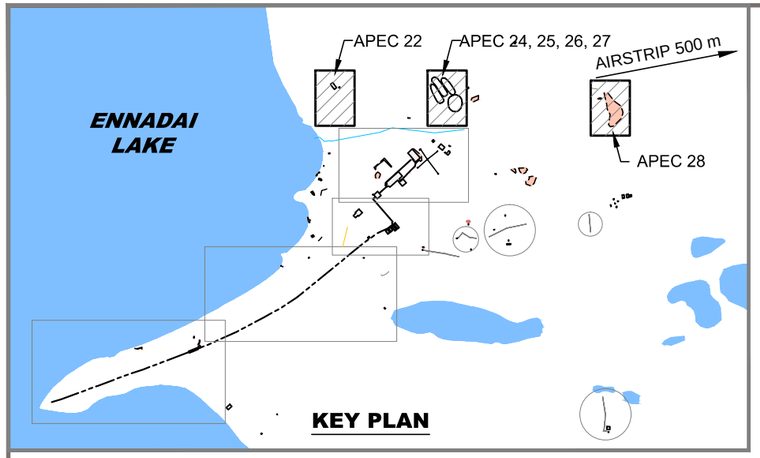
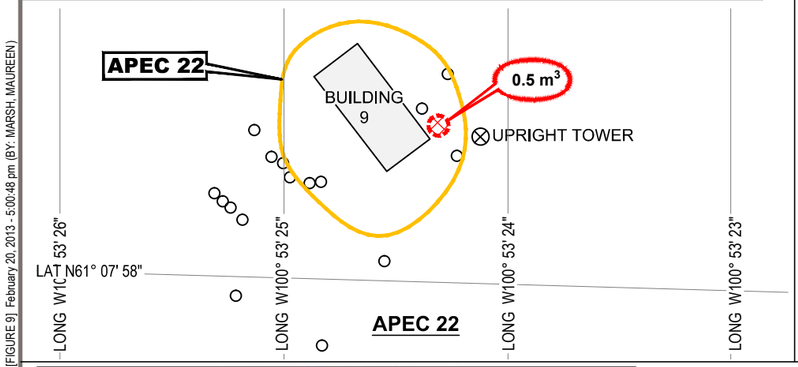
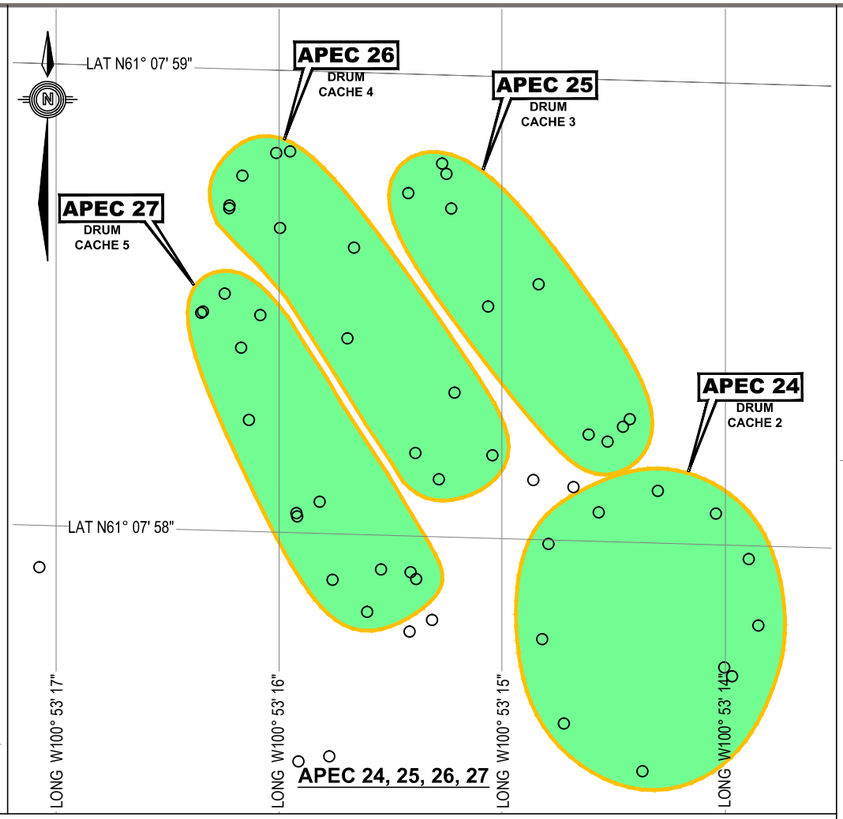
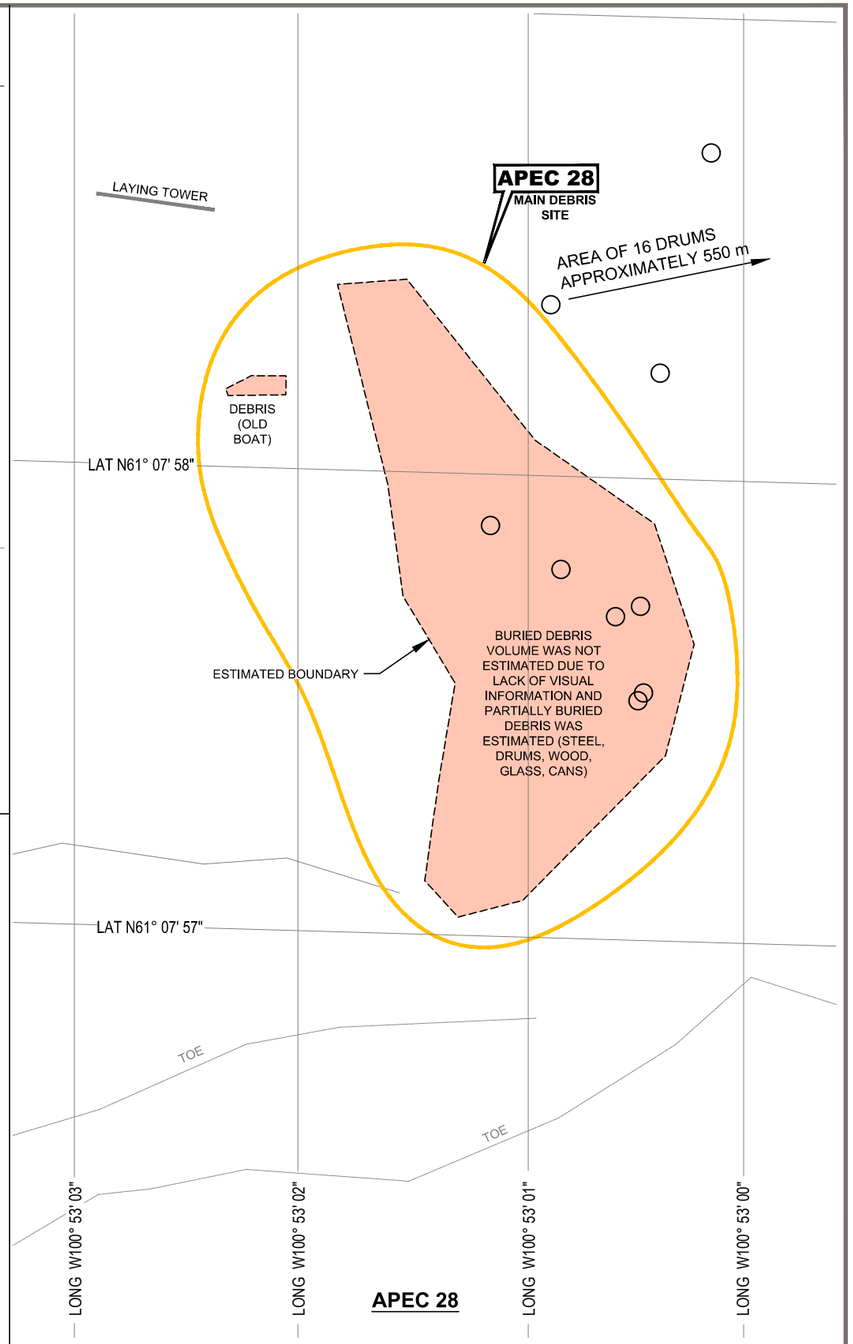








Ennadai Lake RAP Inventory Table

APEC #	Material Type	Material Description	Volume (m^3)
22 Building 9	Non-hazardous	Wood Waste	15
		Concrete (Crown land)	12
		Other Waste	71
	Hazardous	Other Hazardous Waste	0.1
		Asbestos Waste	3
		Total Lead and Leachable Lead Paint on Drums	11 drums
		Liquid Organic Waste in Drums	220 L
		Fire Extinguisher	0.02
24 Drum Cache 2	Non-Hazardous	Liquid Organic Waste in Drums	50 L
		Other Waste	30 drums
	Hazardous	Total Lead and Leachable Lead Paint on Drums	75 drums
25 Drum Cache 3	Non-Hazardous	Other Waste	317 drums
	Hazardous	Liquid Organic Waste in Drums	50 L
		Total Lead and Leachable Lead Paint on Drums	3 drums
26 Drum Cache 4	Non-Hazardous	Other Waste	130 drums
	Hazardous	Total Lead and Leachable Lead Paint on Drums	5 drums
27 Drum Cache 5	Non-Hazardous	Other Waste	225 drums
	Hazardous	Total Lead and Leachable Lead Paint on Drums	5 drums

Table Continued

28 Main Debris Area	Non-Hazardous	Wood Waste	2
		Other Waste	8, 17 drums
	Hazardous	Total Lead and Leachable Lead Paint on Wood and Metal	4
		Total Lead and Leachable Lead Paint on Drums	1 drum
		Other Hazardous Waste	1
N/A Scattered Debris throughout and adjacent to the Site	Non-Hazardous	Wood Waste	2
		Other Waste	31
		Concrete (Crown land)	11
	Hazardous	Asbestos Waste	1
		Total Lead and Leachable Lead Paint on Metal, Wood and Metal Towers	10
		Total Lead and Leachable Lead Paint on Drums	31 drums
		Other Hazardous Waste	10.6
		Liquid Organic Waste in Drums	3075 L

Notes:

1. All volumes: Uncrushed
2. Volumes of total lead and leachable lead paint include the painted substrate
3. Drum volumes are the number of drums, not m^3
4. Liquid volumes are in litres, not m^3

N/A = Not Applicable

LEGEND

- DRUM(S) (205 L)
- DRUM(S) (20 L)
- APEC - AREA OF POTENTIAL ENVIRONMENTAL CONCERN
- BUILDINGS
- DEBRIS
- DRUM CACHE
- METALS IMPACTED SOIL
- HYDROCARBON IMPACTED SOIL

