Solids	8	N/A	2010/08/18	CAM SOP-00428	APHA 2540C

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Ottawa
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

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Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Your Project #: 60158472
Site#: 60158472
Site: SURFACE WATER PADLOPING SI
Your C.O.C. #: 20350501, 203505-0

Attention: Jenna Morrish - Calgary
AECOM Canada Ltd
17203-103 Ave
Edmonton, AB
T5S 1J4

Report Date: 2010/08/23

CERTIFICATE OF ANALYSIS

-2-

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MARIJANE CRUZ, Project Manager
Email: Marijane.Cruz@maxxamanalytics.com
Phone# (905) 817-5756

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Total cover pages: 2

AECOM Canada Ltd
Maxxam Job #: B0B0720
Client Project #: 60158472
Report Date: 2010/08/23
Project name: SURFACE WATER PADLOPING SI
Sampler Initials: JL

RESULTS OF ANALYSES OF WATER

Maxxam ID		GV4957			GV4958		
Sampling Date		2010/08/11 09:00			2010/08/11 09:45		
COC Number		203505-0			203505-0		
	Units	**W1**	**RDL**	**QC Batch**	**W2**	**RDL**	**QC Batch**
Calculated Parameters							
Anion Sum	me/L	510	N/A	2237742	0.277	N/A	2237742
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	95	1	2237740	4	1	2237740
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1	1	2237740	<1	1	2237740
Cation Sum	me/L	434	N/A	2237742	0.236	N/A	2237742
Hardness (CaCO3)	mg/L	4500	1	2236925	2	1	2236925
Hydrox. Alkalinity (calc. as CaCO3)	mg/L	<1	1	2237740	<1	1	2237740
Ion Balance (% Difference)	%	8.09	N/A	2237741	NC	N/A	2237741
Langelier Index (@ 20C)	N/A	0.502	N/A	2237745	-4.31	N/A	2237745
Langelier Index (@ 4C)	N/A	0.263	N/A	2237746	-4.56	N/A	2237746
Saturation pH (@ 20C)	N/A	7.41	N/A	2237745	11.2	N/A	2237745
Saturation pH (@ 4C)	N/A	7.65	N/A	2237746	11.4	N/A	2237746
Inorganics							
Conductivity	umho/cm	43400	1	2238465	40	1	2238465
Total Dissolved Solids	mg/L	27300	10	2239353	26	10	2239353
Orthophosphate (P)	mg/L	0.01	0.01	2238484	<0.01	0.01	2238487
pH	pH	7.9	N/A	2238464	6.9	N/A	2238464
Dissolved Sulphate (SO4)	mg/L	2100	10	2238490	1	1	2238488
Alkalinity (Total as CaCO3)	mg/L	96	1	2238437	4	1	2238437
Dissolved Chloride (Cl)	mg/L	16000	100	2238477	6	1	2238483
Nitrite (N)	mg/L	<0.01	0.01	2238429	<0.01	0.01	2238429
Nitrate (N)	mg/L	<0.1	0.1	2238429	0.1	0.1	2238429
Nitrate + Nitrite	mg/L	<0.1	0.1	2238429	0.1	0.1	2238429

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0720
Report Date: 2010/08/23

AECOM Canada Ltd
Client Project #: 60158472
Project name: SURFACE WATER PADLOPING SI
Sampler Initials: JL

RESULTS OF ANALYSES OF WATER

Maxxam ID		GV4959		GV4960	GV4961		
Sampling Date		2010/08/11 09:55		2010/08/11 10:40	2010/08/11 11:15		
COC Number		203505-0		203505-0	203505-0		
	Units	**W3**	**QC Batch**	**W4**	**W5**	**RDL**	**QC Batch**
Calculated Parameters							
Anion Sum	me/L	482	2237742	518	481	N/A	2237742
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	92	2237740	97	95	1	2237740
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1	2237740	<1	<1	1	2237740
Cation Sum	me/L	438	2237742	482	448	N/A	2237742
Hardness (CaCO3)	mg/L	4500	2236925	4900	4600	1	2237772
Hydrox. Alkalinity (calc. as CaCO3)	mg/L	<1	2237740	<1	<1	1	2237740
Ion Balance (% Difference)	%	4.78	2237741	3.62	3.50	N/A	2237741
Langelier Index (@ 20C)	N/A	0.366	2237745	0.523	0.449	N/A	2237745
Langelier Index (@ 4C)	N/A	0.127	2237746	0.284	0.210	N/A	2237746
Saturation pH (@ 20C)	N/A	7.42	2237745	7.36	7.39	N/A	2237745
Saturation pH (@ 4C)	N/A	7.66	2237746	7.60	7.63	N/A	2237746
Inorganics							
Conductivity	umho/cm	42600	2238465	44500	43300	1	2238465
Total Dissolved Solids	mg/L	27200	2239353	27800	27900	10	2238029
Orthophosphate (P)	mg/L	0.01	2238484	0.02	0.01	0.01	2238484
pH	pH	7.8	2238464	7.9	7.8	N/A	2238464
Dissolved Sulphate (SO4)	mg/L	2000	2238490	2200	2100	10	2238490
Alkalinity (Total as CaCO3)	mg/L	92	2238437	98	96	1	2238437
Dissolved Chloride (Cl)	mg/L	16000	2238477	17000	15000	100	2238477
Nitrite (N)	mg/L	<0.01	2238429	<0.01	<0.01	0.01	2238429
Nitrate (N)	mg/L	<0.1	2238429	<0.1	<0.1	0.1	2238429
Nitrate + Nitrite	mg/L	<0.1	2238429	<0.1	<0.1	0.1	2238429

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B0B0720
Report Date: 2010/08/23

AECOM Canada Ltd
Client Project #: 60158472
Project name: SURFACE WATER PADLOPING SI
Sampler Initials: JL

RESULTS OF ANALYSES OF WATER

Maxxam ID		GV4962	GV4963		GV4964		
Sampling Date		2010/08/11 11:30	2010/08/11 16:35		2010/08/12 14:05		
COC Number		203505-0	203505-0		203505-0		
	Units	**W6**	**W7**	**QC Batch**	**FB**	**RDL**	**QC Batch**
Calculated Parameters							
Anion Sum	me/L	0.958	0.164	2237742	0.000	N/A	2237742
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	25	2	2237740	<1	1	2237740
Carb. Alkalinity (calc. as CaCO3)	mg/L	<1	<1	2237740	<1	1	2237740
Cation Sum	me/L	1.35	0.175	2237742	0.00200	N/A	2237742
Hardness (CaCO3)	mg/L	2	3	2237772	<1	1	2237772
Hydrox. Alkalinity (calc. as CaCO3)	mg/L	<1	<1	2237740	<1	1	2237740
Ion Balance (% Difference)	%	NC	NC	2237741	NC	N/A	2237741
Langelier Index (@ 20C)	N/A	-4.10	-5.10	2237745	NC	N/A	2237745
Langelier Index (@ 4C)	N/A	-4.35	-5.35	2237746	NC	N/A	2237746
Saturation pH (@ 20C)	N/A	10.9	11.2	2237745	NC	N/A	2237745
Saturation pH (@ 4C)	N/A	11.1	11.5	2237746	NC	N/A	2237746
Inorganics							
Conductivity	umho/cm	112	26	2238465	2	1	2238465
Total Dissolved Solids	mg/L	68	16	2239353	<10	10	2238029
Orthophosphate (P)	mg/L	0.02	<0.01	2238484	<0.01	0.01	2238484
pH	pH	6.8	6.1	2238464	5.7	N/A	2238464
Dissolved Sulphate (SO4)	mg/L	1	<1	2238490	<1	1	2238490
Alkalinity (Total as CaCO3)	mg/L	25	2	2238437	<1	1	2238437
Dissolved Chloride (Cl)	mg/L	15	5	2238477	<1	1	2238477
Nitrite (N)	mg/L	<0.01	<0.01	2238429	<0.01	0.01	2238429
Nitrate (N)	mg/L	<0.1	<0.1	2238429	<0.1	0.1	2238429
Nitrate + Nitrite	mg/L	<0.1	<0.1	2238429	<0.1	0.1	2238429

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Maxxam Job #: B0B0720
Report Date: 2010/08/23

AECOM Canada Ltd
Client Project #: 60158472
Project name: SURFACE WATER PADLOPING SI
Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		GV4957		GV4958		GV4959	GV4960		
Sampling Date		2010/08/11 09:00		2010/08/11 09:45		2010/08/11 09:55	2010/08/11 10:40		
COC Number		203505-0		203505-0		203505-0	203505-0		
	Units	**W1**	**RDL**	**W2**	**RDL**	**W3**	**W4**	**RDL**	**QC Batch**
Metals									
Dissolved Aluminum (Al)	mg/L	<1	1	<0.1	0.1	<1	<1	1	2239781
Dissolved Antimony (Sb)	mg/L	<2	2	<0.2	0.2	<2	<2	2	2239781
Dissolved Arsenic (As)	mg/L	<2	2	<0.2	0.2	<2	<2	2	2239781
Dissolved Barium (Ba)	mg/L	<0.2	0.2	<0.02	0.02	<0.2	<0.2	0.2	2239781
Dissolved Beryllium (Be)	mg/L	<0.05	0.05	<0.005	0.005	<0.05	<0.05	0.05	2239781
Dissolved Bismuth (Bi)	mg/L	<2	2	<0.2	0.2	<2	<2	2	2239781
Dissolved Boron (B)	mg/L	3.1	0.2	<0.02	0.02	3.0	3.3	0.2	2239781
Dissolved Cadmium (Cd)	mg/L	<0.05	0.05	<0.005	0.005	<0.05	<0.05	0.05	2239781
Dissolved Calcium (Ca)	mg/L	290	0.5	0.33	0.05	294	315	0.5	2239781
Dissolved Chromium (Cr)	mg/L	<0.1	0.1	<0.01	0.01	<0.1	<0.1	0.1	2239781
Dissolved Cobalt (Co)	mg/L	<0.2	0.2	<0.02	0.02	<0.2	<0.2	0.2	2239781
Dissolved Copper (Cu)	mg/L	<0.2	0.2	<0.02	0.02	<0.2	<0.2	0.2	2239781
Dissolved Iron (Fe)	mg/L	<0.2	0.2	<0.02	0.02	<0.2	<0.2	0.2	2239781
Dissolved Lead (Pb)	mg/L	<0.5	0.5	<0.05	0.05	<0.5	<0.5	0.5	2239781
Dissolved Magnesium (Mg)	mg/L	911	0.5	0.30	0.05	926	988	0.5	2239781
Dissolved Manganese (Mn)	mg/L	<0.1	0.1	<0.01	0.01	<0.1	<0.1	0.1	2239781
Dissolved Molybdenum (Mo)	mg/L	<0.2	0.2	<0.02	0.02	<0.2	<0.2	0.2	2239781
Dissolved Nickel (Ni)	mg/L	<0.5	0.5	<0.05	0.05	<0.5	<0.5	0.5	2239781
Dissolved Phosphorus (P)	mg/L	<1	1	<0.1	0.1	<1	<1	1	2239781
Dissolved Potassium (K)	mg/L	285	10	<1	1	300	316	10	2239781
Dissolved Selenium (Se)	mg/L	<2	2	<0.2	0.2	<2	<2	2	2239781
Dissolved Silicon (Si)	mg/L	<2	2	1.2	0.2	<2	<2	2	2239781
Dissolved Silver (Ag)	mg/L	<0.1	0.1	<0.01	0.01	<0.1	<0.1	0.1	2239781
Dissolved Sodium (Na)	mg/L	7750	50	4.5	0.5	7800	8650	50	2239781
Dissolved Strontium (Sr)	mg/L	5.4	0.1	<0.01	0.01	5.5	5.7	0.1	2239781
Dissolved Sulphur (S)	mg/L	652	5	<0.5	0.5	663	704	5	2239781
Dissolved Tin (Sn)	mg/L	<2	2	<0.2	0.2	<2	<2	2	2239781
Dissolved Titanium (Ti)	mg/L	<0.1	0.1	<0.01	0.01	<0.1	<0.1	0.1	2239781
Dissolved Vanadium (V)	mg/L	<0.1	0.1	<0.01	0.01	<0.1	<0.1	0.1	2239781
Dissolved Zinc (Zn)	mg/L	<0.1	0.1	<0.01	0.01	<0.1	<0.1	0.1	2239781

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0720
Report Date: 2010/08/23

AECOM Canada Ltd
Client Project #: 60158472
Project name: SURFACE WATER PADLOPING SI
Sampler Initials: JL

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		GV4961		GV4962	GV4963	GV4964		
Sampling Date		2010/08/11 11:15		2010/08/11 11:30	2010/08/11 16:35	2010/08/12 14:05		
COC Number		203505-0		203505-0	203505-0	203505-0		
	Units	**W5**	**RDL**	**W6**	**W7**	**FB**	**RDL**	**QC Batch**
Metals								
Dissolved Aluminum (Al)	mg/L	<1	1	1.2	<0.1	<0.1	0.1	2239781
Dissolved Antimony (Sb)	mg/L	<2	2	<0.2	<0.2	<0.2	0.2	2239781
Dissolved Arsenic (As)	mg/L	<2	2	<0.2	<0.2	<0.2	0.2	2239781
Dissolved Barium (Ba)	mg/L	<0.2	0.2	0.16	<0.02	<0.02	0.02	2239781
Dissolved Beryllium (Be)	mg/L	<0.05	0.05	<0.005	<0.005	<0.005	0.005	2239781
Dissolved Bismuth (Bi)	mg/L	<2	2	<0.2	<0.2	<0.2	0.2	2239781
Dissolved Boron (B)	mg/L	3.2	0.2	0.27	<0.02	<0.02	0.02	2239781
Dissolved Cadmium (Cd)	mg/L	<0.05	0.05	<0.005	<0.005	<0.005	0.005	2239781
Dissolved Calcium (Ca)	mg/L	300	0.5	0.11	0.63	<0.05	0.05	2239781
Dissolved Chromium (Cr)	mg/L	<0.1	0.1	<0.01	<0.01	<0.01	0.01	2239781
Dissolved Cobalt (Co)	mg/L	<0.2	0.2	<0.02	<0.02	<0.02	0.02	2239781
Dissolved Copper (Cu)	mg/L	<0.2	0.2	<0.02	<0.02	<0.02	0.02	2239781
Dissolved Iron (Fe)	mg/L	<0.2	0.2	1.73	<0.02	<0.02	0.02	2239781
Dissolved Lead (Pb)	mg/L	<0.5	0.5	<0.05	<0.05	<0.05	0.05	2239781
Dissolved Magnesium (Mg)	mg/L	940	0.5	0.47	0.44	<0.05	0.05	2239781
Dissolved Manganese (Mn)	mg/L	<0.1	0.1	0.01	<0.01	<0.01	0.01	2239781
Dissolved Molybdenum (Mo)	mg/L	<0.2	0.2	<0.02	<0.02	<0.02	0.02	2239781
Dissolved Nickel (Ni)	mg/L	<0.5	0.5	<0.05	<0.05	<0.05	0.05	2239781
Dissolved Phosphorus (P)	mg/L	<1	1	<0.1	<0.1	<0.1	0.1	2239781
Dissolved Potassium (K)	mg/L	306	10	1	<1	<1	1	2239781
Dissolved Selenium (Se)	mg/L	<2	2	<0.2	<0.2	<0.2	0.2	2239781
Dissolved Silicon (Si)	mg/L	<2	2	6.4	0.2	<0.2	0.2	2239781
Dissolved Silver (Ag)	mg/L	<0.1	0.1	<0.01	<0.01	<0.01	0.01	2239781
Dissolved Sodium (Na)	mg/L	8000	50	24.8	2.4	<0.5	0.5	2239781
Dissolved Strontium (Sr)	mg/L	5.7	0.1	<0.01	<0.01	<0.01	0.01	2239781
Dissolved Sulphur (S)	mg/L	671	5	1.1	<0.5	<0.5	0.5	2239781
Dissolved Tin (Sn)	mg/L	<2	2	<0.2	<0.2	<0.2	0.2	2239781
Dissolved Titanium (Ti)	mg/L	<0.1	0.1	0.10	<0.01	<0.01	0.01	2239781
Dissolved Vanadium (V)	mg/L	<0.1	0.1	<0.01	<0.01	<0.01	0.01	2239781
Dissolved Zinc (Zn)	mg/L	<0.1	0.1	0.04	<0.01	<0.01	0.01	2239781

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0720
Report Date: 2010/08/23

AECOM Canada Ltd
Client Project #: 60158472
Project name: SURFACE WATER PADLOPING SI
Sampler Initials: JL

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GV4957	GV4958	GV4959	GV4960		
Sampling Date		2010/08/11 09:00	2010/08/11 09:45	2010/08/11 09:55	2010/08/11 10:40		
COC Number		203505-0	203505-0	203505-0	203505-0		
	Units	**W1**	**W2**	**W3**	**W4**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons							
Benzene	ug/L	<0.2	<0.2	<0.2	<0.2	0.2	2239450
Toluene	ug/L	<0.2	<0.2	<0.2	<0.2	0.2	2239450
Ethylbenzene	ug/L	<0.2	<0.2	<0.2	<0.2	0.2	2239450
o-Xylene	ug/L	<0.2	<0.2	<0.2	<0.2	0.2	2239450
p+m-Xylene	ug/L	<0.4	<0.4	<0.4	<0.4	0.4	2239450
Total Xylenes	ug/L	<0.4	<0.4	<0.4	<0.4	0.4	2239450
F1 (C6-C10)	ug/L	<100	<100	<100	<100	100	2239450
F1 (C6-C10) - BTEX	ug/L	<100	<100	<100	<100	100	2239450
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/L	<100	<100	<100	<100	100	2236952
F3 (C16-C34 Hydrocarbons)	ug/L	<100	<100	<100	<100	100	2236952
F4 (C34-C50 Hydrocarbons)	ug/L	<100	<100	<100	<100	100	2236952
Reached Baseline at C50	ug/L	Yes	Yes	Yes	Yes	N/A	2236952
Surrogate Recovery (%)							
1,4-Difluorobenzene	%	95	97	96	96	N/A	2239450
4-Bromofluorobenzene	%	104	103	106	105	N/A	2239450
D10-Ethylbenzene	%	87	97	94	91	N/A	2239450
D4-1,2-Dichloroethane	%	95	89	96	108	N/A	2239450
o-Terphenyl	%	90	93	88	88	N/A	2236952

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0720
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AECOM Canada Ltd
Client Project #: 60158472
Project name: SURFACE WATER PADLOPING SI
Sampler Initials: JL

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID		GV4961	GV4962	GV4963	GV4964		
Sampling Date		2010/08/11 11:15	2010/08/11 11:30	2010/08/11 16:35	2010/08/12 14:05		
COC Number		203505-0	203505-0	203505-0	203505-0		
	Units	**W5**	**W6**	**W7**	**FB**	**RDL**	**QC Batch**
BTEX & F1 Hydrocarbons							
Benzene	ug/L	<0.2	<0.2	<0.2	<0.2	0.2	2239450
Toluene	ug/L	<0.2	<0.2	<0.2	<0.2	0.2	2239450
Ethylbenzene	ug/L	<0.2	<0.2	<0.2	<0.2	0.2	2239450
o-Xylene	ug/L	<0.2	0.3	<0.2	<0.2	0.2	2239450
p+m-Xylene	ug/L	<0.4	<0.4	<0.4	<0.4	0.4	2239450
Total Xylenes	ug/L	<0.4	<0.4	<0.4	<0.4	0.4	2239450
F1 (C6-C10)	ug/L	<100	110	<100	<100	100	2239450
F1 (C6-C10) - BTEX	ug/L	<100	110	<100	<100	100	2239450
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/L	<100	18000	<100	N/A	100	2236952
F3 (C16-C34 Hydrocarbons)	ug/L	<100	2500	<100	N/A	100	2236952
F4 (C34-C50 Hydrocarbons)	ug/L	<100	220	<100	N/A	100	2236952
Reached Baseline at C50	ug/L	Yes	Yes	Yes	N/A	N/A	2236952
Surrogate Recovery (%)							
1,4-Difluorobenzene	%	96	96	98	98	N/A	2239450
4-Bromofluorobenzene	%	105	107	104	102	N/A	2239450
D10-Ethylbenzene	%	95	100	97	102	N/A	2239450
D4-1,2-Dichloroethane	%	96	106	104	91	N/A	2239450
o-Terphenyl	%	92	102	92	N/A	N/A	2236952

N/A = Not Applicable
RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Maxxam Job #: B0B0720
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POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

Maxxam ID		GV4957	GV4958	GV4959	GV4960		
Sampling Date		2010/08/11 09:00	2010/08/11 09:45	2010/08/11 09:55	2010/08/11 10:40		
COC Number		203505-0	203505-0	203505-0	203505-0		
	Units	**W1**	**W2**	**W3**	**W4**	**RDL**	**QC Batch**

PCBs							
Aroclor 1016	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	2237356
Aroclor 1221	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	2237356
Aroclor 1232	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	2237356
Aroclor 1242	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	2237356
Aroclor 1248	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	2237356
Aroclor 1254	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	2237356
Aroclor 1260	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	2237356
Aroclor 1262	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	2237356
Aroclor 1268	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	2237356
Total PCB	ug/L	<0.05	<0.05	<0.05	<0.05	0.05	2237356
Surrogate Recovery (%)							
2,4,5,6-Tetrachloro-m-xylene	%	74	69	67	80	N/A	2237356
Decachlorobiphenyl	%	95	80	88	103	N/A	2237356

N/A = Not Applicable
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QC Batch = Quality Control Batch

Maxxam Job #: B0B0720
Report Date: 2010/08/23

AECOM Canada Ltd
Client Project #: 60158472
Project name: SURFACE WATER PADLOPING SI
Sampler Initials: JL

POLYCHLORINATED BIPHENYLS BY GC-ECD (WATER)

Maxxam ID		GV4961	GV4962	GV4963		GV4964		
Sampling Date		2010/08/11 11:15	2010/08/11 11:30	2010/08/11 16:35		2010/08/12 14:05		
COC Number		203505-0	203505-0	203505-0		203505-0		
	Units	**W5**	**W6**	**W7**	**QC Batch**	**FB**	**RDL**	**QC Batch**
PCBs								
Aroclor 1016	ug/L	<0.05	<0.05	<0.05	2237356	<0.05	0.05	2239128
Aroclor 1221	ug/L	<0.05	<0.05	<0.05	2237356	<0.05	0.05	2239128
Aroclor 1232	ug/L	<0.05	<0.05	<0.05	2237356	<0.05	0.05	2239128
Aroclor 1242	ug/L	<0.05	<0.05	<0.05	2237356	<0.05	0.05	2239128
Aroclor 1248	ug/L	<0.05	<0.05	<0.05	2237356	<0.05	0.05	2239128
Aroclor 1254	ug/L	<0.05	0.28	<0.05	2237356	<0.05	0.05	2239128
Aroclor 1260	ug/L	<0.05	<0.05	<0.05	2237356	<0.05	0.05	2239128
Aroclor 1262	ug/L	<0.05	<0.05	<0.05	2237356	<0.05	0.05	2239128
Aroclor 1268	ug/L	<0.05	<0.05	<0.05	2237356	<0.05	0.05	2239128
Total PCB	ug/L	<0.05	0.28	<0.05	2237356	<0.05	0.05	2239128
Surrogate Recovery (%)								
2,4,5,6-Tetrachloro-m-xylene	%	61	58	65	2237356	74	N/A	2239128
Decachlorobiphenyl	%	78	87	76	2237356	75	N/A	2239128

N/A = Not Applicable
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GENERAL COMMENTS

Results relate only to the items tested.

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
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Quality Assurance Report

Maxxam Job Number: TB0B0720

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2236952 LHR	Matrix Spike	o-Terphenyl	2010/08/17		93	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/17		108	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/08/17		108	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/08/17		108	%	60 - 130
	Spiked Blank	o-Terphenyl	2010/08/17		93	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/17		100	%	60 - 130
		F3 (C16-C34 Hydrocarbons)	2010/08/17		100	%	60 - 130
		F4 (C34-C50 Hydrocarbons)	2010/08/17		100	%	60 - 130
	Method Blank	o-Terphenyl	2010/08/17		92	%	30 - 130
		F2 (C10-C16 Hydrocarbons)	2010/08/17	<100		ug/L	
		F3 (C16-C34 Hydrocarbons)	2010/08/17	<100		ug/L	
		F4 (C34-C50 Hydrocarbons)	2010/08/17	<100		ug/L	
	RPD	F2 (C10-C16 Hydrocarbons)	2010/08/17	24.6		%	50
		F3 (C16-C34 Hydrocarbons)	2010/08/17	NC		%	50
		F4 (C34-C50 Hydrocarbons)	2010/08/17	NC		%	50
2237356 JZ	Matrix Spike	2,4,5,6-Tetrachloro-m-xylene	2010/08/18		88	%	40 - 130
		Decachlorobiphenyl	2010/08/18		89	%	40 - 130
		Aroclor 1260	2010/08/18		108	%	30 - 130
		Total PCB	2010/08/18		108	%	30 - 130
	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/18		66	%	40 - 130
		Decachlorobiphenyl	2010/08/18		87	%	40 - 130
		Aroclor 1260	2010/08/18		96	%	30 - 130
		Total PCB	2010/08/18		96	%	30 - 130
	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/18		74	%	40 - 130
		Decachlorobiphenyl	2010/08/18		89	%	40 - 130
		Aroclor 1016	2010/08/18	<0.05		ug/L	
		Aroclor 1221	2010/08/18	<0.05		ug/L	
		Aroclor 1232	2010/08/18	<0.05		ug/L	
		Aroclor 1242	2010/08/18	<0.05		ug/L	
		Aroclor 1248	2010/08/18	<0.05		ug/L	
		Aroclor 1254	2010/08/18	<0.05		ug/L	
		Aroclor 1260	2010/08/18	<0.05		ug/L	
		Aroclor 1262	2010/08/18	<0.05		ug/L	
		Aroclor 1268	2010/08/18	<0.05		ug/L	
		Total PCB	2010/08/18	<0.05		ug/L	
	RPD	Aroclor 1016	2010/08/18	NC		%	40
		Aroclor 1221	2010/08/18	NC		%	40
		Aroclor 1232	2010/08/18	NC		%	40
		Aroclor 1242	2010/08/18	NC		%	40
		Aroclor 1248	2010/08/18	NC		%	40
		Aroclor 1254	2010/08/18	NC		%	40
		Aroclor 1260	2010/08/18	NC		%	40
		Aroclor 1262	2010/08/18	NC		%	40
		Aroclor 1268	2010/08/18	NC		%	40
		Total PCB	2010/08/18	NC		%	40
2238029 HAG	QC Standard	Total Dissolved Solids	2010/08/18		97	%	90 - 110
	Method Blank	Total Dissolved Solids	2010/08/18	<10		mg/L	
	RPD	Total Dissolved Solids	2010/08/18	2.2		%	25
2238429 C_N	Matrix Spike	Nitrite (N)	2010/08/19		104	%	80 - 120
		Nitrate (N)	2010/08/19		108	%	80 - 120
	Spiked Blank	Nitrite (N)	2010/08/19		107	%	85 - 115
		Nitrate (N)	2010/08/19		106	%	85 - 115
	Method Blank	Nitrite (N)	2010/08/19	<0.01		mg/L	
		Nitrate (N)	2010/08/19	<0.1		mg/L	
		Nitrate + Nitrite	2010/08/19	<0.1		mg/L	

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2238429 C_N	RPD	Nitrite (N)	2010/08/19	NC		%	25
		Nitrate (N)	2010/08/19	NC		%	25
		Nitrate + Nitrite	2010/08/19	NC		%	25
2238437 PAL	QC Standard	Alkalinity (Total as CaCO3)	2010/08/18		96	%	85 - 115
	Method Blank	Alkalinity (Total as CaCO3)	2010/08/18	<1		mg/L	
	RPD [GV4964-01]	Alkalinity (Total as CaCO3)	2010/08/18	NC		%	25
2238465 PAL	QC Standard	Conductivity	2010/08/18		104	%	85 - 115
	Method Blank	Conductivity	2010/08/18	<1		umho/cm	
	RPD [GV4964-01]	Conductivity	2010/08/18	NC		%	25
2238477 DRM	Matrix Spike	Dissolved Chloride (Cl)	2010/08/19		NC	%	75 - 125
	Spiked Blank	Dissolved Chloride (Cl)	2010/08/19		102	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2010/08/19	<1		mg/L	
	RPD	Dissolved Chloride (Cl)	2010/08/19	1.0		%	20
2238483 DRM	Matrix Spike [GV4958-01]	Dissolved Chloride (Cl)	2010/08/19		105	%	75 - 125
	Spiked Blank	Dissolved Chloride (Cl)	2010/08/19		105	%	80 - 120
	Method Blank	Dissolved Chloride (Cl)	2010/08/19	<1		mg/L	
	RPD [GV4958-01]	Dissolved Chloride (Cl)	2010/08/19	1		%	20
2238484 DRM	Matrix Spike	Orthophosphate (P)	2010/08/19		107	%	75 - 125
	Spiked Blank	Orthophosphate (P)	2010/08/19		101	%	80 - 120
	Method Blank	Orthophosphate (P)	2010/08/19	<0.01		mg/L	
	RPD	Orthophosphate (P)	2010/08/19	NC		%	25
2238487 DRM	Matrix Spike [GV4958-01]	Orthophosphate (P)	2010/08/19		104	%	75 - 125
	Spiked Blank	Orthophosphate (P)	2010/08/19		100	%	80 - 120
	Method Blank	Orthophosphate (P)	2010/08/19	<0.01		mg/L	
	RPD [GV4958-01]	Orthophosphate (P)	2010/08/19	NC		%	25
2238488 DRM	Matrix Spike [GV4958-01]	Dissolved Sulphate (SO4)	2010/08/19		103	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2010/08/19		97	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2010/08/19	<1		mg/L	
	RPD [GV4958-01]	Dissolved Sulphate (SO4)	2010/08/19	NC		%	25
2238490 DRM	Matrix Spike	Dissolved Sulphate (SO4)	2010/08/19		102	%	75 - 125
	Spiked Blank	Dissolved Sulphate (SO4)	2010/08/19		97	%	80 - 120
	Method Blank	Dissolved Sulphate (SO4)	2010/08/19	<1		mg/L	
	RPD	Dissolved Sulphate (SO4)	2010/08/19	1.3		%	25
2239128 LPG	Matrix Spike	2,4,5,6-Tetrachloro-m-xylene	2010/08/19		71	%	40 - 130
		Decachlorobiphenyl	2010/08/19		93	%	40 - 130
		Aroclor 1260	2010/08/19		93	%	30 - 130
		Total PCB	2010/08/19		93	%	30 - 130
	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/18		66	%	40 - 130
		Decachlorobiphenyl	2010/08/18		83	%	40 - 130
		Aroclor 1260	2010/08/18		76	%	30 - 130
		Total PCB	2010/08/18		76	%	30 - 130
	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2010/08/19		66	%	40 - 130
		Decachlorobiphenyl	2010/08/19		75	%	40 - 130
		Aroclor 1016	2010/08/19	<0.05		ug/L	
		Aroclor 1221	2010/08/19	<0.05		ug/L	
		Aroclor 1232	2010/08/19	<0.05		ug/L	
		Aroclor 1242	2010/08/19	<0.05		ug/L	
		Aroclor 1248	2010/08/19	<0.05		ug/L	
		Aroclor 1254	2010/08/19	<0.05		ug/L	
		Aroclor 1260	2010/08/19	<0.05		ug/L	
		Aroclor 1262	2010/08/19	<0.05		ug/L	
		Aroclor 1268	2010/08/19	<0.05		ug/L	

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2239128 LPG	Method Blank	Total PCB	2010/08/19	<0.05		ug/L	
	RPD	Aroclor 1016	2010/08/19	NC		%	40
		Aroclor 1221	2010/08/19	NC		%	40
		Aroclor 1232	2010/08/19	NC		%	40
		Aroclor 1242	2010/08/19	NC		%	40
		Aroclor 1248	2010/08/19	NC		%	40
		Aroclor 1254	2010/08/19	NC		%	40
		Aroclor 1260	2010/08/19	NC		%	40
		Aroclor 1262	2010/08/19	NC		%	40
		Aroclor 1268	2010/08/19	NC		%	40
		Total PCB	2010/08/19	NC		%	40
2239353 JDO	QC Standard	Total Dissolved Solids	2010/08/18		103	%	90 - 110
	Method Blank	Total Dissolved Solids	2010/08/18	<10		mg/L	
2239450 PRB	Matrix Spike [GV4958-05]	1,4-Difluorobenzene	2010/08/19		98	%	70 - 130
		4-Bromofluorobenzene	2010/08/19		104	%	70 - 130
		D10-Ethylbenzene	2010/08/19		90	%	70 - 130
		D4-1,2-Dichloroethane	2010/08/19		90	%	70 - 130
		Benzene	2010/08/19		86	%	70 - 130
		Toluene	2010/08/19		92	%	70 - 130
		Ethylbenzene	2010/08/19		97	%	70 - 130
		o-Xylene	2010/08/19		100	%	70 - 130
		p+m-Xylene	2010/08/19		96	%	70 - 130
		F1 (C6-C10)	2010/08/19		98	%	70 - 130
	Spiked Blank	1,4-Difluorobenzene	2010/08/19		99	%	70 - 130
		4-Bromofluorobenzene	2010/08/19		104	%	70 - 130
		D10-Ethylbenzene	2010/08/19		90	%	70 - 130
		D4-1,2-Dichloroethane	2010/08/19		100	%	70 - 130
		Benzene	2010/08/19		84	%	70 - 130
		Toluene	2010/08/19		91	%	70 - 130
		Ethylbenzene	2010/08/19		95	%	70 - 130
		o-Xylene	2010/08/19		98	%	70 - 130
		p+m-Xylene	2010/08/19		95	%	70 - 130
		F1 (C6-C10)	2010/08/19		93	%	70 - 130
	Method Blank	1,4-Difluorobenzene	2010/08/19		100	%	70 - 130
		4-Bromofluorobenzene	2010/08/19		103	%	70 - 130
		D10-Ethylbenzene	2010/08/19		98	%	70 - 130
		D4-1,2-Dichloroethane	2010/08/19		89	%	70 - 130
		Benzene	2010/08/19	<0.2		ug/L	
		Toluene	2010/08/19	<0.2		ug/L	
		Ethylbenzene	2010/08/19	<0.2		ug/L	
		o-Xylene	2010/08/19	<0.2		ug/L	
		p+m-Xylene	2010/08/19	<0.4		ug/L	
		Total Xylenes	2010/08/19	<0.4		ug/L	
		F1 (C6-C10)	2010/08/19	<100		ug/L	
		F1 (C6-C10) - BTEX	2010/08/19	<100		ug/L	
	RPD [GV4957-05]	Benzene	2010/08/20	NC		%	40
		Toluene	2010/08/20	NC		%	40
		Ethylbenzene	2010/08/20	NC		%	40
		o-Xylene	2010/08/20	NC		%	40
		p+m-Xylene	2010/08/20	NC		%	40
		Total Xylenes	2010/08/20	NC		%	40
		F1 (C6-C10)	2010/08/20	NC		%	40
		F1 (C6-C10) - BTEX	2010/08/20	NC		%	40
2239781 JOH	Matrix Spike [GV4961-02]	Dissolved Aluminum (Al)	2010/08/20		100	%	80 - 120

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QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2239781 JOH	Matrix Spike						
	[GV4961-02]	Dissolved Antimony (Sb)	2010/08/20		94	%	80 - 120
		Dissolved Arsenic (As)	2010/08/20		88	%	80 - 120
		Dissolved Barium (Ba)	2010/08/20		93	%	80 - 120
		Dissolved Beryllium (Be)	2010/08/20		81	%	80 - 120
		Dissolved Bismuth (Bi)	2010/08/20		99	%	80 - 120
		Dissolved Boron (B)	2010/08/20		NC	%	80 - 120
		Dissolved Cadmium (Cd)	2010/08/20		96	%	80 - 120
		Dissolved Calcium (Ca)	2010/08/20		NC	%	80 - 120
		Dissolved Chromium (Cr)	2010/08/20		86	%	80 - 120
		Dissolved Cobalt (Co)	2010/08/20		86	%	80 - 120
		Dissolved Copper (Cu)	2010/08/20		95	%	80 - 120
		Dissolved Iron (Fe)	2010/08/20		86	%	80 - 120
		Dissolved Lead (Pb)	2010/08/20		73 (1)	%	80 - 120
		Dissolved Magnesium (Mg)	2010/08/20		NC	%	80 - 120
		Dissolved Manganese (Mn)	2010/08/20		84	%	80 - 120
		Dissolved Molybdenum (Mo)	2010/08/20		85	%	80 - 120
		Dissolved Nickel (Ni)	2010/08/20		82	%	80 - 120
		Dissolved Phosphorus (P)	2010/08/20		62 (1)	%	80 - 120
		Dissolved Potassium (K)	2010/08/20		NC	%	80 - 120
		Dissolved Selenium (Se)	2010/08/20		92	%	80 - 120
		Dissolved Silicon (Si)	2010/08/20		99	%	80 - 120
		Dissolved Silver (Ag)	2010/08/20		95	%	80 - 120
		Dissolved Sodium (Na)	2010/08/20		NC	%	80 - 120
		Dissolved Strontium (Sr)	2010/08/20		NC	%	80 - 120
		Dissolved Sulphur (S)	2010/08/20		NC	%	80 - 120
		Dissolved Tin (Sn)	2010/08/20		93	%	80 - 120
		Dissolved Titanium (Ti)	2010/08/20		86	%	80 - 120
		Dissolved Vanadium (V)	2010/08/20		88	%	80 - 120
		Dissolved Zinc (Zn)	2010/08/20		91	%	80 - 120
	Spiked Blank	Dissolved Aluminum (Al)	2010/08/20		103	%	90 - 110
		Dissolved Antimony (Sb)	2010/08/20		96	%	90 - 110
		Dissolved Arsenic (As)	2010/08/20		97	%	90 - 110
		Dissolved Barium (Ba)	2010/08/20		101	%	90 - 110
		Dissolved Beryllium (Be)	2010/08/20		95	%	90 - 110
		Dissolved Bismuth (Bi)	2010/08/20		99	%	90 - 110
		Dissolved Boron (B)	2010/08/20		97	%	90 - 110
		Dissolved Cadmium (Cd)	2010/08/20		100	%	90 - 110
		Dissolved Calcium (Ca)	2010/08/20		97	%	90 - 110
		Dissolved Chromium (Cr)	2010/08/20		99	%	90 - 110
		Dissolved Cobalt (Co)	2010/08/20		98	%	90 - 110
		Dissolved Copper (Cu)	2010/08/20		102	%	90 - 110
		Dissolved Iron (Fe)	2010/08/20		98	%	90 - 110
		Dissolved Lead (Pb)	2010/08/20		99	%	90 - 110
		Dissolved Magnesium (Mg)	2010/08/20		95	%	90 - 110
		Dissolved Manganese (Mn)	2010/08/20		98	%	90 - 110
		Dissolved Molybdenum (Mo)	2010/08/20		97	%	90 - 110
		Dissolved Nickel (Ni)	2010/08/20		98	%	90 - 110
		Dissolved Phosphorus (P)	2010/08/20		94	%	90 - 110
		Dissolved Potassium (K)	2010/08/20		99	%	90 - 110
		Dissolved Selenium (Se)	2010/08/20		96	%	90 - 110
		Dissolved Silicon (Si)	2010/08/20		99	%	90 - 110
		Dissolved Silver (Ag)	2010/08/20		100	%	90 - 110
		Dissolved Sodium (Na)	2010/08/20		103	%	90 - 110
		Dissolved Strontium (Sr)	2010/08/20		100	%	90 - 110

AECOM Canada Ltd
Attention: Jenna Morrish - Calgary
Client Project #: 60158472
P.O. #:
Project name: SURFACE WATER PADLOPING SI

Quality Assurance Report (Continued)

Maxxam Job Number: TB0B0720

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2239781 JOH	Spiked Blank	Dissolved Sulphur (S)	2010/08/20		97	%	90 - 110
		Dissolved Tin (Sn)	2010/08/20		93	%	90 - 110
		Dissolved Titanium (Ti)	2010/08/20		97	%	90 - 110
		Dissolved Vanadium (V)	2010/08/20		99	%	90 - 110
		Dissolved Zinc (Zn)	2010/08/20		96	%	90 - 110
	Method Blank	Dissolved Aluminum (Al)	2010/08/20	<0.1		mg/L	
		Dissolved Antimony (Sb)	2010/08/20	<0.2		mg/L	
		Dissolved Arsenic (As)	2010/08/20	<0.2		mg/L	
		Dissolved Barium (Ba)	2010/08/20	<0.02		mg/L	
		Dissolved Beryllium (Be)	2010/08/20	<0.005		mg/L	
		Dissolved Bismuth (Bi)	2010/08/20	<0.2		mg/L	
		Dissolved Boron (B)	2010/08/20	<0.02		mg/L	
		Dissolved Cadmium (Cd)	2010/08/20	<0.005		mg/L	
		Dissolved Calcium (Ca)	2010/08/20	<0.05		mg/L	
		Dissolved Chromium (Cr)	2010/08/20	<0.01		mg/L	
		Dissolved Cobalt (Co)	2010/08/20	<0.02		mg/L	
		Dissolved Copper (Cu)	2010/08/20	<0.02		mg/L	
		Dissolved Iron (Fe)	2010/08/20	<0.02		mg/L	
		Dissolved Lead (Pb)	2010/08/20	<0.05		mg/L	
		Dissolved Magnesium (Mg)	2010/08/20	<0.05		mg/L	
		Dissolved Manganese (Mn)	2010/08/20	<0.01		mg/L	
		Dissolved Molybdenum (Mo)	2010/08/20	<0.02		mg/L	
		Dissolved Nickel (Ni)	2010/08/20	<0.05		mg/L	
		Dissolved Phosphorus (P)	2010/08/20	<0.1		mg/L	
		Dissolved Potassium (K)	2010/08/20	<1		mg/L	
		Dissolved Selenium (Se)	2010/08/20	<0.2		mg/L	
		Dissolved Silicon (Si)	2010/08/20	<0.2		mg/L	
		Dissolved Silver (Ag)	2010/08/20	<0.01		mg/L	
		Dissolved Sodium (Na)	2010/08/20	<0.5		mg/L	
		Dissolved Strontium (Sr)	2010/08/20	<0.01		mg/L	
		Dissolved Sulphur (S)	2010/08/20	<0.5		mg/L	
		Dissolved Tin (Sn)	2010/08/20	<0.2		mg/L	
		Dissolved Titanium (Ti)	2010/08/20	<0.01		mg/L	
		Dissolved Vanadium (V)	2010/08/20	<0.01		mg/L	
		Dissolved Zinc (Zn)	2010/08/20	<0.01		mg/L	
	RPD [GV4961-02]	Dissolved Calcium (Ca)	2010/08/20	1.9		%	25
		Dissolved Copper (Cu)	2010/08/20	NC		%	25
		Dissolved Iron (Fe)	2010/08/20	NC		%	25
		Dissolved Magnesium (Mg)	2010/08/20	1.6		%	25
		Dissolved Manganese (Mn)	2010/08/20	NC		%	25
		Dissolved Potassium (K)	2010/08/20	5.5		%	25
		Dissolved Sodium (Na)	2010/08/20	0.5		%	25
		Dissolved Zinc (Zn)	2010/08/20	NC		%	25

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.
Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was not sufficiently significant to permit a reliable recovery calculation.
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.
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Validation Signature Page

Maxxam Job #: B0B0720

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

BRAD NEWMAN, Scientific Specialist

CHARLES ANCKER, B.Sc., M.Sc., C.Chem, Senior Analyst

EWA PRANJIC, M.Sc., C.Chem, Scientific Specialist

PAUL RUBINATO, Analyst, Maxxam Analytics

ALINA SEGAL, Manager Main Lab - Organics

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

Validation Signature Page

Maxxam Job #: B0B0720

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

STEVE ROBERTS, Lab Supervisor, Ottawa

==

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.

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Your P.O. #: B05524
Site#: 60158472
Site: SURFACE WATER PADLOPING
Your C.O.C. #: na

Attention: Jenna Morrish
AECOM Canada Ltd
2540 Kensington Rd NW
Calgary, AB
CANADA T2N3S3

Report Date: 2010/10/13

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B0E2456
Received: 2010/10/08, 11:55

Sample Matrix: Water
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Method Reference
Metals Analysis by ICPMS (as received) (1)	8	2010/10/08	2010/10/12	CAM SOP-00447	EPA 6020

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Metals analysis was performed on the sample 'as received'.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

MARIJANE CRUZ, Project Manager
Email: MCruz@maxxam.ca
Phone# (905) 817-5756

==
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

Maxxam Job #: B0E2456
Report Date: 2010/10/13

AECOM Canada Ltd

Project name: SURFACE WATER PADLOPING
Your P.O. #: B05524

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		HL2269		HL2270		HL2271	HL2272		
Sampling Date		2010/08/11 09:00		2010/08/11 09:45		2010/08/11 09:55	2010/08/11 10:40		
COC Number		na		na		na	na		
	Units	**W1**	**RDL**	**W2**	**RDL**	**W3**	**W4**	**RDL**	**QC Batch**
Metals									
. Aluminum (Al)	ug/L	<100	100	15	5	<100	<100	100	2292824
. Antimony (Sb)	ug/L	<10	10	<0.5	0.5	<10	<10	10	2292824
. Arsenic (As)	ug/L	<20	20	<1	1	<20	<20	20	2292824
. Barium (Ba)	ug/L	<100	100	<5	5	<100	<100	100	2292824
. Beryllium (Be)	ug/L	<10	10	<0.5	0.5	<10	<10	10	2292824
. Bismuth (Bi)	ug/L	<20	20	<1	1	<20	<20	20	2292824
. Boron (B)	ug/L	3700	200	<10	10	3800	3800	200	2292824
. Cadmium (Cd)	ug/L	<2	2	<0.1	0.1	<2	<2	2	2292824
. Calcium (Ca)	ug/L	350000	4000	400	200	340000	360000	4000	2292824
. Chromium (Cr)	ug/L	<100	100	<5	5	<100	<100	100	2292824
. Cobalt (Co)	ug/L	<10	10	<0.5	0.5	<10	<10	10	2292824
. Copper (Cu)	ug/L	<20	20	<1	1	<20	<20	20	2292824
. Iron (Fe)	ug/L	<2000	2000	<100	100	<2000	<2000	2000	2292824
. Lead (Pb)	ug/L	<10	10	<0.5	0.5	<10	<10	10	2292824
. Lithium (Li)	ug/L	150	100	<5	5	140	140	100	2292824
. Magnesium (Mg)	ug/L	1100000	1000	380	50	1100000	1100000	1000	2292824
. Manganese (Mn)	ug/L	<40	40	<2	2	<40	<40	40	2292824
. Molybdenum (Mo)	ug/L	<20	20	<1	1	<20	<20	20	2292824
. Nickel (Ni)	ug/L	<20	20	<1	1	<20	<20	20	2292824
. Phosphorus (P)	ug/L	<2000	2000	<100	100	<2000	<2000	2000	2292824
. Potassium (K)	ug/L	340000	4000	660	200	330000	340000	4000	2292824
. Selenium (Se)	ug/L	<40	40	<2	2	<40	<40	40	2292824
. Silicon (Si)	ug/L	<1000	1000	1300	50	<1000	<1000	1000	2292824
. Silver (Ag)	ug/L	<2	2	<0.1	0.1	<2	<2	2	2292824
. Sodium (Na)	ug/L	9300000	2000	5000	100	9100000	9400000	2000	2292824
. Strontium (Sr)	ug/L	6100	20	2	1	5900	6200	20	2292824
. Tellurium (Te)	ug/L	<20	20	<1	1	<20	<20	20	2292824
. Thallium (Tl)	ug/L	<1	1	<0.05	0.05	<1	<1	1	2292824
. Thorium (Th)	ug/L	<20	20	<1	1	<20	<20	20	2292824
. Tin (Sn)	ug/L	<20	20	<1	1	<20	<20	20	2292824
. Titanium (Ti)	ug/L	<100	100	<5	5	<100	<100	100	2292824

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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AECOM Canada Ltd

Maxxam Job #: B0E2456
Report Date: 2010/10/13

Project name: SURFACE WATER PADLOPING
Your P.O. #: B05524

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		HL2269		HL2270		HL2271	HL2272		
Sampling Date		2010/08/11 09:00		2010/08/11 09:45		2010/08/11 09:55	2010/08/11 10:40		
COC Number		na		na		na	na		
	Units	**W1**	**RDL**	**W2**	**RDL**	**W3**	**W4**	**RDL**	**QC Batch**
. Tungsten (W)	ug/L	<20	20	<1	1	<20	<20	20	2292824
. Uranium (U)	ug/L	3	2	<0.1	0.1	2	3	2	2292824
. Vanadium (V)	ug/L	26	20	<1	1	39	49	20	2292824
. Zinc (Zn)	ug/L	<100	100	<5	5	<100	<100	100	2292824
. Zirconium (Zr)	ug/L	<20	20	<1	1	<20	<20	20	2292824

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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AECOM Canada Ltd

Maxxam Job #: B0E2456
Report Date: 2010/10/13

Project name: SURFACE WATER PADLOPING
Your P.O. #: B05524

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		HL2273		HL2274	HL2275	HL2276		
Sampling Date		2010/08/11 11:15		2010/08/11 11:30	2010/08/11 16:35	2010/08/12 14:05		
COC Number		na		na	na	na		
	Units	**W5**	**RDL**	**W6**	**W7**	**FB**	**RDL**	**QC Batch**
Metals								
. Aluminum (Al)	ug/L	<100	100	1300	6	<5	5	2292824
. Antimony (Sb)	ug/L	<10	10	0.8	<0.5	<0.5	0.5	2292824
. Arsenic (As)	ug/L	<20	20	<1	<1	<1	1	2292824
. Barium (Ba)	ug/L	<100	100	15	<5	<5	5	2292824
. Beryllium (Be)	ug/L	<10	10	<0.5	<0.5	<0.5	0.5	2292824
. Bismuth (Bi)	ug/L	<20	20	<1	<1	<1	1	2292824
. Boron (B)	ug/L	3900	200	16	<10	<10	10	2292824
. Cadmium (Cd)	ug/L	<2	2	<0.1	<0.1	<0.1	0.1	2292824
. Calcium (Ca)	ug/L	340000	4000	<200	740	<200	200	2292824
. Chromium (Cr)	ug/L	<100	100	<5	<5	<5	5	2292824
. Cobalt (Co)	ug/L	<10	10	0.7	<0.5	<0.5	0.5	2292824
. Copper (Cu)	ug/L	<20	20	11	<1	<1	1	2292824
. Iron (Fe)	ug/L	<2000	2000	4000	<100	<100	100	2292824
. Lead (Pb)	ug/L	<10	10	2.6	<0.5	<0.5	0.5	2292824
. Lithium (Li)	ug/L	150	100	<5	<5	<5	5	2292824
. Magnesium (Mg)	ug/L	1100000	1000	570	530	<50	50	2292824
. Manganese (Mn)	ug/L	<40	40	14	<2	<2	2	2292824
. Molybdenum (Mo)	ug/L	<20	20	2	<1	<1	1	2292824
. Nickel (Ni)	ug/L	<20	20	4	<1	<1	1	2292824
. Phosphorus (P)	ug/L	<2000	2000	110	<100	<100	100	2292824
. Potassium (K)	ug/L	340000	4000	2000	450	<200	200	2292824
. Selenium (Se)	ug/L	<40	40	<2	<2	<2	2	2292824
. Silicon (Si)	ug/L	<1000	1000	8100	230	<50	50	2292824
. Silver (Ag)	ug/L	<2	2	<0.1	<0.1	<0.1	0.1	2292824
. Sodium (Na)	ug/L	9300000	2000	22000	2700	190	100	2292824
. Strontium (Sr)	ug/L	6200	20	2	4	<1	1	2292824
. Tellurium (Te)	ug/L	<20	20	<1	<1	<1	1	2292824
. Thallium (Tl)	ug/L	<1	1	<0.05	<0.05	<0.05	0.05	2292824
. Thorium (Th)	ug/L	<20	20	<1	<1	<1	1	2292824
. Tin (Sn)	ug/L	<20	20	<1	<1	<1	1	2292824
. Titanium (Ti)	ug/L	<100	100	120	<5	<5	5	2292824

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

AECOM Canada Ltd

Maxxam Job #: B0E2456
Report Date: 2010/10/13

Project name: SURFACE WATER PADLOPING
Your P.O. #: B05524

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		HL2273		HL2274	HL2275	HL2276		
Sampling Date		2010/08/11 11:15		2010/08/11 11:30	2010/08/11 16:35	2010/08/12 14:05		
COC Number		na		na	na	na		
	Units	**W5**	**RDL**	**W6**	**W7**	**FB**	**RDL**	**QC Batch**
. Tungsten (W)	ug/L	<20	20	<1	<1	<1	1	2292824
. Uranium (U)	ug/L	2	2	0.5	<0.1	<0.1	0.1	2292824
. Vanadium (V)	ug/L	50	20	10	<1	<1	1	2292824
. Zinc (Zn)	ug/L	<100	100	<5	<5	<5	5	2292824
. Zirconium (Zr)	ug/L	<20	20	2	<1	<1	1	2292824

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Sample HL2269-01: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample HL2271-01: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample HL2272-01: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Sample HL2273-01: Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

Results relate only to the items tested.

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Maxxam Analytics

AECOM Canada Ltd
Attention: Jenna Morrish
Client Project #:
P.O. #: B05524
Project name: SURFACE WATER PADLOPING

Quality Assurance Report

Maxxam Job Number: MB0E2456

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2292824 HRE	Matrix Spike						
	[HL2270-01]	. Aluminum (Al)	2010/10/12		99	%	80 - 120
		. Antimony (Sb)	2010/10/12		101	%	80 - 120
		. Arsenic (As)	2010/10/12		104	%	80 - 120
		. Barium (Ba)	2010/10/12		97	%	80 - 120
		. Beryllium (Be)	2010/10/12		95	%	80 - 120
		. Bismuth (Bi)	2010/10/12		95	%	80 - 120
		. Boron (B)	2010/10/12		92	%	80 - 120
		. Cadmium (Cd)	2010/10/12		100	%	80 - 120
		. Calcium (Ca)	2010/10/12		106	%	80 - 120
		. Chromium (Cr)	2010/10/12		99	%	80 - 120
		. Cobalt (Co)	2010/10/12		97	%	80 - 120
		. Copper (Cu)	2010/10/12		99	%	80 - 120
		. Iron (Fe)	2010/10/12		101	%	80 - 120
		. Lead (Pb)	2010/10/12		96	%	80 - 120
		. Lithium (Li)	2010/10/12		99	%	80 - 120
		. Magnesium (Mg)	2010/10/12		104	%	80 - 120
		. Manganese (Mn)	2010/10/12		102	%	80 - 120
		. Molybdenum (Mo)	2010/10/12		102	%	80 - 120
		. Nickel (Ni)	2010/10/12		98	%	80 - 120
		. Phosphorus (P)	2010/10/12		100	%	80 - 120
		. Potassium (K)	2010/10/12		105	%	80 - 120
		. Selenium (Se)	2010/10/12		102	%	80 - 120
		. Silicon (Si)	2010/10/12		104	%	80 - 120
		. Silver (Ag)	2010/10/12		93	%	80 - 120
		. Sodium (Na)	2010/10/12		104	%	80 - 120
		. Strontium (Sr)	2010/10/12		100	%	80 - 120
		. Tellurium (Te)	2010/10/12		100	%	80 - 120
		. Thallium (Tl)	2010/10/12		95	%	80 - 120
		. Thorium (Th)	2010/10/12		98	%	80 - 120
		. Tin (Sn)	2010/10/12		100	%	80 - 120
		. Titanium (Ti)	2010/10/12		105	%	80 - 120
		. Tungsten (W)	2010/10/12		98	%	80 - 120
		. Uranium (U)	2010/10/12		99	%	80 - 120
		. Vanadium (V)	2010/10/12		99	%	80 - 120
		. Zinc (Zn)	2010/10/12		102	%	80 - 120
		. Zirconium (Zr)	2010/10/12		100	%	80 - 120
	Spiked Blank	. Aluminum (Al)	2010/10/12		98	%	90 - 110
		. Antimony (Sb)	2010/10/12		99	%	90 - 110
		. Arsenic (As)	2010/10/12		100	%	90 - 110
		. Barium (Ba)	2010/10/12		98	%	90 - 110
		. Beryllium (Be)	2010/10/12		96	%	90 - 110
		. Bismuth (Bi)	2010/10/12		96	%	90 - 110
		. Boron (B)	2010/10/12		94	%	90 - 110
		. Cadmium (Cd)	2010/10/12		98	%	90 - 110
		. Calcium (Ca)	2010/10/12		103	%	90 - 110
		. Chromium (Cr)	2010/10/12		98	%	90 - 110
		. Cobalt (Co)	2010/10/12		97	%	90 - 110
		. Copper (Cu)	2010/10/12		97	%	90 - 110
		. Iron (Fe)	2010/10/12		101	%	90 - 110
		. Lead (Pb)	2010/10/12		96	%	90 - 110
		. Lithium (Li)	2010/10/12		98	%	90 - 110
		. Magnesium (Mg)	2010/10/12		103	%	90 - 110
		. Manganese (Mn)	2010/10/12		99	%	90 - 110
		. Molybdenum (Mo)	2010/10/12		100	%	90 - 110

AECOM Canada Ltd
Attention: Jenna Morrish
Client Project #:
P.O. #: B05524
Project name: SURFACE WATER PADLOPING

Quality Assurance Report (Continued)

Maxxam Job Number: MB0E2456

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2292824 HRE	Spiked Blank	. Nickel (Ni)	2010/10/12		97	%	90 - 110
		. Phosphorus (P)	2010/10/12		98	%	90 - 110
		. Potassium (K)	2010/10/12		103	%	90 - 110
		. Selenium (Se)	2010/10/12		99	%	90 - 110
		. Silicon (Si)	2010/10/12		104	%	90 - 110
		. Silver (Ag)	2010/10/12		96	%	90 - 110
		. Sodium (Na)	2010/10/12		102	%	90 - 110
		. Strontium (Sr)	2010/10/12		98	%	90 - 110
		. Tellurium (Te)	2010/10/12		96	%	90 - 110
		. Thallium (Tl)	2010/10/12		97	%	90 - 110
		. Thorium (Th)	2010/10/12		97	%	90 - 110
		. Tin (Sn)	2010/10/12		98	%	90 - 110
		. Titanium (Ti)	2010/10/12		102	%	90 - 110
		. Tungsten (W)	2010/10/12		99	%	90 - 110
		. Uranium (U)	2010/10/12		98	%	90 - 110
		. Vanadium (V)	2010/10/12		98	%	90 - 110
		. Zinc (Zn)	2010/10/12		98	%	90 - 110
		. Zirconium (Zr)	2010/10/12		100	%	90 - 110
	Method Blank	. Aluminum (Al)	2010/10/12	<5		ug/L	
		. Antimony (Sb)	2010/10/12	<0.5		ug/L	
		. Arsenic (As)	2010/10/12	<1		ug/L	
		. Barium (Ba)	2010/10/12	<5		ug/L	
		. Beryllium (Be)	2010/10/12	<0.5		ug/L	
		. Bismuth (Bi)	2010/10/12	<1		ug/L	
		. Boron (B)	2010/10/12	<10		ug/L	
		. Cadmium (Cd)	2010/10/12	<0.1		ug/L	
		. Calcium (Ca)	2010/10/12	<200		ug/L	
		. Chromium (Cr)	2010/10/12	<5		ug/L	
		. Cobalt (Co)	2010/10/12	<0.5		ug/L	
		. Copper (Cu)	2010/10/12	<1		ug/L	
		. Iron (Fe)	2010/10/12	<100		ug/L	
		. Lead (Pb)	2010/10/12	<0.5		ug/L	
		. Lithium (Li)	2010/10/12	<5		ug/L	
		. Magnesium (Mg)	2010/10/12	<50		ug/L	
		. Manganese (Mn)	2010/10/12	<2		ug/L	
		. Molybdenum (Mo)	2010/10/12	<1		ug/L	
		. Nickel (Ni)	2010/10/12	<1		ug/L	
		. Phosphorus (P)	2010/10/12	<100		ug/L	
		. Potassium (K)	2010/10/12	<200		ug/L	
		. Selenium (Se)	2010/10/12	<2		ug/L	
		. Silicon (Si)	2010/10/12	<50		ug/L	
		. Silver (Ag)	2010/10/12	<0.1		ug/L	
		. Sodium (Na)	2010/10/12	<100		ug/L	
		. Strontium (Sr)	2010/10/12	<1		ug/L	
		. Tellurium (Te)	2010/10/12	<1		ug/L	
		. Thallium (Tl)	2010/10/12	<0.05		ug/L	
		. Thorium (Th)	2010/10/12	<1		ug/L	
		. Tin (Sn)	2010/10/12	<1		ug/L	
		. Titanium (Ti)	2010/10/12	<5		ug/L	
		. Tungsten (W)	2010/10/12	<1		ug/L	
		. Uranium (U)	2010/10/12	<0.1		ug/L	
		. Vanadium (V)	2010/10/12	<1		ug/L	
		. Zinc (Zn)	2010/10/12	<5		ug/L	
		. Zirconium (Zr)	2010/10/12	<1		ug/L	
	RPD [HL2270-01]	. Aluminum (Al)	2010/10/12	NC		%	25

AECOM Canada Ltd
Attention: Jenna Morrish
Client Project #:
P.O. #: B05524
Project name: SURFACE WATER PADLOPING

Quality Assurance Report (Continued)

Maxxam Job Number: MB0E2456

QA/QC Batch Num Init	QC Type	Parameter	Date Analyzed yyyy/mm/dd	Value	Recovery	Units	QC Limits
2292824 HRE	RPD [HL2270-01]	. Antimony (Sb)	2010/10/12	NC		%	25
		. Arsenic (As)	2010/10/12	NC		%	25
		. Barium (Ba)	2010/10/12	NC		%	25
		. Beryllium (Be)	2010/10/12	NC		%	25
		. Bismuth (Bi)	2010/10/12	NC		%	25
		. Boron (B)	2010/10/12	NC		%	25
		. Cadmium (Cd)	2010/10/12	NC		%	25
		. Calcium (Ca)	2010/10/12	NC		%	25
		. Chromium (Cr)	2010/10/12	NC		%	25
		. Cobalt (Co)	2010/10/12	NC		%	25
		. Copper (Cu)	2010/10/12	NC		%	25
		. Iron (Fe)	2010/10/12	NC		%	25
		. Lead (Pb)	2010/10/12	NC		%	25
		. Lithium (Li)	2010/10/12	NC		%	25
		. Magnesium (Mg)	2010/10/12	6.6		%	25
		. Manganese (Mn)	2010/10/12	NC		%	25
		. Molybdenum (Mo)	2010/10/12	NC		%	25
		. Nickel (Ni)	2010/10/12	NC		%	25
		. Phosphorus (P)	2010/10/12	NC		%	25
		. Potassium (K)	2010/10/12	NC		%	25
		. Selenium (Se)	2010/10/12	NC		%	25
		. Silicon (Si)	2010/10/12	1.3		%	25
		. Silver (Ag)	2010/10/12	NC		%	25
		. Sodium (Na)	2010/10/12	0.06		%	25
		. Strontium (Sr)	2010/10/12	NC		%	25
		. Tellurium (Te)	2010/10/12	NC		%	25
		. Thallium (Tl)	2010/10/12	NC		%	25
		. Thorium (Th)	2010/10/12	NC		%	25
		. Tin (Sn)	2010/10/12	NC		%	25
		. Titanium (Ti)	2010/10/12	NC		%	25
		. Tungsten (W)	2010/10/12	NC		%	25
		. Uranium (U)	2010/10/12	NC		%	25
		. Vanadium (V)	2010/10/12	NC		%	25
		. Zinc (Zn)	2010/10/12	NC		%	25
		. Zirconium (Zr)	2010/10/12	NC		%	25

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.
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 #: B0E2456

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

BRAD NEWMAN, Scientific Specialist

==
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.