ISSUED FOR USE

0 20 m

Scale: 1: 400

CLIENT

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

REMEDIAL ACTION PLAN FORMER WEATHER STATION ENNADAI LAKE, NU

SITE PLAN SHOWING NON-HAZARDOUS AND HAZARDOUS WASTE AND SOIL EXCEEDANCES

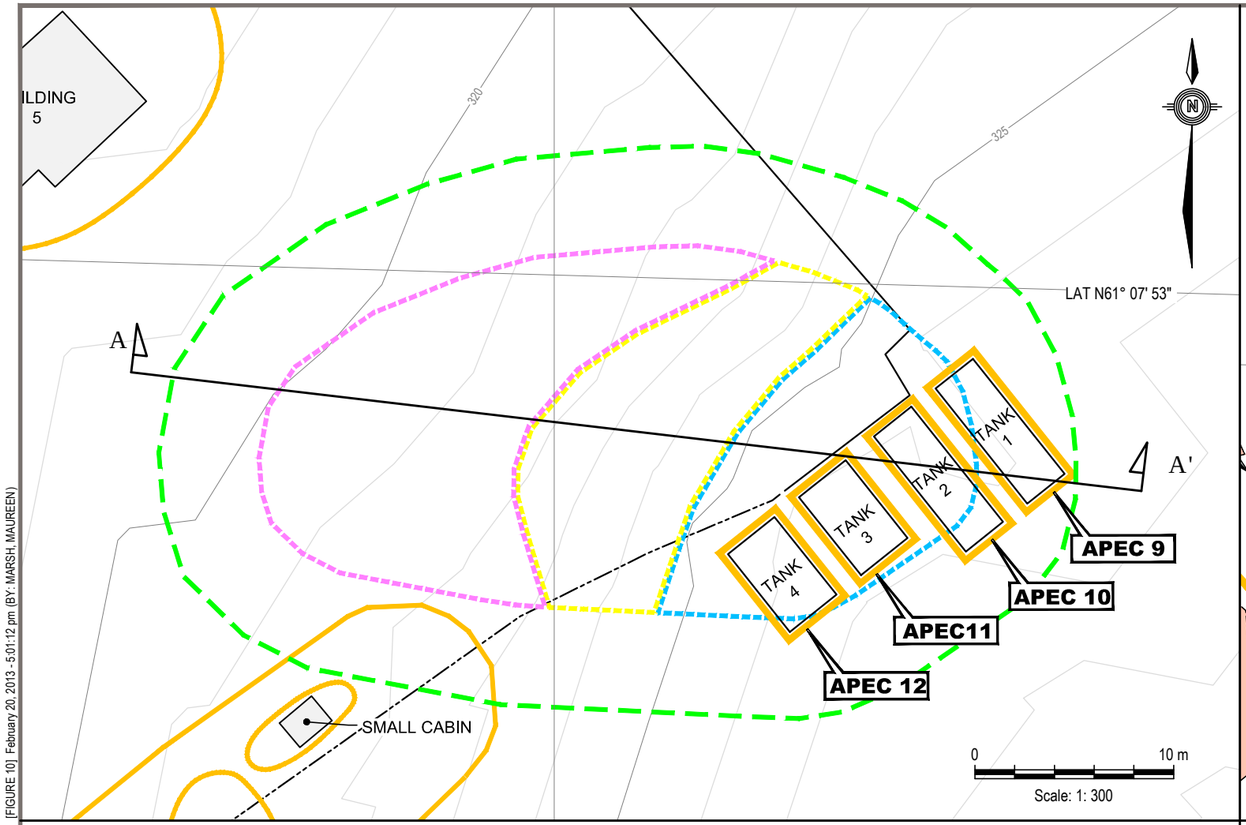
A TETRA TECH COMPANY

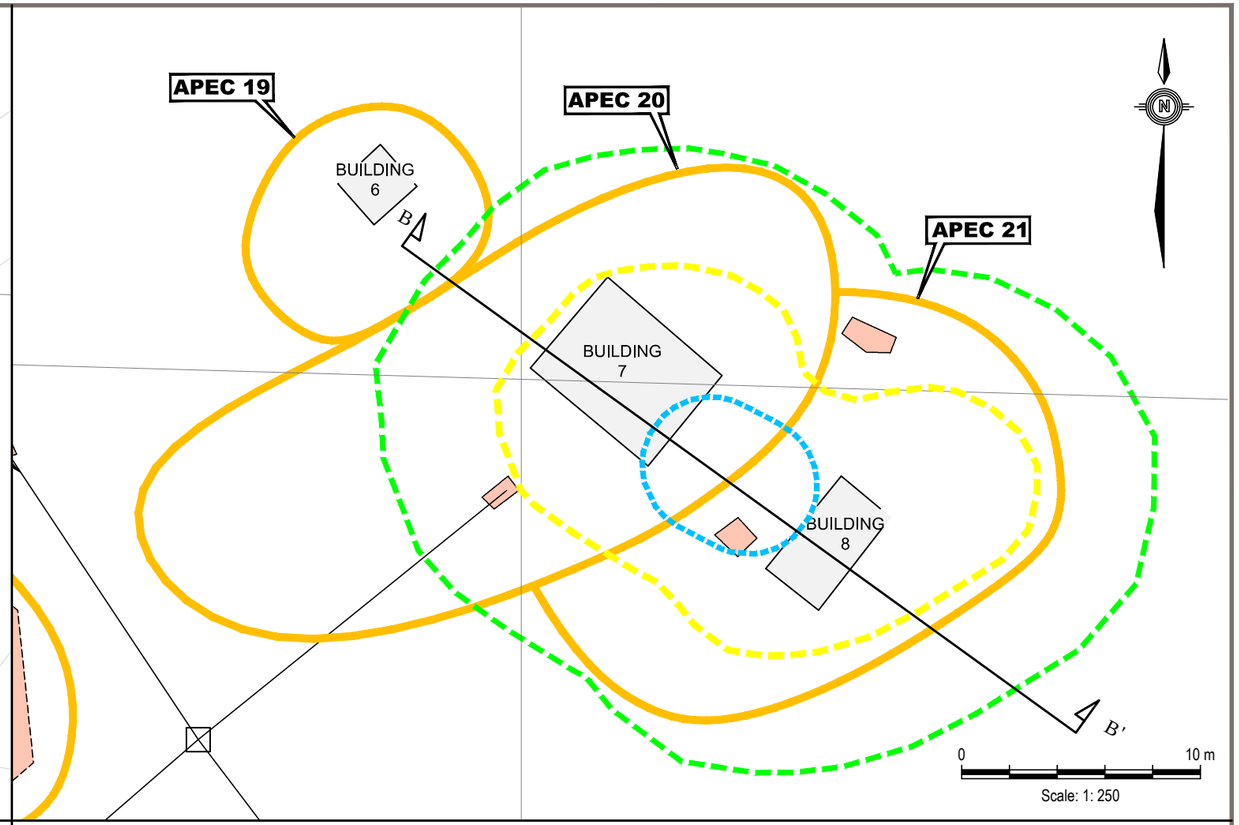
PROJECT NO.	DWN	CKD	REV
Y22101286	MM	MC	0

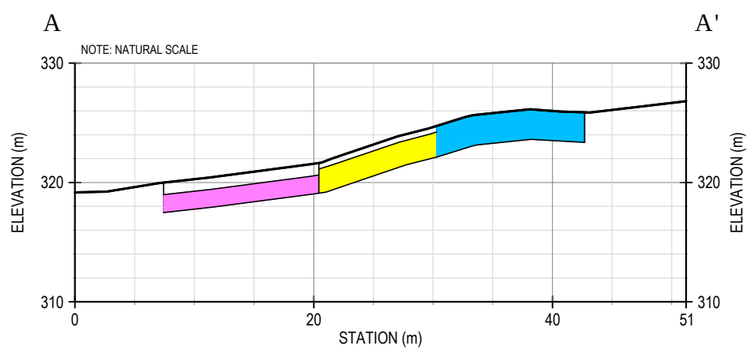
OFFICE: EDM

DATE: February 2013

Figure 9







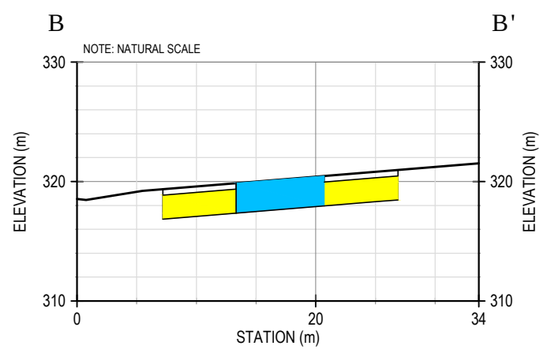
SCHEMATIC PROFILE OF IMPACTED SOIL
(Refer to Figure 7 for location of impacted soil)

AREA 1
-CONTAMINATED SOIL 0 - 2.5 m bgl

AREA 2
-CONTAMINATED SOIL 0.5 - 2.5 m bgl

AREA 3
-CONTAMINATED SOIL 1.0 - 2.5 m bgl

AREA 4
-EXCAVATION REQUIRED FOR SLOPE STABILITY AND EGRESS



SCHEMATIC PROFILE OF IMPACTED SOIL
(Refer to Figure 8 for location of impacted soil)

AREA 1
-CONTAMINATED SOIL 0 - 2.5 m bgl

AREA 2
-CONTAMINATED SOIL 0.5 - 2.5 m bgl

AREA 3
-REQUIRED FOR SLOPE STABILITY AND EGRESS OF EXCAVATION AREA

AREA 4
-SECONDARY IMPACT AREA

ISSUED FOR USE

CLIENT

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

A TETRA TECH COMPANY

REMEDIAL ACTION PLAN
FORMER WEATHER STATION
ENNADAI LAKE, NU

PLAN AND SCHEMATIC PROFILE OF IMPACTED SOIL AREAS

PROJECT NO.	DWN	CKD	REV
Y22101286	MM	MC	0
OFFICE: EDM	DATE: February 2013		

Figure 10

Q:\Edmonton\Drafting\PROJECTS\Y2211\Y22101286 Ennadai\Autocad\ RAP\ISSUED FOR USE\Hazmat + Soil Figures 5-10\Y22101286 RAP Figures 5 to 10 IFU.dwg [FIGURE 10] February 20, 2013 - 5:01:12 pm (BY: MARSH, MAUREEN)

ENNADAI LAKE

LANDFILL 1
LANDFILL 2
LANDFILL 3
LANDFARM 2
LANDFARM 1

B1
B2
B4
B5
B6
B7
B8

TP9-S09
TP08-S08
TP10-S10
TP04-S04
PH05-S05
TP07-S07
PH06-S06
PH03-S03
PH02-S02
TP01-S01
TP13-S13
TP12-S12
TP19-S19
TP20-S20
TP16-S16
TP15-S15
TP14-S14

GEOTECH 1
GEOTECH 2
GEOTECH 3
GEOTECH 4
GEOTECH 5
GEOTECH 6

ENVIRONMENT CANADA WEATHER STATION (BOUNDARIES ARE APPROXIMATE)

LEGEND:

- INUIT OWNED LAND
- DRAINAGE CHANNEL
- BORROW SOURCE
- SAMPLING LOCATION
- SPRING
- ENVIRONMENTAL RESTRICTED AREA
- POTENTIAL LOCATION OF LANDFILL AND LANDFARM
- PROPOPSED LOCATION FOR LANDFILL AND LANDFARM

ISSUED FOR USE

0 200 m

Approximate Scale 1: 6 000

CLIENT

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

REMEDIAL ACTION PLAN
FORMER WEATHER STATION
ENNADAI LAKE, NU
SITE PLAN SHOWING
LANDFILL, LANDFARM, BORROW AREAS AND SAMPLE LOCATIONS

A TETRA TECH COMPANY

PROJECT NO.	DWN	CKD	REV
Y22101286	MM	KO	0

OFFICE	DATE
EDM	February 2013

Figure 11

Q:\Edmonton\Drafting\PROJECTS\Y2201\Y22101286 Ennadai\Autocad\ RAP\ISSUED FOR USE\Geotech Figures 11-14\Y22101286 RAP Figure 11 and 14 IFU.dwg [FIGURE 11] February 20, 2013 - 5:35:32 pm (BY: MARSH, MAUREEN)

B8

LANDFARM 2

B1

LANDFILL 2

B6

B5

ENVIRONMENT CANADA
WEATHER STATION
(BOUNDARIES ARE
APPROXIMATE)

B2

B7

LEGEND:

- INUIT OWNED LAND
- SPRING
- DRAINAGE CHANNEL
- BORROW SOURCE
- ATV TRAIL
- POTENTIAL NEW ROAD ROUTE
- ENVIRONMENTAL RESTRICTED AREA
- FOOTPRINT OF DESIGNED LANDFILL AND PREFERRED LOCATION FOR LANDFARM

ISSUED FOR USE

0 100

Scale: 1: 2 500 (metres)

CLIENT

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

eba A TETRA TECH COMPANY

REMEDIAL ACTION PLAN
FORMER WEATHER STATION
ENNADAI LAKE, NU

SITE PLAN SHOWING
FOOTPRINT OF DESIGNED LANDFILL AND PREFERRED LOCATION FOR LANDFARM

PROJECT NO.	DWN	CKD	REV
Y22101286	MM	KK	0

OFFICE: EDM

DATE: February 2013

Figure 12

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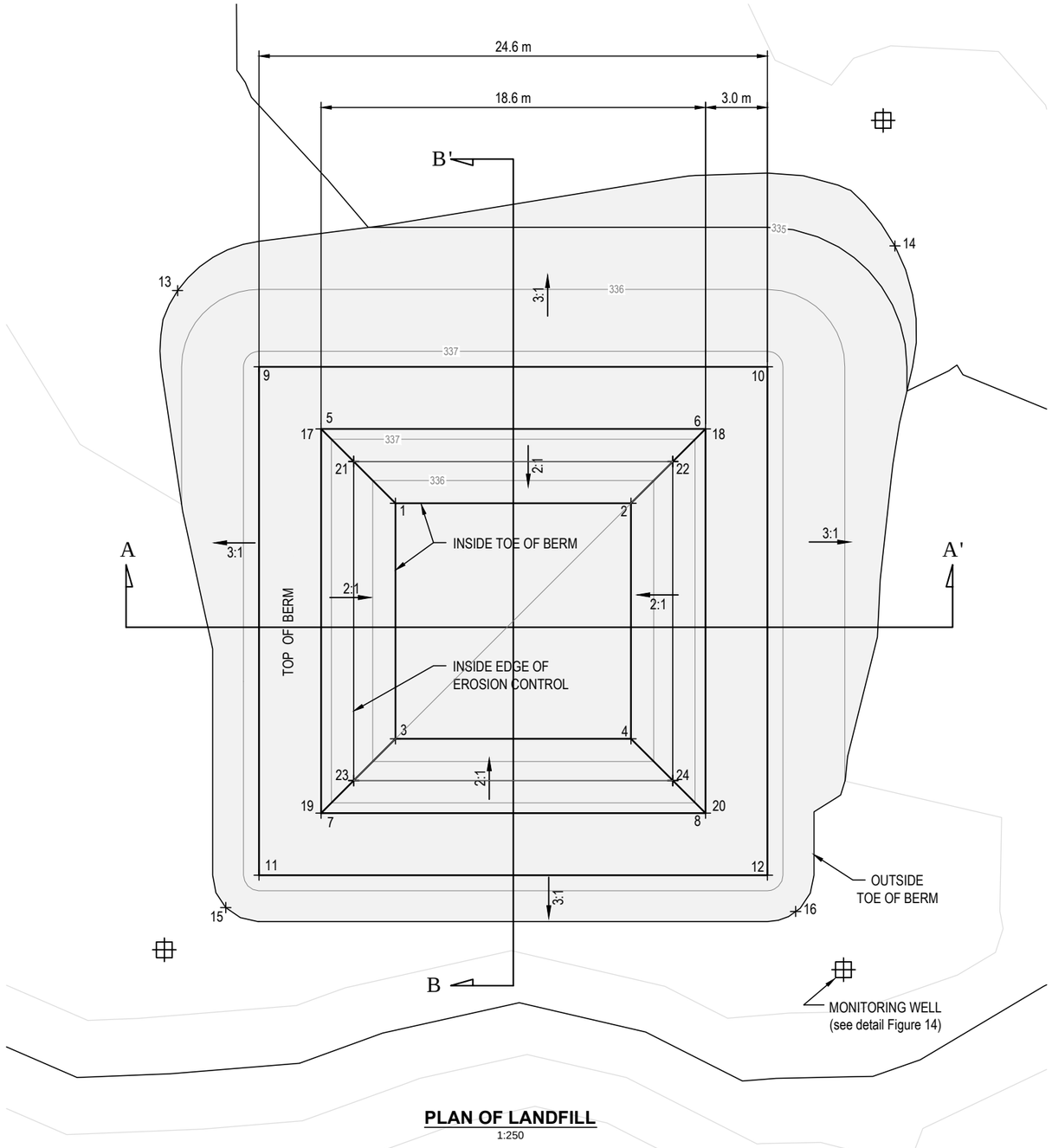
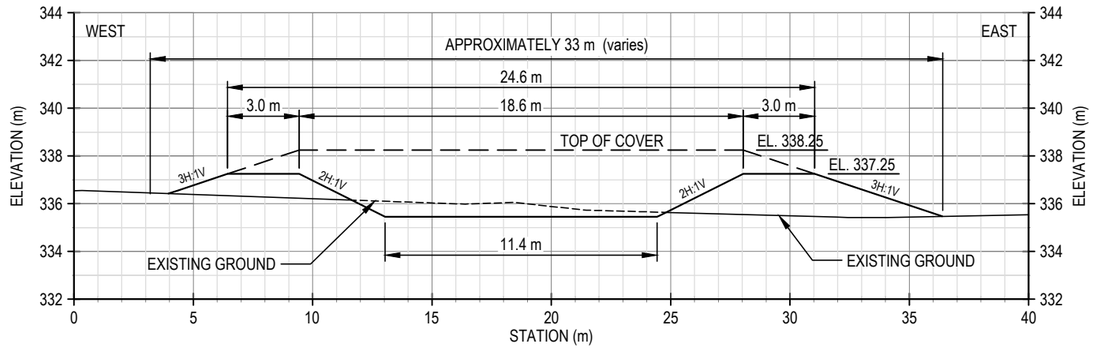
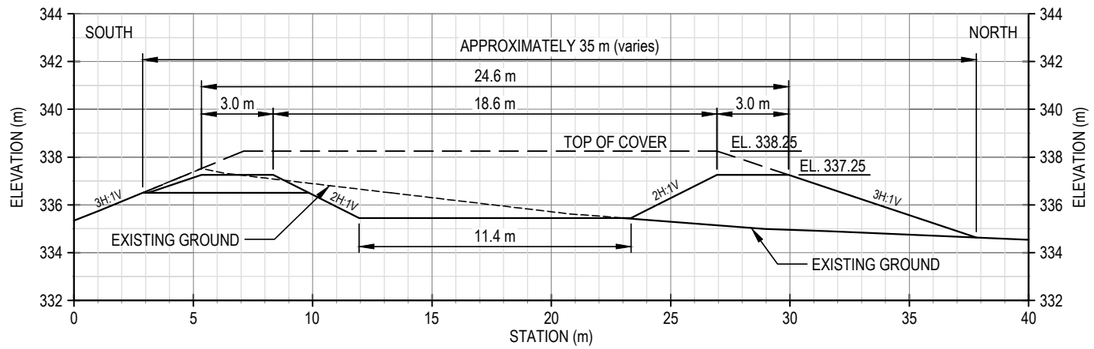


PLAN OF LANDFILL

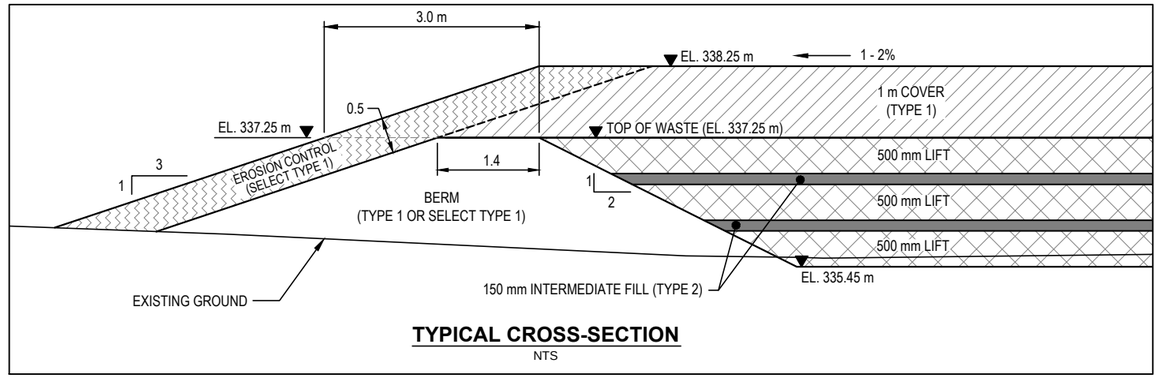
1:250



CROSS-SECTION A-A'



CROSS-SECTION B-B'



TYPICAL CROSS-SECTION

NTS

NOTES:

1. HEIGHT OF PERIMETER BERMS MAY VARY DEPENDING ON SURROUNDING TOPOGRAPHY AND FINAL DESIGN GRADES AND ELEVATIONS.
2. ALL DIMENSIONS SHOWN ARE DESIGN MINIMUMS UNLESS OTHERWISE NOTED.

LEGEND:

- PROPOSED GROUNDWATER MONITORING WELL (LOCATION TO BE CONFIRMED PRIOR TO INSTALLATION)

LAYOUT POINTS				
POINT	DESCRIPTION	NORTHING	EASTING	ELEVATION (m)
1	INSIDE TOE OF BERM	6779015.354	398528.663	335.450
2	INSIDE TOE OF BERM	6779015.354	398540.063	335.450
3	INSIDE TOE OF BERM	6779003.954	398528.663	335.450
4	INSIDE TOE OF BERM	6779003.954	398540.063	335.450
5	CREST OF BERM	6779018.954	398525.063	337.250
6	CREST OF BERM	6779018.954	398543.663	337.250
7	CREST OF BERM	6779000.354	398525.063	337.250
8	CREST OF BERM	6779000.354	398543.663	337.250
9	CREST OF BERM	6779021.954	398522.063	337.250
10	CREST OF BERM	6779021.954	398546.663	337.250

LAYOUT POINTS				
POINT	DESCRIPTION	NORTHING	EASTING	ELEVATION (m)
11	CREST OF BERM	6778997.354	398522.063	337.250
12	CREST OF BERM	6778997.354	398546.663	337.250
13	OUTSIDE TOE OF BERM	6779025.647	398518.121	335.450
14	OUTSIDE TOE OF BERM	6779027.808	398552.835	334.415
15	OUTSIDE TOE OF BERM	6778995.785	398520.451	336.500
16	OUTSIDE TOE OF BERM	6778995.598	398548.029	336.500
17	TOP OF COVER	6779018.954	398525.063	338.250
18	TOP OF COVER	6779018.954	398543.663	338.250
19	TOP OF COVER	6779000.354	398525.063	338.250
20	TOP OF COVER	6779000.354	398543.663	338.250

LAYOUT POINTS				
POINT	DESCRIPTION	NORTHING	EASTING	ELEVATION (m)
21	INSIDE EDGE OF EROSION CONTROL	6779017.373	398526.644	338.250
22	INSIDE EDGE OF EROSION CONTROL	6779017.373	398542.082	338.250
23	INSIDE EDGE OF EROSION CONTROL	6779001.935	398526.644	338.250
24	INSIDE EDGE OF EROSION CONTROL	6779001.935	398542.082	338.250