Maxxam Analytics International Corporation o/a Maxxam Analytics 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.maxxam.ca

MOISTURE CONTENT

JOB No.: 60158472
CLIENT: PWGSC
PROJECT: Padloping Island

DATE: September 27, 2010

HOLE NO.	TP-1	TP-2	TP-3	TP-3	TP-4	TP-5
SAMPLE NO.	G1	G2	G1	G3	G2	G1
DEPTH (m)	0.5 - 0.55	0.4 - 0.45	0.2 - 0.25	0.75 - 0.8	0.6 - 0.65	0.6 - 0.65
MOISTURE CONTENT %	6.7	3.5	13.8	10.9	9.5	6.1

HOLE NO.	TP-6	TP-7	TP-8	TP-9	TP-10	TP-11
SAMPLE NO.	G2	G1	G2	G2	G2	G2
DEPTH (FT)	0.5 - 0.6	0.5 - 0.65	0.3 - 0.35	0.5 - 0.55	0.35 - 0.4	0.5 - 0.55
MOISTURE CONTENT %	5.6	15.8	9.8	7.2	6.7	7.6

HOLE NO.	TP-12	TP-14				
SAMPLE NO.	G2	G2				
DEPTH (FT)	0.4 - 0.5	0.35 - 0.4				
MOISTURE CONTENT %	9.4	5.9				

HOLE NO.						
SAMPLE NO.						
DEPTH (FT)						
MOISTURE CONTENT %						

NOTES:

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MATERIALS LABORATORY
AECOM
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (204) 284-2040

JOB No.:	60158472	DATE:	29-Sep-10
CLIENT:	PWGSC	TEST HOLE:	TP-3 B2
PROJECT:	Padloping Island	SAMPLE:	S10-160
LOCATION:		DEPTH:	0.05-0.8m
		TECH.:	JG

Liquid Limit

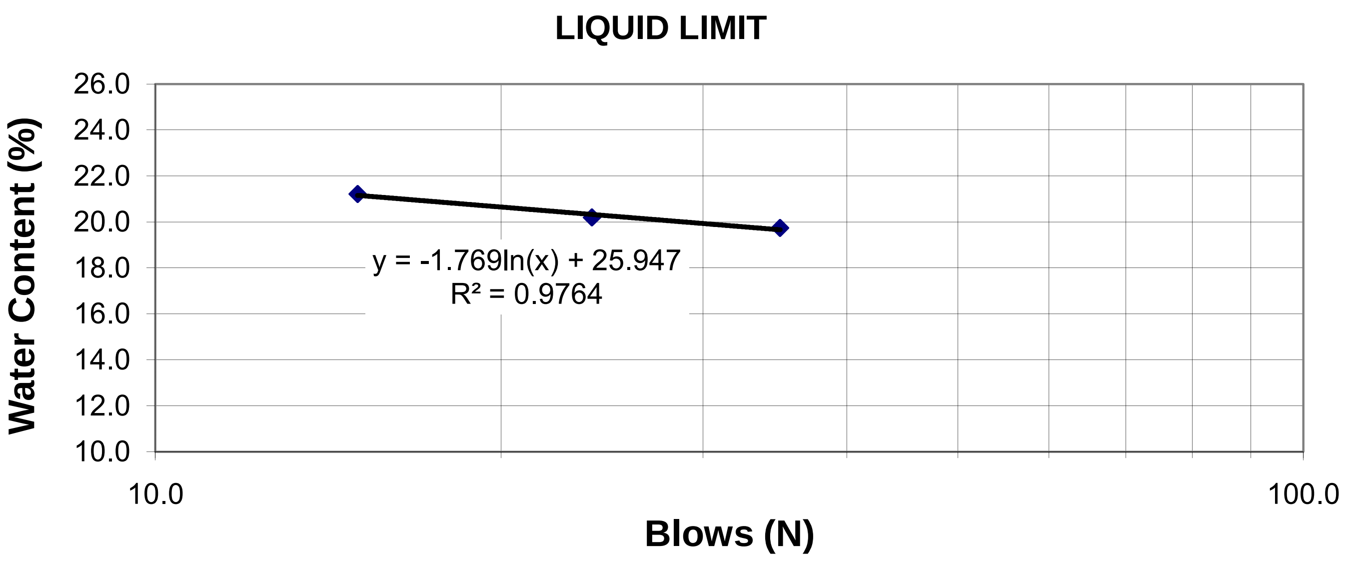
WATER CONTENT

Blows	35	24	15		
WT. SAMPLE WET + TARE (gr)	132.707	140.406	130.817		
WT. SAMPLE DRY + TARE (gr)	130.548	136.251	128.042		
WT. TARE (gr)	119.606	115.671	114.962		
WT. WATER (gr)	2.159	4.155	2.775		
WT. DRY SOIL (gr)	10.942	20.580	13.080		
MOISTURE CONTENT (%)	19.731	20.190	21.216		

Plastic Limit

WATER CONTENT

WT. SAMPLE WET + TARE (gr)	118.298	126.427			
WT. SAMPLE DRY + TARE (gr)	117.522	125.451			
WT. TARE (gr)	111.862	118.383			
WT. WATER (gr)	0.776	0.976			
WT. DRY SOIL (gr)	5.660	7.068			
MOISTURE CONTENT (%)	13.710	13.809			



Liquid Limit =	20.3	Plastic Limit =	13.8	Plasticity Index =	6.5

GRAIN SIZE DISTRIBUTION

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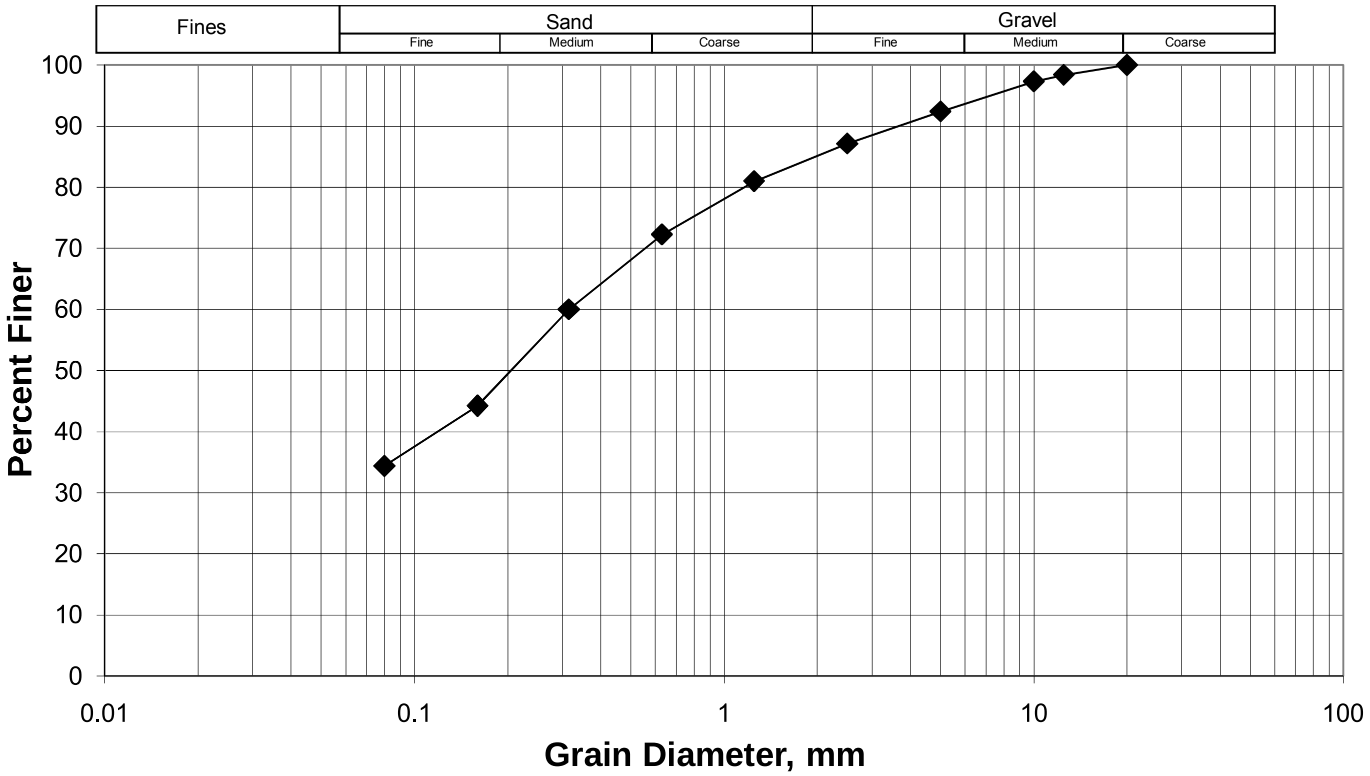
Client:	PWGSC	Sample No.:	S10-144
Project:	Padloping Island	Location:	TP-1 B2
Job No:	60158472	Depth:	0.05 - 0.75 m
Date :	27-Sep-10	Description	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5	-		
50.0	-		
40.0	-		
25.0	-		
20.0	-	100.0	
12.5	-	98.4	
10.0	-	97.3	
5.00	-	92.4	
2.50	-	87.1	
1.25	-	81.0	
0.630	-	72.3	
0.315	-	60.0	
0.160	-	44.2	
0.080	-	34.4	

GRAIN SIZE DISTRIBUTION CURVE



** Note: Soil Classification based on Grain Size from Canadian Foundation Engineering Manual, 3rd edition (1992).

GRAIN SIZE DISTRIBUTION

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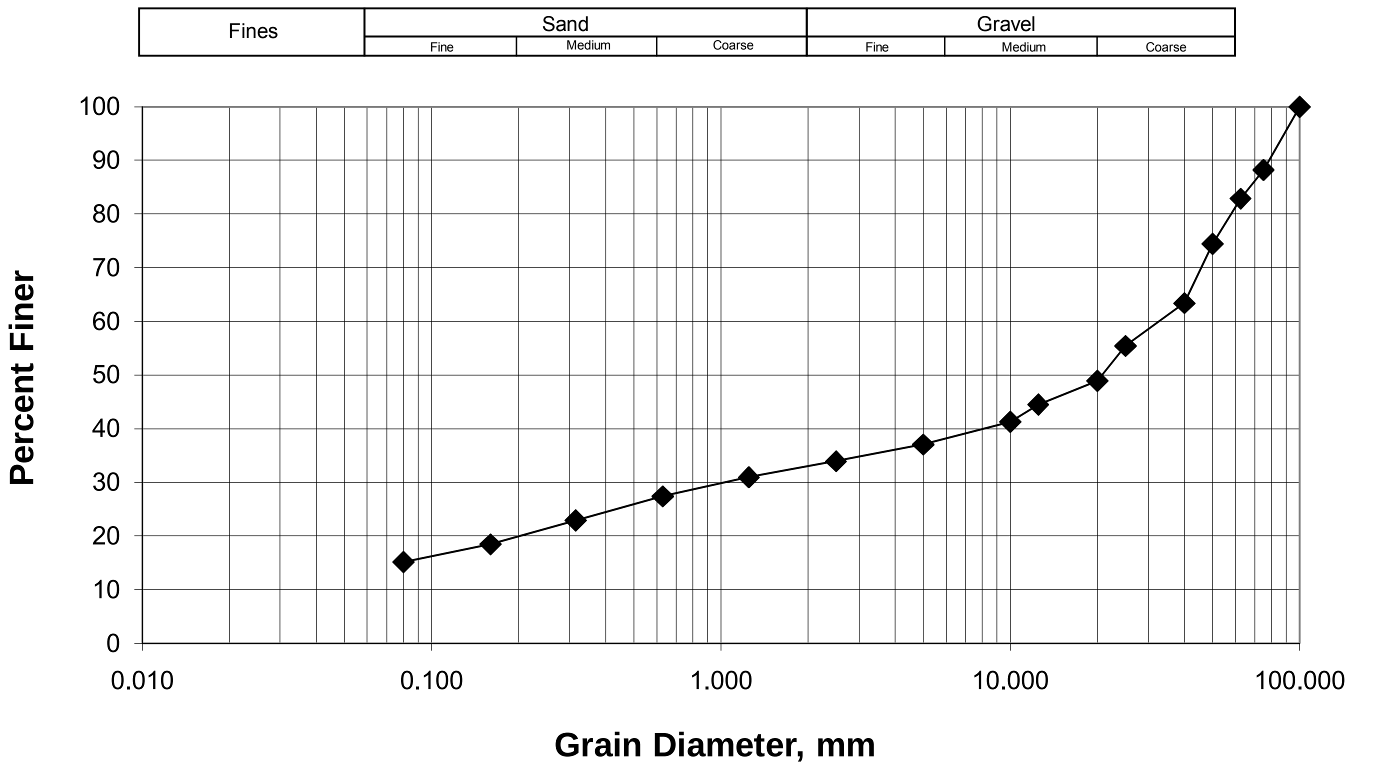
Client:	PWGSC	Sample No.:	S10-156
Project:	Padloping Island	Location:	TP-2 B1
Job No:	60158472	Depth:	0.05 - 0.45 m
Date :	27-Sep-10	Description:	Granular Material

Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-	100.0	
75.0	-	88.3	
62.5	-	82.9	
50.0	-	74.5	
40.0	-	63.4	
25.0	-	55.5	
20.0	-	48.9	
12.5	-	44.5	
10.0	-	41.3	
5.0	-	37.1	
2.5	-	33.9	
1.25	-	31.0	
0.630	-	27.4	
0.315	-	23.0	
0.160	-	18.5	
0.080	-	15.2	

GRAIN SIZE DISTRIBUTION CURVE



GRAIN SIZE DISTRIBUTION

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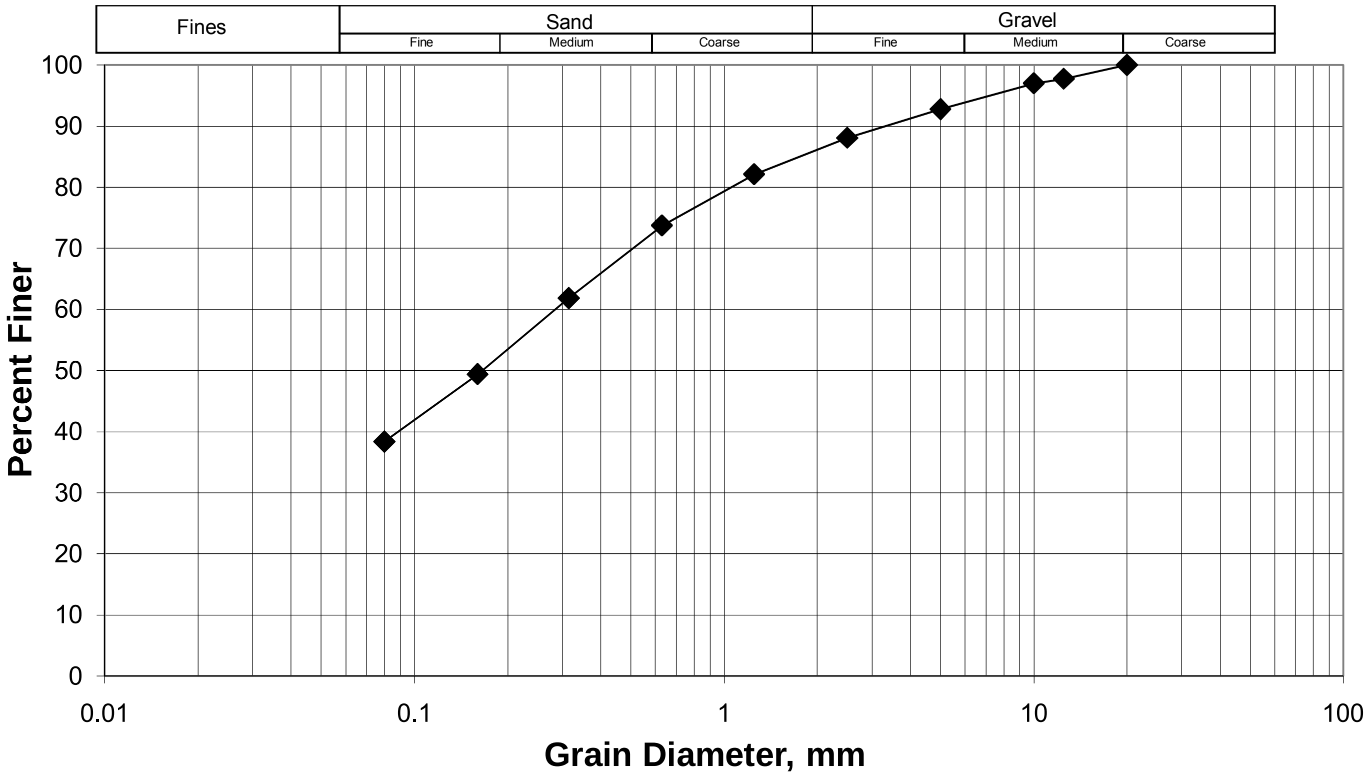
Client:	PWGSC	Sample No.:	S10-147
Project:	Padloping Island	Location:	TP-4 B1
Job No:	60158472	Depth:	0.05 - 0.5 m
Date :	27-Sep-10	Description	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5	-		
50.0	-		
40.0	-		
25.0	-		
20.0	-	100.0	
12.5	-	97.7	
10.0	-	97.0	
5.00	-	92.8	
2.50	-	88.1	
1.25	-	82.1	
0.630	-	73.8	
0.315	-	61.9	
0.160	-	49.4	
0.080	-	38.4	

GRAIN SIZE DISTRIBUTION CURVE



** Note: Soil Classification based on Grain Size from Canadian Foundation Engineering Manual, 3rd edition (1992).

GRAIN SIZE DISTRIBUTION

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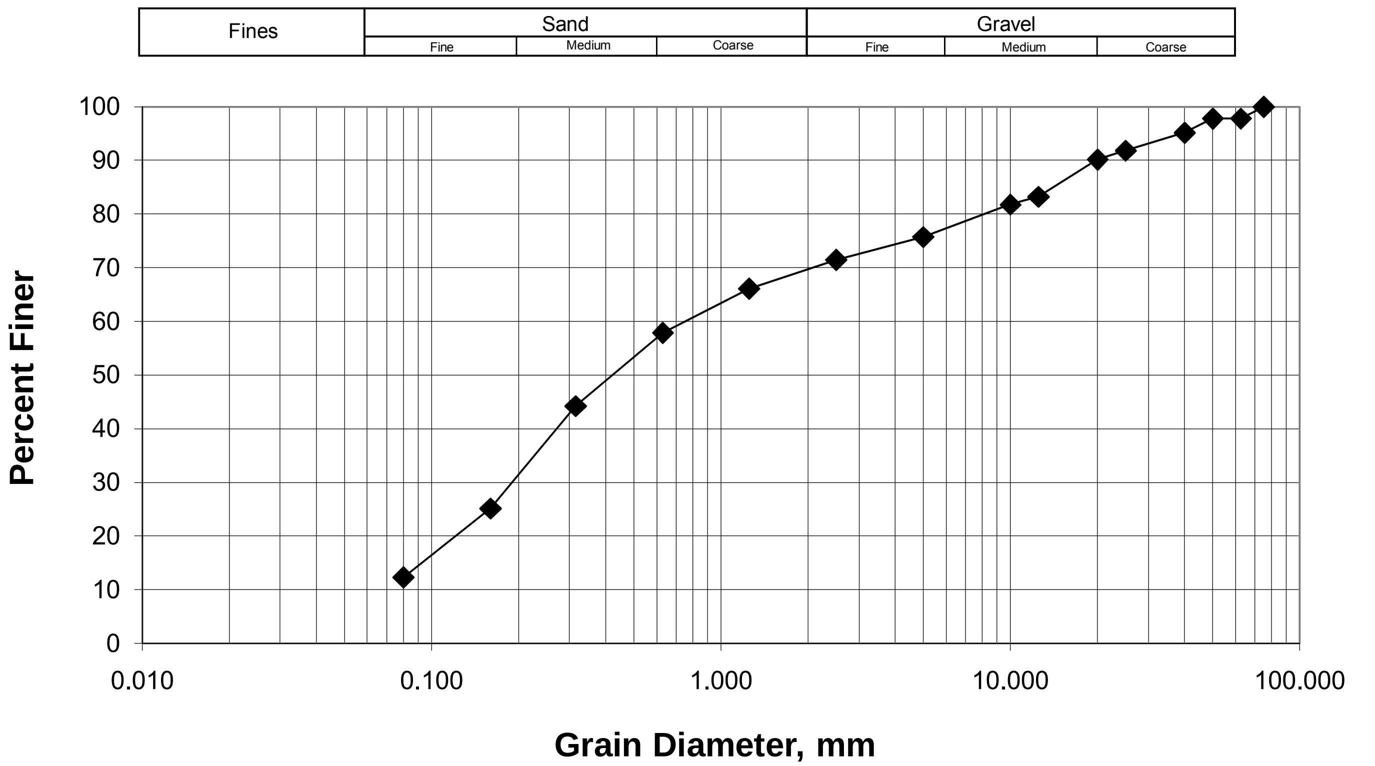
Client:	PWGSC	Sample No.:	S10-154
Project:	Padloping Island	Location:	TP-5 B2
Job No:	60158472	Depth:	0.05 - 0.9 m
Date :	27-Sep-10	Description:	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-	100.0	
62.5	-	97.8	
50.0	-	97.8	
40.0	-	95.2	
25.0	-	91.8	
20.0	-	90.2	
12.5	-	83.2	
10.0	-	81.8	
5.0	-	75.7	
2.5	-	71.5	
1.25	-	66.1	
0.630	-	57.9	
0.315	-	44.2	
0.160	-	25.1	
0.080	-	12.3	

GRAIN SIZE DISTRIBUTION CURVE



GRAIN SIZE DISTRIBUTION

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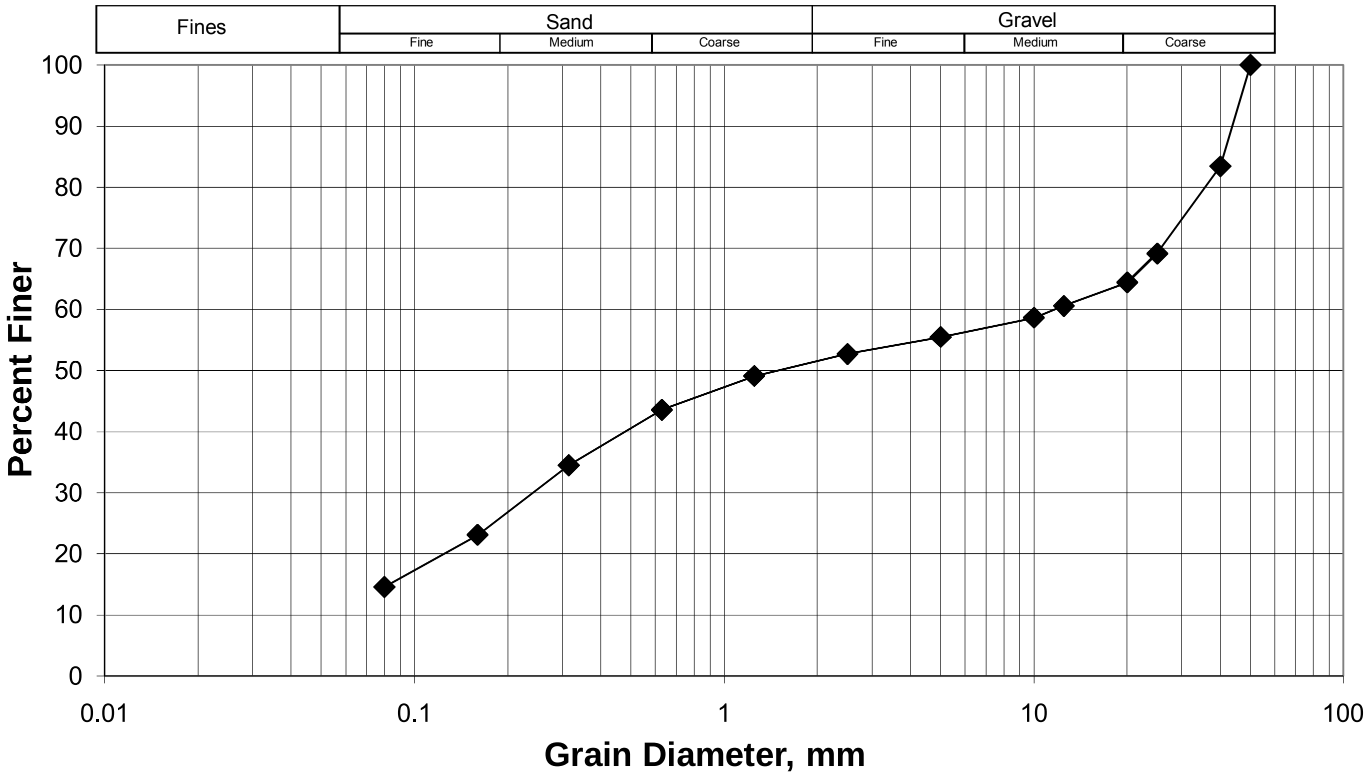
Client:	PWGSC	Sample No.:	S10-144
Project:	Padloping Island	Location:	TP-7 B2
Job No:	60158472	Depth:	0.05 - 0.75 m
Date :	27-Sep-10	Description	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5			
50.0	-	100.0	
40.0	-	83.4	
25.0	-	69.2	
20.0	-	64.4	
12.5	-	60.6	
10.0	-	58.6	
5.00	-	55.5	
2.50	-	52.7	
1.25	-	49.1	
0.630	-	43.6	
0.315	-	34.5	
0.160	-	23.1	
0.080	-	14.6	

GRAIN SIZE DISTRIBUTION CURVE



** Note: Soil Classification based on Grain Size from Canadian Foundation Engineering Manual, 3rd edition (1992).

GRAIN SIZE DISTRIBUTION

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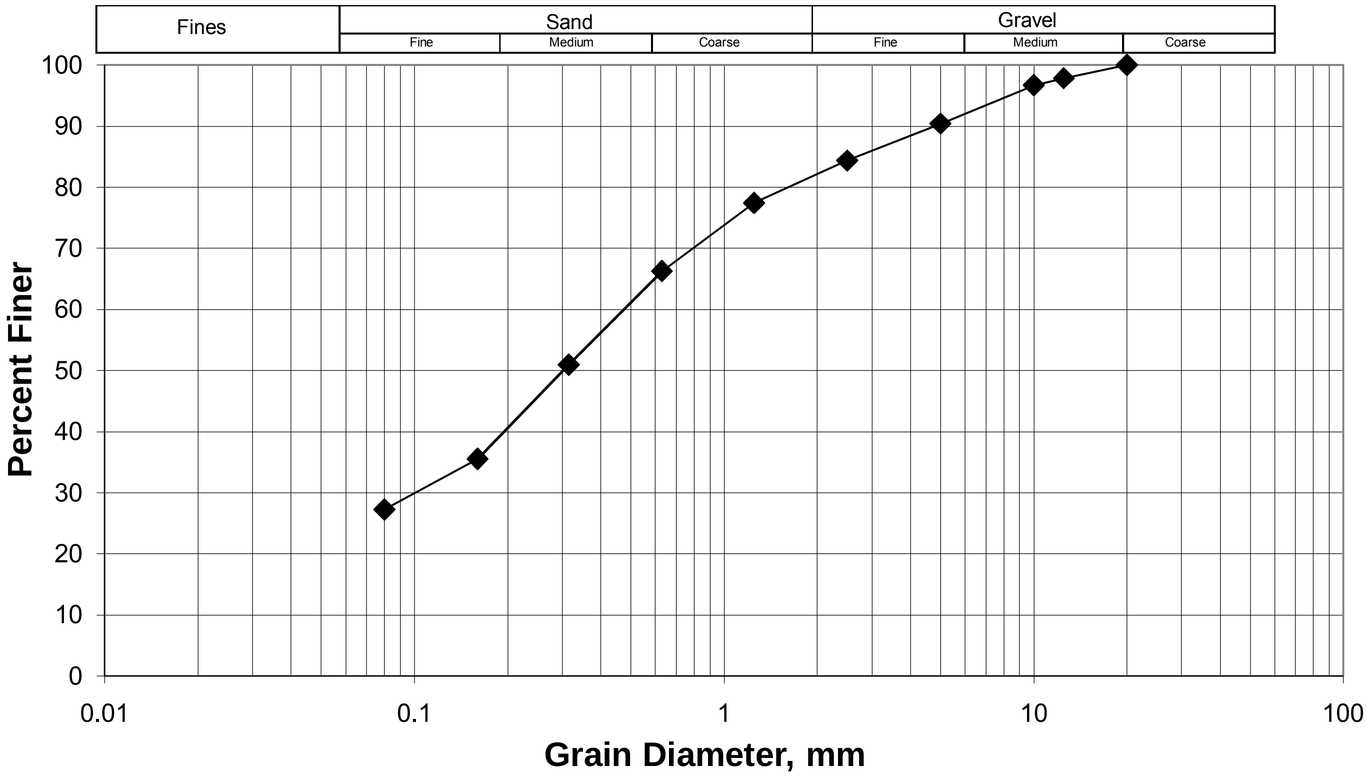
Client:	PWGSC	Sample No.:	S10-145
Project:	Padloping Island	Location:	TP-8 B1
Job No:	60158472	Depth:	0.05 - 0.4 m
Date :	27-Sep-10	Description	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5	-		
50.0	-		
40.0	-		
25.0	-		
20.0	-	100.0	
12.5	-	97.8	
10.0	-	96.7	
5.00	-	90.4	
2.50	-	84.4	
1.25	-	77.4	
0.630	-	66.3	
0.315	-	51.0	
0.160	-	35.6	
0.080	-	27.3	

GRAIN SIZE DISTRIBUTION CURVE



** Note: Soil Classification based on Grain Size from Canadian Foundation Engineering Manual, 3rd edition (1992).

GRAIN SIZE DISTRIBUTION

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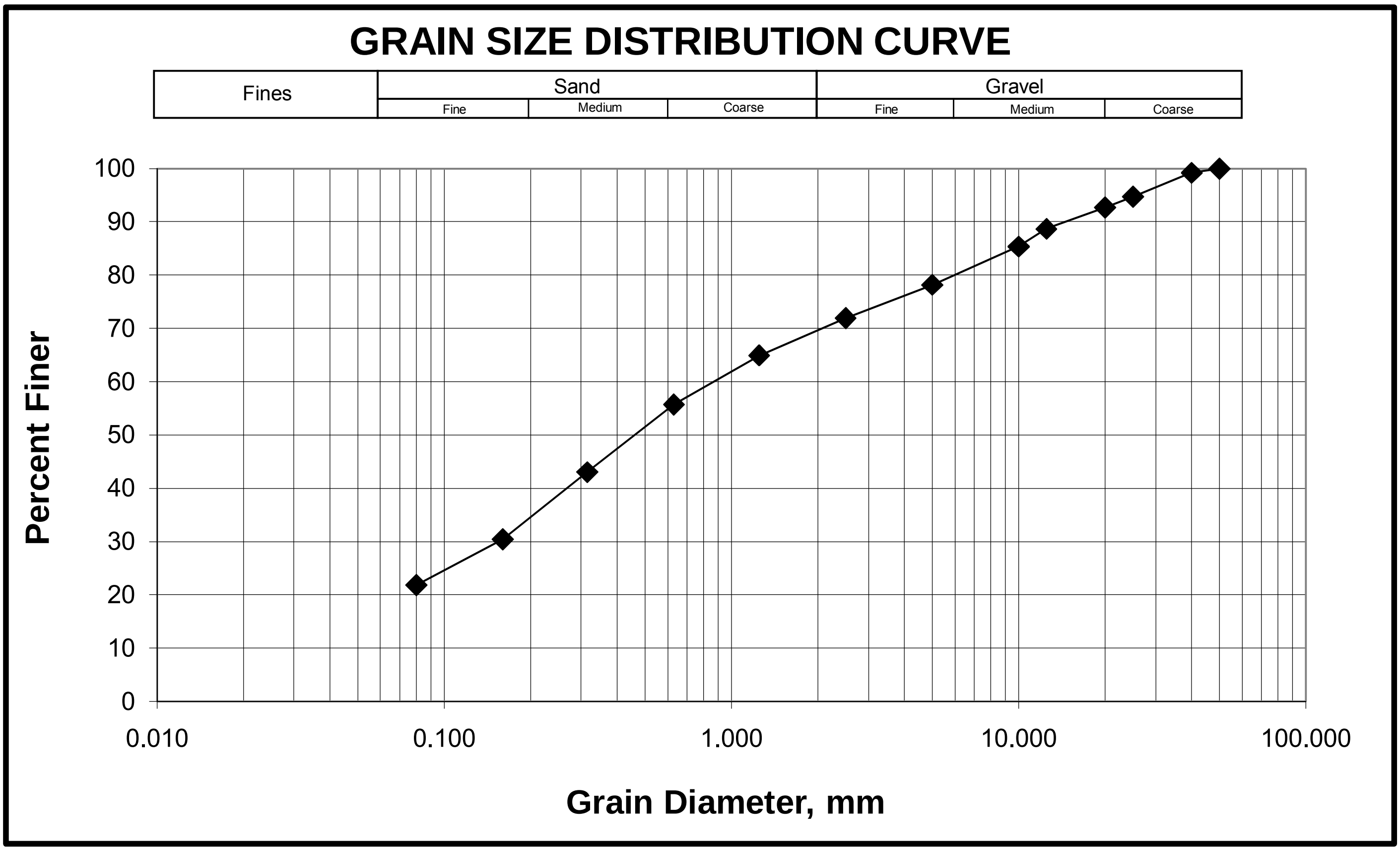
Client:	PWGSC	Sample No.:	S10-152
Project:	Padloping Island	Location:	TP-9 B1
Job No:	60158472	Depth:	0.05 - 0.6 m
Date :	27-Sep-10	Description:	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5	-		
50.0	-	100.0	
40.0	-	99.2	
25.0	-	94.7	
20.0	-	92.7	
12.5	-	88.7	
10.0	-	85.4	
5.0	-	78.2	
2.5	-	71.9	
1.25	-	64.9	
0.630	-	55.7	
0.315	-	43.0	
0.160	-	30.4	
0.080	-	21.8	



GRAIN SIZE DISTRIBUTION

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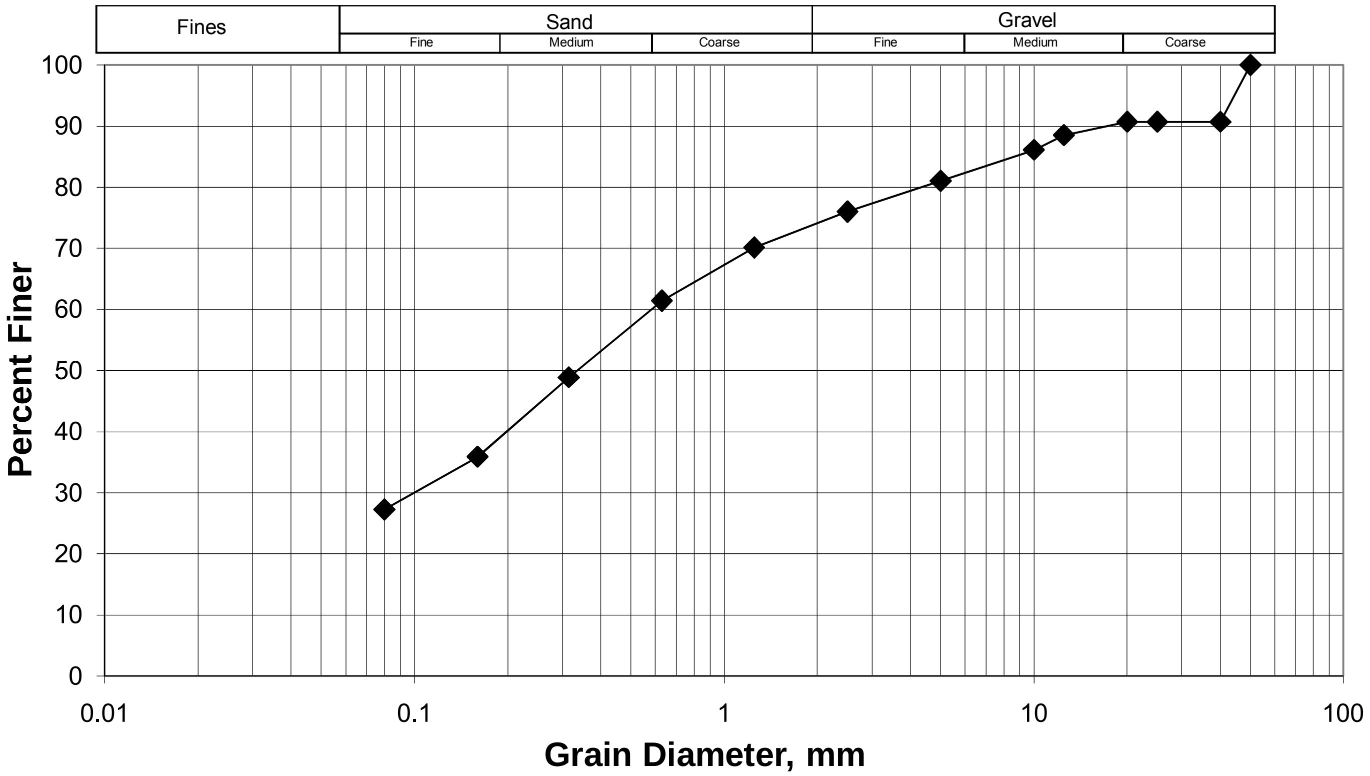
Client:	PWGSC	Sample No.:	S10-143
Project:	Padloping Island	Location:	TP-10 B1
Job No:	60158472	Depth:	0.05 - 0.7 m
Date :	27-Sep-10	Description	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5	-		
50.0	-	100.0	
40.0	-	90.7	
25.0	-	90.7	
20.0	-	90.7	
12.5	-	88.5	
10.0	-	86.1	
5.00	-	81.0	
2.50	-	76.0	
1.25	-	70.1	
0.630	-	61.4	
0.315	-	48.9	
0.160	-	35.9	
0.080	-	27.2	