ISSUED FOR USE

CLIENT

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

REMEDIAL ACTION PLAN
FORMER WEATHER STATION
ENNADAI LAKE, NU

LANDFILL CONCEPTUAL DESIGN PLAN

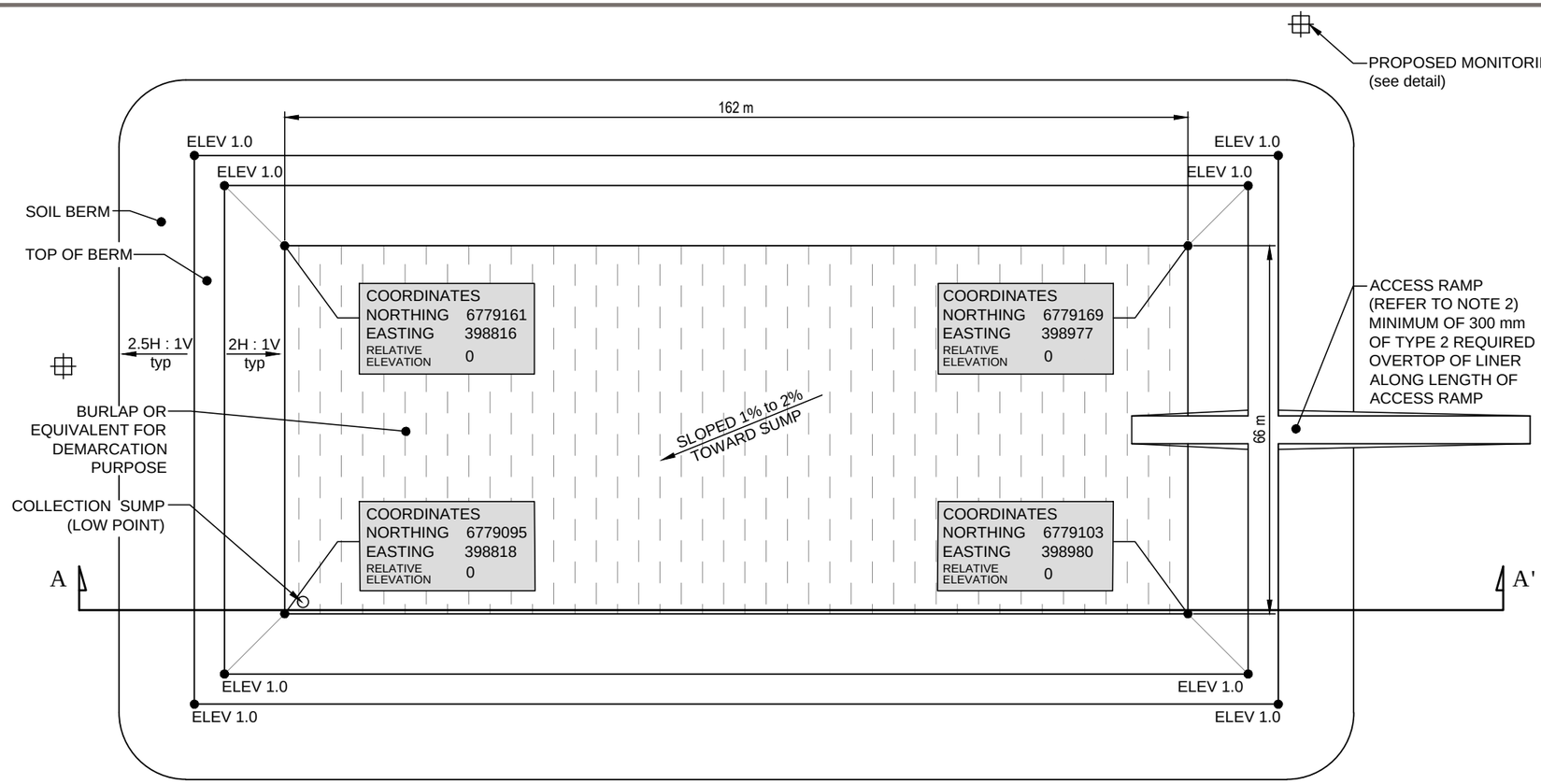
eba A TETRA TECH COMPANY

PROJECT NO.	DWN	CKD	REV
Y22101286	EL	KO	0

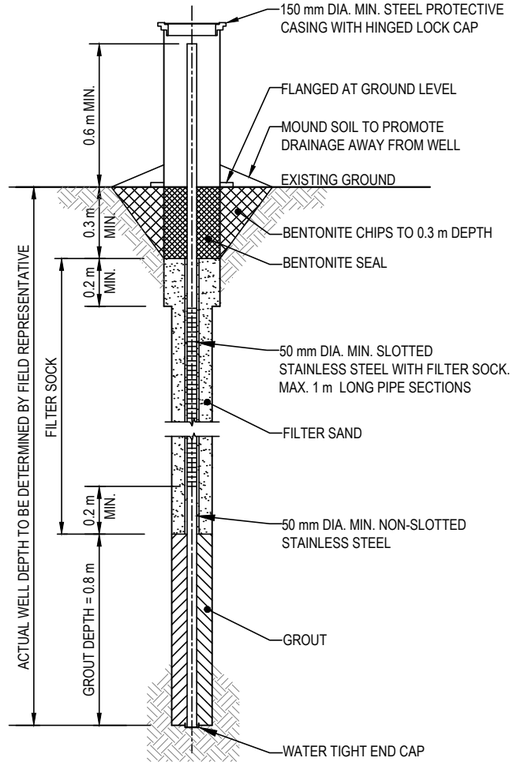
OFFICE: EDM

DATE: February 2013

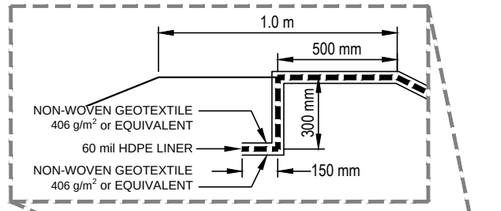
Figure 13



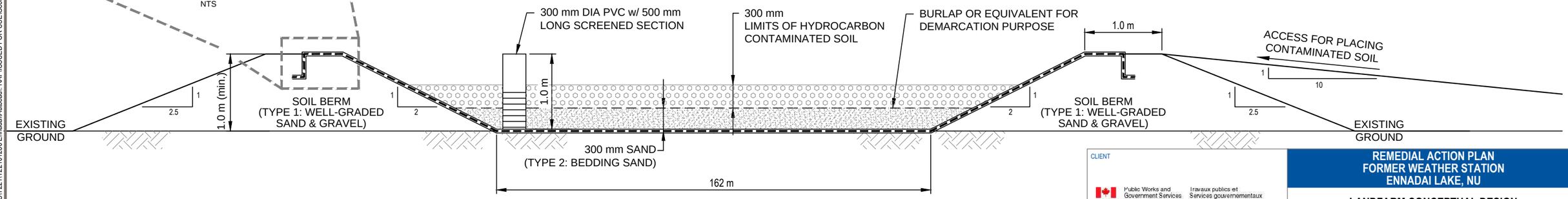
PLAN OF LANDFARM
NTS



DETAIL OF MONITORING WELL
NTS



ANCHOR TRENCH DETAIL
NTS



TYPICAL CROSS-SECTION A - A'
NTS

LEGEND:

- PROPOSED GROUNDWATER MONITORING WELL (LOCATION TO BE CONFIRMED PRIOR TO INSTALLATION)

NOTE:

ALL DIMENSIONS SHOWN ARE DESIGN MINIMUMS UNLESS OTHERWISE NOTED

ISSUED FOR USE

CLIENT

Public Works and Government Services Canada / Travaux publics et Services gouvernementaux Canada

REMEDIAL ACTION PLAN
FORMER WEATHER STATION
ENNADAI LAKE, NU

LANDFARM CONCEPTUAL DESIGN
PLAN AND SECTION

eba A TETRA TECH COMPANY

PROJECT NO.	DWN	CKD	REV
Y22101286	MM	CC/EG	0

OFFICE	DATE
EDM	February 2013

Figure 14

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APPENDIX A
TERMS OF REFERENCE

TERMS OF REFERENCE

PHASE III ENVIRONMENTAL SITE ASSESSMENT
REMEDIAL ACTION PLAN
ARCHAEOLOGICAL ASSESSMENT
ENVIRONMENTAL IMPACT ASSESSMENT
REMEDIAL DESIGN

FOR

ENNADAI LAKE FORMER WEATHER STATION
NUNAVUT

Prepared by: Northern Contaminated Site Group
Public Works and Government Services Canada
April, 2012

Prepared for: Contaminated Sites Program, Nunavut Region
Aboriginal Affairs and Northern Development Canada

Issued April 24, 2012

TABLE OF CONTENTS

1.0 GENERAL INFORMATION

.1 General

As the custodian of most federal lands in the North, Aboriginal Affairs and Northern Development Canada (AANDC) has responsibility, through the Contaminated Sites Program (CSP), to manage a number of contaminated properties that are no longer maintained by the original occupant. AANDC's portfolio of contaminated sites in the North originated from private sector mining, oil and gas activities and government military activity dating back over half a century, many years before the environmental impacts of such activities were adequately understood. The former Ennadai Lake weather station site in Nunavut is one of these sites.

This Terms of Reference (ToR) has been developed on behalf of AANDC to solicit professional services from a qualified firm composed of environmental, geotechnical and engineering specialists with the capability and expertise to successfully complete an investigation at the study site, report on their findings and ultimately develop design documents.

The AANDC Nunavut Regional Office Contaminated Sites Program and PWGSC Northern Contaminated Sites will eventually be carrying out the remediation of the Ennadai Lake site. A Phase III Environmental Site Assessment (ESA), Hazardous and Non-hazardous Materials Audit and Geotechnical Evaluation of this site will be completed to support this remediation work. This TOR consists of an evaluation of the existing site information, identification of any information gaps and the implementation of a detailed assessment plan to fill in the information gaps identified. Following a thorough review of all available site information and studies previously conducted, a Phase III Site Assessment, Remedial Action Plan (RAP), Environmental Impact Assessment (EIA) and a detailed site remediation cost estimate will be developed.

All project activities must be carried out in accordance with the latest version of the *Abandoned Military Site Remediation Protocol* developed by AANDC (available upon request). PWGSC, on behalf of AANDC is inviting a proposal from your firm to complete the scope of work and adhere to all standards and guidelines outlined in this document. The Consultant will be expected to provide a full range of environmental consulting and engineering services including but not limited to preparation of reports, specifications and cost estimates. The Consultant will be the prime contractor/consultant and will be responsible to coordinate any sub-consultant/contractor or specialty consultant. The services outlined apply not only to the Consultant, but to any sub-consultant and specialty consultant disciplines that may be required. The project is being funded through the Federal Contaminated Sites Action Plan (FCSAP) and must be compliant with FCSAP requirements including reporting structures and submission deadlines.

Federal Contaminated Sites Action Plan (FCSAP)

Federal contaminated sites are a legacy of past land use practices when the environmental consequences were not appreciated. Since 1999, Treasury Board Secretariat (TBS) has approved a Management Framework of policies and best practices including the Federal Contaminated Sites Management Policy (TBS, 2000b). Under this Policy, individual departments are responsible for managing their contaminated sites within existing budgets.

FCSAP is administered jointly by TBS and Environment Canada (EC), which houses the Secretariat. Scientific and technical advice is provided by EC, Fisheries and Oceans Canada (DFO), Health Canada (HC) and PWGSC.

This is the first detailed statement of work being submitted for the Ennadai Lake Remediation Project. AANDC has retained the Northern Contaminated Sites (NCS) division of Public Works and Government Services Canada (PWGSC) to assist in the compilation and contracting requirements for the project.

The vigorous work plan for this fiscal year, as detailed herein, is to complete an archaeological assessment, a geotechnical investigation and a detailed phase III ESA which will allow for the development of the RAP and associated cost estimate, followed by an EIA which shall be completed to identify potential impacts of the RAP on the environment and propose actions to mitigate such impacts. Development of the tender documents (design specifications, drawings and final cost estimate) will be developed concurrently with the above noted tasks in order for the project to proceed with a February/March 2013 tender period.

.2 Background Information

The Ennadai Lake Weather Station site is located about 370 km west of Arviat (the nearest community) and 500 km southwest of Rankin Inlet, Nunavut, at approximately 61° 07' 51" N latitude and 100° 53’ 14” W longitude. The site was a weather station as of the 1950s. It was operated either as a manned or unmanned station, at different times since its inception and was abandoned in the late 1980s to early 1990s. Concerns about the site were first expressed in 1994 to the Kivalliq Inuit Association (KIA) by the local hunters regarding leaking fuel tanks at the site.

Site Characteristics

The Ennadai Lake Weather Station site is located at an elevation of 320 metres above sea level on the eastern shore of Ennadai Lake. An esker forms a central ridge through the site. The topography generally slopes to the northwest and southwest away from the esker, with relief of approximately 25 m.

According to supporting information, the bedrock at the Ennadai Lake Weather Station site area is undivided gneiss (metamorphosed igneous rock). The surficial deposits at the site consist of till plain, esker, and ice contact stratified drift. Till can be described as poorly sorted sediments with distinctive forms deposited directly by glacial ice. This till plain is generally sandy, silty, noncalcareous grey till which includes areas of clay-rich red till. An esker is an elongate sinuous ridge of glacio-fluvial sand and gravel. The area

north of the site was also characterized by 20-80% outcrop, and the bedrock is mantled by an average of less than 1 m of surficial deposits

The Ennadai Lake Weather Station site area is located within an arctic region with extreme average daily temperatures of -26.8 ^{O}C in January and 16.8^{O}C in July. With wind chill, temperatures can fall below -70 ^{O}C during the winter. In the Rankin Inlet area, daily average temperatures are above 0 °C during only four months of the year (June to September). The region experiences rainfall between April and November, in the average range between 1 mm and 57.3 mm (in August). Precipitation in the form of snow can occur at any time throughout the year, but is not common in July or August. Maximum snowfall typically occurs in April, at an average amount of 38.0 cm. The water equivalent of the average annual precipitation in the area is 327 mm.

Ennadai Lake is located in an area of continuous permafrost (90-100%). Summer active layer depths above the permafrost depend on vegetation cover, subsurface material type, and moisture conditions, but typically range from about 15 cm depth in areas supporting a thick organic mat to more than 120 cm in areas where vegetation cover is thin.

Due to the coarse grained characteristics of the surficial materials and the moderately continuous vegetative cover at the site, the local active layer is shallow in poorly drained areas and deeper in areas with well drained soil conditions (i.e. in areas of sand deposits such as the on-site esker) . Any permafrost at the bottom of the active layer would act as a barrier below the groundwater table, and the movement of groundwater and infiltrating surface water at this site would be expected to follow the local contours of any permafrost (and/or bedrock in areas of shallow overburden) toward low-lying areas. Test pits were dug to a sufficient depth to discover permafrost down-gradient of the Drum Caches in poorly drained conditions at the site.

The site footprint is relatively compact, generally occupying a portion of the eastern shore of Ennadai Lake. Drainage paths vary across the site and are generally determined by local topography, which generally drains toward Ennadai Lake via the shortest path. The most significant surface water body located within close proximity to site features posing potential environmental concerns is Ennadai Lake, which is very large (consisting of three large interconnected bays, with a total area of approximately 500 km^2). Ennadai Lake drains north through the Kazan River watershed to Hudson Bay.

Potential receptors at the site include humans, a variety of wildlife and Ennadai Lake, a water body of significant size. There is a commercial hunting and fishing lodge located on Ennadai Lake approximately 30 km from the site, and the area is frequented by hunters from Arviat and Rankin Inlet. It is assumed that Environment Canada (EC) staff periodically visit the site to check on the modern weather station equipment, but the schedule of this maintenance is unknown. Wildlife observed during WESA's field work program in the region surrounding Rankin Inlet in 2009 included bears (tracks), several bird species and arctic hare. According to various sources quoted in WESA's report, Ennadai Lake is within the territory of other mammals such as: musk oxen, barren ground caribou, grey wolves, arctic foxes, red foxes, wolverines, ermine, brown lemmings, barren ground grizzly bear, least weasels, mink, northern red backed and meadow voles, and ground squirrels.

The Kivalliq West region from Baker Lake south to Arviat is typically sparsely vegetated. The terrain ranges from exposed bedrock outcrops to hummocky tundra with small shrubs such as willow, larch, blueberries and cranberries, a variety of mushrooms, mosses, lichens and grasses. The region surrounding Rankin Inlet is typically well vegetated, and moderately sized trees are present in areas with sufficient soil cover to support their growth. The site is located in a moderately vegetated area.

Land Tenure
Based on a legal interpretation obtained by AANDC, detailed further in the supporting documents, the portion of the Ennadai Lake Weather Station site, containing the abandoned buildings and the above ground storage tanks are on Inuit Owned Land, which is administered by the KIA. However the liability for the contamination present at the Ennadai Lake Weather Station ultimately belongs to DIAND (AANDC).

.3 Objectives

The objectives of the project for this site, are to:

1. Obtain traditional knowledge regarding past and present land use of the site from elders of the nearby communities; with respect to potential contamination and ensure local community and Inuit involvement in the program at the site
2. Identify, characterize, and quantify hazardous and non-hazardous materials at the site and in nearby water bodies;
3. Identify and delineate contaminated soil areas at the site;
4. Complete a detailed site survey, including the documentation of any flora fauna noted at the site and a brief description of the site based on literature and professional experience;
5. Identify potential locations for landfill(s), temporary camp location and land farm(s) on site;
6. Identify borrow sources that may be used for the potential repair of site roads, as well as for the construction of a potential landfill(s), backfilling requirements, re-grades and land farm on site;
7. Evaluate the condition of site access roads;
8. Evaluate the logistical challenges associated with mobilization, site remediation and demobilization activities at the site;
9. Document all information in written reports for site (ESA phase III, RAP, Archaeological and EIA);
10. Participate in community consultations to present draft versions of RAP at Arviat, NU;
11. Develop cost estimate;
12. Update the NCSCS Classification Worksheets for the Sites.

2.0 SCOPE OF WORK

Note, it is strongly recommended that consultant explores all options available to retain local community members to be involved during data gap analysis and with the site assessment work.

The scope of this project includes the following tasks and associated activities. A more thorough review and description of each task will be discussed and potentially altered during the gap analysis review meeting as mention under task 1 below.

Task 1: Review Previous Information, Data Gap Analysis & Pre-Program Planning

Prior to planning and executing the site assessment, all previous studies for the site must be reviewed in order to determine if any information is lacking from the existing documents to adequately complete the required reports and remedial design. The planning for the field program will focus on collecting information that is missing from the site that is considered most critical for evaluating remedial options and addressing high risk uncertainties during development of design documents. A summary of the gaps that are identified from the existing reports and other known sources of information are to be documented and classified in order of importance and/or risk such that a collective team discussion can be had as to their relevance during the planning of the field work plan, sampling regimes and their impacts on overall program objectives. The gap analysis may reveal additional assessment work required, therefore this activity shall be completed as early as possible, prior to estimating resource and time requirements for the remaining project tasks.

Upon completion of data gap analysis, submit a draft report and plan for a half day /4hr planning session meeting with PWGSC and AANDC project managers at location of consultant's choice. The purpose of the meeting will be to discuss findings of the gap analysis, project schedule, overall project objectives, discuss specific requirements of each remaining task, risk management considerations, other specific program expectations, etc.

The underlying intent of this exercise is to develop a collaborative work plan that is fiscally responsible, utilizing efficiencies learned from past project experience, to focus the site and reporting time on information that is considered most pertinent during development of the tender documents.

Relevant reports will be provided to the Consultant as follows:

TITLE	AUTHOR	DATE
Integrated Phase I & II ESA, KW 007 – Ennadai Lake	WESA	March 2010

Task 2: Delineation of Contaminated Soil Areas

Areas of soil contamination were identified previously at various locations on the sites.

Contaminants of concern as reported in the above noted documents include the existence of various inorganic elements. Further soil sampling may be required to further delineate and quantify the volume of soil contaminated by inorganic elements and/or soil cross contaminated by both inorganic elements and petroleum hydrocarbons (PHC). Further delineation, horizontally and/or vertically of the impacted areas may be required to increase the level of accuracy of known volumes that are considered in exceedance of applicable criteria. Collected samples to be evaluated based on the Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (CEQG) (CCME 2007).

Further investigation may also be required during the assessment program to better understand the areas impacted by PHCs and/or Benzene, Toluene, Ethylbenzene and Xylenes (BTEX). Testing of the areas where PHCs are suspected may required further delineation, horizontally and/or vertically to the extent possible using a suitable screening methodology followed by an adequate number of samples to be submitted to the laboratory for analysis. The intent of this exercise is to increase the level of accuracy of the known impacted areas. The Canadian Council of Ministers of the Environment (CCME) Canada Wide Standards (CWS) will be the default criteria.

Task 3: Inventory of Hazardous and Non-Hazardous Materials

Non-hazardous materials at the sites are predominantly associated with building materials and scattered debris including wood, scrap metal, concrete, barrels, tanks, etc. Estimated volumes of non-hazardous materials and debris will be fundamental in the decision to design a landfill on-site and must be exhaustive for all types of material found.

A detailed inventory may be required to confirm the number of barrels on site, whether the barrels are on the surface or partially buried and whether they are full, partially full or half full. An indicative assessment of a statistically representative number of barrels will be conducted to determine the amount and type of material expected to be within full or partially full barrels during remediation. A statistically significant portion of the barrels that contain unknown liquids will be sampled and the sample submitted to the laboratory that can identify the liquid material type. Any potential substance release to the ground at the location(s) of the barrel piles or dump will be investigated and substances identified and characterized.

Based upon the findings of the barrel sampling program, estimates of the volume of liquid which can be incinerated on-site, shipped south for disposal or treated will be produced. This determination will be made in accordance with the DEW Line Cleanup *Barrel Protocol*.

Hazardous materials on-site may include but are not limited to batteries, residual petroleum hydrocarbons or other unknown hazardous liquids in barrels and storage tanks, paint containing lead, pressurized gas and asbestos containing materials. In order to determine appropriate handling and disposal options, all hazardous and potentially hazardous materials on-site must be identified and characterized. The volume and/or surface area estimates for all types of hazardous building materials shall be calculated.

The purpose of this task is to inventory hazardous and non-hazardous materials and debris in order to calculate volumes and weights of materials. All waste types must be

identified. The consultant will use this information to prepare a detailed waste summary. For each type of material, the summary must include: waste location, waste description, photo, volume and weight of waste, method used to estimate the volume and weights and any relevant comments.

Task 4: Assessment of Borrow Sources and Potential Landfill and Land Farm Locations

It is anticipated that the comprehensive remediation activities to be planned for this site will generate a substantial volume of waste, both hazardous and non-hazardous. The construction of a non-hazardous landfill at the site for the disposal of the waste is an option that may be implemented. Therefore, investigations are required to confirm if this is a viable option.

This activity includes the identification of at least one (1) feasible landfill and land farm area and a determination of the volume of material that could be placed in each. Potential landfill locations will be based on the area available (using previously disturbed areas to the extent possible), acceptable soil and foundation conditions, limited surface runoff through the area, relatively level topography, no impediment to natural drainage in the area and an appropriate distance from natural water bodies or water courses. The anticipated volume and type of debris or impacted soil to be deposited in each facility will also influence locations. An evaluation shall be conducted to determine suitable locations for a non-hazardous materials landfill and a laydown area suitable for land farming of PHC contaminated soils.

Borrow material will be necessary for landfill berms, caps, as intermediate fill and to repair existing access roads and the “nearby airstrip” as required. This task will include the identification and characterization of potential sources of granular borrow materials, the types of material available, an estimate of the quantity of each type available from each location and the coordinates (Latitudes and Longitudes) of the borrow sources. Identification of sufficient volumes of various granular classifications will be required to carry out the remedial options proposed in the Remedial Action Plan.

Options detailing the development of the gravel sources (borrow areas and/or the development of bedrock outcrops) shall include remedial measures to mitigate the environmental effect of the gravel and/or rock removal at the site. Activities recommended for the development of gravel sources during the implementation of the site remediation plan shall not adversely affect the environmental condition of the site. The removal of material from the borrow sources, upon completion of the project, shall not result in significant and permanent thermal degradation of the permafrost in the area, significantly alter the site drainage or drastically change the topography of the area.

Test pits shall be excavated at the proposed new landfill and land farm location and in potential granular borrow areas to establish soil structure, subsurface water and depth to bedrock or permafrost. Soil samples must be collected during test pitting for laboratory index testing and determination of water content, particle size distributions and moisture density relationship.

Task 5: Roadway, Airstrip and Site Access Evaluation

The “nearby airstrip” and access roads will require assessment to determine if upgrade activities are required to support future remediation activities at the site. It must be

determined if all debris at the site will be accessible by heavy machinery during the future clean up efforts. The Consultant will be required to identify improvements necessary to ensure all debris is accessible by standard remediation equipment and labourers. All roads will also require an assessment of potential remediation options at the completion of site activities (i.e. the removal of roads where required, particularly to facilitate suitable site drainage).

An inspection of the airstrip must be completed in order to determine its load capacity to support the possibility that future contractors require aircraft to mobilize personnel, remediation equipment and supplies. Anticipated maintenance requirements and schedules should also be presented.

Test pits should be excavated at key points along the length of the airstrip to assess its surfacing structure, and laboratory testing should be conducted to evaluate the soil types and grain size composition. Drainage or erosion channels and the presence of surface or subsurface occurrences of water and the depth at which it was encountered are also to be indicated. As well, determine the load capacity of the airstrip, taking subgrade material into consideration, indicate loaded and unloaded aircraft load rating (ALR) of aircraft such as DC-3, DC-4, Hercules C130, Otter, Twin Otter DHC6 and the Shorts Skyvan.

Task 6: Detailed Site Survey

A full survey of the site shall be completed using total station or RTK GPS equipment capable of achieving an accuracy of at least 3 centimetres. Topographical information will be collected as part of the sites survey. All geotechnical, geophysical and environmental assessment sampling locations will be surveyed and tied into the existing sites infrastructure using a UTM coordinate system (i.e. including all structures and key existing features, proposed borrow sources, current dump areas, proposed areas for landfills, land farms and borrow areas, test pit locations, sampling locations, impacted areas, etc.).

All control points used, exact location of control points and description of control points shall be described in the site survey section of the assessment report.

Survey information will be input into AutoCAD (version 2007 or later) to generate a base topographic map for the site with 1m contours. The base plan generated will be made available and utilized for future works at the site.

Task 7: Photographic and Video Record

The Consultant will maintain a photographic record of areas investigated at the site. All photographs must be described in detail and dated. In addition to photographs, the consultant is required to produce video footage of all areas of interest at the site. Video footage shall include describing the important features of the site and is to be delivered in a digital format. This footage may be used in presentations to the community/regulators or as part of the tender process for the remedial works. The video shall include the overall site as well as pertinent details of issues at the site.

Task 8: Environmental Screening Assessment

The consultant shall conduct an environmental screening assessment for the final RAP in accordance with the Nunavut Land Claims Agreement as outlined in Appendix C of this document for the site.

Task 9: NCSCS Classification

The Consultant shall update the FCSAP Classification Worksheets for the Sites based on available and new found information (post phase III ESA) and strictly adhere to the most recent guidance documents:

http://www.ccme.ca/assets/pdf/pn_1403_ncscs_guidance_e.pdf

The worksheets will be made available to the successful consultant. As described in the NCSCS Classification guidance document, it is required that the rationale for scoring decisions be documented.

Task 10: Archaeological Investigation and Report

Note: Permit to conduct Archaeological investigation at the site was submitted to CLEY prior to March 31, 2012.

The archaeological surveys will address the following items:

- completion of an overview for the site considering the nature and location of recorded sites in the general region and previous archaeological research in determining archaeological potential, assessing likelihood of projects effects on archaeological sites, and determining the scope and nature of in field studies;
- completion of a field inventory and assessment,
- completion of a heritage features or structures evaluation for consideration of heritage value,
- provision of a heritage resource impact assessment which evaluates site significance, assesses project related effects on the identified sites, the significance of these effects, and presents mitigation options to minimize project effects;
- implementation of more detailed investigations at key sites and appropriate mitigation at significant sites affected by the proposed projects (if required); and
- preparation of a final permit report detailing the results of all phases of the archaeological project and provision of a summary of these results suitable for inclusion in screening documents (if required).

The following tasks will be required to fulfill the requirements of the scope of work for the Archaeological Investigation:

Task 10.1 Site File Search

A site file search of Borden Units in the NTS 1:50,000 map sheets in which the project areas are situated will be completed to determine the number, nature and terrain associations of previously recorded sites in the regions.

Task 10.2 Literature Review

A literature search will be required to provide information on the archaeological and historic context of each project region and data on relative site significance. Historical information on the site infrastructure itself should be included to provide background.

Task 10.3 Preparation of Overview Document

- Other literature regarding past human use (i.e. archaeological, historic and traditional use), as well as environmental change through time, will be reviewed for data pertinent to the development of a generalized model of site potential in the projects areas.
- Data collected will be presented in an overview document discussing the regional archaeological chronology, identifying archaeological potential, archaeological concerns and potential impacts from the proposed remediation programs. The documents will form the archaeological context component of the final permit report for each site.