GRAIN SIZE DISTRIBUTION CURVE



** Note: Soil Classification based on Grain Size from Canadian Foundation Engineering Manual, 3rd edition (1992).

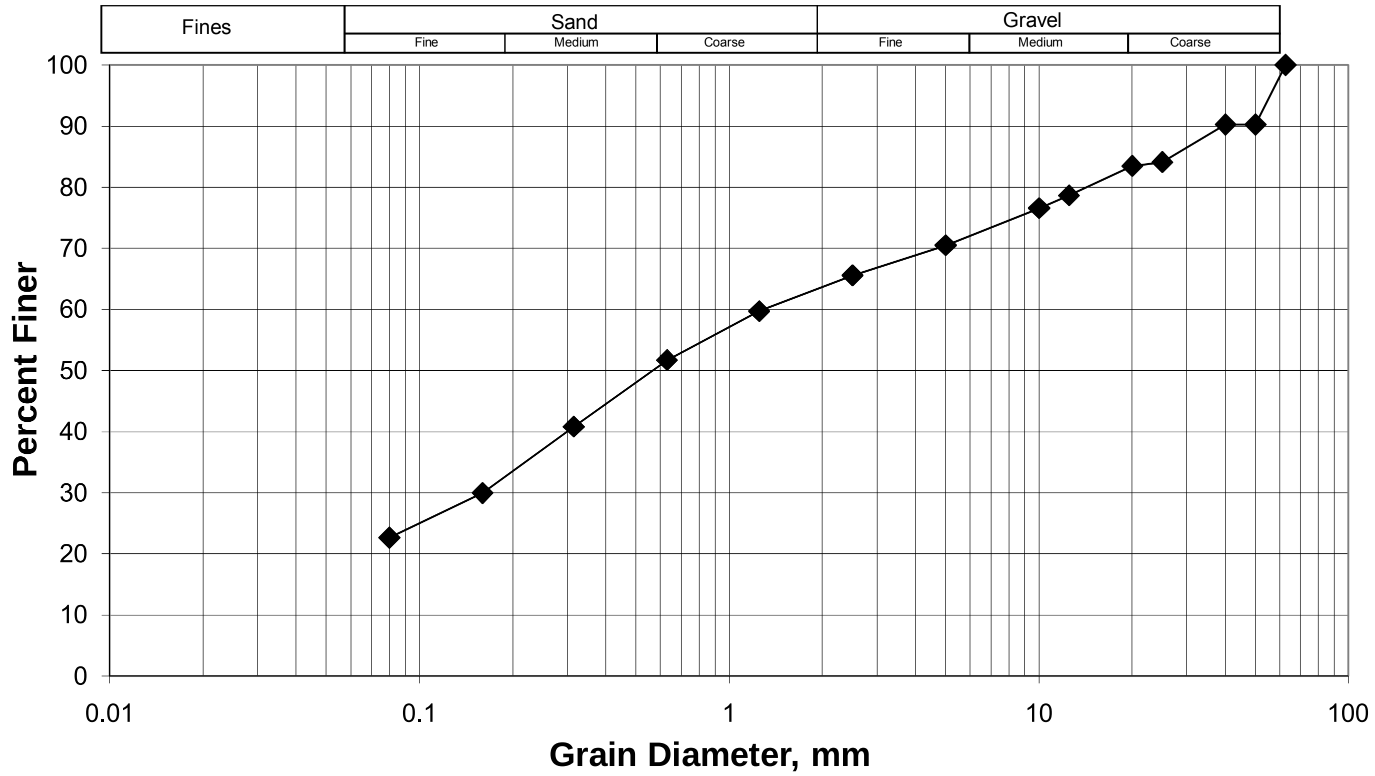
GRAIN SIZE DISTRIBUTION

MATERIALS LABORATORY
AECOM
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (204) 284-2040

Client:	PWGSC	Sample No.:	S10-146
Project:	Padloping Island	Location:	TP-11 B1
Job No:	60158472	Depth:	0.05 - 0.7 m
Date :	27-Sep-10	Description	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5	-	100.0	
50.0	-	90.3	
40.0	-	90.3	
25.0	-	84.1	
20.0	-	83.5	
12.5	-	78.7	
10.0	-	76.6	
5.00	-	70.5	
2.50	-	65.6	
1.25	-	59.7	
0.630	-	51.7	
0.315	-	40.8	
0.160	-	30.0	
0.080	-	22.7	

GRAIN SIZE DISTRIBUTION CURVE



** Note: Soil Classification based on Grain Size from Canadian Foundation Engineering Manual, 3rd edition (1992).

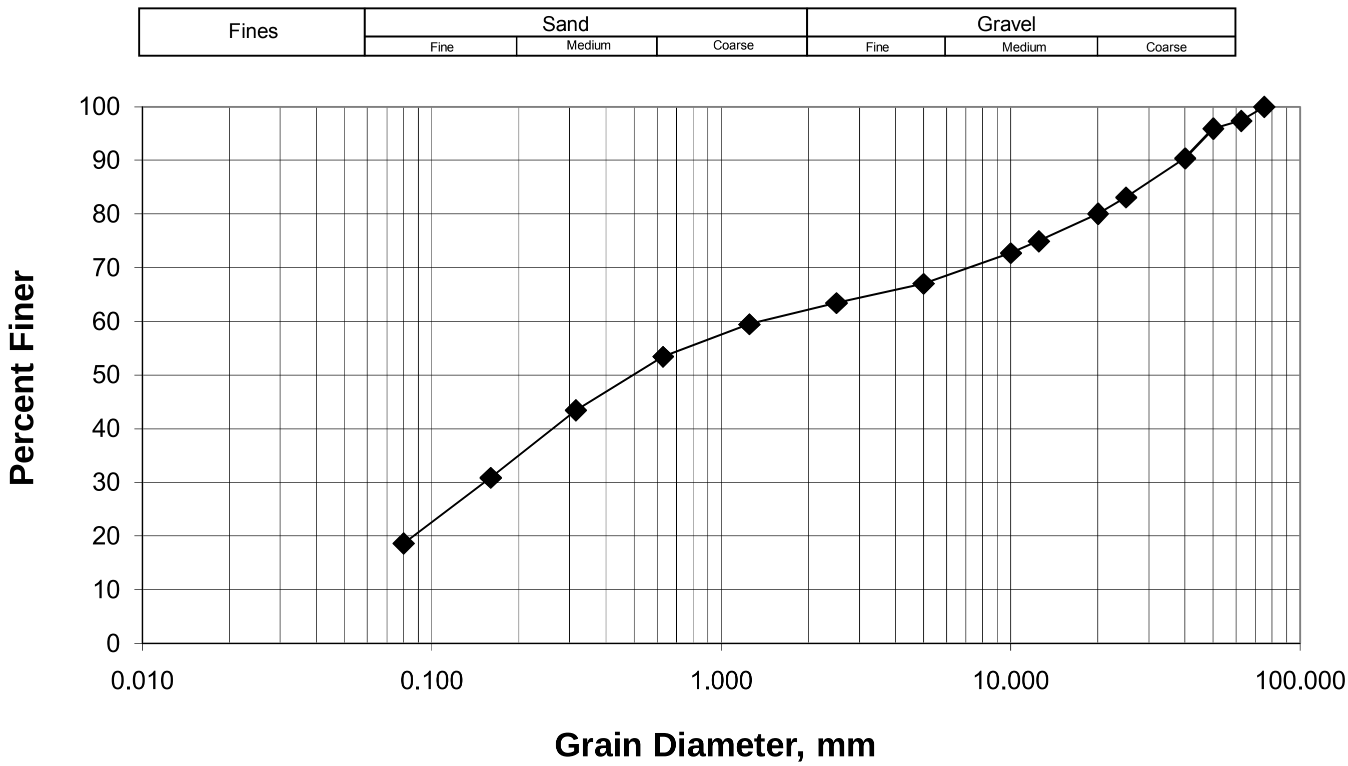
GRAIN SIZE DISTRIBUTION

MATERIALS LABORATORY
AECOM
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (204) 284-2040

Client:	PWGSC	Sample No.:	S10-153
Project:	Padloping Island	Location:	TP-12 B1
Job No:	60158472	Depth:	0.05 - 0.6 m
Date :	27-Sep-10	Description:	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-	100.0	
62.5	-	97.4	
50.0	-	95.9	
40.0	-	90.4	
25.0	-	83.1	
20.0	-	80.1	
12.5	-	75.0	
10.0	-	72.7	
5.0	-	67.0	
2.5	-	63.4	
1.25	-	59.5	
0.630	-	53.5	
0.315	-	43.5	
0.160	-	30.9	
0.080	-	18.6	

GRAIN SIZE DISTRIBUTION CURVE

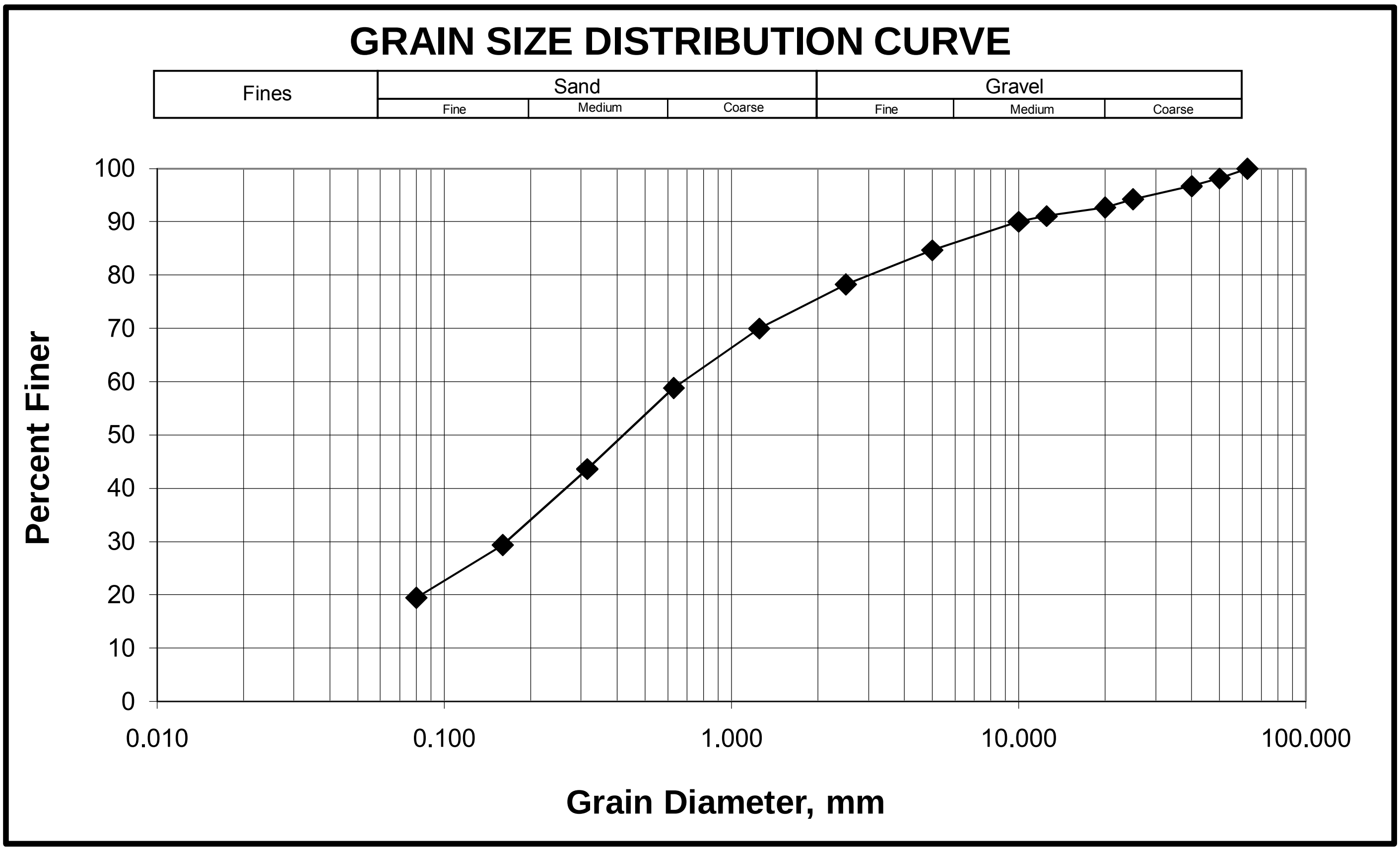


GRAIN SIZE DISTRIBUTION

MATERIALS LABORATORY
AECOM
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (204) 284-2040

Client:	PWGSC	Sample No.:	S10-151
Project:	Padloping Island	Location:	TP-13 B1
Job No:	60158472	Depth:	0.05 - 0.7 m
Date :	27-Sep-10	Description:	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5	-	100.0	
50.0	-	98.2	
40.0	-	96.7	
25.0	-	94.3	
20.0	-	92.7	
12.5	-	91.1	
10.0	-	90.0	
5.0	-	84.7	
2.5	-	78.3	
1.25	-	70.0	
0.630	-	58.8	
0.315	-	43.6	
0.160	-	29.3	
0.080	-	19.4	

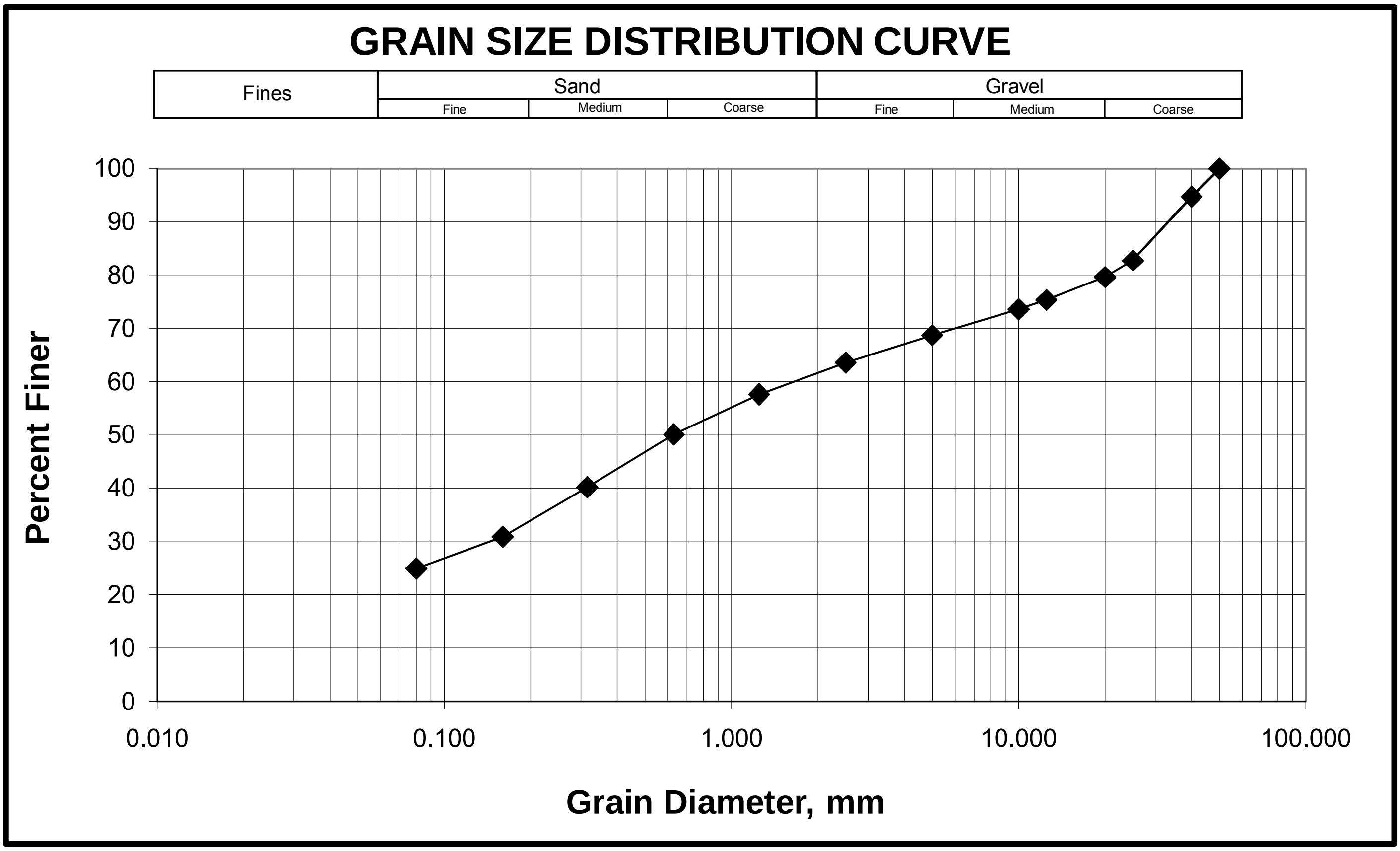


GRAIN SIZE DISTRIBUTION

MATERIALS LABORATORY
AECOM
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (204) 284-2040

Client:	PWGSC	Sample No.:	S10-150
Project:	Padloping Island	Location:	TP-14 B1
Job No:	60158472	Depth:	0.05 - 0.5 m
Date :	27-Sep-10	Description:	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5	-		
50.0	-	100.0	
40.0	-	94.7	
25.0	-	82.7	
20.0	-	79.6	
12.5	-	75.4	
10.0	-	73.6	
5.0	-	68.7	
2.5	-	63.6	
1.25	-	57.6	
0.630	-	50.1	
0.315	-	40.2	
0.160	-	31.0	
0.080	-	25.0	



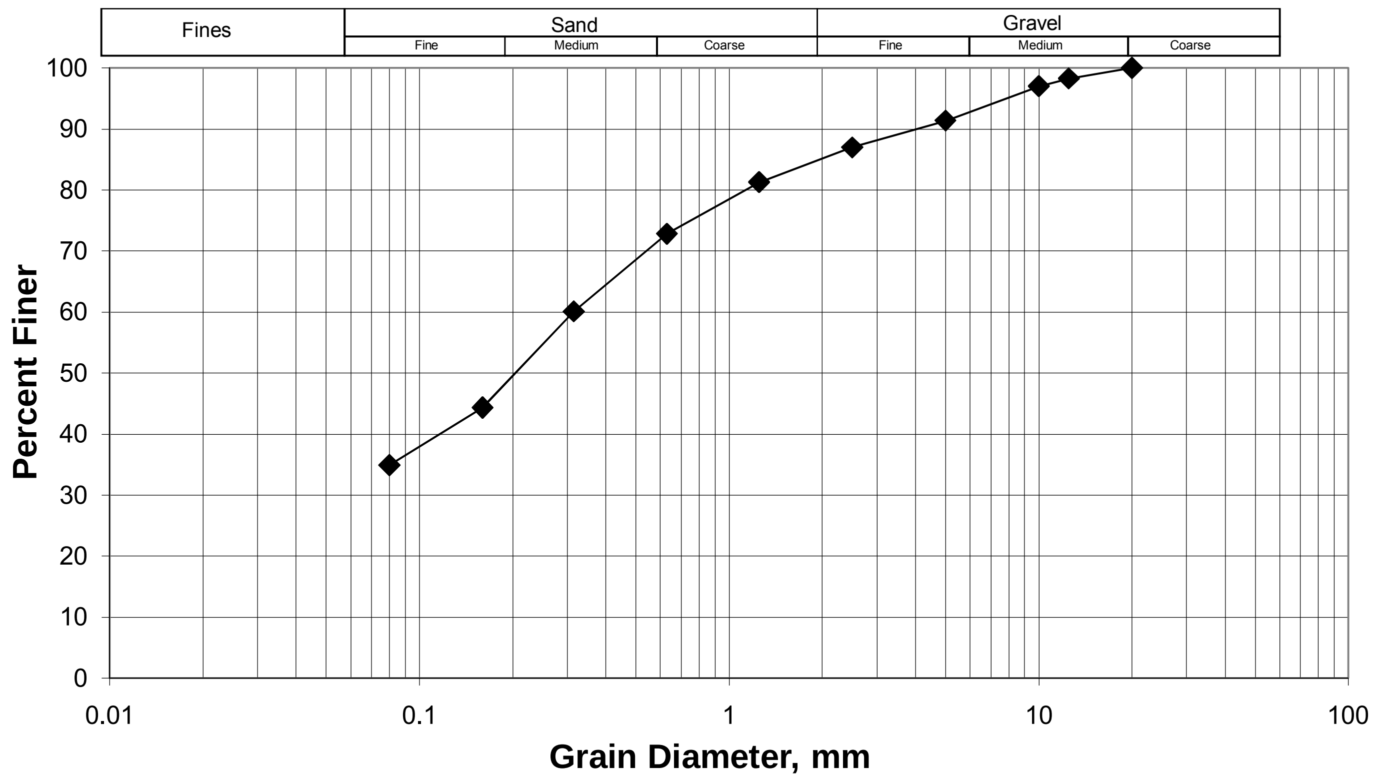
GRAIN SIZE DISTRIBUTION

MATERIALS LABORATORY
AECOM
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (204) 284-2040

Client:	PWGSC	Sample No.:	S10-141
Project:	Padloping Island	Location:	TP-15 B1
Job No:	60158472	Depth:	0.05 - 0.6 m
Date :	27-Sep-10	Description	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5	-		
50.0	-		
40.0	-		
25.0	-		
20.0	-	100.0	
12.5	-	98.3	
10.0	-	97.0	
5.00	-	91.4	
2.50	-	87.0	
1.25	-	81.3	
0.630	-	72.8	
0.315	-	60.1	
0.160	-	44.3	
0.080	-	34.9	

GRAIN SIZE DISTRIBUTION CURVE



** Note: Soil Classification based on Grain Size from Canadian Foundation Engineering Manual, 3rd edition (1992).

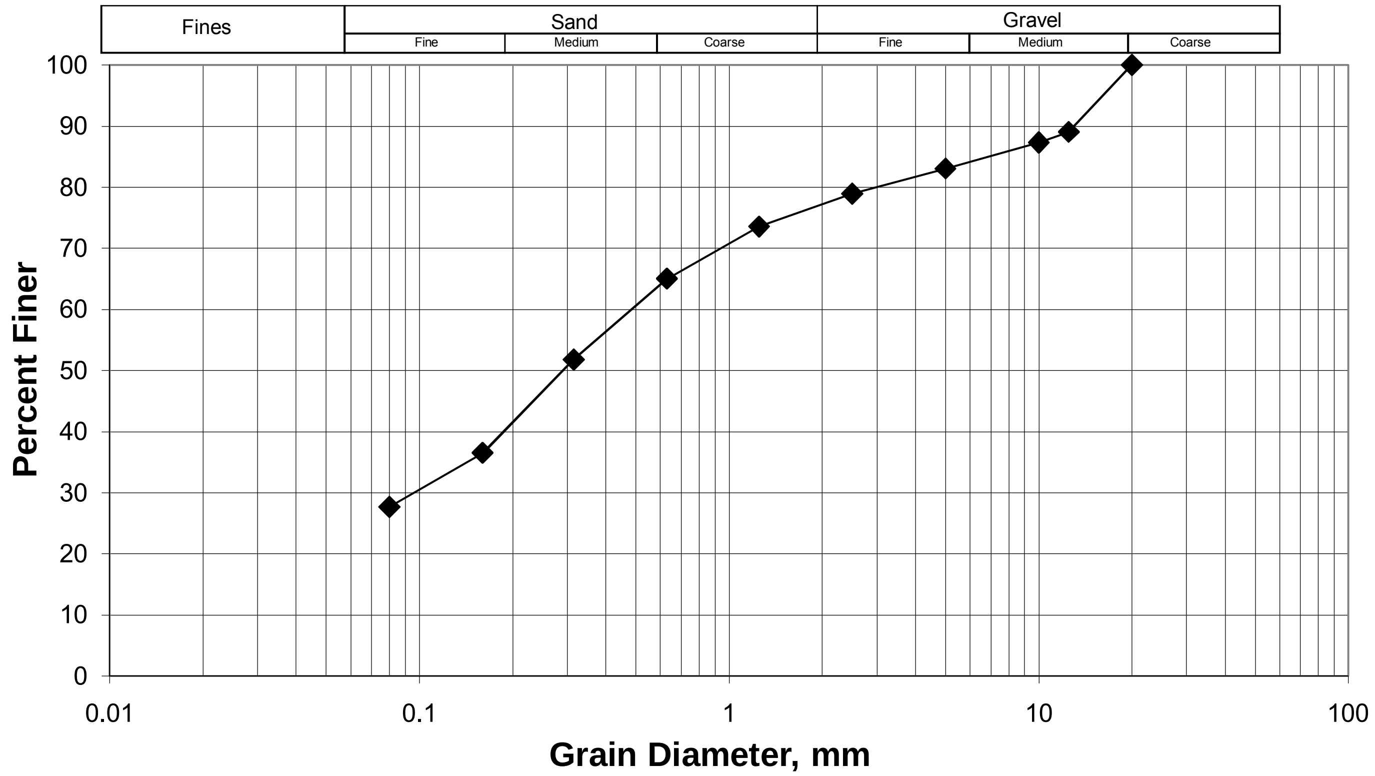
GRAIN SIZE DISTRIBUTION

MATERIALS LABORATORY
AECOM
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (204) 284-2040

Client:	PWGSC	Sample No.:	S10-142
Project:	Padloping Island	Location:	TP-16 B1
Job No:	60158472	Depth:	0.05 - 0.75 m
Date :	27-Sep-10	Description	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5	-		
50.0	-		
40.0	-		
25.0	-		
20.0	-	100.0	
12.5	-	89.1	
10.0	-	87.3	
5.00	-	83.0	
2.50	-	78.9	
1.25	-	73.6	
0.630	-	65.0	
0.315	-	51.8	
0.160	-	36.5	
0.080	-	27.7	

GRAIN SIZE DISTRIBUTION CURVE



** Note: Soil Classification based on Grain Size from Canadian Foundation Engineering Manual, 3rd edition (1992).

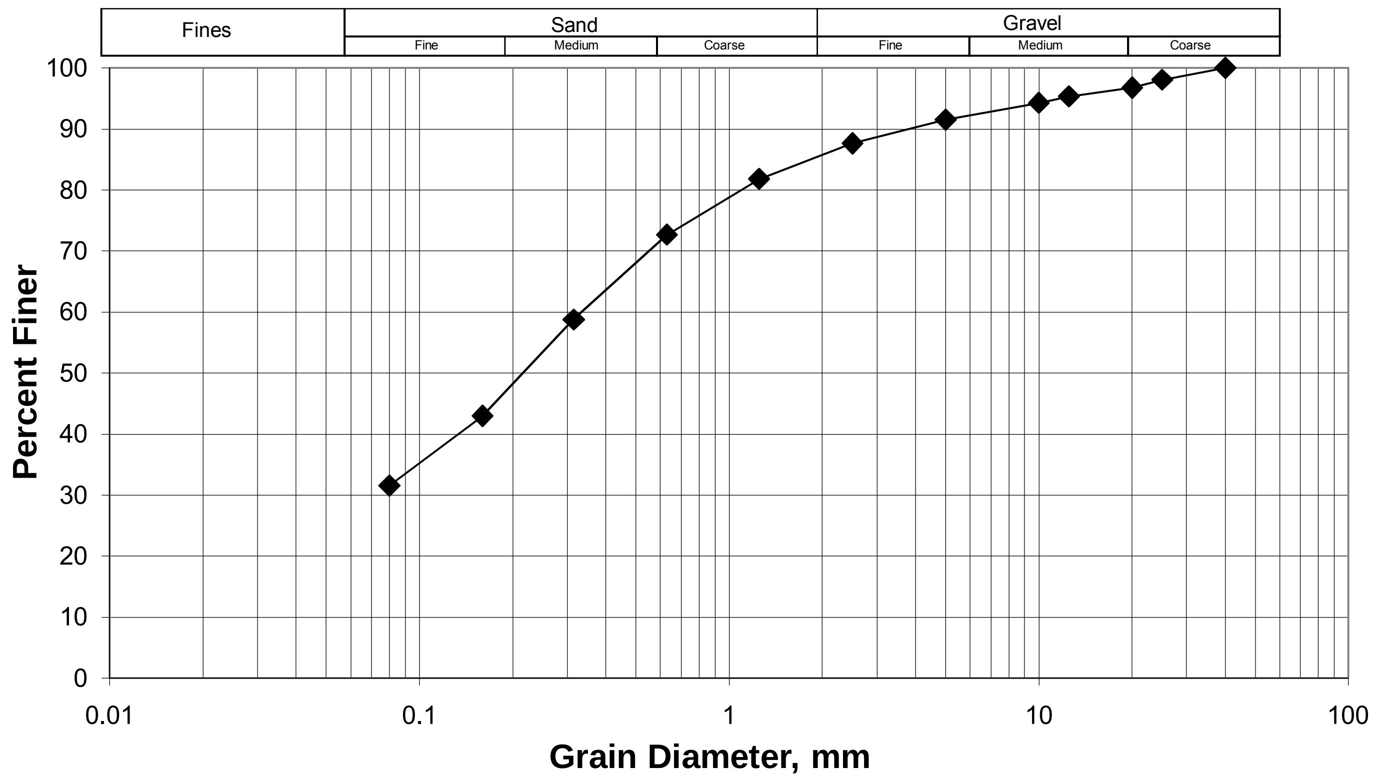
GRAIN SIZE DISTRIBUTION

MATERIALS LABORATORY
AECOM
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (204) 284-2040

Client:	PWGSC	Sample No.:	S10-148
Project:	Padloping Island	Location:	TP-17 B1
Job No:	60158472	Depth:	0.05 - 0.8 m
Date :	27-Sep-10	Description	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
50.0	-		
40.0	-	100.0	
25.0	-	98.1	
20.0	-	96.7	
12.5	-	95.3	
10.0	-	94.3	
5.00	-	91.5	
2.50	-	87.6	
1.25	-	81.8	
0.630	-	72.7	
0.315	-	58.8	
0.160	-	43.0	
0.080	-	31.6	

GRAIN SIZE DISTRIBUTION CURVE



** Note: Soil Classification based on Grain Size from Canadian Foundation Engineering Manual, 3rd edition (1992).

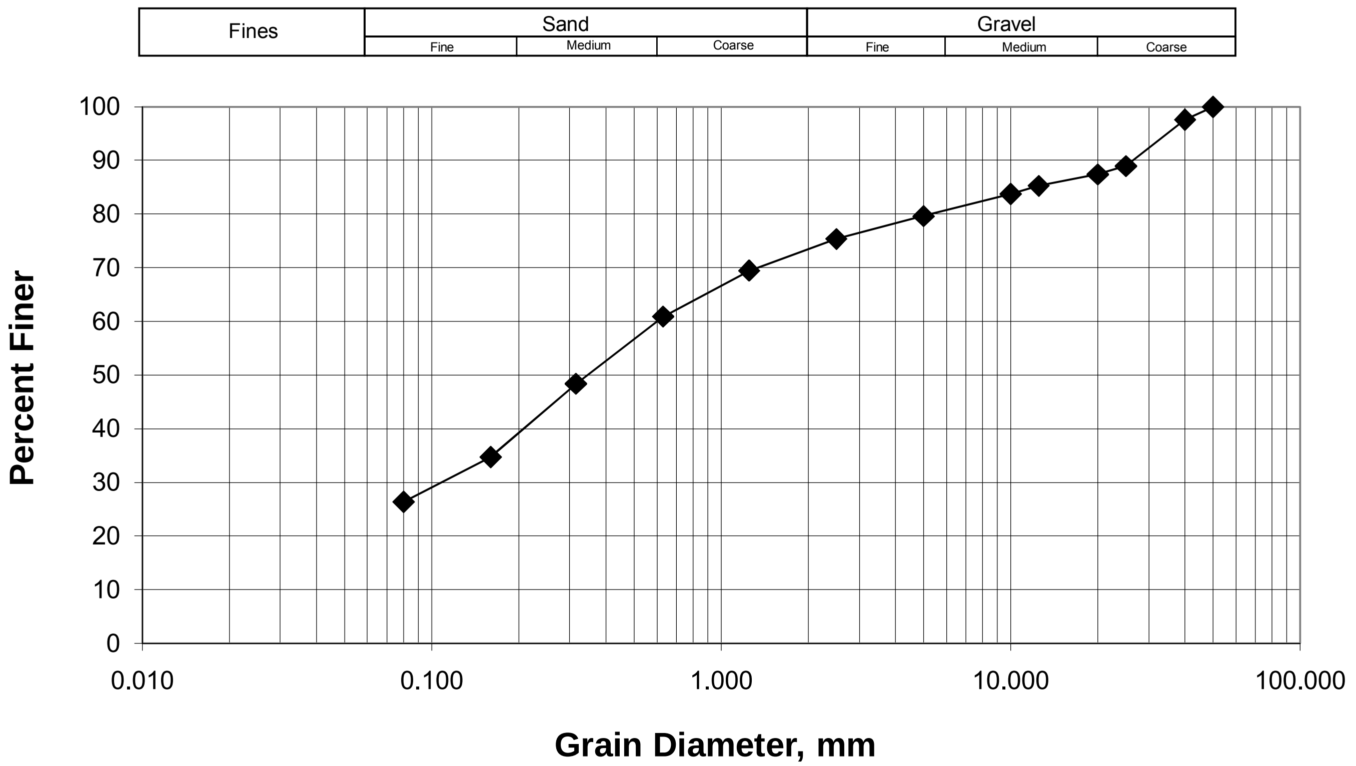
GRAIN SIZE DISTRIBUTION

MATERIALS LABORATORY
AECOM
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (204) 284-2040

Client:	PWGSC	Sample No.:	S10-164
Project:	Padloping Island	Location:	TP-18 B1
Job No:	60158472	Depth:	0.05 - 0.6 m
Date :	29-Sep-10	Description:	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5	-		
50.0	-	100.0	
40.0	-	97.6	
25.0	-	88.9	
20.0	-	87.4	
12.5	-	85.3	
10.0	-	83.8	
5.0	-	79.6	
2.5	-	75.4	
1.25	-	69.5	
0.630	-	60.9	
0.315	-	48.4	
0.160	-	34.7	
0.080	-	26.3	