The following tasks have been identified for the Archaeological Impact Assessments:

Task 10.4 Field Inventory and Assessment

The field programs will focus on assessment of all areas of high and moderate archaeological potential. Other areas of potential will also be examined. The field studies will identify archaeological materials, document location and content, and provide data that could be used for the development of recommendations for future remediation programs. Inventory and assessment techniques will follow established practices and generally consist of the following:

- visual examination of the identified areas to determine the presence of such surficial features such as stone circles, cairns, camps, etc. and exposed pre-contact cultural materials such as stone tool making debris and tools,
- excavation of shovel tests (ca. 40x40 cm) to varying depths to determine the potential for subsurface pre-contact cultural remains,
- visual examination of bedrock exposures (if any) or gravels for Quaternary palaeontological fossils as well as pre-contact quarrying activity,
- excavation of either additional shovel tests or 1x1 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. The GPS coordinates will be given to CLEY and PWGSC in a separate letter report to ensure the archaeological significant areas remain protected. This information is required by PWGSC in order to prevent and avoid disturbance during site activities.
- documentation of individual site features to record content, context, potential identity, etc. to provide information required to develop mitigation programs.

Task 10.5 Site Evaluation

Site evaluations will consider perceived archaeological resource value and community cultural value as well as the predicted impact from the proposed programs. 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 multi-component sites. Undisturbed multi-component sites are generally assigned the highest archaeological resource value.

Task 10.6 Evaluation of Mitigative Options

Prior to evaluation of mitigative options, the perceived value of the identified archaeological sites will be discussed with the project design team to determine the

feasibility of avoiding important sites. Only if site avoidance was not possible, will other mitigative measures such as collection and documentation, and controlled excavation be considered. Recommendations for a controlled excavation mitigative plan will specify the amount of excavation in square metres and suggest locations for excavation units/blocks.

- Collection and documentation as a mitigative option will be undertaken at the time of the field assessments at all sites with low archaeological resource value.
- Avoidance will be recommended if feasible at all sites assigned high archaeological resource value.
- Mitigative excavations will be recommended at those sites assigned high archaeological resource value that could not be avoided by borrow and other facility relocation.
- A management plan for required mitigation relative to the proposed construction schedules will be discussed with the project team.

Task 10.7 Community Liaison

The proposed project areas lie within the traditional territory of the regional Inuit occupants. Because the precontact sites in the project areas represent the cultural history of aboriginal occupation, their perspective on *cultural value* of archaeological sites is important to the evaluation of public and ethnic historical resource value. Ethnic and public value of both individual heritage resource sites and heritage resources in general have been identified as an important parameter of community regional land use plans.

Community consultations will be planned in conjunction with the completion of the draft Remediation Action Plan and is tentatively scheduled for mid January 2009.

At the time of the consultations, communities will be informed of the archaeological assessment. Community review and input will be incorporated into site interpretation, archaeological resource value, and appropriate mitigation options. It may also be necessary to hold a meeting with community members after completion of site inventory to determine their perspectives on the need to visit identified archaeological sites relative to community cultural or spiritual values. This information would then be used to assign heritage resource values to the individual site. It will be necessary for the archaeologist to attend these meetings to provide the necessary input regarding the archaeological significance of the proposed sites.

Task 10.8 Mitigation

At those sites which cannot be avoided and which are assigned moderate to high archaeological resource values, recommendations for mitigation will be made and undertaken after discussion with the project team and in consultation with the qualified archaeologist. It is anticipated that mitigation would likely consist of controlled surface collection of surficially exposed sites and controlled excavation of sites with subsurface cultural materials. The specific nature of this aspect of the archaeological studies cannot be determined until the inventory component of the field work has been completed.

Task 10.9 Analysis and Reporting

Analysis of collected artifacts will include cleaning, cataloguing, identification, inventory, and description of each individual piece by a qualified archaeologist for inclusion in the

final reports. Both stone material and technological identification and descriptions of all artifacts will be undertaken. GPS site information would be provided for mapping relative to the sites. Archaeological site maps, photographs, and artifact scans will be prepared as digital files.

Upon completion of the field components and the required artifact curation, a draft report will be prepared. Final permit reports for each of the archaeological studies (i.e. one for each site) will be prepared for Public Works and Government Services Canada on behalf of Aboriginal Affairs and Northern Development Canada, for review by the Department of Culture, Language, Elders, and Youth. The reports will include a project description, the environmental setting, the historical and archaeological context for the project area, field methodology, and the results of the field reconnaissance at each site. The reports will include both descriptive, as well as mapped, data on the sites, artifacts, and features identified, as well as detailed information on the nature, content, and significance of the artifacts and features identified. Cultural material recovered will be inventoried, described, and discussed within each report text to aid in evaluation of scientific and interpretive value. All identified sites will be documented on appropriate site inventory forms.

Task 11: Detailed Written Reports – Phase III ESA

Based upon the findings of the field investigation (Task 2 to 7 above), the Consultant will prepare a comprehensive report containing the results of all investigations completed at the site, including hazardous and non-hazardous waste audit, geotechnical investigation, contaminated soils delineation and other site assessment activities.

Task 12: Detailed Written Reports – Remedial Action Plan (RAP)

Based on the results and report generated from the assessment activities a separate comprehensive site Remedial Action Plan will be developed for the site. The Consultant will be required to review the results of the Phase III ESA for hazardous and non-hazardous wastes. For each waste stream and issue identified at site, remedial options shall be developed in accordance with the latest version of the AANDC *Abandoned Military Site Remediation Protocol*. Each remedial option shall be evaluated with its respective potential risks, value they provide to the Crown, the resources available to complete the project and the degree that they reduce the environmental liabilities. Advantages and disadvantages for each option are to be explored and discussed. The goals of the remediation plan are to reduce the environmental liabilities present at the site, maximize benefits to local community members and Inuit and ensure good value. This plan will also incorporate key factors such as other AANDC policies, community concerns, clean up criteria and risk management techniques. Once the various remedial options have been detailed, recommendations shall be made as to the preferred approach.

The draft RAP will be the basis for community meetings. At the community meeting, the various remedial options will be presented and discussed. The objective of the community meeting will be to arrive at a consensus as to the appropriate remedial option for each environmental issue.

During remediation planning for the site, representatives from the surrounding communities shall be involved in order to utilize their knowledge of the site and determine the local support services that are available. It is imperative that the final plan meets their requirements and they are included from project planning to final site closure and future monitoring. Public Community meetings will be conducted in Arviat, NU to present the draft RAP for the site, take questions and obtain comments from the members of the communities, before finalizing the RAP and design for the site. The community meetings will be set up by Aboriginal Affairs and Northern Development Canada (AANDC) and shall be attended by the Consultant.

Task 13: Remedial Design – Specifications and Drawings

TASK OBJECTIVES

To achieve the objectives of the remediation work, PWGSC requires Consultant services to review existing reports, and provide Tender Documents. The scope of work for the Consultant is generally expected to include, but not limited to the items outlined below:

1. The remediation will be done in accordance with the consultant designed specifications and drawings and the AANDC Abandoned Military Site Remediation Protocol (AMSRP). The project goals that are to be addressed while implementing the design and remediation work for the site generally encompass the following:
    a. Minimize human health and safety risks.
    b. Protect fish, wildlife, and vegetation.
    c. Protect water quality.
    d. Minimize environmental impacts during remediation.
    e. Preserve worker health and safety during remediation.
    f. Return the site to its original condition where possible or an alternative productive ecosystem.
    g. Minimize long term care and maintenance.
    h. Apply overall cost-effectiveness considerations.
    i. Meet with PWGSC to identify project requirements.
    j. Apply AANDC AMSRP

GENERAL REQUIREMENTS

.1 The following general services outlined apply to the Consultant, and to all Sub-Consultant disciplines that may be required under this task, including but not limited to:
    .1 Provision of Tender Documents based on development of Environmental Assessment Reports and Remedial Action Plan (RAP).
    .2 Provision of Tender Documents based on various site restorations programs and related design requirements.
    .3 Preparation of complete, comprehensive and fully coordinated stamped construction drawings and details suitable for tendering and later construction purposes.
    .4 Preparation of specifications of all elements, including materials and equipment, manufacturer's methods of installation, design and

performance criteria and quality of workmanship, all in accordance with the most recent version of the NMS format.

.5 Preparation of Indicative and Substantive cost estimates.

.6 Assistance during Tender period, by preparing addenda and answering questions and attending meetings with bidders and contractors.

SPECIFIC REQUIREMENTS

.1 Meetings. Consultant will be expected to attend various project related meetings, record and distribute minutes, prepare addenda, presentation, answer questions, etc.

.1 Arrange for a pre-design meeting (or conference call) between the Consultant, PWGSC and AANDC to review the Remedial Action Plan and the associated elements of the specification.

.2 Take part in pre-solicitation bidders site tour (August 2012). The Crown will provide transportation between Rankin Inlet, NU and the site.

.3 Prior to providing the 100% submission, and once all comments have been collected, the Consultant will arrange for a final tender documents review meeting with PWGSC (estimated at 1/2 day). The purpose of this meeting is to review, discuss, and incorporate all comments into the final submission.

.4 Participate in bidders conference (February 2013). Estimate ½ day meeting in Arviat, NU.

2. Cost estimate. Name and qualifications of estimator to be provided with proposal submission. Cost estimates to be developed in accordance with the applicable sections outlined in the “INAC Cost Estimating Guidelines 2007” and other industry standards. Basis for all costs are to be supported by clearly stated assumptions as they relate, but not limited to remediation methodology, equipment and labour rates, fuel costs, escalation, inflation, profit, etc.

.1 Perform cost-benefit analysis (CBA) for onsite versus offsite options as it relates to non-hazardous waste storage and treatment of PHC contaminated soils.

.2 Submit Indicative Cost estimate for review with 75% tender documents

.3 Submit Substantive cost estimate with final tender documents

TENDER DOCUMENTS / DESIGN SPECIFICATIONS

.1 Identify borrow sources required.

.2 Identify quantities for debris, building demolition other material removals.

.3 Provide all engineering designs based on the reviewed documentations and recommendations.

.4 The design will include a non hazardous landfill capable of accepting non hazardous debris and soils from the site, asbestos abatement.

.5 The design will include the onsite treatment of PHC contaminated soil (performance based design), processing of residual tank and drum contents.

.6 Include under a separate submission, a design report which is to include information used and assumptions made during the design process. Also to identify the specific information used to design the remediation of the site including waste stream volumes, landfill capacities, borrow volume and quality requirements etc. The outline of the report is to include as a minimum:
  .1 Introduction
  .2 Information Sources
  .3 Assumed Site Conditions
  .4 Execution Assumptions
  .5 Design Decisions
  .6 References.

.7 The specification and drawings will include but is not limited to the items below:
  .1 Provide Division 1 sections based on the template provided by PWGSC.
  .2 Provide all applicable technical specification sections.
  .3 Provide all applicable drawings and related figures.

TASK DELIVERABLES

.1 See table 1 below for major milestones and deliverables pertaining to the remedial design task.

TABLE 1 – PROJECT MILESTONES / DELIVERABLES

Deliverable No.	Activity Description
1	Project Meetings (start-up meeting, bidder's conference, tender document review meeting). Consultant to participate in discussions and record meeting minutes.
2	Submission of 75% Specification, Drawings and Indicative Cost Estimate
3	Submission of the 99% Specification, Drawings and Substantive Cost Estimate
4	Submission of the "Issued for Tender", and "Issued for Construction" Specification and Drawings
5	Submission of Final Design Report

3.0 ADMINISTRATIVE SERVICES

1.0 General

The Consultant shall maintain a high standard of professionalism and courtesy. The Consultant will provide the following general services as outlined below but not limited to:

- Attend project meetings as required during all phases of project delivery.
- Provide full coordination with work of other disciplines including environmental coordination, contracted engineering and specialist Consultants.
- Provide assistance with project scheduling, budget and cost control.
- Provide assistance with risk management.

.1 Project Consultant Staff, Budget and Cost Controls

The Consultant shall clearly establish the project team and organizational structure and shall submit the names and responsibilities of each of the members of their staff that will be involved in the project. The Consultant shall designate one individual who will be responsible for overseeing the project and who will liaise with the PWGSC Project Manager throughout the project. The Consultant will not be permitted to make personnel changes, without prior approval by the PWGSC Project Manager.

The Consultant will provide detailed qualifications for all members of their project team. Clearly indicate their expertise for the activities they will be working on. Given the location of the work, the involvement of Inuit people in the work to be undertaken shall be considered. Clearly identify the number of Inuit people to be retained to aid in the completion of this work. If a project scope change is anticipated, the Consultant must notify the PWGSC Project Manager in writing immediately. No additional or supplemental work shall be undertaken or in substitution of the work specified unless approved in writing by the Contracting Authority.

The Consultant shall include all logistical requirements including transportation to and from lodging/staging site, accommodation en route and during the assessment activities, living expenses and other associated costs in their submission.

The approved budget for the project must not be exceeded unless otherwise approved by the Contract Authority and/or Project Manager followed by written confirmation. Effective cost estimating and cost control is of prime importance.

.2 Risk Management

The Consultant will assist the Project Manager in:

1. Identifying risk elements based on past experience, using proposed checklist or other available lists.
2. Qualify/quantify probability of risk event and their impact on project or related work (Low, Medium, High).

3. Apply a dollar value to all risk/probability impact events as applicable.
4. Prepare contingency plans for possible changes to the work, budget and schedule.
5. Prioritize risk events (i.e., concentrate efforts on risk event with High probability and Medium to High impact).
6. Develop risk management plan (i.e., evaluate alternatives for mitigation of risks involved).
7. Implement risk mitigation on items and approaches approved by the Project Manager.

.3 Project Management & Submission Documentation Standards

The PWGSC Project Manager for this project is:

Michael Bernardin, Project Manager, Environmental Engineering
Public Works and Government Services Canada
5th Floor, Telus Tower, 10025 Jasper Avenue
Edmonton, Alberta T5J 1S6
Ph: (780) 497-3853 Fax: (780) 497-3842
Email: michael.bernardin@pwgsc.gc.ca

The Consultant will provide reports, and associated documentation including all annexes, tables and photographs as per deliverable format outlined below. The Consultant will be responsible for the cost of processing the project reports using the Consultant's own or contracted typing/word processing facilities. The Consultant will be responsible for all proof-reading. CADD Standards will be provided to the Consultant. The CADD drawing format required for drawings is the AutoCAD native format with the DWG file extension, Release 2007 or later. All drawings are to be produced in the metric system of measurement.

The Consultant shall maintain contact with the PWGSC Project Manager throughout the contract. Draft and Final reports shall be submitted to the Project Manager. Submissions include one (1) electronic copy (Adobe Acrobat pdf) of the Draft Reports, and six (6) hard copies & six (6) electronic copies (CDs) (Adobe Acrobat pdf) of the Final Reports. All report figures and final site survey(s) are to be in AutoCAD format.

The Consultant will provide Draft Documents for review by the PWGSC Project Manager. Project Manager will provide comments within 2 weeks of submission. Provide written response to Project Managers comments for each review.

.4 Scheduling

The following scheduled milestones must be met in order to coincide with site operations, anticipated tendering and remediation period, and to maintain AANDC project funding forecast:

Initial Proposal Due Date (**Task 1 only**)	May 2nd, 2012
Complete Proposal Due Date	May 22nd, 2012
Submission of Consultant's Detailed Site Work Plan and Final Field Schedule	June 11th, 2012
Submission of Consultant Site Specific Health and Safety Plan	4 weeks prior to Field Work
Field Investigation to be completed between:	Aug 1st. – Sept. 10, 2012
Completion of Draft Assessment Reports	October 15, 2012
Completion of Final Assessment Reports and FCSAP Worksheets	Two weeks after receipt of client comments
Completion of: Draft RAP, Draft Archaeological Report Draft Specifications/Drawing set Indicative cost estimate	November 23rd, 2012
Proposed Community Meeting (Arviat)	November 28, 2012
Draft EA Screening Report	December 10th, 2012
Completion of: Final RAP Final Archeologically Report Final EA Screening Report IFT Specification/drawing set Substantive cost estimate	December 21, 2012

A proposed schedule for the completion of the work must be provided with your submittal. This schedule shall identify the timing of tasks associated with the various project tasks and activities, including required report submissions. The Consultant shall adhere to the detailed schedule established in their proposal.

.5 Site Logistics

The Consultant will be responsible for coordination and costing all logistical matters in regards to site access and occupancy. A section in the Consultant's proposal shall detail the logistical strategy as it relates to transporting equipment and personnel to and from the site, number of people onsite, duration of work, accommodations for employees, food supply, wildlife monitors, waste management, electrical supply, communication system, etc.

Should the Consultant determine that a base camp onsite is the most cost effective and practical means of carrying out the field program then it will be the Consultants responsibility to ensure all required permits are obtained. (i.e. Water Licence)

SPECIAL LOGISTICS CONSIDERATIONS:

The consultant shall include within their planning and costs, transportation, lodging and bear monitoring for an additional two (2) Non-Consultant Personnel and associated gear to be onsite throughout the duration of the field work that include:

1. One (1) PWGSC Representative;
2. One (1) AANDC Representative;

The following health and safety items will be made available upon Consultant's request to facilitate the field operations.

1. 12' by 14' Canvas Tent (duffel bag and 200L blue barrel) – 50 kg
2. 3 x Pelican Cases (Emergency Camp) (27" x 27" x 24" each) – 130 kg
    - Each Pelican Case is equipped with shelter and nourishment to sustain 5 persons for approximately 5 days and should be relied on in the event of an emergency only.

CROWN FURNISHED EQUIPMENT:

If deemed necessary for appropriate level of delineation of the contaminated soils, the equipment that will be made available to the Consultant for excavation/sampling purposes is a Beaver Pro QH ATV Mount excavator (http://www.beaverpro.com/) attached to a 2005 Yamaha 400 4X4 ATV. The excavation depth of the Beaver Pro will be sufficient to reach permafrost depths. The manual is available from the PWGSC Project Manager upon request. It is the responsibility of the Consultant to transport this unit from Edmonton to site and back to Edmonton once work is complete. The consultant is to obtain an operator for this piece of equipment shall it be utilized.

The Consultant shall clearly indicate whether they will be using the Quad-excavator in proposal. If the Consultant does not plan to use the Quad-excavator, the means to which excavation and sampling will be conducted on site shall be clearly indicated in detail.

ADDITIONAL EQUIPMENT REQUIREMENTS:

It shall be noted that there may be sampling locations not accessible by the Quad-excavator. The Consultant is responsible for providing all equipment necessary to complete the scope of work as outlined in this ToR. This may include but is not limited to hand auger, shovel, barrel thieves and barrel wrenches, sediment sampler, etc.); sampling containers; personal protective equipment (Tyvek suits, respirators equipped with organic gas cartridges, nitrile gloves, etc.); and personal equipment.

.6 Health and Safety Requirements

AANDC voluntarily complies with the applicable provincial/territorial health and safety acts and regulations, in addition to the Canada Labour Code and Canada Occupational Health and Safety Regulations. The Consultant must establish a Site Specific Health and Safety program for their staff on the project. The consultant shall be familiar with the Health and Safety plans of AANDC during the development of the safety plan for the project. The AANDC Environmental Health and Safety Management System Manual, is available for review upon request.

The guiding Health and Safety plan shall default to AANDC's above referenced document in the event that the site is not occupied by any other party.

The Consultant Site Specific Health and Safety Plan shall outline health and safety requirements specific to the hazards identified at the site and the work they will be completing on the site. The plan shall also identify the Codes/Statutes to be met, rules of behaviour, protective equipment and clothing to be provided, security features to be established, responsible individuals, details on the communication system and emergency response procedures and emergency contacts. The Consultant shall be responsible for providing bear encounter education and personal protection to all employees, contractors, and others at the site including the provision of wildlife monitors.

The Consultant shall, where the Consultant is working on Federal property and is in control of the work site (no Construction contractor), for the purposes of the Safety Act and Regulations Nunavut, and for the duration of the Work of the Contract act as the Employer, where the consultant is the only employer on the work site, in accordance with the Authority Having Jurisdiction.

Qualified wildlife monitors are to be provided in sufficient numbers by the Consultant to ensure safe working environments for crews operating in different areas of the site. PWGSC will provide copies of relevant permits obtained by AANDC to the Consultant outlining all requirements that must be complied with.

The Consultant working on projects shall:

1. Provide to the Contracting Authority, prior to Contract Award or Standing Offer authorization:
   - A Workers Compensation Board letter of good standing, also listing covered Directors, Principals, Proprietor(s) or Partners who will be or who are anticipated to be present on the work site.
   - A Claims Cost Summary.
2. Comply with requirements of Canada Labour Code.
3. Ensure that the advance notification of Project has been submitted to the Labour Authority and that he/she will be required to provide proof of sending it. Acceptable

proof could be a copy of the registered mail receipt, or a copy of the fax transmittal notice, or a signed statement by the Consultant stating that the form has been delivered.

.7 Lines of Communication and Coordination

1. The PWGSC Project Manager is responsible for the project and is the liaison between the Consultant and the Client Department (AANDC Project Lead).
2. The Project Manager administers the project and controls the Consultant's work during all phases of project delivery.
3. The Consultant will:
   a. Correspond only with the Project Manager and not communicate directly with the Client department, unless authorized in writing by the Project Manager. If so authorized, the Consultant will provide to the Project Manager, a copy of any such correspondence and/or summary of discussions with the Client.
   b. Ensure that all communications carry Project Manager's Project Title, Project Number, File Number and name of person to whom correspondence is addressed.
   c. Advise the Project Manager and/or Contracting Authority of any changes that may affect schedule or budget, or are inconsistent with instructions or written approvals previously given or decisions previously agreed to.
   d. Detail the extent and reasons for the changes and obtain confirmation in writing as soon as feasible.
   e. Coordinate and assume responsibility for the work of any and all Sub-Consultants and Specialists Consultants retained by the Consultant.
   f. Ensure clear, accurate and ongoing timely and responsive communication of concept, budget, and scheduling issues.

.8 Quality Assurance Reviews

1. The Project Manager will conduct Quality Assurance Reviews on reports, drawings, schedules, and costs estimates prepared by the Consultant, in a manner and at stages noted herein. The Consultant will respond in writing to all comments, in a timely manner and will be held accountable for delays if proper and timely responses do not occur.
2. Such reviews are not intended as a check against errors or omissions contained within the documents submitted. The Consultant is responsible for any such errors or omissions, regardless of any review by Project Manager.
3. While Project Manager acknowledges the Consultant's obligations to meet project requirements, the project delivery process entitles Project Manager to review the work. Project Manager reserves the right to reject undesirable or unsatisfactory work. The Consultant will obtain the Project Manager acceptances during each of the project stages.
4. Acceptances indicate that, based on a general review of material for specific issues, the material is considered to comply with governmental and departmental objectives and practices and those overall project objectives shall be satisfied. The acceptance does not relieve the Consultant of professional responsibility for the work and compliance with the terms and conditions of the Contract.
5. The Project Manager acceptances do not prohibit rejection of work, which is determined to be unsatisfactory at later stages of review.

6. Acceptances by the Client and other agencies and levels of government will be obtained to supplement the Project Manager acceptances. The Consultant will assist the Project Manager in securing all such acceptances and adjust all documentation as required by such authorities when securing acceptance.

.9 Special Requirements

- Hours of work on-site are based on a 12-hour day, 7 days per week on site.
- The Consultant will use a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratory. The Consultant is to include all applicable laboratory analyses costs plus applicable mark-up as per the existing Supply Arrangement.
- The Consultant will use the metric system of measurement for calculations, drawings, etc.
- The information, data, material, etc. gathered as part of this study shall be treated as confidential and shall only be discussed with the Project Manager unless otherwise directed by the Project Manager.
- All of the drawing information produced by the Consultant shall be compatible with and capable of input to the CAD system in use at the PWGSC offices. Final reports for each project activity shall be provided in paper and electronic format.
- No acceptance or approval by the Project Manager, expressed or implied, will be deemed to relieve the Consultant of their professional or technical responsibility for the calculations, drawings, analytical results, or other material prepared or assembled by the Consultant, or for things required under this Agreement.
- The Consultant will refer queries on the project from the public, news media, etc. to the Project Manager.
- Refer to *Contaminated Sites Cost Estimating Guide*, *March 31, 2007* for detailed definitions of estimating classes (Indicative / Substantive).

.10 Terms of Payment

Invoices will be submitted to the Project Manager on a monthly basis. The final invoice shall be submitted within 2 weeks of the acceptance of the final report.

4.0 TECHNICAL SERVICES

.1 Codes and Standards

1. All criteria will be in accordance with the current edition of Canadian Codes and Standards, and, any other relevant Codes as applicable. If local or municipal codes and bylaws are more stringent, they will take precedence.
2. Regulations, by-laws, and decisions of "Authorities having jurisdiction" will be observed. In cases of overlap, the most stringent will apply.
3. The Consultant will identify and communicate with all jurisdictions applicable to the project.
4. For material properties (both physical and chemical), methods of fabrication, tests, etc., reference shall be made to the latest editions of CSA Standards and the Canadian General Standards Board, or to local standards if they are more stringent.