GRAIN SIZE DISTRIBUTION CURVE



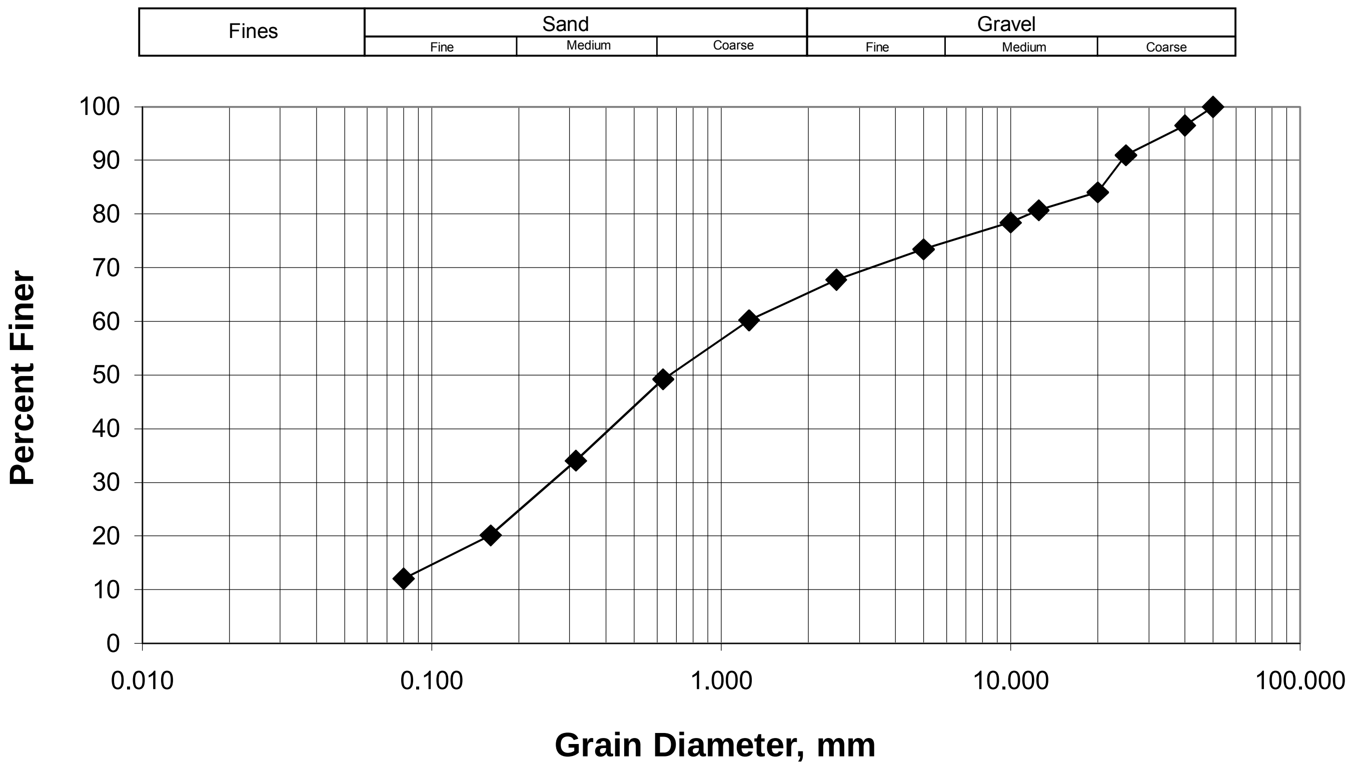
GRAIN SIZE DISTRIBUTION

MATERIALS LABORATORY
AECOM
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (204) 284-2040

Client:	PWGSC	Sample No.:	S10-163
Project:	Padloping Island	Location:	TP-19 B1
Job No:	60158472	Depth:	0.05 - 0.6 m
Date :	29-Sep-10	Description:	Granular Material

CDN. Sieve (mm.)	Sieve No.	Total Percent Passing	Specification (min - max)
100.0	-		
75.0	-		
62.5	-		
50.0	-	100.0	
40.0	-	96.5	
25.0	-	91.0	
20.0	-	84.1	
12.5	-	80.7	
10.0	-	78.4	
5.0	-	73.4	
2.5	-	67.8	
1.25	-	60.2	
0.630	-	49.2	
0.315	-	34.0	
0.160	-	20.1	
0.080	-	12.0	

GRAIN SIZE DISTRIBUTION CURVE

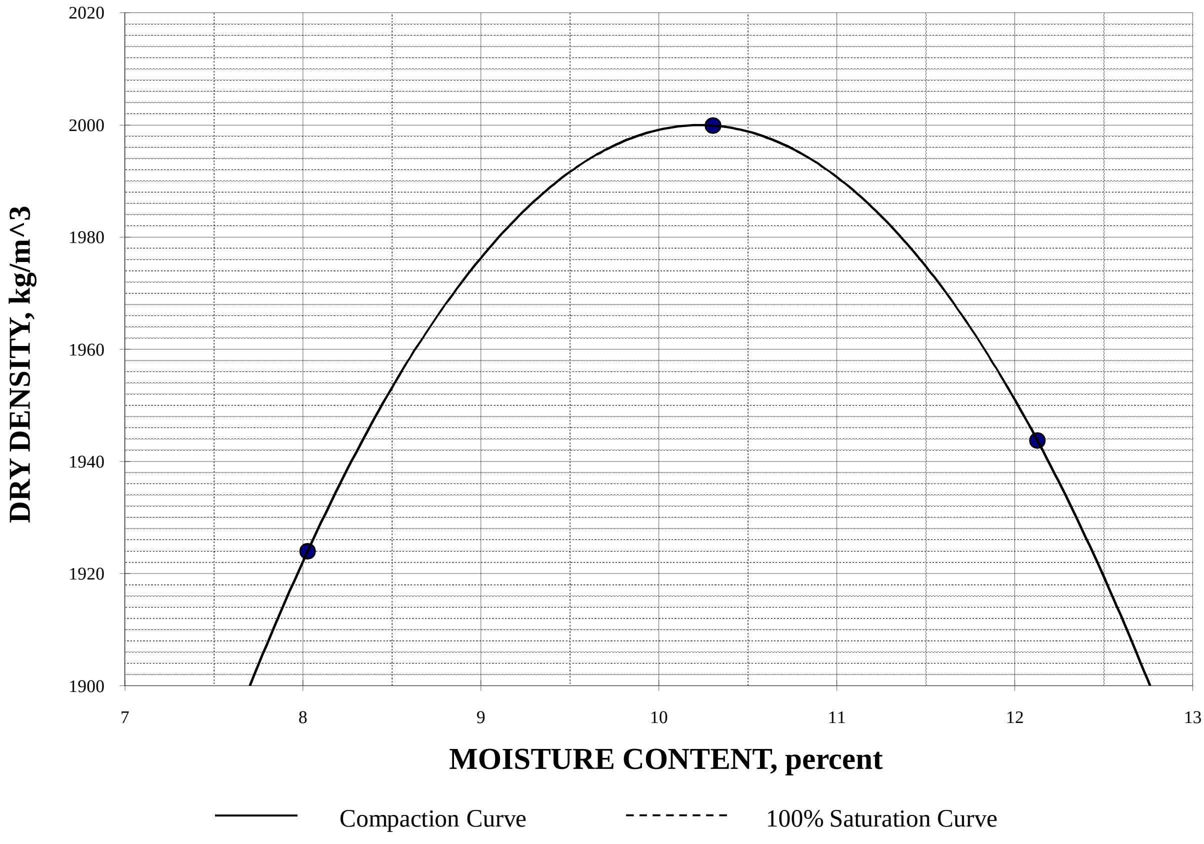


Proctor Compaction
ASTM D 698-00

MATERIALS LABORATORY
AECOM
99 Commerce Drive, Winnipeg, Manitoba, R3P 0Y7
tel (204) 477-5381 **fax** (204) 284-2040

Client:	PWGSC	**Job No:**	60158472
Project:	Paloping Island	**Sample:**	Granular Material
Lab No.	S10-157	**Source:**	TP-6 B1
Date Tested:	September 28, 2010	**Depth:**	0.05 - 0.75 m

TRIAL NUMBER	1	2	3		
Wet Unit Weight (kg/cu.m.)	2078	2206	2179		
Dry Unit Weight (kg/cu.m.)	1924	2000	1944		
Moisture Content (%)	8.0	10.3	12.1		



Description / Remarks:

OVERSIZE PARTICLE CORRECTION (ASTM D 4718)	
CORRECTED MAX:	2,098 Kg/m^3
CORRECTED OPTIMUM:	8.9 %
MAXIMUM DRY DENSITY:	2,000 Kg/m^3
OPTIMUM MOISTURE:	10.2 %
PROCTOR NO:	**P1511**

Appendix E

Geophysics Report

Associated Geosciences

Geophysical Investigation at Padloping Island 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.069

September 8, 2010

AECOM
17007 107th Avenue
Edmonton, Alberta
T5S 1G3

Attention: Nick Oke

Dear Nick;

Associated Geosciences Ltd. (AGL) is pleased to submit the following report entitled:

Geophysical Investigation at Padloping Island
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

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 a former weather station at Padloping Island in Nunavut, Canada, between August 3rd and 11th, 2010. This survey formed one component of environmental assessments being undertaken on the site during the same time. The objective of the survey was to delineate the extents of buried landfills at the site.

All work was done in accordance with Associated Geosciences Ltd. (AGL) proposal AMP476.

1.1 Site Description

Padloping Island is located 80 km south-east of Qikiqtarjuaq, Nunavut. The remains of the weather station are focused on the southern beach and marshy area in the centre of the island.

There were several areas identified as potential landfills and these were the primary areas for geophysical investigation. These included the beach ridge, former Inuit hamlet, and metal dump. Other areas for investigation were determined on-site.

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 are 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 were 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

3.1 Padloping Island

For this survey, the background gradient was quite low, so the threshold criterion for determining the boundary of potential landfills was chosen to be approximately +/- 25 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 flagged out and surveyed by AECOM personnel as they were surveyed with the gradiometer.

The main areas covered were the metal dump, the former hamlet, and the beach ridge. 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.

3.1.1 Metal Dump

The results for the survey in the major landfill area are shown in Figure A1. An extensive area covering the perimeter of the metal dump was surveyed. There were areas with significant surface debris, including the dump itself, and were not surveyed because of interference with the instrument. In this area no significant lobes were identified for sampling. The low magnetic readings displayed in Figure A1 are most likely to be attributed to the survey path getting too close to surface debris. Small anomalies were also found throughout the metal dump and were likely due to small metallic objects.

3.1.2 Beach Ridge

The results for the survey of the beach ridge area are shown in Figure A2. There were 3 (three) landfill lobes found in this area. One of the landfills, labeled Lobe A, was centered in between two large surface debris areas. The other 2 lobes were along the high water line on the beach, there was some surface debris present in the area. The lobes were labeled B and C. Multiple smaller anomalies, was discovered in this area, these anomalies were likely attributed to small metallic objects. These smaller anomalies were not sampled by AECOM personnel.

3.1.3 Hamlet Area

The results from the survey in the hamlet area are shown in Figure A3. The hamlet area is north of the beach, one (1) lobe was determined here, Lobe D. The survey area had large concentrations of surface debris, as well as former building foundations. Lobe D was identified on a ridge east of the hamlet, surface debris was visible in the area. Other lobes were discovered at this area but were not sampled by AECOM personnel. These areas were smaller in size than Lobe D and had similar magnetic responses, which may be due to metallic debris in the subsurface.

3.1.4 Pond Area

The results from the survey at the pond area are shown in Figure A4. There were three (3) landfill lobes found near the station, Lobes E, F and G. The pond can be described as standing water surrounded by elevated mounds of soil on three sides, with the fourth side open for a stream to drain the pond. These lobes all have portions for thick metal beams extending out of the ground. The lobes were located on elevated sections surrounding the pond. Smaller anomalies were present at the pond area. These anomalies may be the result of metallic debris in the subsurface. The anomalies were not sampled by AECOM personnel.

3.1.5 South Mound

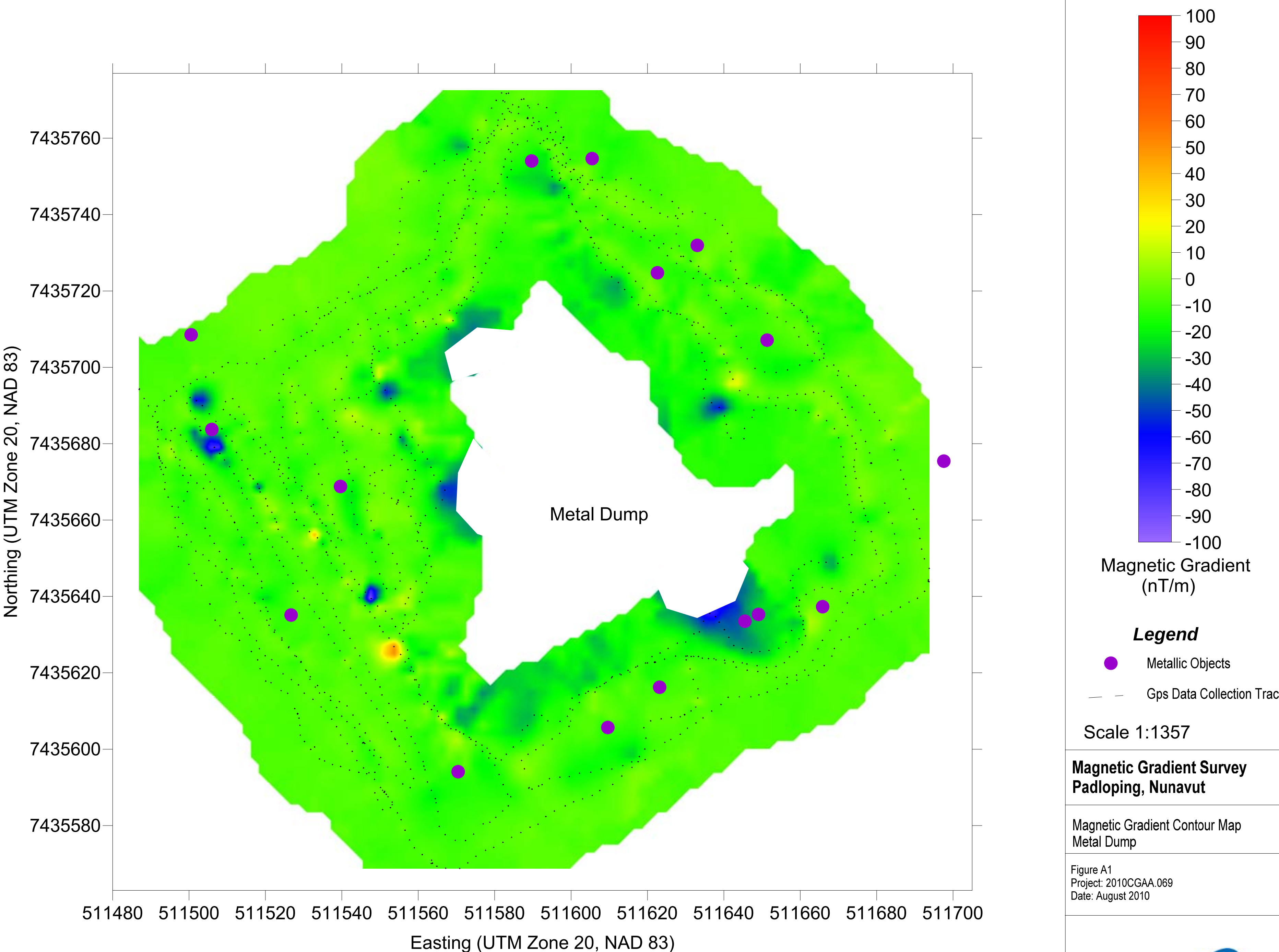
The results from the survey at the South Mound are shown in Figure A5. The mound was located south of the garage. Two (2) lobes were identified at this location, Lobe H and I. The mound can be described as an excavated hole with the excavated soil piled on to the south of the hole. The excavated hole was not included in the survey path because of high standing water preventing a path through the excavated hole. Like the other areas at this site the South Mound area had large amounts of surface debris, which may have had an effect on the survey readings. Lobe H and I had various pieces of metallic debris partially exposed at surface. Other lobes were identified, but not sampled, in this area. The other lobes were smaller in size approximately 5 m in diameter.

3.1.6 West Mound

The results from the survey at the West Mound are shown in Figure A6. There were four (4) lobes identified at this location, Lobe J, K, L and M. The area can be described as excavated soil piled in one location, unlike the south mound, there was no trench with standing water present in this area. Located in this area were two (2) cement blocks with evidence of a rebar frame. The area also contained large amounts of surface debris, including a large cluster of barrels. Smaller anomalies were also present in this area, which may be an indication of smaller buried metallic debris. These smaller anomalies were not sampled by AECOM personnel.

4.0 CONCLUSION

The magnetic gradient survey conducted at the weather station on Padloping Island, Nunavut, successfully delineated several landfills. Throughout the site at Padloping Island, 14 landfill lobes were detected and their boundaries were delineated in the field, which allowed AECOM personnel to survey their boundaries, and sample the soil surrounding them.

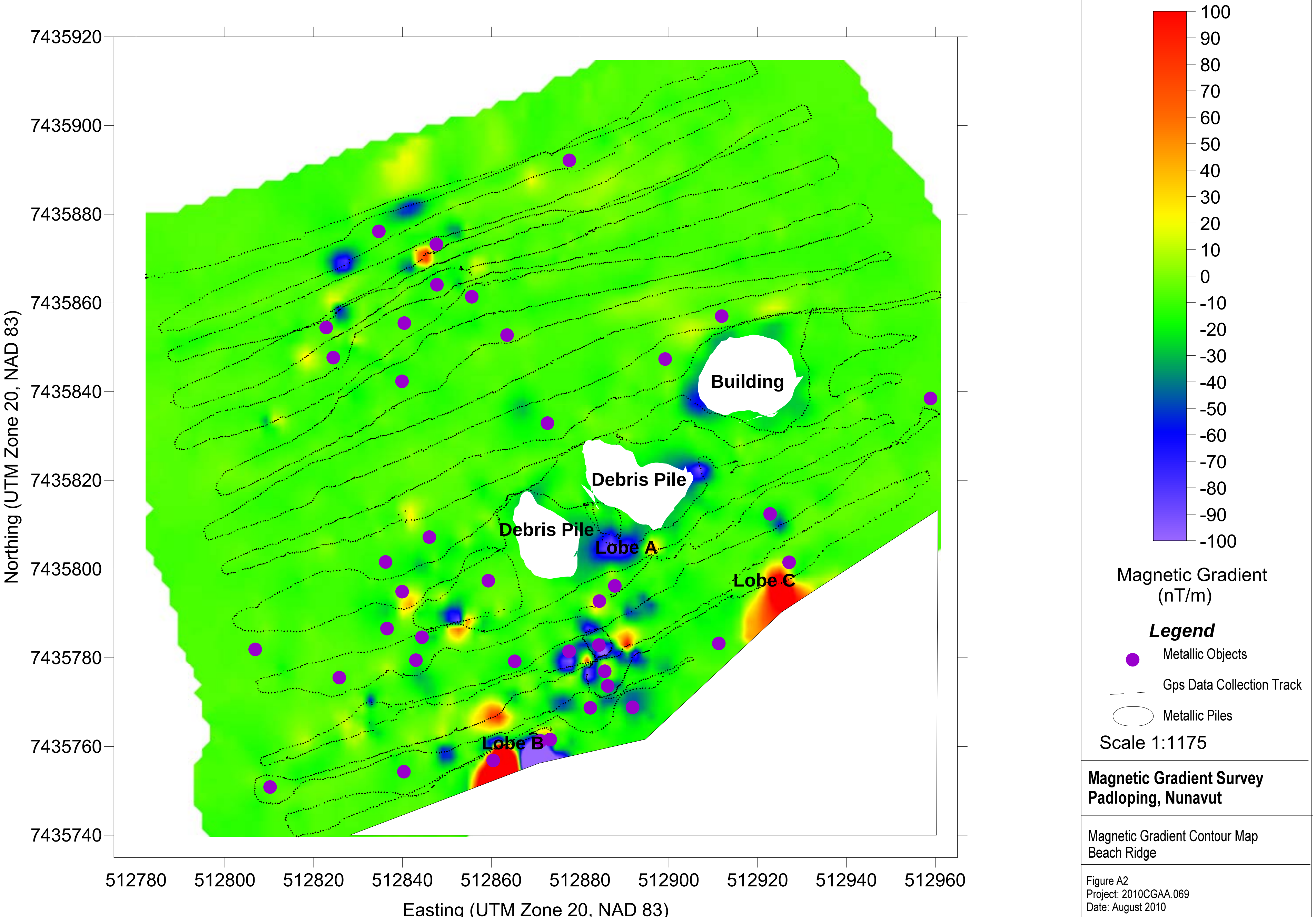


Magnetic Gradient Survey
Padloping, Nunavut

Magnetic Gradient Contour Map
Metal Dump

Figure A1
Project: 2010CGAA.069
Date: August 2010

Associated Geosciences



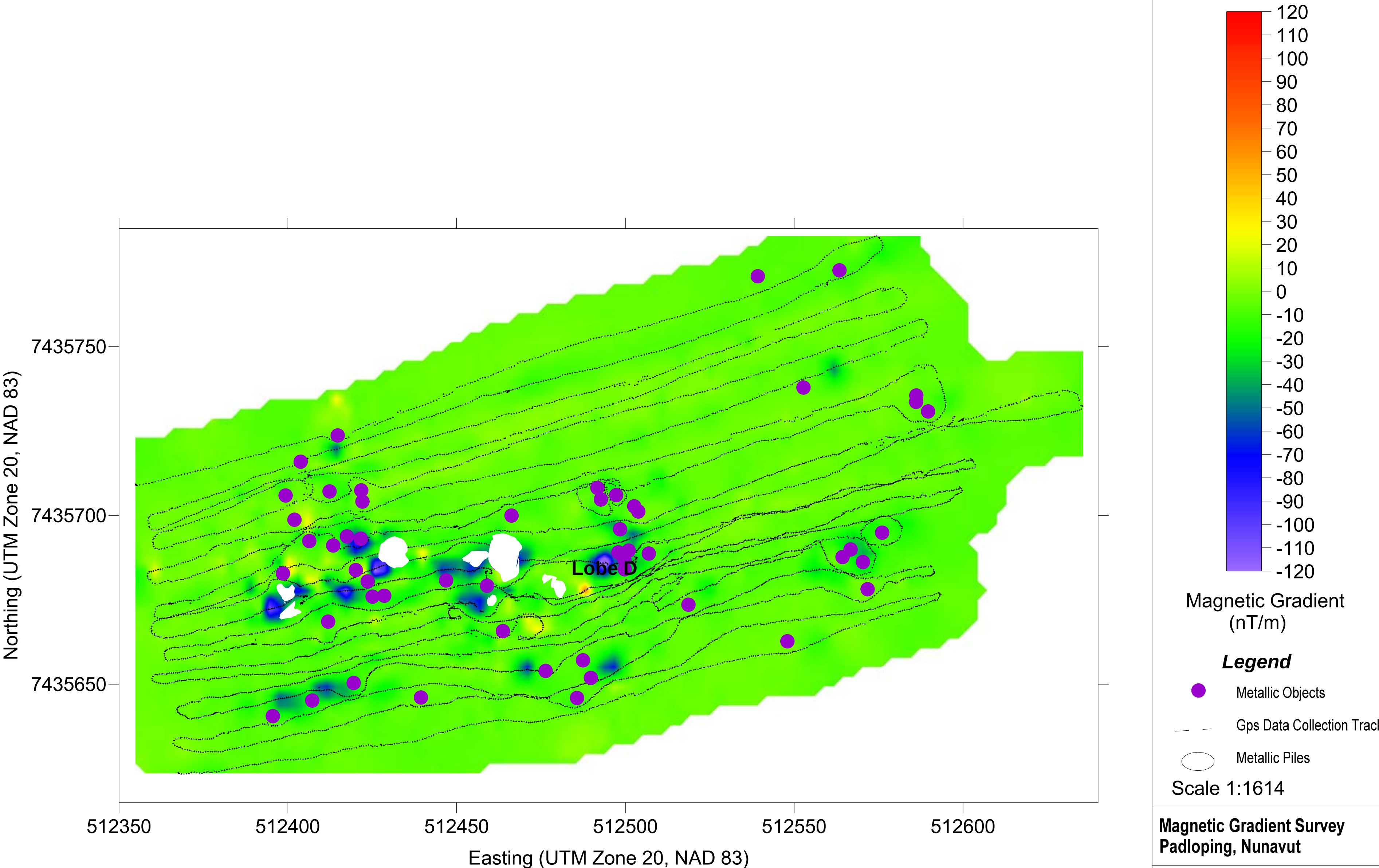
Scale 1:1175

Magnetic Gradient Survey
Padloping, Nunavut

Magnetic Gradient Contour Map
Beach Ridge

Figure A2
Project: 2010CGAA.069
Date: August 2010

Associated Geosciences



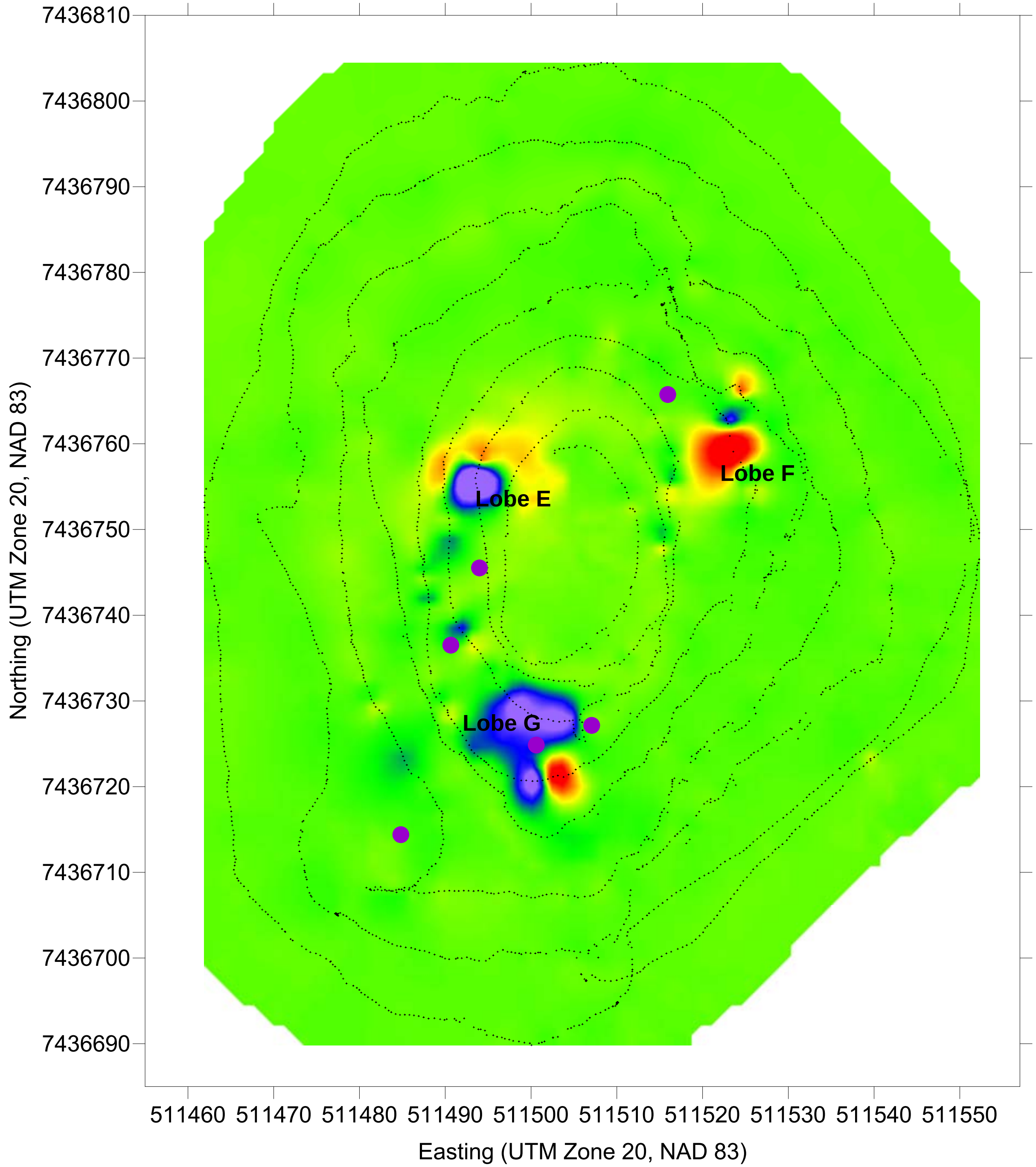
Scale 1:1614

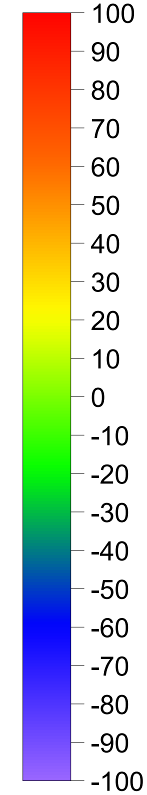
Magnetic Gradient Survey
Padloping, Nunavut

Magnetic Gradient Contour Map
Hamlet

Figure A3
Project: 2010CGAA.069
Date: August 2010

Associated Geosciences





Magnetic Gradient (nT/m)

Legend

Metallic Objects

Gps Data Collection Track

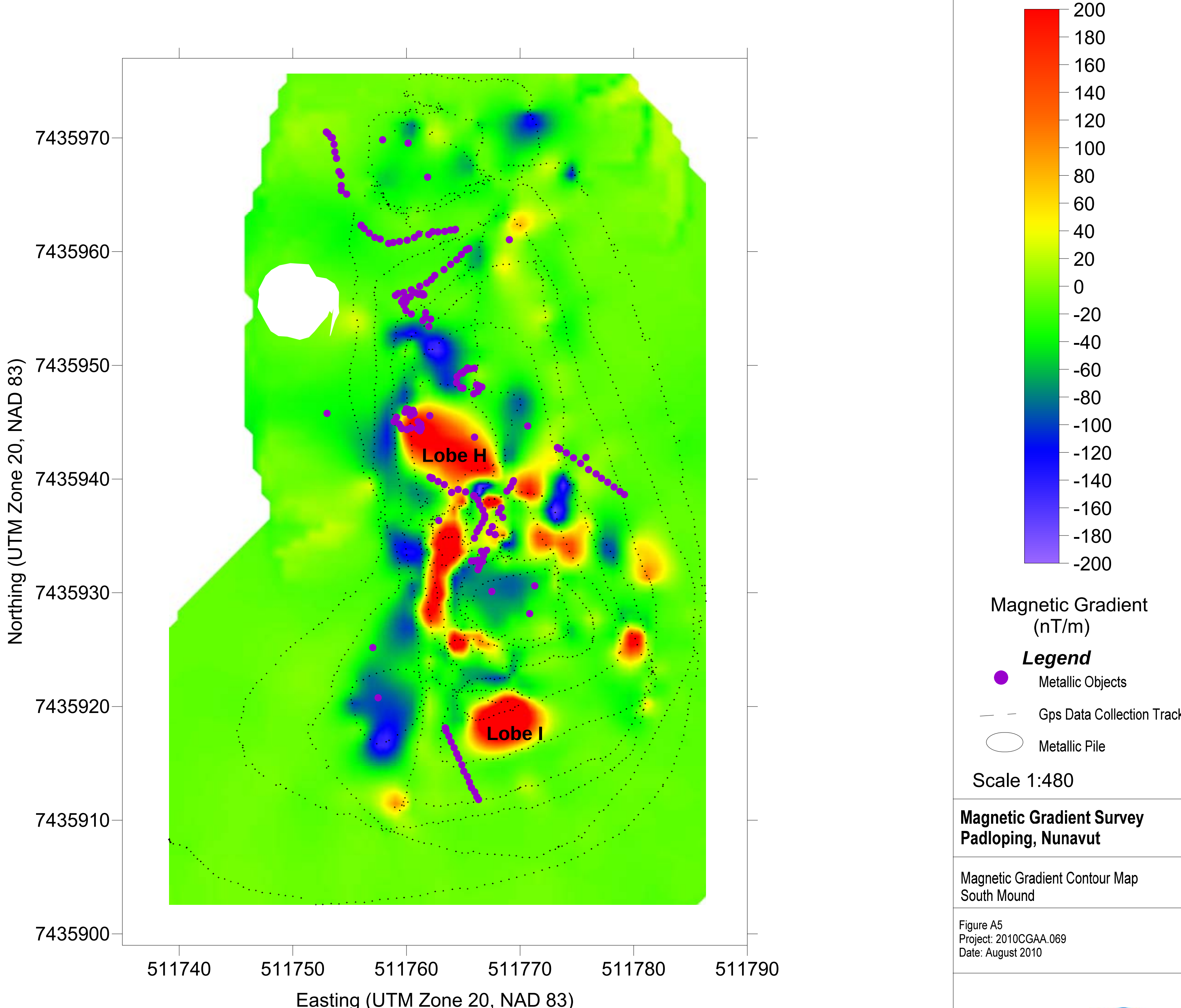
Scale 1:751

Magnetic Gradient Survey
Padloping, Nunavut

Magnetic Gradient Contour Map
Pond

Figure A4
Project: 2010CGAA.069
Date: August 2010

Associated Geosciences

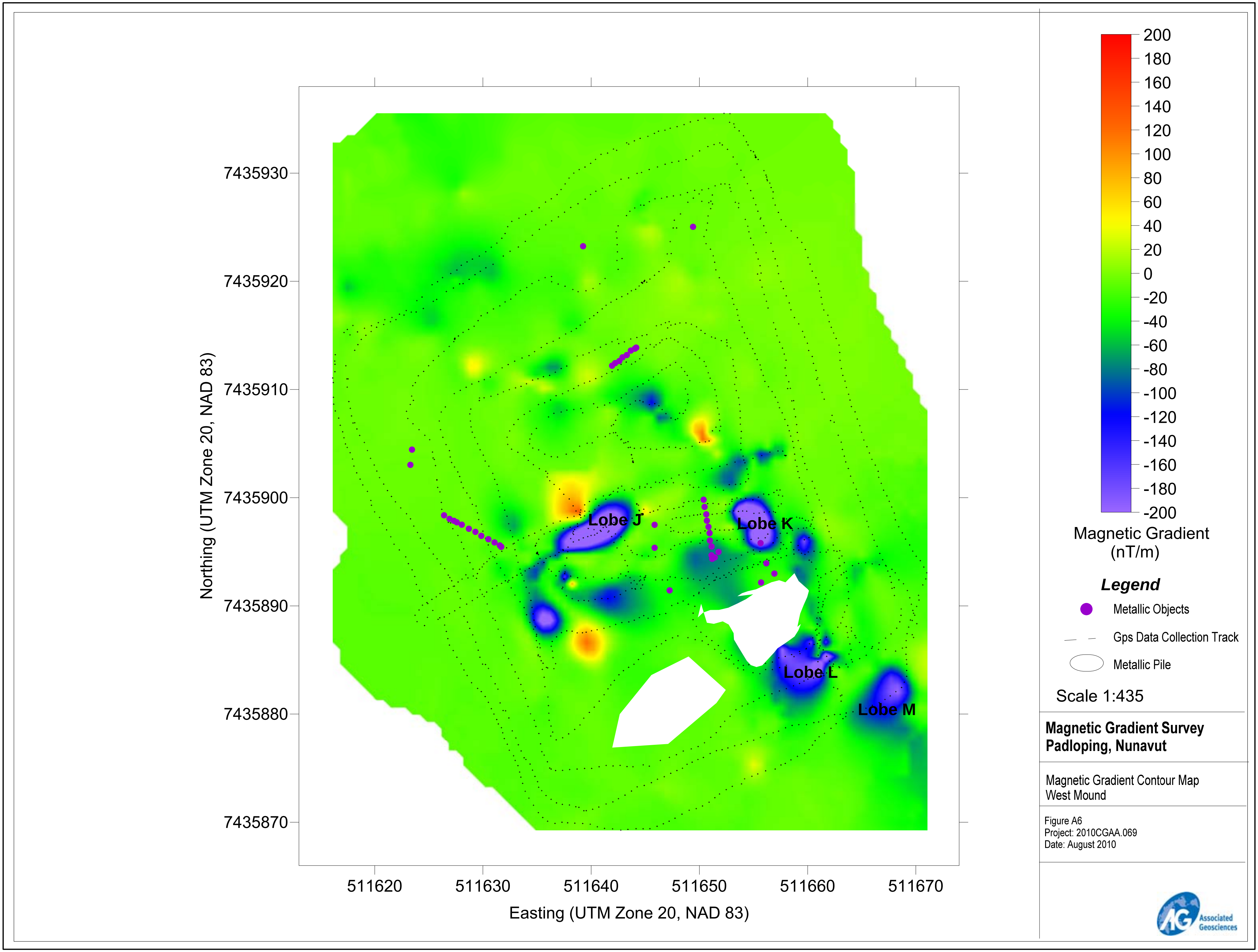


Magnetic Gradient Survey
Padloping, Nunavut

Magnetic Gradient Contour Map
South Mound

Figure A5
Project: 2010CGAA.069
Date: August 2010

Associated Geosciences



7435930
7435920
7435910
7435900
7435890
7435880
7435870
Northing (UTM Zone 20, NAD 83)
511620
511630
511640
511650
511660
511670
Easting (UTM Zone 20, NAD 83)
Lobe J
Lobe K
Lobe L
Lobe M
200
180
160
140
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
Magnetic Gradient (nT/m)
Legend
Metallic Objects
Gps Data Collection Track
Metallic Pile
Scale 1:435
Magnetic Gradient Survey
Padloping, Nunavut
Magnetic Gradient Contour Map
West Mound
Figure A6
Project: 2010CGAA.069
Date: August 2010
Associated Geosciences

Appendix F

Geotechnical Test Pit Logs

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-01**
LOCATION: BA-1 N 7,436,204.3 E 510,545.9		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 15.747

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	ELEVATION (m)
0	PT		PEAT - some gravel, damp					
	SM		SAND - silty, some gravel, trace cobbles, fine to medium grained, gravel and cobbles ~50 % subangular to ~ 50 % subrounded, medium brown, wet - trace gravel - saturated, seepage - gravel = 7.6 %, sand = 58.0 %, silt/clay = 34.4 % - Grab Sample 1 from 0.5 m to 0.55 m	BULK GRAB	2 1		Oversize Gradation Estimate: 0-100mm ~ 93 % 100-150mm ~ 4 % > 150mm ~ 3 % Boulders in testpit area not reflected in testpit log	
			END OF TESTPIT (0.75 m) - due to seepage					15
1								
								14
2								

	LOGGED BY: SY	COMPLETION DEPTH: 0.75 m
AECOM	REVIEWED BY: BF	COMPLETION DATE: 8/4/10
	PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-02**
LOCATION: BA-1 N 7,436,042.9 E 510,177.1		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 16.949

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	ELEVATION (m)
0	PT		PEAT - some gravel, damp					
	CL-CI		CLAY and SILT - sandy, trace gravel, low to medium plastic, medium brown, wet	BULK	1		Oversize Gradation Estimate: 0-100mm ~ 90 % 100-150mm ~ 6 % > 150mm ~ 4 % Boulders in testpit area not reflected in testpit log	
	GP		GRAVEL - sandy, some cobbles, sand fine to coarse grained , gravel and cobbles ~ 50 % subangular to ~ 50 % subrounded, medium brown, wet - gravel = 62.9 %, sand = 21.9 %, silt/clay = 15.2 % - saturated, seepage - Grab Sample 2 from 0.4 m to 0.45 m	GRAB	2	●		
			END OF TESTPIT (0.45 m) - due to seepage					
1								16
2								15

LOG OF TESTHOLE 60158472_PADLOPING_GEOTECH_TESTPIT LOGS.GPJ UMA.GDT 10/14/10

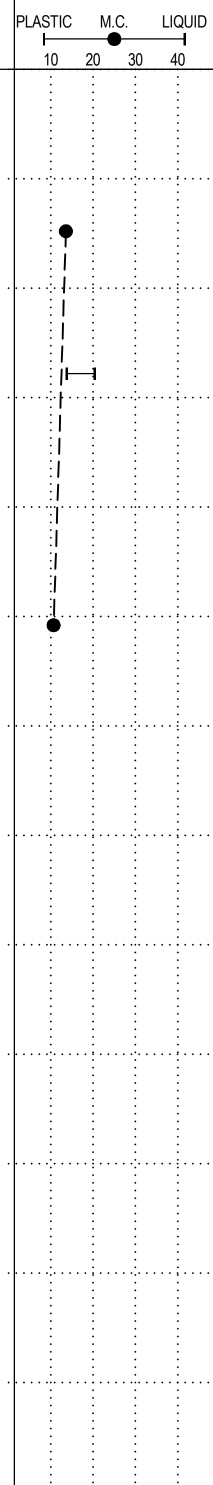
AECOM

LOGGED BY: SY	COMPLETION DEPTH: 0.45 m
REVIEWED BY: BF	COMPLETION DATE: 8/4/10
PROJECT ENGINEER: Nick Oke	

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-03**
LOCATION: BA-1 N 7,436,013.4 E 510,051.1		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 14.065

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	ELEVATION (m)
0	PT		PEAT - some gravel, some cobbles, ~ 60 % subrounded to ~ 40 % subangular, damp					
	CL-ML		CLAY and SILT - some sand, trace gravel, low to medium plastic, greyish brown, wet	BULK			Oversize Gradation Estimate: 0-100mm ~ 95 % 100-150mm ~ 3 % > 150mm ~ 2 % Boulders in testpit area not reflected in testpit log	14
			- Grab Sample 1 from 0.2 m to 0.25 m	GRAB	1			
			- increasing sand content, some cobbles, low plastic					
			- saturated, seepage					
					2			
			- Grab Sample 3 from 0.75 m to 0.8 m	GRAB	3			
			END OF TESTPIT (0.80 m) - due to refusal at cobble/boulder layer					
1								13
2								



AECOM	LOGGED BY: SY	COMPLETION DEPTH: 0.80 m
	REVIEWED BY: BF	COMPLETION DATE: 8/4/10
	PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-04**
LOCATION: BA-1 N 7,436,313.6 E 510,437.6		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 13.824

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	ELEVATION (m)
0	PT		PEAT - some gravel, some cobbles, moist					
	SM		SAND and SILT - clayey, trace gravel, fine to medium grained, gravel ~ 50 % subangular, ~ 40 % subrounded to ~ 10 % angular, medium brown, wet	BULK			Oversize Gradation Estimate: 0-100mm ~ 80 % 100-150mm ~ 5 % > 150mm ~ 15 % Boulders in testpit area not reflected in testpit log	
			- gravel = 7.2 %, sand = 54.4 %, silt/clay = 38.4 %		1			
			- saturated, seepage - Grab Sample 2 from 0.4 m to 0.45 m	GRAB	2	●		
			END OF TESTPIT (0.50 m) - due to seepage					
1								13
2								12

AECOM

LOGGED BY: SY	COMPLETION DEPTH: 0.50 m
REVIEWED BY: BF	COMPLETION DATE: 8/4/10
PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-05**
LOCATION: BA-2 N 7,436,428.9 E 511,283.1		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 44.826

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	ELEVATION (m)
0	PT		PEAT - some gravel, some sand, damp					
	SW		SAND - gravelly, some cobbles, some silt, trace organics (roots), fine to coarse grained, well graded, medium brown, moist	BULK			Oversize Gradation Estimate: 0-100mm ~ 82 % 100-150mm ~ 10 % > 150mm ~ 8 % Boulders in testpit area not reflected in testpit log	
			- cobbly, gravelly, ~ 50 subangular to ~ 50 % subrounded, light brown					
			- gravel = 24.3 %, sand = 63.4 %, silt/clay = 12.3 %		2			
			- Grab Sample 1 from 0.6 m to 0.65 m	GRAB	1	●		
			- bouldery					44
			END OF TESTPIT (0.90 m) - due to refusal at boulder layer					
1								
								43
2								

AECOM

LOGGED BY: SY	COMPLETION DEPTH: 0.90 m
REVIEWED BY: BF	COMPLETION DATE: 8/6/10
PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-06**
LOCATION: BA-2 N 7,436,309.9 E 511,405.2		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 49.152

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	ELEVATION (m)
0	PT		PEAT - some gravel, some sand, damp					
	SM		SAND - some gravel, some cobbles, some silt, some clay, fine to coarse grained, gravel and cobbles ~ 50 % subangular to ~ 50 % subrounded, medium brown, moist	BULK			Oversize Gradation Estimate: 0-100mm ~ 85 % 100-150mm ~ 10 % > 150mm ~ 5 % Boulders in testpit area not reflected in testpit log	49
			- SPMDD = 2,000 kg/m^3, OMC = 10.2 %	BULK	1			
			- wet	GRAB				
			- Grab Sample 2 from 0.5 m to 0.6 m	GRAB	2	●		
			- bouldery	BULK				
			END OF TESTPIT (0.75 m) - due to refusal at boulder layer					
1								48
2								

	LOGGED BY: SY	COMPLETION DEPTH: 0.75 m
AECOM	REVIEWED BY: BF	COMPLETION DATE: 8/6/10
	PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-07**
LOCATION: BA-2 N 7,436,304.3 E 511,454.4		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 46.509

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	ELEVATION (m)
0	PT	PEAT - some gravel, some sand, damp					
	SW	SAND - some cobbles, some gravel, trace organics (roots), fine to medium grained, well graded, medium brown, damp	BULK			Oversize Gradation Estimate: 0-100mm ~ 75-85 % 100-150mm ~ 10-15 % > 150mm ~ 5-10 %	
	GP	GRAVEL and SAND - cobbly, some silt, fine to coarse grained, ~ 50 % subangular to ~ 50 % subrounded, light brown, damp	BULK				
		- gravel = 44.5 %, sand = 40.9 %, silt/clay = 14.6 %	BULK	2			
		- Grab Sample 1 from 0.5 m to 0.65 m	GRAB	1	●		46
		- bouldery					
1		END OF TESTPIT (1.00 m) - due to refusal at boulder layer					
2							45

AECOM	LOGGED BY: SY	COMPLETION DEPTH: 1.00 m
	REVIEWED BY: BF	COMPLETION DATE: 8/6/10
	PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-08**
LOCATION: BA-6 N 7,435,591.5 E 511,399.9		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 9.739

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	ELEVATION (m)
0	GP	PEAT - some gravel, damp					
	SM	SAND - silty, clayey, trace gravel, fine to medium grained, medium brown, wet				Oversize Gradation Estimate: 0-100mm ~ 92 % 100-150mm ~ 6 % > 150mm ~ 2 %	
		- gravel = 9.6 %, sand = 63.1 %, silt/clay = 27.3 %	BULK	1			
		- Grab Sample 2 from 0.3 m to 0.35 m	GRAB	2	●		
		- saturated, seepage					
		END OF TESTPIT (0.45 m) - due to seepage					
							9
1							
							8
2							

AECOM

LOGGED BY: SY	COMPLETION DEPTH: 0.45 m
REVIEWED BY: BF	COMPLETION DATE: 8/6/10
PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-09**
LOCATION: BA-6 N 7,435,476.5 E 511,338.2		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 0.847

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	ELEVATION (m)
0	PT		PEAT - some gravel, moist					
	SM		SAND - silty, clayey, gravelly, some cobbles, fine to medium grained, medium brown, wet	BULK			Oversize Gradation Estimate: 0-100mm ~ 95 % 100-150mm ~ 3 % > 150mm ~ 2 %	
			- gravel = 21.8 %, sand = 56.4 %, silt/clay = 21.8 %		1			
			- saturated, seepage					
			- Grab Sample 2 from 0.5 m to 0.55 m	GRAB	2	●		
			END OF TESTPIT (0.65 m) - due to seepage					
								0
1								
								-1
2								

AECOM

LOGGED BY: SY	COMPLETION DEPTH: 0.65 m
REVIEWED BY: BF	COMPLETION DATE: 8/6/10
PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-10**
LOCATION: BA-3, LF-1 N 7,435,624.1 E 512,415.0		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 4.211

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	ELEVATION (m)
0	PT		PEAT - some gravel, damp					
	SM		SAND - silty, some gravel, some cobbles, fine to coarse grained, medium brown, moist	BULK			Oversize Gradation Estimate: 0-100mm ~ 85 % 100-150mm ~ 7 % > 150mm ~ 8 %	4
			- gravel = 19.0 %, sand = 53.8 %, silt/clay = 27.2 %					
			- Grab Sample 2 from 0.35 m to 0.4 m	GRAB	1 2	●		
			- bouldery					
			- saturated, seepage					
			END OF TESTPIT (0.70 m) - due to refusal at boulder layer and seepage					
1								
								3
2								

AECOM

LOGGED BY: SY	COMPLETION DEPTH: 0.70 m
REVIEWED BY: BF	COMPLETION DATE: 8/6/10
PROJECT ENGINEER: Nick Oke	

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC		TESTHOLE NO: **TP-11**
LOCATION: BA-3, LF-1 N 7,435,720.3 E 512,506.3			PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)		ELEVATION (m): 5.413

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	ELEVATION (m)
0	PT		PEAT - some gravel, damp					
	SM		SAND - gravelly, silty, some cobbles, fine to medium grained, medium brown, wet	BULK			Oversize Gradation Estimate: 0-100mm ~ 94 % 100-150mm ~ 4 % > 150mm ~ 2 %	
			- fine to coarse grained, saturated, seepage					
			- gravel = 29.5 %, sand = 47.8 %, silt/clay = 22.7 %	BULK	1			5
			- Grab Sample 2 from 0.5 m to 0.55 m	GRAB	2	●		
			END OF TESTPIT (0.70 m) - due to seepage					
1								
								4
2								

AECOM	LOGGED BY: SY	COMPLETION DEPTH: 0.70 m
	REVIEWED BY: BF	COMPLETION DATE: 8/6/10
	PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-12**
LOCATION: BA-2 N 7,436,400.4 E 511,266.3		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 43.625

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	ELEVATION (m)
0	PT		PEAT - some gravel, some cobbles, damp					
	SW		SAND - gravelly, some cobbles, some silt, fine to medium grained, well graded, medium brown, damp - fine to coarse grained, light to medium brown - gravel = 33.0 %, sand = 48.4 %, silt/clay = 18.6 % - Grab Sample 2 from 0.4 m to 0.5 m	BULK GRAB	1 2		Oversize Gradation Estimate: 0-100mm ~ 85 % 100-150mm ~ 8 % > 150mm ~ 7 %	
			END OF TESTPIT (0.60 m) - due to refusal at boulder layer					43
1								
								42
2								

AECOM	LOGGED BY: SY	COMPLETION DEPTH: 0.60 m
	REVIEWED BY: BF	COMPLETION DATE: 8/8/10
	PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-13**
LOCATION: BA-4 N 7,436,465.7 E 512,006.1		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 63.572

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
0	GP		GRAVEL and COBBLES - some organics, damp				
	SM		SAND - some silt, some gravel, some cobbles, fine to medium grained, medium brown, moist - gravel = 15.3 %, sand = 65.3 %, silt/clay = 19.4 %	BULK	1	Oversize Gradation Estimate: 0-100mm ~ 96 % 100-150mm ~ 3 % > 150mm ~ 2 %	63
			END OF TESTPIT (0.70 m) - due to refusal at boulder layer				
1							
							62
2							

	LOGGED BY: SY	COMPLETION DEPTH: 0.70 m
AECOM	REVIEWED BY: BF	COMPLETION DATE: 8/8/10
	PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-14**
LOCATION: BA-5, LF-3 N 7,435,643.5 E 511,593.6		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 18.15

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	ELEVATION (m)
0	PT		PEAT - damp					
	SM		SAND - gravelly, silty, some cobbles, fine to coarse grained, medium brown, wet	BULK			Oversize Gradation Estimate: 0-100mm ~ 97 % 100-150mm ~ 2 % > 150mm ~ 1 %	18
			- gravel = 31.3 %, sand = 43.7 %, silt/clay = 25.0 %		1			
			- saturated, seepage					
			- Grab Sample 2 from 0.35 m to 0.4 m	GRAB	2	●		
			END OF TESTPIT (0.55 m) - due to seepage					
1								17
2								

AECOM	LOGGED BY: SY	COMPLETION DEPTH: 0.55 m
	REVIEWED BY: BF	COMPLETION DATE: 8/10/10
	PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-15**
LOCATION: BA-3, LF-1 N 7,435,830.1 E 512,457.2		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 17.91

SAMPLE TYPE: GRAB / SHELBY TUBE / SPLIT SPOON / BULK / NO RECOVERY / CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
0	PT		PEAT - some gravel, wet				
	SM		SAND - silty, trace gravel, some cobbles, fine to coarse grained, medium brown, wet - gravel = 8.6 %, sand = 56.5 %, silt/clay = 34.9 % - saturated, seepage	BULK	1	Oversize Gradation Estimate: 0-100mm ~ 98 % 100-150mm ~ 1 % > 150mm ~ 1 %	
			END OF TESTPIT (0.75 m) - due to seepage and sloughing				
							17
1							
							16
2							

AECOM	LOGGED BY: SY	COMPLETION DEPTH: 0.75 m
	REVIEWED BY: BF	COMPLETION DATE: 8/10/10
	PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-16**
LOCATION: BA-3, LF-1 N 7,435,835.6 E 512,355.6		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 18.871

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
0	PT		PEAT - some sand, some gravel, damp				
	SM		SAND - silty, some gravel, some cobbles, fine to medium grained, medium brown, wet - cobbly - saturated, seepage - fine to coarse grained - gravel = 17.0 %, sand = 55.3 %, silt/clay = 27.7 %	BULK	1	Oversize Gradation Estimate: 0-100mm ~ 80-85 % 100-150mm ~ 10-13 % > 150mm ~ 5-7 %	
			END OF TESTPIT (0.80 m) - due to seepage and sloughing				18
1							
							17
2							

AECOM	LOGGED BY: SY	COMPLETION DEPTH: 0.80 m
	REVIEWED BY: BF	COMPLETION DATE: 8/10/10
	PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-17**
LOCATION: BA-3, LF-1 N 7,435,963.6 E 512,348.0		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 25.36

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
0	PT		PEAT - some sand and gravel, damp				
	SP		SAND - trace gravel, trace fines, fine to medium grained, poorly graded, medium brown, wet	BULK		Oversize Gradation Estimate: 0-100mm ~ 95 % 100-150mm ~ 3 % > 150mm ~ 2 %	
	SM		SAND - silty, trace gravel, some cobbles, fine to medium grained, medium brown, wet - saturated, seepage - gravel = 8.5 %, sand = 59.9 %, silt/clay = 31.6 %	BULK	1		25
			END OF TESTPIT (0.80 m) - due to seepage				
1							
							24
2							

AECOM

LOGGED BY: SY	COMPLETION DEPTH: 0.80 m
REVIEWED BY: BF	COMPLETION DATE: 8/10/10
PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-18**
LOCATION: BA-7, LF-2 N 7,435,971.8 E 511,715.7		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 32.329

SAMPLE TYPE: GRAB, SHELBY TUBE, SPLIT SPOON, BULK, NO RECOVERY, CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
0	PT		PEAT - some sand, some gravel, damp				
	SM		SAND - silty, gravelly, some cobbles, fine to coarse grained, well graded, medium brown, wet - gravel = 20.4 %, sand = 53.3 %, silt/clay = 26.3 % - saturated, seepage	BULK	1	Oversize Gradation Estimate: 0-100mm ~ 94 % 100-150mm ~ 3 % > 150mm ~ 3 % Boulders in testpit area not reflected in testpit log Maximum boulder size in testpit vicinity is ~ 1.2 m	32
			END OF TESTPIT (0.60 m) - due to seepage				
1							
							31
2							

AECOM	LOGGED BY: SY	COMPLETION DEPTH: 0.60 m
	REVIEWED BY: BF	COMPLETION DATE: 8/10/10
	PROJECT ENGINEER: Nick Oke	Page 1 of 1

PROJECT: Padloping Island Site Investigation	CLIENT: PWGSC	TESTHOLE NO: **TP-19**
LOCATION: BA-7, LF-2 N 7,435,873.2 E 511,611.4		PROJECT NO.: 60158472
CONTRACTOR:	METHOD: Hand Excavated (Shovel)	ELEVATION (m): 32.089

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	ELEVATION (m)
0	PT		PEAT - some sand, some gravel, damp				
	SM		SAND - gravelly, some silt, some cobbles, trace organics (roots), fine to coarse grained, well graded, medium brown, wet - no organics - saturated, seepage - gravel = 26.6 %, sand = 61.4 %, silt/clay = 12.0 %	BULK	1	Oversize Gradation Estimate: 0-100mm ~ 98 % 100-150mm ~ 2 % > 150mm ~ 0 % No oversize material in immediate vicinity of testpit	32
			END OF TESTPIT (0.60 m) - due to seepage and sloughing				
1							31
2							

AECOM	LOGGED BY: SY	COMPLETION DEPTH: 0.60 m
	REVIEWED BY: BF	COMPLETION DATE: 8/10/10
	PROJECT ENGINEER: Nick Oke	Page 1 of 1

Appendix G

Archaeological Impact Assessment Report

FINAL REPORT

ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) OF THE FORMER USAF PADLOPING ISLAND WEATHER STATION, PADLOPING, NUNAVUT

Submitted to:

The Department of Culture, Language, Elders and Youth (CLEY), Nunavut
Nunavut Permit No. 2010-016A

DISTRIBUTION:

5 Copies	**AECOM** **Edmonton, Alberta**
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3 Copies	**Golder Associates Ltd.** **Calgary, Alberta**

November 2010 **10-1333-0025**

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EXECUTIVE SUMMARY

During August of 2010, Golder Associates Ltd. conducted an Archaeological Impact Assessment (AIA) of the former United States Air Force (USAF) Padloping Island Weather Station on Padloping Island, Nunavut on behalf of AECOM working for Public Works and Government Services Canada (PWGSC) and Indian and Northern Affairs Canada (INAC). This AIA was carried out in conjunction with the Phase III Environmental Site Assessment, Hazardous and Non-Hazardous Materials Audit, Geotechnical Evaluation and Remedial Action Plan. All required fieldwork was completed under an Archaeological Permit (2010-016A) issued by the Department of Culture, Language, Elders and Youth (CLEY), Nunavut to Brent Murphy of Golder.

The former USAF Padloping Island Weather Station is located on Padloping Island, approximately 80 km southeast of Qikiqtarjuaq, Nunavut. Low-level aerial reconnaissance of the site area was conducted in order to assess the locations of all structures and debris requiring further investigation and to identify areas of archaeological potential. The site area is characterized by natural springs and is poorly drained. During the study three heritage resource sites were newly recorded including the weather station, Inuit settlement and cemetery were identified and documented as per the *Nunavut Archaeological and Palaeontological Sites Regulations* (2003).

PWGSC has fulfilled the requirements to identify the potential for impact to heritage resources during the proposed remediation/reclamation of the former USAF Padloping Island Weather Station on Padloping Island. The AIA included the participation of Losie Audiakiak and Johnny Kooneeliusie from the local community of Qikiqtarjuaq, who acted as bear monitors and participated in the identification and recording of heritage resource sites.

During the investigation a former weather station, an Inuit settlement and cemetery were recorded as heritage resource sites and assigned Borden site numbers: MgBu 5, MgBu 6 and MgBu 7. It is recommended that PWGSC and INAC have met their obligations to assess the potential for impact to heritage resources during the proposed Remedial Action Plan. It is also recommended that the newly identified site MgBu 7 be avoided during reclamation activities, none of the structures from MgBu 6 be removed during

remediation, and that any material that is removed from MgBu 5 such as fuel barrels, metal debris, and wood debris, be hand picked. Further, that none of the recorded features associated with MgBu 5 be disturbed by borrow sources, landfills or heavy vehicle traffic.

It is also recommended that any information on the sites be recorded during public consultation and used to assess the potential for impact during the development of the Remedial Action Plan of the USAF Padloping Weather Station.

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1. INTRODUCTION

During August of 2010, Golder Associates Ltd. (Golder) conducted an Archaeological Impact Assessment (AIA) of the former United States Air Force Padloping Island Weather Station, Padloping Island in conjunction with the Phase III Environmental Site Assessment, Hazardous and Non-Hazardous Materials Audit, Geotechnical Evaluation, Remedial Action Plan on behalf of AECOM and Public Works and Government Services Canada (PWGSC). All required fieldwork was completed under an Archaeological Permit (2010-016A) issued by the Department of Culture, Language, Elders and Youth (CLEY), Nunavut to Brent Murphy of Golder.

Low-level aerial reconnaissance of the site area was initially flown in order to assess the locations of all structures and debris requiring further investigation and to identify areas of archaeological potential. The AIA was intended to identify any artifacts or heritage resource areas that might be impacted by a remediation program and, as such, only those areas of previous and potential disturbance were assessed. The intent of this program was not to conduct a full AIA of the entire Padloping Island. However, during traverses of the former weather station some lands outside of proposed impacts were surveyed (Figure 1).

As requested, areas that will not be impacted during remediation were not fully examined. As a result of the survey three new heritage resources sites, MgBu 5, MgBu 6, and MgBu 7 were recorded by the author during the program, which were documented as per the *Nunavut Archaeological and Palaeontological Sites Regulations* (2003).

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STUDY AREA

REFERENCE

TOPOGRAPHIC MAP 16M & 16N 3rd EDITION OBTAINED FROM Canmatrix.© 1994 HER MAJESTY THE QUEEN IN RIGHT OF CANADA, DEPARTMENT OF NATURAL RESOURCES : TRANSVERSE MERCATOR DATUM : NAD83 COORDINATE SYSTEM : UTM ZONE 20W.

PROJECT

PADLOPING ISLAND USAF WEATHER STATION

TITLE

STUDY AREA

Golder Associates
Calgary, Alberta

PROJECT	10.1333.0025.8470	
DESIGN	BM	14/10/10
CADD	KJM	14/10/10
CHECK	BM	19/10/10
REVIEW	DB	19/10/10

FILE No. 10133300258470A001
SCALE AS SHOWN REV. 0

FIGURE: 1

2. LOCATION, POTENTIAL IMPACTS, AND OBJECTIVES

2.1 Location

The former USAF Padloping Island Weather Station, codenamed Crystal III is located on Padloping Island 80 km southwest of Qikiqtarjuaq, Nunavut. Padloping Island is off the northeast coast of Baffin Island on the Hudson Strait. The abandoned weather station was built and operated by the United States Air Force from 1943 until the end of the Second World War when it was taken over by the Canadian Department of Transport who operated the station until 1956. The abandoned weather station is located on a coastal plain approximately 400 m from the bay bordered by a steep cliff, two shallow lakes to the west and undulating hills to the east. (Plates 1 and 2) The site includes the remains of several buildings and large amount of debris including fuel barrels and abandoned vehicles.

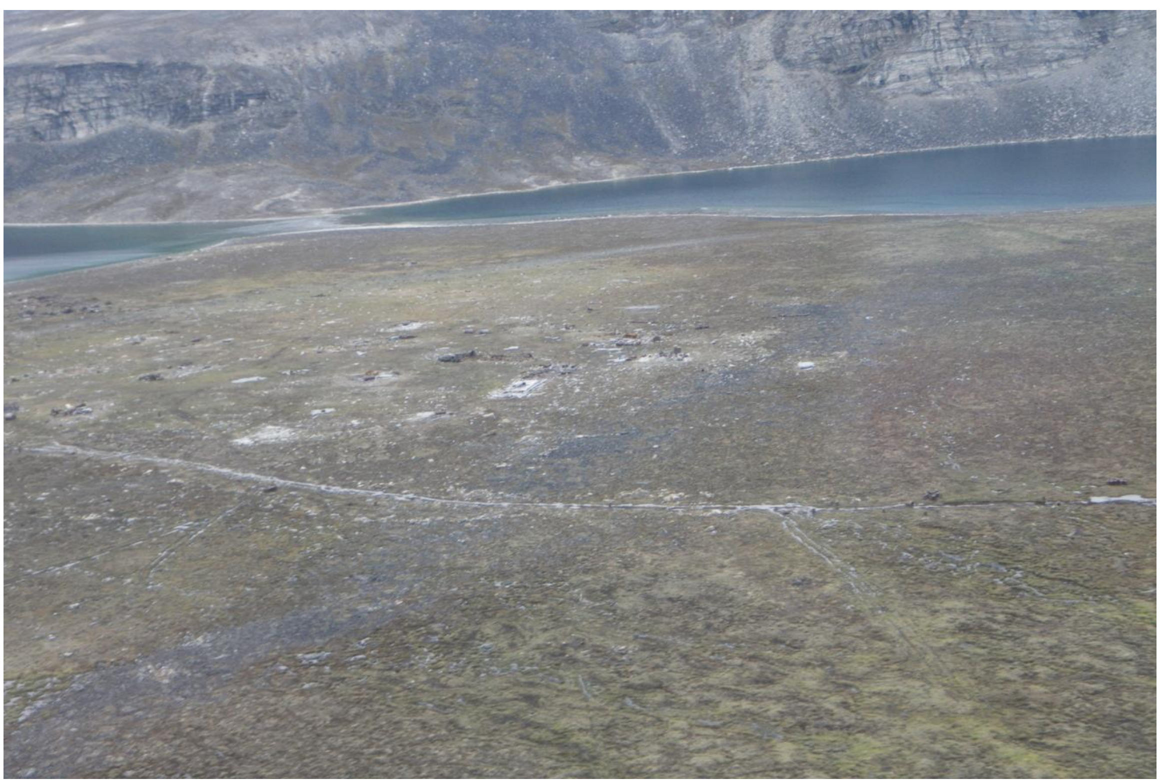


Plate 1 Aerial photo of the Project area, view southwest showing building remains.

Plate 2 Aerial photo of the beach landing area with main site in the background. Barrel dumps can be seen on shore and a sunken barge is seen off the beach.

2.2 Potential Impacts

The potential impacts to heritage resources around the former weather station on Padloping Island are dependent upon the proximity of those resources to the remediation activities that will be conducted to remove the remnants of the former weather station. Heritage resource sites are non-renewable resources that may be located at or near ground level or may be deeply buried. Prehistoric or precontact archaeological sites are those sites which contain features, artifacts or ecofacts reflecting the use of a given land base by people prior to European influences and technologies. Features are non-portable articles that indicate a human modification of the local environment such as hearths, pits, tent rings, stone cairns and Inuksuk. 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, and cut and modified bone. Ecofacts are naturally occurring items such as preserved plant remains or pollen that can aid in the interpretation of archaeological sites. Historic archaeological sites include the features, artifacts and ecofacts relating to the past few hundred years of human occupation. 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.

Alteration of the landscape can result in the damage or complete destruction of all or portions of historic resource 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. These losses are permanent and irreversible. Primary, secondary and tertiary impacts are possible with any new development. Remediation can be considered a new development in this context if it impacts previously undisturbed areas during operation.

Primary impacts include those disturbances resulting immediately from a project. The primary impact zone is the area within the remediation footprint including access roads, temporary work zones, borrow pits and dumps. Individual sites are likely to be affected to varying degrees if they are located within the development area. Artifact context is fundamental to interpretation of archaeological sites. By disturbing the context in which artifacts and features are recovered, interpretations of heritage resources sites and, ultimately, past lifeways are affected negatively.

Secondary impacts can occur when the support services or additional access required by development adversely affects heritage resources outside the primary target areas. The remediation project should have no secondary effect on heritage resources.

Tertiary impacts are the results of project induced changes in demography and land use patterns. Increased rates of intentional and unintentional impacts can be expected as a result of increased visitation to an area if the project were large enough to affect regional population bases. Tertiary impacts are anticipated to be very low for this project, especially because changes to the site through remediation will probably only negatively affect the visitation rates.

The study detailed in this report is intended to identify areas of possible impact and to determine whether the current proposed project will disturb those heritage resources located in proximity to the development.

2.3 Project Objectives

The objective of the 2010 study at the former USAF Padloping Island Weather Station located on Padloping Island is to ensure that heritage resources are not inadvertently impacted by the proposed clean-up and remediation project. The purpose of this AIA is to:

- conduct a pre-impact assessment of the proposed remediation areas;
- identify any archaeological sites within those areas (if present);
- make recommendations to CLEY, AECOM and PWGSC to mitigate or avoid those sites;
- make recommendations on surveillance and monitoring;
- provide a cost estimate on implementing the recommendations during the construction phase; and
- prepare a draft Final Report to be reviewed by AECOM and PWGSC, followed by a Final Report for distribution as required and submission to CLEY.

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 anthropological theory of environmental determinism suggests that, to a great extent, environmental factors condition human behavioural and cultural adaptations, or patterns of behaviour. The environment has likely influenced many of the activities that contribute to the character of the regional prehistoric record. All available environmental variables must be considered as indicators of prehistoric use of the landscape.

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.

Baffin Island is part of the Canadian Shield, an old erosion surface of Precambrian rocks. Specifically, the northeast coast is mountainous and framed by numerous fjords, inlets, cliffs, eroded sandstone valleys and intricate alpine glaciers flowing to the sea (Collignon 2005). Hundreds of small islands surround the coast. The vegetation is diverse by sparse and dwarfed with sedges, saxifrage, dryas, Arctic willows, cottongrass, broad-leafed willows, herbs and Arctic poppies being the most common plants of the 350 species recorded on the island. Caribou, wolf, Arctic fox, lemming, Arctic hare, and polar bears are the most common land mammals on the island while sea mammals include walrus and several species of seals and whales are found in coastal waters.

The abandoned weather station is located on a coastal plain approximately 400 m from the bay bordered by a steep cliff two shallow lakes to the west and undulating hills to the east. The main site is connected to the beach landing area and fresh water lake by roads. During the study wildlife that was observed near the station area included a polar bear, numerous seals and whales. The site area is wet, boggy and heavily vegetated with sedges, willows and many flowering plants, grasses and rushes (Plate 3).

Plate 3 View south along road with the main station to the right of the photo showing typical vegetation.

3.3 Heritage Resources

Archaeology is the study of human history through the material remains of culture, now known as heritage resources. The ultimate goal in archaeology is to describe the cultures and events responsible for the creation and deposition of the remains at a given archaeological site. As such, archaeologists use material remains to determine the nature and age of cultural occupations at a site. Artifacts, ecofacts and features deposited into the natural environment, along with their inter-relationships, are the integral parts that make up an archaeological site. The *Nunavut Archaeological and Palaeontological Sites Regulations* (2003) define heritage resources as: "but not limited to, archaeological and historical sites, burial grounds, palaeontological sites, historical buildings and cairns."

Predating the arrival of Europeans, precontact archaeological sites are comprised of artifacts, features and residues of native origin typically characterized by modified bone and stone, and stone structures. Historic sites are those structures, features, and objects of European influence that date back to contact with the Europeans but can also represent more recent activity of more than 50 years. Depending on the context, sites less than 50 years old may be considered to represent traditional land use and are identified to document continued use and occupation of an area to the present time. A key component of the historic period record are the sites, artifacts and affiliated resources relating to post-contact Aboriginal people's use of the landscape. These include both archaeological sites and objects such as standing and collapsed cabins, campsites, graves, and traditional sites and resources, such as special places, hunting and plant collecting areas, traplines and their associated remains, oral traditions and various documents. These latter resources are usually identified through consultation procedures such as Traditional Use Studies (TUS) or community consultations.

Additionally, heritage resources include, as well as the sites where events took place in the past, all of the objects that they contain and any of the contextual information that may be associated with them and will aid in their interpretation, including natural specimens and documents or verbal accounts.

Heritage resources are non-renewable and are susceptible to alteration, damage, and destruction by construction and development activities. The value of heritage resources cannot be measured in terms of individual artifacts or biological specimens, rather the value of these resources lies in the integrated information which is derived from the relationship of the individual artifacts and fossil specimens, associated features, spatial relationships (distribution), and contextual situations. Interpretation of heritage resource materials, and the ability to interpret the significance of particular sites in a landscape, is based on an understanding of the nature of the relationship between individual archaeological and palaeontological materials as well as the sediments and strata within which they are contained. As such, removal or mixing of cultural or fossil bearing sediments results in the permanent loss of information basic to the understanding of these resources. As a result, heritage resources are increasingly susceptible to destruction and depletion through disturbance.

Similarly, tundra areas north of the tree line are characterized by extremely slow rates of soil development and sediment accumulation. Accordingly, at repeatedly occupied sites, there is little chance of distinguishing occupations relating to different periods within the 5,000-year record of human occupation in the region without recovering a diagnostic indicator. Some areas of high sediment deposition rates are present within the study area, but these are not the typical scenario.

The lack of temporally diagnostic artifacts, the absence of materials suitable for radiocarbon dating, and the natural mixing of shallow archaeological deposits serve to limit the definition of the recognized prehistory for the region. In contrast, extant documents, records, and oral testimony provide a firmer basis for understanding the historic period of the region.

3.3.1 Cultural Chronology

Many of the archaeological materials in the project area represent human activity after the ice sheet receded from Baffin Island about 5,000 years ago. Soon afterward the island was colonized by Paleo-Eskimos with Southwestern Baffin Island, Melville Peninsula, Southhampton Island and the north of Quebec being considered to be part of the core area of Pre-Dorset and Dorset Culture Development.

3.3.1.1 Arctic Small Tool Tadition (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.

3.3.1.2 Dorset Culture (2,500 B.P. to 1,000 B.P.)

The Dorset culture occupied the Canadian Arctic from 2,500 B.P. until at least 1,000 B.P. (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).

3.3.1.3 Thule (1,000 B.P. to 400 B.P.)

The Thule tradition dates from approximately 1,000 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.

3.3.2 Historic Inhabitants

Historic use of the project area is identified with the ‘Baffin Eskimo’. This group inhabited the southern two-thirds of Baffin Island and some of the nearby islands off its shores (Kemp 1984:464). The remaining northern region of the Island is inhabited by the Iglulik (Kemp 1984:464). The island region that is inhabited by the Baffin Eskimo is characterized by freshwater systems located in the central interior and mountainous areas in the northeast and southwest (Kemp 1984:464). The region was first inhabited by the Pre-Dorset approximately 4,200 years ago, supported by archaeological sites identified at Lake Harbour, Frobisher Bay, and Pond Inlet (Desrosiers 2005:193). Prior to this inhabitation, a large ice sheet had covered the island until its melting 5,000 years ago

(Desrosiers 2005:193). Dorset groups are identified in the archaeological record following this, between 2,500 and 600 years ago. The regions of southwestern Baffin Island, Melville Peninsula, Southampton Island, and northern Quebec are considered the central regions of Pre-Dorset and Dorset cultural development (Desrosiers 2005:193). Thule groups entered the area during the final 200 years of the Dorset occupation of the area. These two archaeologically distinct cultures coexisted in the region, but the character of this relationship is unclear. Much of the information known of the historic Thule, or Baffin Eskimo, is based on the ethnographic recordings of Franz Boas from the late 1800's. At this time, Boas recognized seven distinct regional populations within the Baffin Eskimo area (Kemp 1984:464). These populations were "linked together by [bilateral] kinship and the mutual use of hunting and territory, to form larger territorial and social groupings...bands" (Kemp 1984:464). Importantly, by the time of Boas' ethnography the Baffin Eskimo possessed many European goods, which influenced and altered the traditional life-ways of the local groups.

European contact with the Baffin Eskimo populations began in the 16th Century with the Frobisher Expedition (Kemp 1984:467), whose task it was to find the North West Passage (Desrosiers 2005:193). However, previously Baffin Bay had been explored by the Norse (Heinrichs 2005:191). During the 10th Century these Norseman built settlements on Greenland and perhaps Newfoundland but little evidence remains of where and how far they had actually travelled as these same settlements collapsed during the 13th Century. Baffin Bay was next explored and recorded by John Davis in 1587. European interaction gradually increased with the rise of European whale hunting; whaling stations began operating throughout the eastern arctic in the 1880's (Kemp 1984:466). Such whaling activities around Davis Strait originated in the 1700's, but it was not until the 1850's that all the inhabitants of the Cumberland Sound and Davis Strait regions were in contact with whalers (Kemp 1984:466). The whaling industry was eventually eclipsed by fur trapping in 1910 (Kemp 1984:474). Also at this time Anglican missionaries entered the region (Kemp 1984:474).

The Baffin Eskimo have historically utilized a vast array of subsistence resources, including marine, terrestrial, avian, and freshwater game; however, the wolf was sought but not utilized for subsistence (Kemp 1984:467). A vast array of tools was used for hunting, such as plugs to stop the bleeding of seals that made it easier for their transport. Bird nets were also constructed and used to ensnarl various avian species (Kemp 1984:468). Hunting weapons included breathing-hole harpoons that had compound elements, and single-curve bows (Kemp 1984:69). Metal, along with driftwood, antler, bone, and stone, were used in the construction of these implements. In addition, Baffin Eskimo technology allowed for water transportation via kayaks and umiaks, or women's boats (Kemp 1984:469); the form of the kayaks was not consistent throughout the Baffin Eskimo area. Dog sleds were used as well. These sleds were the dominant method of transportation until the 1960's when snowmobiles were introduced (Kemp 1984:469). With these forms of transportation, the Baffin Eskimo interacted with neighbouring groups such as those from northern Quebec (Kemp 1984:465). However, this interaction did not occur regularly.

Different subsistence resources were procured based on the season. For instance, seals (particularly ringed seal) were hunted along the floe-edge during the spring months, and caribou herds were hunted during the fall in the interior and coastal regions (sometimes with the aid of drives) (Kemp 1984:467-468). As this instance suggests, Baffin Eskimo mobility was seasonal and influenced by the location of what game they were pursuing. As a rule, Baffin Eskimo groups resided primarily in the coastal regions. It was the caribou that pulled groups into the interior, whereby three particular lakes were favoured as hunting locals: Nettling, Amadjuak, and Sylvia Grinnel Lakes (Kemp 1984:468). During these interior hunts, if excess caribou meat was produced, then it would be cached at these interior locations and retrieved at times of food stress during the winter months (Kemp 1984:468). In addition to there being differences in subsistence procurement based on seasonality, there were also differences in dwellings. Winter dwellings were commonly snow houses, although occasionally early and abandoned Thule houses were reused through the addition of roofs (Kemp 1984:470). In contrast to the winter, skin tents were utilized during the warmer months. These tents varied in form and size depending on how far they were to be transported and their use (Kemp 1984:470). A further seasonal distinction is found in Baffin Eskimo clothing; only caribou skin was used for winter clothing, and seal skin was used in addition to caribou for summer clothes (Kemp 1984:470).

3.3.3 Heritage Studies

A search of the Canadian Museum of Civilization database identified five previously recorded sites on Padloping Island with an additional three sites recorded on the neighbouring Qaqaluit, Paugnang and Block Islands. However, none of the previously recorded sites are located within the study area and therefore were not revisited.

Prior to the current study of the USAF Padloping Island Weather Station on Padloping Island, a total of five archaeological sites were recorded on the island. These sites included: MgBu 1, MgBu 3, MgBu 4, MgBt 3, and MhBt 2. The first of these sites, MgBu 1, was classed as a prehistoric lithic scatter, though bone and ivory artifacts were also recovered. Identified in 1963 by Father Guy Mary-Rousseliere (1913-1994), the site possibly relates to the Pre-Dorset or Thule. The second site previously recorded on Padloping Island was MhBt 2. This site was identified by D. Clark in 1964 as a cairn of undetermined age. The other three sites previously recorded on Padloping island (MgBu 3, MgBu 4, and MgBt 3) are all listed as Sabo sites, named after George Sabo who identified them in 1975; individually these are Sabo sites JJ, KK, and II. Located by local informants, MgBu 4 was a prehistoric Thule campsite with multiple structures, two of which were found eroding from a terrace edge. In total, six Thule semi-subterranean sod and stone dwellings, and two sod and stone qarmats were recorded. Four of these Thule dwellings were bilobate. Besides the multiple features, one harpoon ice pick was also recovered. MgBt 3 had both prehistoric and indigenous historic associations (Thule and Inuit). This site consisted of two areas, the first area held the remains of a qarmat, a tent ring, and a cache; the qarmat was badly disturbed. Qarmats are rectangular structures that were built on the surface or in a shallow pit with interiors that were arranged in a way that was identical to semi-subterranean houses, in terms of sleeping plarforms, and were often be made of snow or ice walls with caribou or muskox hide roofs. The cache and tent ring were actually a single feature as the ring had been transformed into a cache. The second area was to the east and consisted of multiple rectangular tent rings, associated with recent debris. These rings were situated on higher ground than the first area. The third Sabo site was MgBu 3, which was an undisturbed indigenous historic site. It was classed as a campsite with a qarmat, tent ring, and cache. The caches from MgBt 3 and MgBu 3 were not elaborated upon.

Three islands, situated in close proximity to Padloping Island hold three additional previously identified archaeological sites. These islands have one previously recorded site each and are called: Qaqaluit Island, Paugnang Island, and Block Island. The MhBt 1 was also known as the Cape Searle site, located on the north shore of Qaqaluit Island. The site was recorded by D. Clark in 1964 as a stone cairn with undetermined temporal and cultural associations. The second site, MgBt 2, was a prehistoric site located on a rocky ledge along the south shore of Paugnang Island. George Sabo in 1975 recorded this (and MgBt 1) site while conducting the Thule Archaeology Conservation Project. There were a total of three structures identified, two of which were looted. The other structure was eroding but did not indicate looting. These three structures were associated with the late Thule. The third and final site, MgBt 1, was located on the south shore of Block Island. The site was identified as 4 closely placed villages. The first was an Inuit village comprised of numerous wood platformed qarmats. The second, a Thule village, was also comprised of qarmats (n=2) but were made of stone and one had a stone cairn built within. The third village, associated with the Thule, had 3 stone houses. One of these structures had a recent cache placed within it and two burial cairns placed behind the structure’s back walls. Nearby to this structure were 2 kayak rests, a number of tent rings, and additional caches. Approximately 105 metres to the north of these three villages was the forth and final grouping of structures. These structures (n=3) were associated with the Thule.

4. METHODOLOGY

4.1 Field Inventory and Assessment

All field work was conducted under a valid Class II Archaeological Permit issued by CLEY. The field program focused on assessment of all areas of high and moderate archaeological potential within the abandoned weather station, and the proposed borrow source and landfill locations. The purpose of the field investigation was to identify archaeological materials, document location and content and provide data to be used in the development of recommendations for future remediation programs. Inventory and assessment techniques followed established practices and consisted of the following:

- visual examination of the identified areas to determine the presence of such surficial features such as standing or collapsed buildings, dumps, cache pits, cabin foundations, etc. and exposed precontact cultural materials such as stone tool making debris and tools;
- visual examination of the identified areas to determine the presence of items of historical military interest;
- excavation of shovel tests (ca. 40 x 40 cm) to varying depths to determine the potential for subsurface precontact cultural remains if deposition is present;
- visual examination of bedrock exposures (if any) or gravels for precontact quarrying activity;
- excavation of either additional shovel tests or 1 x 1 m units for the purpose of identifying the distribution, density, and nature of cultural remains associated with sites identified through inventory procedures;
- documentation of the location (GPS coordinates), nature, size, and complexity of each identified site; and
- documentation of individual site features to record content, context, potential identity, and to provide information required to develop a mitigation program.

These results, along with updates and recommendations will be included in written submissions to CLEY as required by the Permit to conduct the AIA, and discussed with the Chief Archaeologist of Nunavut.

4.2 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.

Community input will play a role in the evaluation of site value, and the inclusion of members of the local community on the field crew aided in the in-field discussions regarding site significance.

4.3 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 Project team to determine the feasibility of avoiding important sites. If site avoidance is not possible, other mitigative measures such as collection and documentation, and controlled mapping/excavation be considered and discussed with CLEY. 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 may be summarized by:

- 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 to be discussed with the site project team and CLEY.

4.4 Reporting

Analysis of collected artifacts includes cleaning, cataloguing, identification, inventory, and description of each individual piece for inclusion in the final report. GPS site information is provided for mapping relative to the former site structures at the site and to CLEY, but not included in the final versions of this report. Archaeological site maps, photographs, and artifact scans are prepared as digital files.

5. RESULTS

Upon completion of the field component and the artifact curation, a draft report was prepared. This final permit report on the archaeological studies will be forwarded to AECOM for review and then submitted to CLEY for review. 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 descriptive 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 that was recovered was 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.

If required, a summary of the findings will be prepared for inclusion in a screening document.

The following workplan was followed:

- avoidance has been recommended where feasible at all sites assigned high archaeological resource value (this to include all constructed features: burials, tent rings, caches, hunting blinds, hearths);
- collection and documentation has been undertaken as a mitigative option of sites with low archaeological resource value and as a method of protecting the heritage resource from future undocumented impacts due to increased personnel activity in the vicinity; and
- acceptable methods of mitigation were discussed with CLEY and the Territorial Archaeologist, and may lead to a recommendation for detailed mapping, collection and/or test excavations at those sites assigned high archaeological resource value that cannot be avoided by reclamation project.

A management plan for required mitigation, monitoring or surveillance relative to the proposed remediation will be developed as part of the contracted services deliverable to PWGSC. This includes site mitigation, additional survey of any project re-locates required due to site avoidance, and verification of those heritage sites located outside the proposed development activity area that should remain outside re-located areas.

A search of the Canadian Museum of Civilization database identified five previously recorded sites on Padloping Island with an additional three sites having been recorded on the neighbouring Qaqaluit, Paugnang and Block Islands. However none of the previously recorded sites are located within the study area and were therefore not revisited.

5.1 Community Consultation

Consultation regarding the USAF Padloping Island Weather Station Phase III Environmental Site Assessment, Hazardous and Non-Hazardous Materials Audit, Geotechnical Evaluation, Remedial Action Plan is ongoing.

5.2 Field Results

The AIA assessment included all of the areas of moderate to high archaeological potential that have been disturbed by the weather station as well as areas identified as having potential for future borrow sources or dumps. The disturbed areas that were surveyed included the main site (Plate 4), original site (Plate 5) access roads, beach landing area (Plate 6), barrel dumps, metal dumps (Plate 7) and anywhere there was evidence of a bull dozer push or any other disturbance. 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 (Plate 8).

During the investigation the former weather station, Inuit Settlement and cemetery were recorded as heritage resource sites. This was due to the fact that all of these sites were more than 50 years old, as per the *Nunavut Archaeological and Palaeontological Sites*

Regulations (2003). The weather station includes the original site, main station, roads and numerous barrel and metals dumps. The Inuit Settlement is made up of the remains of at least 22 houses that were determined from stone outlines and constructions materials, and the Inuit graveyard is located adjacent to the study area and consists of 20 graves. All three sites are described in more detail below.

Plate 4 View east of the remains of the maintenance garage.

Plate 5 View southwest of original warehouse.

Plate 6 View west of beach landing area with crushed barrels and sunken barge.

Plate 7 View west of metal dump area.

Plate 8 View south of potential borrow source between salt water and fresh water lakes.

In addition to the heritage sites, modern land use sites consisting of modern tent rings and Inuksuit were observed. There are two rather large Inuksuit at the beach landing area of the site, both have dates engraved or written on them from 1999 and 2003, respectively (Plate 9 and 10). There are also at least 11 modern tent rings along the beach landing area and along the access road from the beach to the station (Plate 11). Recent plastic and aluminum debris around the beach landing area further attests to the continued use of the island. The community of Qikiqtarjuaq initiated a clean up of the Padloping Island site in 1993, crushing approximately 3,000 fuel barrels (INAC 2008) which can be seen in the background of Plate 6.

Plate 9 Photo of modern Inuksuk dated August 7, 1999.

Plate 10 Photo of modern Inuksuk dated 2003.

Plate 11 Modern tent ring with wooden floor, a second tent ring can be seen in the background.

5.3 Newly Recorded Heritage Resource Sites

5.3.1 MgBu 5

MgBu 5 is an abandoned weather station that was built and operated by the United States Air Force from 1943 until the end of the Second World War when it was taken over by the Canadian Department of Transport who operated the station until 1956. The abandoned weather station is located on a coastal plain approximately 400 m from the bay bordered by a steep cliff, two shallow lakes to the west and undulating hills to the east (Figure 1).

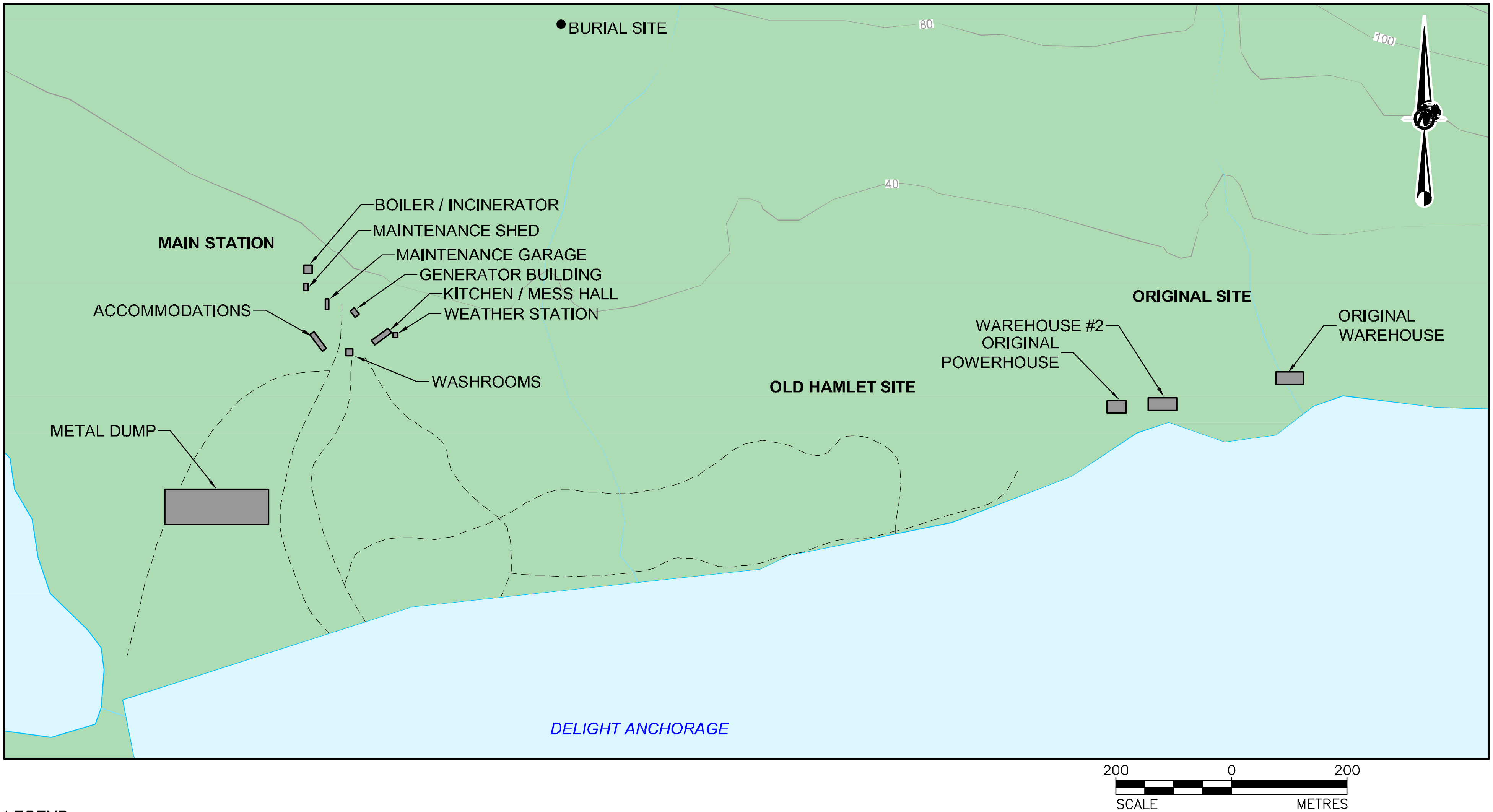
The abandoned weather station consists of two localities, the original site and the main site (Figure 2). The original site includes two warehouses (Plate 12) and a powerhouse (Plate 13) as well as metal debris, wooden power poles, electrical wire, fuel barrels and dimensional lumber. All that remains of one of the warehouses is structural steel and metal sheeting with several US Army canon heaters (Plate 12). The remains of the powerhouse consist of two generators that are on their side with some of the wooden floor remaining. There is also a stove between the warehouse and generators with a manufacture date of June 19, 1942.

The main site consists of a maintenance shed, supply depot, boiler/incinerator, library, maintenance garage, washrooms, accommodations, kitchen/mess hall, weather station and several barrel and metal dumps. Structural remains consists of the metal frame of the maintenance garage (Plate 4), cement and brick foundation of the boiler/incinerator (Plate 14), cement foundation of the library building and two generators from the Generator Building (Plate 15). There is also a lot of miscellaneous metal and wood debris, wooden power poles and an army truck. The main metal dump is south of the main site. Fuel barrels, construction material, food cans and abandoned vehicles were all observed there (Plate 7 and Plate 16). The area has several roads going from the main site to both the beach landing area and to the freshwater lake to the west of the site area (Plate 3). At the beach landing area there are two sunken barges, only one of which is visible above the water; crushed oil barrels and miscellaneous metal debris litter the area (Plate 6).

North of the main site on a gravel ridge is an open grave that once contained an American serviceman (Plate 17). The grave consists of a broken wooden cross and portions of a picket fence. The body has since been repatriated. No further information is available on the grave.

All of the remains of the USAF Padloping Weather Station will be removed during the planned remediation of the site by PWGSC. The site was recorded as a heritage site as it is more than 50 years old the as per the *Nunavut Archaeological and Palaeontological Sites Regulations* (2003). No further work is recommended as the recording of the site is thought to be sufficient mitigation.

L:\2010\1333\10-1333-0025\8470\Report A\Fig 2 10133300258470A002 Site Plan.dwg Nov 23, 2010 – 11:52am



LEGEND

CONTOUR (METRES)

TRAIL

WATERCOURSE

WATERBODY

REFERENCE

ALBERTA NTDB DIGITAL DATA OBTAINED FROM GEOMATICS CANADA, AUGUST 2001. MAPSHEET 16M AND 16N DATUM: NAD83 PROJECTION: UTM ZONE 20

PROJECT

PADLOPING ISLAND USAF WEATHER STATION

TITLE

SITE LOCATION
MgBu 5

Golder Associates
Calgary, Alberta

PROJECT	10.1333.0025.8470	
DESIGN	BM	14/10/10
CADD	KJM	19/10/10
CHECK	BM	19/10/10
REVIEW	DB	19/10/10

FILE No. 10133300258470A002

SCALE AS SHOWN REV. 0

FIGURE: 2

Plate 12 View east of warehouse #2 showing structural remains and US Army canon heaters.

Plate 13 Photo of generators at the original site, MgBu 5.

Plate 14 View northwest of the remains of the boiler/incinerator.

Plate 15 Photo of generators at the main site, MgBu 5.

Plate 16 View south of metal dump.

Plate 17 View north of grave.

5.3.2 MgBu 6

Site MgBu 6 is the Padloping Island Inuit Settlement that extends along the beach south and east of the USAF Weather Station. Historic reports indicate that the settlement was mentioned as early at 1884 with seven remaining families being resettled to Broughton Island (now Qikiqtarjuaq) in 1968 so that their children could attend school. The Padloping Island Settlement, along with the settlement at Kivitoo, were the larger centers of Inuit occupation in the region prior to the establishment of the DEW Line site at Broughton Island (Qikiqtani Truth Commission (QTC) 2010). There is also a graveyard that is associated with the settlement to the west of a salt water lake that was recorded as MgBu 7 and reported on below.

Approximately 22 Inuit houses are located at MgBu 6, as they are scattered along the upper beach terrace for 1,100 m. The house remains are quite diverse consisting of stone outlines (Plate 18), wooded floors (Plate 19) as well as areas that appear to have had structures at one time (Plate 20) (Table 1). The site extends southeast of the main station of the USAF Padloping Weather Station on both sides of the Original Site of the weather station.

Table 1 Feature metrics, MgBu 6

Feature	Size (m)	Orientation	Shape	Feature	Size (m)	Orientation	Shape
1	4.5 X 9.5	NW/SE	Rectangular	12	4 X 5	N/S	Rectangular
2	7 X 5.4	NE/SW	Rectangular	13	5 X 5		Square
3	5 X 5		Circular	14	5 X 7	N/S	Rectangular
4	5.5 X 5	NW/SE	Rectangular	15	4		Circular
5	3.5 X 2.5	E/W	Rectangular	16	5 X 3	N/S	Rectangular
6	5 X 7	N/S	Rectangular	17	5		Circular
7	7 X 7	NE/SW	Rectangular	18	5 X 3	N/S	Rectangular
8	8 X 8	N/S	Rectangular	19	5 X 7	N/S	Rectangular
9	6 X 6		Square	20	4 X 4		Circular
10	7 X 6	NW/SE	Rectangular	21	5 X 7	N/S	Rectangular
11	5 X 5		Circular	22	5 X 7	E/W	Rectangular

The debris around the houses consists of both domestic material such as books, clothing, eating utensils, bed frames, pots, lanterns, two rifles, women's figure skates, a snowmobile and a sewing machine and material from the weather station. The debris from the weather station includes bricks (stamped "SEABOARD PENN MADE IN U.S.A."), miscellaneous pieces of metal, stove parts, electronic parts, electrical wire, as well as fuel barrels. Around the house remains there are also several areas where debris has been burned. The amount of debris around the house features are not evenly distributed with the western feature, close to the weather station main site, having much more debris than the features that were recorded on the east side of the site. East of the recorded site there are also several recent stone tent rings and it was thought that the site continues to the east but was not surveyed during the current program as it was not within the study area.

During the recording of MgBu 6, there was no cultural material observed that indicated any occupation prior to the construction of the weather station. This may be because earlier sites are to the east of MgBu 6 or because the site has been occupied since at least 1884 and earlier features and material culture are now mixed in or covered by the more modern debris.

Site MgBu 6 is considered to be significant in terms of its place in the 20th Century Inuit history. It is recommended that none of the house foundations, stone tent rings and wooden flooring be removed during the remediation of the site and that any material that is removed, fuel barrels, metal debris, wood debris be hand picked and that none of the recorded features associated with the site be disturbed by borrow sources, landfills or by heavy vehicle traffic. It is also recommended that during public consultation for the remediation of the USAF Padloping Weather Station any information on the site be recorded.

Plate 18 View south of Feature 19, MgBu 6.

Plate 19 View southeast of Feature 2, MgBu 6, with wooden floor and the remains of walls.

Plate 20 View northeast of Feature 5, MgBu 6, showing the former location of a house.

5.3.3 MgBu 7

Site MgBu 7 is an Inuit graveyard that is associated with the Padloping Island Settlement located to the west of the settlement on a ridge at the base of a cliff on the other side of a salt water lake. The lake is easily accessible in low tide when the mouth of the lake can be traversed as water is draining out of the lake into the ocean. The graveyard consists of twenty grave sites placed side by side oriented east to west (Plate 21 and 22). Of the twenty graves all but five have wooded crosses with names, in syllabics, and dates. The graves date from 1948 to 1967 and with the exception of a single grave with a collapsed top are in good shape. According to the dates and judging by the size of the graves most are those of children.

Site MgBu 7 is considered to be significant in terms of its place in the 20th Century Inuit history. It is recommended that this site be avoided during the planned remediation activities and that any information on the cemetery that is brought up during public consultation for the remediation of the USAF Padloping Weather Station be recorded.

Plate 21 View east of graveyard with Padloping Settlement and weather station in the background.

Plate 22 View west of the graveyard, MgBu 7.

6. SUMMARY AND RECOMMENDATIONS

The AIA of the USAF Padloping Weather Station conducted under Nunavut Permit 2010-016A produced the results discussed in Section 5 and outlined in Table 2. As requested, areas which will not be impacted during remediation were not fully examined. During the study three sites, the weather station, Padloping Island Inuit Settlement and Inuit Graveyard, were recorded as per the *Guidelines for Applicants and Holders of Nunavut Territory Archaeology and Palaeontology Permits* (Government of Nunavut 2003).

Table 2 Heritage Site Recommendations

Site	Type	Significance	Recommendations
MgBu 5	Weather Station	Limited	No further work is recommended
MgBu 6	Inuit Settlement	High	Avoidance is recommended
MgBu 7	Graveyard	High	Avoidance is recommended

PWGSC has fulfilled the requirements to indentify the potential for impact to heritage resources during the proposed remediation/reclamation of the USAF Padloping Island Weather Station on Padloping Island. The AIA of the Padloping Island weather station included the participation of Losie Audiakiak and Johnny Kooneeliusie from the local community of Qikiqtarjuaq, who acted as bear monitors and participated in the identification and recording of the heritage resource sites.

During the investigation the former weather station, the Inuit Settlement and cemetery were recorded as heritage resource sites and were assigned Borden site numbers Mgbu 5, MgBu 6, and MgBu 7. All of the remains of the USAF Padloping Weather Station will be removed during the planned remediation of the site by PWGSC. The site was recorded as a heritage site as it is more than 50 years old as per the *Nunavut Archaeological and Palaeontological Sites Regulations*. No further work is recommended as the recording of the site is thought to provide sufficient mitigation.

Site MgBu 6 is considered to be significant in terms of its place in 20th Century Inuit history. It is recommended that none of the house foundations, stone tent rings and wooden flooring be removed during the remediation of the site and that any material that is removed (fuel barrels, metal debris, wood debris) be hand picked and that none of the recorded features associated with the site be disturbed by borrow sources, landfills or by heavy vehicle traffic. It is also recommended that any information on the site be recorded during public consultation and used to assess the potential for impact during the development of the Remedial Action Plan of the USAF Padloping Weather Station.

Site MgBu 7 is considered to be significant in terms of its place in the 20th Century Inuit history. It is recommended that this site be avoided during the planned remediation activities and that any information on the cemetery be recorded during public consultation and used to assess the potential for impact during the development of the Remedial Action Plan of the USAF Padloping Weather Station

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.

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APPENDIX I

PHOTOGRAPH LOG

Padloping Island AIA Photo Log

Number	Borden Number (if applicable)	Comment
10-016Aphoto1		View north of metal dump from the air
10-016Aphoto2		View north of metal dump from the air
10-016Aphoto3		View northwest of the metal dump from the air
10-016Aphoto4		View west of quad trail with metal dump in the background
10-016Aphoto5		View southwest of metal dump from the air
10-016Aphoto6		View southwest of metal dump from the air
10-016Aphoto7		Rifle
10-016Aphoto8		View south across Hudson Strait from the site
10-016Aphoto9		View south across Hudson Strait from the site
10-016Aphoto10		View southeast across Hudson Strait from the site
10-016Aphoto11		View east across hamlet
10-016Aphoto12	MgBu-5	View northwest of tent ring, Feature 1, MgBu-5
10-016Aphoto13	MgBu-5	View west of tent ring, Feature 1, MgBu-5
10-016Aphoto14	MgBu-5	View south of tent ring , Feature 1, MgBu-5
10-016Aphoto15	MgBu-5	View west of tent ring, Feature 1, MgBu-5
10-016Aphoto16	MgBu-5	View southwest of Feature 1, MgBu-5
10-016Aphoto17	MgBu-5	Detail of wood along the outer ring of site, Feature 1, MgBu-5
10-016Aphoto18	MgBu-5	Photo of metal debris close to Feature 1 at MgBu-5
10-016Aphoto19	MgBu-5	Photo of sewing machine close to Feature 1, MgBu-5
10-016Aphoto20	MgBu-5	View west of garbage that has been burned
10-016Aphoto21	MgBu-5	View west of garbage that has been burned
10-016Aphoto22	MgBu-5	View north from the beach area of burned material
10-016Aphoto23	MgBu-5	View north of another area with burned garbage
10-016Aphoto24	MgBu-5	View west of second area with burned garbage
10-016Aphoto25	MgBu-5	View north of Feature 2, MgBu-5
10-016Aphoto26	MgBu-5	View west of Feature 2, MgBu-5
10-016Aphoto27	MgBu-5	Detail of cultural material at Feature 2, MgBu-5
10-016Aphoto28	MgBu-5	View south of Feature 2, MgBu-5
10-016Aphoto29	MgBu-5	Detail of coal at Feature 2, MgBu-5
10-016Aphoto30	MgBu-5	View southeast of Feature 2, MgBu-5
10-016Aphoto31	MgBu-5	View southeast of Feature 2, MgBu-5
10-016Aphoto32	MgBu-5	View south from Feature 2, MgBu-5
10-016Aphoto33	MgBu-5	Detail of metal stove/furnace at Feature 2, MgBu-5
10-016Aphoto34	MgBu-5	Detail of brick
10-016Aphoto35	MgBu-5	Detail of clothing at Feature 2, MgBu-5
10-016Aphoto36	MgBu-5	Detail of wood debris, including 'ribs' from a Quonset type hut, Feature 2, MgBu-5
10-016Aphoto37	MgBu-5	marker
10-016Aphoto38	MgBu-5	View northwest of Feature 3, MgBu-5

PIN-E AIA Photo Log (continued)

Number	Borden Number (if applicable)	Comment
10-016Aphoto39	MgBu-5	View northwest of Feature 3, MgBu-5
10-016Aphoto40	MgBu-5	Detail of Feature 3, MgBu-5
10-016Aphoto41	MgBu-5	Detail of Feature 3, MgBu-5
10-016Aphoto42	MgBu-5	Detail of Feature 3, MgBu-5
10-016Aphoto43	MgBu-5	View southeast of Feature 3, MgBu-5
10-016Aphoto44	MgBu-5	Book at Feature 3, MgBu-5
10-016Aphoto45	MgBu-5	Book at Feature 3, MgBu-5
10-016Aphoto46	MgBu-5	Book at Feature 3, MgBu-5
10-016Aphoto47	MgBu-5	Snow machine west of Feature 3, MgBu-5
10-016Aphoto48	MgBu-5	Ceramic insulator
10-016Aphoto49	MgBu-5	View northwest of Feature 4, MgBu-5
10-016Aphoto50	MgBu-5	View northwest of Feature 4, MgBu-5
10-016Aphoto51	MgBu-5	View west of Feature 4, MgBu-5
10-016Aphoto52	MgBu-5	View southwest of Feature 4, MgBu-5
10-016Aphoto53	MgBu-5	View southeast of Feature 4, MgBu-5
10-016Aphoto54	MgBu-5	Detail of domestic artifacts, Feature 4, MgBu-5
10-016Aphoto55	MgBu-5	Women's figure skate, Feature 4, MgBu-5
10-016Aphoto56	MgBu-5	Electric light fixture, MgBu-5
10-016Aphoto57	MgBu-5	Toy snow machine, MgBu-5
10-016Aphoto58	MgBu-5	Toy snow machine, MgBu-5
10-016Aphoto59	MgBu-5	Toy snow machine, MgBu-5
10-016Aphoto60	MgBu-5	Tape player, MgBu-5
10-016Aphoto61	MgBu-5	View northeast of Feature 5, MgBu-5
10-016Aphoto62	MgBu-5	View southeast of Feature 5, MgBu-5
10-016Aphoto63	MgBu-5	View south of Feature 5, MgBu-5
10-016Aphoto64	MgBu-5	View east across the site from Feature 5, MgBu-5
10-016Aphoto65	MgBu-5	View south of Feature 5, MgBu-5
10-016Aphoto66	MgBu-5	View south of Feature 6, MgBu-5
10-016Aphoto67	MgBu-5	View west of Feature 6, MgBu-5
10-016Aphoto68	MgBu-5	View north of Feature 6, MgBu-5
10-016Aphoto69	MgBu-5	View southeast across MgBu-5 from Feature 6
10-016Aphoto70	MgBu-5	View northwest of Feature 7, MgBu-5
10-016Aphoto71	MgBu-5	View northwest of Feature 7, MgBu-5
10-016Aphoto72	MgBu-5	View southwest of Feature 7, MgBu-5
10-016Aphoto73	MgBu-5	Misc debris around Feature 7, MgBu-5
10-016Aphoto74	MgBu-5	Detail of wood stuck in the ground, Feature 7, MgBu-5
10-016Aphoto75	MgBu-5	Misc debris around Feature 7, MgBu-5
10-016Aphoto76	MgBu-5	View south of MgBu-5 from Feature 7
10-016Aphoto77	MgBu-5	View northeast of Feature 8, MgBu-5

PIN-E AIA Photo Log (continued)

Number	Borden Number (if applicable)	Comment
10-016Aphoto78	MgBu-5	View west of Feature 8, MgBu-5
10-016Aphoto79	MgBu-5	View south of Feature 8, MgBu-5
10-016Aphoto80	MgBu-5	View east of Feature 8, MgBu-5
10-016Aphoto81	MgBu-5	View north of Feature 9, MgBu-5
10-016Aphoto82	MgBu-5	View west of Feature 9, MgBu-5
10-016Aphoto83	MgBu-5	View south of Feature 9, MgBu-5
10-016Aphoto84	MgBu-5	Detail of electronics at Feature 9, MgBu-5
10-016Aphoto85	MgBu-5	Detail of cultural material at Feature 9, MgBu-5
10-016Aphoto86	MgBu-5	View southwest of Feature 10, MgBu-5
10-016Aphoto87	MgBu-5	View southeast of Feature 10, MgBu-5
10-016Aphoto88	MgBu-5	View north of Feature 10, MgBu-5
10-016Aphoto89	MgBu-5	Detail of burned area, Feature 10, MgBu-5
10-016Aphoto90	MgBu-5	View west of Feature 10,MgBu-5
10-016Aphoto91	MgBu-5	Warehouse at main station, view east
10-016Aphoto92	MgBu-5	View northeast across main station
10-016Aphoto93	MgBu-5	View south of metal dump
10-016Aphoto94	MgBu-5	View southeast across site from the air
10-016Aphoto95	MgBu-5	View southwest of main station form the air
10-016Aphoto96	MgBu-5	View southwest of main station form the air
10-016Aphoto97	MgBu-5	View northwest of site from the air
10-016Aphoto98	MgBu-5	View south of original warehouse
10-016Aphoto99	MgBu-5	View south of original warehouse
10-016Aphoto100	MgBu-5	View southwest of original warehouse
10-016Aphoto101	MgBu-5	View southwest across original site with warehouse in the background
10-016Aphoto102	MgBu-6	View north of Feature 20, MgBu-6
10-016Aphoto103	MgBu-6	View southwest of Feature 20, MgBu-6
10-016Aphoto104	MgBu-6	Detail of electronic equipment near Feature 20, MgBu-6
10-016Aphoto105	MgBu-6	View northeast of Feature 21, MgBu-6
10-016Aphoto106	MgBu-6	View north of Feature 21, MgBu-6
10-016Aphoto107	MgBu-6	Detail of floor and debris, Feature 21, MgBu-6
10-016Aphoto108	MgBu-6	View south off Feature 21, MgBu-6
10-016Aphoto109	MgBu-6	View northwest of Feature 22, MgBu-6
10-016Aphoto110	MgBu-6	View northwest of Feature 22, MgBu-6
10-016Aphoto111	MgBu-6	View south of Feature 22, MgBu-6
10-016Aphoto112	MgBu-6	View southwest of modern rings east of MgBu-6
10-016Aphoto113	MgBu-6	View south of modern rings east of MgBu-6
10-016Aphoto114	MgBu-6	View southwest of modern rings east of MgBu-6
10-016Aphoto115	MgBu-6	View south of modern rings east of MgBu-6

PIN-E AIA Photo Log (continued)

Number	Borden Number (if applicable)	Comment
10-016Aphoto116		View west along beach on the east end of the study area
10-016Aphoto117		View west along beach on the east end of the study area
10-016Aphoto118	MgBu-6	View south of Feature 19,MgBu-6
10-016Aphoto119	MgBu-6	View north of Feature 19, MgBu-6
10-016Aphoto120	MgBu-6	View north of Feature 14, MgBu-6
10-016Aphoto121	MgBu-6	View southeast of Feature 14, MgBu-6
10-016Aphoto122	MgBu-6	View southwest of Feature 14, MgBu-6
10-016Aphoto123	MgBu-6	View east of Feature 14, MgBu-6
10-016Aphoto124	MgBu-6	View south of Feature 15, MgBu-6 with original warehouse in the background
10-016Aphoto125	MgBu-6	View east of Feature 15, MgBu-6
10-016Aphoto126	MgBu-5	View southeast of original warehouse with heaters
10-016Aphoto127	MgBu-5	detail of a heater
10-016Aphoto128	MgBu-5	Stove at original weather station site
10-016Aphoto129	MgBu-5	Detail of stove at original station site
10-016Aphoto130	MgBu-5	Diesel genset at the original site
10-016Aphoto131	MgBu-5	View east across original site
10-016Aphoto132	MgBu-6	View north of Feature 18, MgBu-6
10-016Aphoto133	MgBu-6	View east of Feature 18, MgBu-6
10-016Aphoto134	MgBu-6	View south of Feature 18, MgBu-6
10-016Aphoto135	MgBu-6	Detail of telephone pole beside Feature 18, MgBu-6
10-016Aphoto136	MgBu-6	View north of Feature 17, MgBu-6
10-016Aphoto137	MgBu-6	View northeast of Feature 17, MgBu-6
10-016Aphoto138	MgBu-6	View north of Feature 16, MgBu-6
10-016Aphoto139	MgBu-6	View northeast of Feature 16, MgBu-6
10-016Aphoto140	MgBu-6	View north of Feature 11,MgBu-6
10-016Aphoto141	MgBu-6	View west of Feature 11, MgBu-6
10-016Aphoto142	MgBu-6	Gun beside Feature 11, MgBu-6
10-016Aphoto143	MgBu-6	Polar bear skull near Feature 11, MgBu-6
10-016Aphoto144	MgBu-6	View north of Feature 12, MgBu-6
10-016Aphoto145	MgBu-6	View east of Feature 12, MgBu-6
10-016Aphoto146		View north of modern tent rings
10-016Aphoto147		View west of modern tent ring with wooden floor
10-016Aphoto148		View southwest of modern tent ring with wooden floor
10-016Aphoto149	MgBu-5	View west of barrels and sunken barge at beach
10-016Aphoto150		Modern Inuksuk
10-016Aphoto151		Detail of modern Inuksuk
10-016Aphoto152		Detail of modern Inuksuk
10-016Aphoto153		Detail of modern Inuksuk

PIN-E AIA Photo Log (continued)

Number	Borden Number (if applicable)	Comment
10-016Aphoto154	MgBu-5	Photo of crushed army jeep and cat
10-016Aphoto155	MgBu-5	Photo of amphibious vehicle
10-016Aphoto156	MgBu-5	Detail of amphibious vehicle
10-016Aphoto157	MgBu-5	Photo of truck and amphibious vehicle
10-016Aphoto158	MgBu-5	Photo of amphibious vehicle
10-016Aphoto159	MgBu-7	View east of Inuit grave yard
10-016Aphoto160	MgBu-7	Detail of grave marker
10-016Aphoto161	MgBu-7	Detail of grave marker
10-016Aphoto162	MgBu-7	Detail of grave marker
10-016Aphoto163	MgBu-7	Detail of grave marker
10-016Aphoto164	MgBu-7	Detail of grave marker
10-016Aphoto165	MgBu-7	Detail of grave marker
10-016Aphoto166	MgBu-7	Detail of grave marker
10-016Aphoto167	MgBu-7	Detail of grave marker
10-016Aphoto168	MgBu-7	Detail of grave marker
10-016Aphoto169	MgBu-7	Detail of grave marker
10-016Aphoto170	MgBu-7	Detail of grave marker
10-016Aphoto171	MgBu-7	Detail of grave marker
10-016Aphoto172	MgBu-7	Detail of grave marker
10-016Aphoto173	MgBu-7	View east of Inuit grave yard
10-016Aphoto174	MgBu-7	View east of Inuit grave yard
10-016Aphoto175	MgBu-7	Detail of grave with collapsed lid
10-016Aphoto176	MgBu-7	View west of Inuit grave yard
10-016Aphoto177	MgBu-7	View east of site from the Inuit grave yard
10-016Aphoto178	MgBu-7	View west of Inuit grave yard
10-016Aphoto179	MgBu-7	View west of Inuit grave yard
10-016Aphoto180		Modern Inuksuk
10-016Aphoto181		Detail of walrus skull on Inuksuk
10-016Aphoto182		Modern Inuksuk
10-016Aphoto183		View south of site from outcrop to the north of site
10-016Aphoto184		View south of site from outcrop to the north of site
10-016Aphoto185		View south east of site from proposed borrow near freshwater lake
10-016Aphoto186		View southwest of proposed borrow between lakes
10-016Aphoto187		View southwest of proposed borrow between lakes
10-016Aphoto188		View south of outcrop that may be borrow near fresh water lake
10-016Aphoto189		View east across proposed borrow of freshwater lake and outcrop
10-016Aphoto190	MgBu-5	View east of American grave
10-016Aphoto191	MgBu-5	View northwest of American grave
10-016Aphoto192	MgBu-5	Detail of American grave

PIN-E AIA Photo Log (continued)

Number	Borden Number (if applicable)	Comment
10-016Aphoto193		View northwest of proposed gravel borrow
10-016Aphoto194		View south of site from proposed borrow
10-016Aphoto195	MgBu-5	View south of site from road
10-016Aphoto196		View south west of site from road
10-016Aphoto197		View south west of site from road
10-016Aphoto198	MgBu-5	Photo of genset at main site
10-016Aphoto199	MgBu-5	Photo of a truck
10-016Aphoto200	MgBu-5	Photo of the warehouse
10-016Aphoto201	MgBu-5	Photo of building remains

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:	**Padloping Island, NU**	
Civic Address: *(or other description of location)*	Padloping Island, NU (Former US Coast Guard Station)	
Site Common Name : *(if applicable)*	Crystal-III	
Site Owner or Custodian: *(Organization and Contact Person)*	Indian and Northern Affairs Canada (INAC)	
Legal description *or* metes and bounds:	The Former US Coast Guard Station is located on Padloping Island, Nunavut (62° 02' N, 62° 44' W).	
Approximate Site area:	84.8 ha	
PID(s*)* : *(or Parcel Identification Numbers [PIN] if untitled Crown land)*		
Centre of site: *(provide latitude/longitude or UTM coordinates)*	Latitude: Longitude:	______ degrees ______ min ______ secs ______ degrees ______ min ______ secs
	UTM Coordinate:	Northing __7435994____________ Easting ___511644___________
Site Land Use:	Current:	Not used - abandoned US Coast Guard Station.
	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:	The Padloping Island weather station site is located at 67° 02' N, 62° 44' W in Merchants Bay on the southwest portion of the island. Padloping Island is located off the northeast coast of the Cumberland Peninsula of Baffin Island, approximately 440 km north-northeast of Iqaluit and 75 km southeast of Qikiqtarjuak. In 1943, the United States Military constructed a United States Air Force (USAF) weather station on Padloping Island, codenamed Crystal III. The station was operated by the USAF until the end of the Second World War; and subsequently operated by the Canadian Department of Transport until 1956. A long history of Inuit settlement near Padloping Island site predates the weather station, and a written history of an Inuit community dates back to 1884. The remains of a hamlet, abandoned in the early 1960s, are nearby the remains of the site. 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).	

CCME National Classification System for Contaminated Sites (2008, 2010 v 1.2)
Summary of Site Conditions

Affected media and Contaminants of Potential Concern (COPC):	The affected media include soil, sediment, surface water, groundwater, paint, concrete and barrel (50 gallon drum) contents. The COPC for soil and sediment include arsenic, cadmium, chromium, cobalt, copper, lead, mercury, nickel, zinc, poychlorinated biphenyls (PCBs) and petroleum hydrocarbons (PHCs). The COPC for water are included in the Canadian Water Quality Guidelines for the Protection of Aquatic Life and the Guidelines for Canadian Drinking Water Quality in addition to PCBs and PHCs. The COPC for paint and concrete typically include PCBs and lead. Barrel contents are assessed according to the Barrel Protocol included in the Abandoned Military Site Remediation Protocol published by INAC (2009) and include COPC such as alcohol, glycol, PCBs, chlorine, cadmium, chromium and lead.

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, do not continue, you must have a minimum of a Phase I Environmental Site Assessment or equivalent.

Scoring Completed By:	Jenna Morrish (AECOM Canada Ltd.)
Date Scoring Completed:	13-Dec-10

CCME National Classification System (2008, 2010 v 1.2)

(I) Contaminant Characteristics

Padloping Island, NU

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		A Phase III ESA was conducted by AECOM at the site August 3 to August 11, 2010 (AECOM, 2010). 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 cadmium, copper, lead, zinc, Type A PHC (F3 + F4) and Type B PHC (F1+F2+F3). No PCB exceedances were identified though they were detected in two areas. One sample was found to exceed the TDG criterion for leachable lead. A groundwater sample collected from a test pit exceeded CEQG (Aquatic Life - Freshwater) for aluminum, copper, iron and lead. PCBs and F1 to F4 PHCs were detected in the sample. A surface water sample collected from the potential drinking water lake was compared to the GCDWQ and did not meet the criterion for pH.	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	According to the attached reference material, the following known contaminants on site (AECOM, 2010) have high hazard ranking: 1. Cadmium 2. Lead 3. F1 PHC (Type B PHC)	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")?	dium (10x to 10	Lead results for one soil sample (10,000 mg/kg) exceeeds the relevant critieron (200 mg/kg) by 50x (AECOM, 2010). This is the highest exceedance.	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	4			
"Potential" - score	---			

CCME National Classification System (2008, 2010 v 1.2)

(I) Contaminant Characteristics

Padloping Island, NU

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 ha or 1000 m3	Total affected soil volume is estimated to be approximately 344 m3 (AECOM, 2010). Affected groundwater and surface water volumes have not been included.	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	2			
"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	No	The identified chemicals on site (AECOM, 2010) do not fall into the persistent chemicals category listed in the attached reference section.	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	There is currently no infrastructure at the site. All historical buildings have been partially or totally demolished (AECOM, 2010).		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	Metals, light extractable PHCs, heavy extractable PHCs (AECOM, 2010).	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	2			
"Potential" - Score	---			

Contaminant Characteristic Total

Raw Total Scores- "Known"	22
Raw Total Scores- "Potential"	0
Raw Combined Total Scores	22
Total Score (Raw Combined / 40 * 33)	**18.2**

(II) Migration Potential (Evaluation of contaminant migration pathways)

Padloping Island, NU

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 strongly suspected 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. Groundwater samples were collected from test pits completed south of the East and West Barrel Caches. The groundwater concentrations in one test pit completed south of the West Barrel Cache (W6) exceeded the relevant guidelines (Canadian Water Quality Guidelines for the Protection of Aquatic Life - Freshwater) by a factor of 2.6 to 13.3 (AECOM, 2010). The exceedances were as follows: Aluminum: 1.3 mg/L, criterion: 0.1 mg/L Copper: 0.011 mg/L, criterion: 0.002 mg/L Iron: 4.0 mg/L, criterion: 0.300 mg/L Lead: 0.0026 mg/L, criterion 0.001 mg/L There is no known contact of contaminants with the groundwater (i.e. buried debris) however the groundwater sampled from the test pit completed south of the West Barrel Cache had a hydrocarbon sheen and odour with detectable F1 to F4 PHC and PCBs. 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** Potable Environments Guidelines for Canadian Drinking Water Quality: www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/sum_guide-res_recom/index_e.html Non-Potable Environments Canadian Water Quality Guidelines for Protection of Aquatic Life. CCME. 1999 www.ccme.ca 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	All shallow test pits (0.2 to 0.6 m) had relatively rapid groundwater seepage. Mobile contaminants include F1- F4 PHCs, PCBs (present at detectable concentrations in groundwater) and Al, Cu, Fe and Pb (total concentrations exceeding in groundwater) (AECOM, 2010).	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.

(II) Migration Potential (Evaluation of contaminant migration pathways)

Padloping Island, NU

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
b. Presence of engineered sub-surface containment? No containment Partial containment Full containment Do Not Know Score	No containment 3	There is no containment at site.	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 Score	3 m or less 1	No confining layer of geologic material was observed (AECOM, 2010).	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: 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	Hydraulic conductivity was not measured but is assumed from the attached reference material sheet (silty sand (10^-5 to 10^-1) and gravel (10^-1 to 10^2)).	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	Low 0.4	Annual precipitation = 602.5 mm Precipitation factor = 0.6 (calculated as indicated in cell to the right) Permeability factor = 0.6 (assuming sand) Precipitation infiltration rate = 0.36 (calculated as indicated in cell to the right)	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 cm/s 2	Hydraulic conductivity was not measured but is assumed from the attached reference material sheet (silty sand (10^-5 to 10^-1) and gravel (10^-1 to 10^2)).	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	11.4			
Allowed Potential score	---	Note: If a "known" score is provided, the "potential" score is disallowed.		
Groundwater pathway total	**12**			

(II) Migration Potential (Evaluation of contaminant migration pathways)

Padloping Island, NU

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
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). ii) Same as (i) except the information is not known but <u>strongly suspected</u> based on indirect observations. iii) Meets CWQG or absence of surface water exposure pathway (i.e., Distance to nearest surface water is > 5 km.) Score	12 8 0 Go to Potential ---	Surface water in the Freshwater Lake does not meet the guideline for pH (6.5 to 9) but does not exceed by >1 X with a value of 6.1. A pH of 6.1 is not atypical when considering the underlying geologic formations (Hamilton et. al., 2001 - referenced in AECOM, 2010). There were a few empty barrels identified in the shallow part of the Freshwater Lake. Since there was no known contact of contaminants with the surface water and the only parameter that did not comply with the guidelines was pH, the potential scoring has been used. Four other surface water samples were collected were from the ocean, and all values complied with the relevant guidelines (Canadian Water Quality Guidelines for the Protection of Aquatic Life - Marine). There are two sunken barges present in the marine environment south of the Station Area. Since there was no known contact of contaminants with the marine surface water and there were no exceeding parameters, the potential scoring has been used.	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.
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	There is no containment at site.	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	COPCs have been identified within 30 m of the marine habitat.	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	Contaminants have been identified at surface and shallow depth. The overall site slope is intermediate.	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.).	

CCME National Classification System (2008, 2010 v 1.2)

(II) Migration Potential (Evaluation of contaminant migration pathways)

Padloping Island, NU

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
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 = 602.5 mm Precipitation factor = 0.6 (calculated as indicated in cell to the right) Infiltration factor = 0.3 (assuming sand) Run-off Potential = 0.18 (calculated as indicated in cell to the right)	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	9.7	Note: If a "known" score is provided, the "potential" score is disallowed.		
Surface water pathway total	**9.7**			
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. Strongly suspected that soils exceed guidelines COPCs in surface soils does not exceed the CCME soil quality guideline or is not present (i.e., bedrock). Score	12 9 0 12 12	COPCs measured in surface soils exceed relevant site guidelines (DEW Line Cleanup Criteria) outlined in the INAC Abandoned Military Site Remediation Protocol (2009). The elements that exceeded included: cadmium, copper, lead, zinc, leachable lead, Type A PHC and Type B PHC (AECOM, 2010).	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
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				
a. Are the soils in question covered? Exposed Vegetated Landscaped Paved Do Not Know Score	Exposed 6	Soils are exposed with limited moss cover 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.
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 Score	>30% of year 0	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).	

(II) Migration Potential (Evaluation of contaminant migration pathways)

Padloping Island, NU

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
Potential surface soil pathway total Allowed Potential score **Soil pathway total**	6 --- **12**	**Note: If a "known" score is provided, the "potential" score is disallowed.**		
4. Vapour				
A. Demonstrated COPCs in vapour.				
Vapour has been measured (indoor or outdoor) in concentrations exceeding risk based concentrations. Strongly suspected (based on observations and/or modelling) Vapour has not been measured and volatile hydrocarbons have not been found in site soils or groundwater. Score	12 9 0 Go to Potential ---	VOCs were measured in some soil samples and were found to be below risk based concentrations.	Consult previous investigations, including human health risk assessments, for reports of vapours detected.	
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 Score	Low 1	Low volatility has been applied because there are minimal detectable BTEXs (H ranges from 5.19 to 7.88E-0.3).	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.
b. What is the soil grain size? Fine Coarse Do Not Know Score	Coarse 4	Bulk sampling completed for soil samples indicate coarse grained material onsite.	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).	
c. Is the depth to the source less than 10m? Yes No Do Not Know Score	Yes 2	Contaminants have been identified at surface and shallow depth.	Review groundwater depths below grade for the site.	
d. Are there any preferential pathways? Yes No Do Not Know Score	No 0	There are no subsurface structures (i.e. Pipelines etc.)	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.
Potential vapour pathway total Allowed Potential score **Vapour pathway total**	7 7 **7**	Note: If a "known" score is provided, the "potential" score is disallowed.		

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(II) Migration Potential (Evaluation of contaminant migration pathways)

Padloping Island, NU

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 do not contain COPCs though there is potential for impact since there is minimal distance between debris and barrels stored on the beach and the ocean (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		Sediments do not contain COPCs.		
a. Are the sediments having COPC exceedances capped with sediments having no exceedances ("clean sediments")?	Yes		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	0			
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?	No		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	0			
c. For rivers, are the contaminated sediments in an area prone to sediment scouring?	No		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	
Yes No Do Not Know	0			
Potential sediment pathway total	0			
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	24	
Raw "potential" total	16.7	
Raw combined total	40.7	Note: If "Known" and "Potential" scores are provided, the checklist defaults to known. Therefore,
Total (max 33)	**21.0**	the total "Potential" Score may not reflect the sum of the individual "Potential" scores.

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(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Padloping Island, NU

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 ---	While there are COPCs that exceed relevant criteria, the site is not regularly frequented by humans. The site has been used occasionally by local people for hunting and fishing. Potential Scoring is used.	*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, especially near the beach/barge area, is occasionally used by the local population for camping, hunting and fishing.	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 access is uncontrolled and the contaminants are not well covered.	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	The site, especially near the beach/barge area, is occasionally used by the local population for camping, hunting and fishing.	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 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	No 0 Coarse 1 1	Bulk sampling completed for soil samples indicate coarse grained material onsite.	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. 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.	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

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Padloping Island, NU

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for human exposure				
iii) Ingestion (i.e., ingestion of food items, water and soils [for children]), including traditional foods. 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	There is debris within 100 m of the Freshwater Lake on site however most debris is centered at the Main Station which is more than a km away from the lake.	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 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.	**Selected References:** Guidelines for Canadian Drinking Water Quality: www.hc-sc.gc.ca/hecs-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.
Score	3			
Is an alternative water supply readily available? Yes No Do Not Know	No	There is debris within 100 m of the Freshwater lake, the only available supply of freshwater on the Island.		
Score	1			
Is human ingestion of contaminated soils possible? Yes No Do Not Know	Yes	The site is occasionally used by local people for hunting and fishing.	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 for the site to be 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	The site, especially near the beach/barge area, is occasionally used by the local population for camping, hunting and fishing.		
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		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)

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Padloping Island, NU

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
B. Potential for ecological exposure (for the contaminated portion of the site)				
a) Terrestrial i) Land use Agricultural (or Wild lands) Residential/Parkland Commercial Industrial Do Not Know	Agricultural (or Wild lands	When considering the definitions of land use for ecological receptors, the site is considered to be Wild lands since it is habitat to polar bears (observed on-site) (AECOM, 2010).	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). 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).	
Score	3			
ii) Uptake potential Direct Contact - Are plants and/or soil invertebrates likely exposed to contaminated soils at the site? Yes No Do Not Know	Yes	Impacted soils are located within the upper 1.5 m of the site.	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.	
Score	1			
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	Yes		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.	
Score	1			
Are terrestrial animals likely to be ingesting contaminated soils at the site? Yes No Do Not Know	Yes		Refer to an Ecological Risk Assessment report. Most animals will co-ingest some soil while eating plant matter or soil invertebrates.	
Score	1			
Can the contamination identified bioaccumulate? Yes No Do Not Know	Yes	Animals (polar bears, caribou, arctic fox, hare, etc.) are likely to ingest contaminated surface water and contaminated soils that contain lead at site. Lead can bioaccumulate. In addition, PCBs have been found at low concentrations in soils. The site is frequented by polar bears, identified as a species at risk.	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.	
Score	1			
Distance to sensitive terrestrial ecological area 0 to 300 m 300 m to 1 km 1 to 5 km > 5 km Do Not Know	0 to 300 m		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.
Score	3			
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	Sensitive	The primary aquatic environment at the site is the Delight Anchorage which is considered to be a sensitive aquatic environment. Whales, seals, walrus and fish are in the vicinity of the site.	"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.	
Score	3			

(III) Exposure (Demonstrates the presence of an exposure pathway and receptors)

Padloping Island, NU

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
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	Do Not Know	Groundwater seepage was not observed. Sampling was not conducted at point of contact.	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.	
Score	0.5			
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	0 to 300 m	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.
Score	3			
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	Yes		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.	
Score	1			
Raw Aquatic Total Potential	7.5	Note if a "Known" Ecological Effects score is provided, the "Potential" score is disallowed.		
Allowed Aquatic Total Potential	7.5			
4. Ecological Exposure Modifying Factors				
a) Known occurrence of a species at risk. Is there a potential for a species at risk to be present at the site? Yes No Do Not Know	Yes	The site is a habitat for species of special concern (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
	2			
Score	---			
b) Potential impact of aesthetics (e.g., enrichment of a lake or tainting of food flavor).		There are two sunken barges located near the shoreline, south of the Station Area.		
Is there evidence of aesthetic impact to receiving water bodies? Yes No Do Not Know	Yes 2 ---		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.
Is there evidence of olfactory impact (i.e., unpleasant smell)? Yes No Do Not Know	Yes 2 ---	In some areas, the soil has a slight hydrocarbon odor.	Examples of olfactory change can include the smell of a COPC or an increase in the rate of decay in an aquatic habitat.	
Is there evidence of increase in plant growth in the lake or water body? Yes No Do Not Know	No 0 ---		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.	
Is there evidence that fish or meat taken from or adjacent to the site smells or tastes different? Yes No Do Not Know	No 0 ---	Local people were fishing on site and did not indicate any such problems. No hunting was conducted during the site visit.	Some contaminants can result in a distinctive change in the way food gathered from the site tastes or smells.	
Ecological Modifying Factors Total - Known	**6**			
Ecological Modifying Factors Total - Potential	**---**			
Raw Ecological Total - Known	6			
Raw Ecological Total - Potential	17.5			
Raw Ecological Total	23.5			
Ecological Total (Max 18)	**18.0**			

Definition	Score	Rationale for Score (document any assumptions, reports, or site-specific information; provide references)	Method Of Evaluation	Notes
5. Other Potential Contaminant Receptors				
a) Exposure of permafrost (leading to erosion and structural concerns)		No roads or structures are dependent on permafrost at the site.\		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?	No		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	0			
Do Not Know	---			
Is there a physical pathway which can transport soils released by damaged permafrost to a nearby aquatic environment?	Yes	The site is adjacent to the arctic Ocean and melting permafrost can lead to transport of contaminants to the aquatic environment.	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	2			
Do Not Know	---			
Other Potential Receptors Total - Known	**2**			
Other Potential Receptors Total - Potential	**0**			

Exposure Total		
Raw Human Health + Ecological Total - Known	14	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	33.5	
Raw Total	47.5	
Exposure Total (max 34)	**35.1**	

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	4	---
4. Contaminant Quantity	2	---
5. Modifying Factors	2	---
Raw Total Score	22	0
Raw Total Score (Known + Potential)	22	
Adjusted Total Score (Raw Total / 40 *33)	**18.2**	(max 33)

II. Migration Potential

	Known	Potential
1. Groundwater Movement	12	---
2. Surface Water Movement	---	9.7
3. Soil	12	---
4. Vapour	---	7
5. Sediment Movement	0	---
6. Modifying Factors	0	0
Raw Total Score	24	16.7
Raw Total Score (Known + Potential)	40.7	
Adjusted Total Score (Raw Total / 64 * 33)	**21.0**	(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	---
Raw Total Ecological Score	6	17.5
Raw Total Ecological Score (Known + Potential)	23.5	
Adjusted Total Ecological Score	18.0	(maximum 18)
5. Other Receptors	2	0
Total Other Receptors Score (Known + Potential)	2	
Total Exposure Score (Human + Ecological + Other)	**42.0**	
Adjusted Total Exposure Score (Total Exposure / 46 * 34)	**31.0**	(max 34)

Site Score

Padloping Island, NU

Site Letter Grade	**C**
Certainty Percentage	**75%**
% Responses that are "Do Not Know"	**-16%**
Total NCSCS Score for site	**70.2**
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.