.2 General Technical Requirements

The Consultant will provide and coordinate full professional consulting services required during all phases of project delivery as outlined below but not limited to:

1. Make all necessary arrangements with the originator or owner of documents use of any copyrighted or owned documents for purposes of the project. On completion of the project all documents provided by Project Manager are to be returned to Project Manager.
2. Attend and contribute to Project Meetings throughout the duration of the project.
3. Provide full coordination with work of other disciplines, Sub-Consultant and Specialist Consultants.
4. Site remediation design and implementation, and compliance assessments.
5. Provide Environmental Audits/Baseline Studies (for all issues related to real property) and Environmental Site Investigations/Assessments
6. Provide all phases of Environmental Assessments including Infrastructure and Demolition Assessment
7. Provide Hazardous Materials Listing and Identification, Asbestos Sampling and Listing, Environment Sampling and Waste Audit.
8. Provide Geotechnical and Geophysical Investigation.
9. Provide Remedial Action Plan (RAP) with separate Substantive cost estimate.
10. Conduct an environmental screening assessment for the proposed RAP in accordance with the Nunavut Land Claims Agreement.
11. Preparation and presentation of reports for review and approval.
12. Interpretation and/or adherence to all applicable codes, Environmental, Fire, Health and Safety Requirements, other specific codes or standards.
13. Assistance during implementation of recommendations for site restoration.
14. Provide technical advice during implementation of the RAP.

.3 Quality Assurance/Quality Control (QA/QC)

A proper QA/QC program must be established by the Consultant to ensure that data obtained is accurate and representative of actual conditions. The consultant shall identify

in their proposal the number of QA/QC samples included in their proposed sampling program. This shall involve, among other steps:

- use of trip, field and equipment blanks
- use of duplicate and spiked samples
- proper sample containment, preservation, handling and transportation
- the use of a CALA accredited laboratory for sample analysis
- the use of detection limits appropriate for the required evaluation criteria/guidelines
- due regard and diligence for necessary health and safety precautions

.4 Proposal Response Requirements

Proposals must be returned to the Contracting Authority. Any deficiencies noted in the Terms of Reference or items that require clarification shall be resolved with the PWGSC Contracting Authority prior to the submission of the proposal. The proposal shall provide sufficient detail to adequately address the requirements of these Terms of Reference and be a maximum of twenty (20) pages in length not including the necessary tables, resumes and cost proposal section. Ensure the following aspects are included:

(A) Project Understanding - Demonstrated understanding of the unique nature of the project, scope of the work and logistical planning relative to but not limited to the constraints of working in remote environments with potentially limited support.

(B) Project Team - Provide a description of experience and background for each key member of the team including resume and descriptions of relevant projects these personnel have worked on. Preference will be given to those teams whose members exhibit a wide array of northern experience and technical expertise.

(C) Description of Work - Provide a detailed methodology of how the design project work will be completed. Included in the description shall be logistics, health and safety considerations, methodology and the identification of potential problems and mitigative measures for all aspects of the proposed work.

(D) Schedule - Prepare a schedule of activities that will illustrate the duration of each of the major tasks (major tasks include, but are not limited to, the tasks described in Section 1.4). Each task shall be broken down into sufficient subtasks so that the Engineer can easily monitor the project progress. Show deliverable dates on the schedule.

(E) Problem Identification and Management - Describe the process for identifying potential problems, bringing them forward to the Engineer and how they will be managed.

(F) Level of Effort - Estimated hours, units, etc including mobilization/demobilization costs are to be clearly indicated for each activity associated with the project.

(G) Cost - The estimated cost for the project submitted in the Consultant's proposal shall include all necessary expenditures to undertake all of the required work outlined in these Terms of Reference and in the Consultant's Proposal.

2 PROPOSAL SUBMISSIONS

.1 Initial proposal which is to include costs under **task 1 only**, shall be delivered to the Project Manager via electronic mail no later than 14:00 MST on May 2nd, 2012.

.2 Complete proposal, encompassing all remaining tasks shall be delivered to the Project Manager via electronic mail no later than 14:00 MST on May 22nd, 2012.

3 INVOICING

.1 The Consultant will provide invoices in the format defined in Appendix A, Tables A1 to A3.

Proposals are to be forwarded via electronic mail only to:

Michael.bernardin@pwgsc.gc.ca

This section, when completed, will be considered as the Contractor's Financial Proposal. Payment will be made in accordance with the following pricing:

Table 1 – Summary of Project Activities

Activity No.	Activity Description
Initial Proposal Submission:	
Task 1	Review of Related Documentation, Data Gap Analysis & Project Planning Session
Complete Proposal Submission:	
Task 2 - 7	Field Investigation Activities (c/w field work plan and SSHSP)
Task 8	Environmental Screening Assessment and Reporting
Task 9	FCSAP Site Classification Worksheets
Task 10	Archaeological Investigation and Reporting
Task 11	Phase III ESA Reporting
Task 12	Remedial Action Plan Reporting
Task 13	Remedial Design Specifications and Cost estimate

A. Professional Services: The Contractor will be paid the following firm hourly rates for work performed pursuant to this Contract, in accordance with the Statement of Work and in accordance with Standing Offer EW699-100053. **Any tasks that are described in this Terms of Reference that are not specifically listed as activities in the above table are considered incidental to the work.**

Table 2 – Fee Proposal

Position/Title	Hourly Rate	Hours by Activity No.								
		1	2-7	8	9	10	11	12	13	**Total**
Table 2 Total										

*Position/Title and rate for proposed personnel must be in accordance with the Standing Offer Agreement

Disbursements

B. Communications

Disbursements for Communications shall be recovered at a firm fixed percentage of time based fees and shall be full compensation for: IT, telecom, faxcom, day to day printing and courier charges, etc as follows:

Table 3 – Communications Disbursement Proposal

Category	Table 2 Total	Mark-up %	Total
Communications		2%	
Table 3 Total			

C. Major Disbursements

Major Disbursements shall be recovered at cost plus a firm fixed percentage. Major Disbursements shall include: Travel, Room and Board, Materials & Supplies, Testing & Analysis, Equipment Rentals, Freight, Subcontracting, Sub consulting, one time large printing jobs, etc. Note: Travel, Room and Board and Meals shall be as per rates allowed by the Treasury Board Travel Directive.

Table 4 – Major Disbursements Proposal

Category	Mark-up %	Total (By Activity No.)
Travel	0%	
Room and Board	0%	
Materials and Supplies	0%	
Testing and Analysis	0%	
Equipment Rentals	0%	
Freight	0%	
Sub consultants	0%	
Sub contractors	0%	
Table 4 Total		

Summary of Table Costs:

Table	Total
Table 2 – Fees	
Table 3 – Communications	
Table 4 – Major Disbursements	
Sub-Total	
GST @ 5%	
Total Estimated Cost	

APPENDIX A: INVOICING INSTRUCTIONS

TABLE A1- SUMMARY OF FEES

Resource	Position	Category	Total Hours	Supply Arrangement Billing Rate	Costs
Billing period:				Sub-total Costs:	

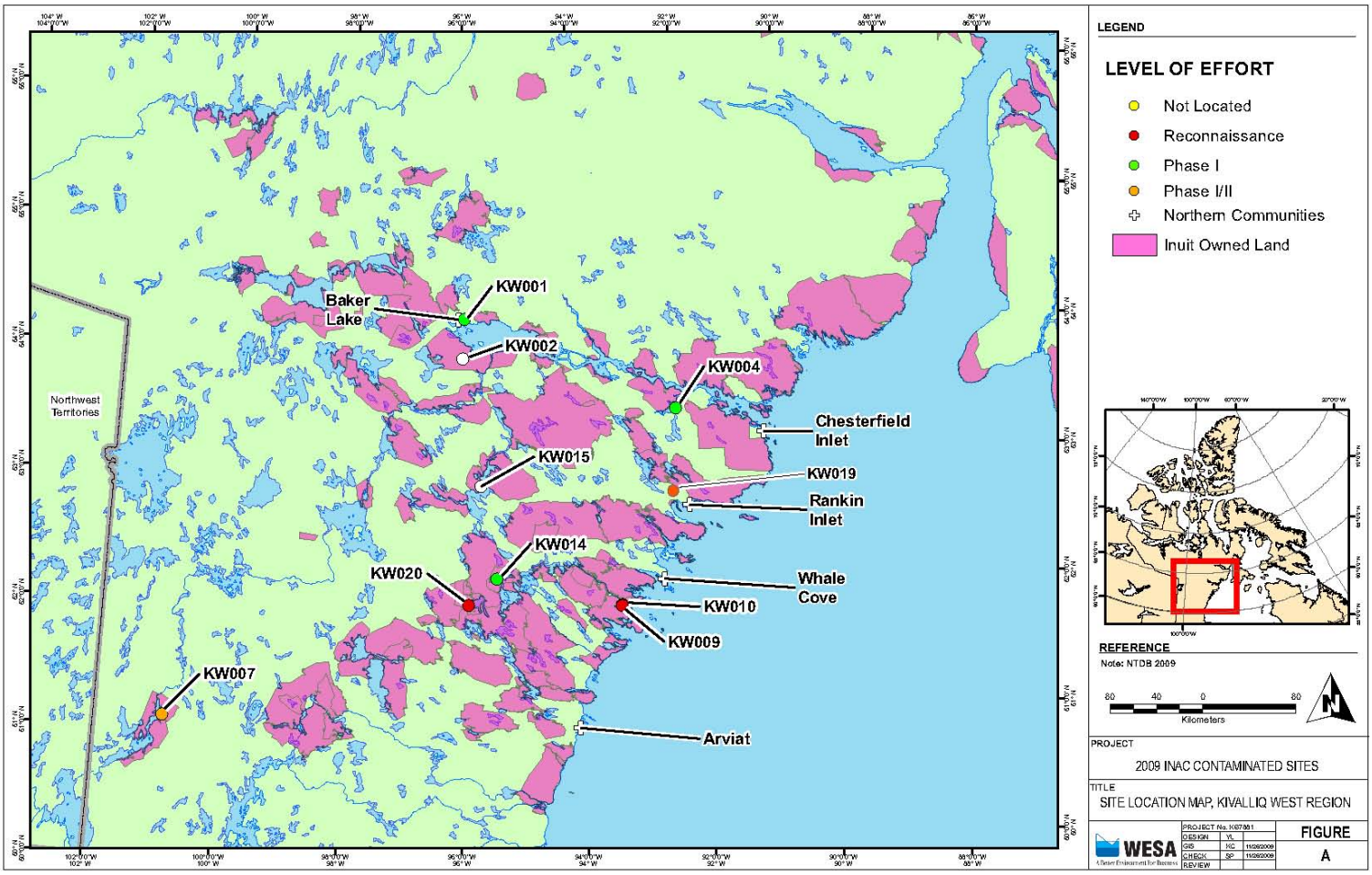
TABLE A2 – SUMMARY OF DISBURSEMENTS

Billing Period:		
Disbursement Categories	Comments	Costs
Travel – Air		
Accommodation		
Other 1 (describe)		
Other 2 (describe)		
Originating Resource:	Total:	

TABLE A3 – SUMMARY INVOICE ROLL-UP

Date of Invoice	Invoice #	Billing period:
PWGSC Project Number:	Project Title:	
Proposed Fees: Percentage:	Fees (Detailed breakdown and roll-up of tasks) for billing period: Percentage spent:	Fees remaining: Percentage remaining:
Proposed Disbursements: Percentage:	Disbursements (Detailed breakdown and roll-up of tasks) for billing period: Percentage spent:	Disbursements remaining: Percentage remaining:
Total PAW available in contract	PAW Committed (Detailed breakdown and roll-up of tasks) for billing period: Percentage spent:	PAW Remaining for each Task Authorization: Percentage remaining:
----------	Total:	----------

APPENDIX B: ENNADAI LAKE SITE LOCATION



APPENDIX C: ENVIRONMENTAL SCREENING OF THE PROPOSED REMEDIATION OF THE ENNADAI LAKE SITE UNDER THE NUNAVUT IMPACT REVIEW PROCESS

Environmental Assessment (EA) Regulatory Process

AANDC projects in Nunavut are subject to the territorial environmental impact assessment process. Territorial environmental assessment requirements are set out in the *Nunavut Land Claims Agreement* under Section 12.2.4.

Section 12.2.4 of the Nunavut Land Claims Agreement (NLCA) requires that the Nunavut Impact Review Board (NIRB) screen project proposals based on defined criteria. Project proposals are provided to NIRB by regulatory agencies as part of the overall project approval process (i.e. Nunavut Water Board; Nunavut Planning Commission).

Section 12.12.7 of the NLCA states that the *Canadian Environmental Assessment Act* no longer applies within the geographic area.

Objectives

The objective of this environmental screening assessment is to:

- Assess the environmental, social, economic and cultural effects of the proposed remediation of the former exploration sites including identification of potential impacts and development of mitigation measures where necessary.

Specific objectives required to achieve the general objective include:

- Identify project components and development activities which may result in potential impacts to the environment and the effect of these on the receiving physical and/or socio-economic environments.
- Identify existing conditions within the project area, including existing uses of land, resources and other activities which have the potential, in combination with proposed remediation activities, to affect the physical and/or socio-economic environment.
- Assess cumulative effects associated with this project and other past, present or proposed projects in the area.
- Determine any follow-up requirements

Scope

The Consultant will:

- provide a general description of the principal project elements (“a physical work that a Proponent proposes to construct, operate, modify, decommission, abandon, or otherwise carry out, or a physical activity that a Proponent proposes to undertake or otherwise carry out, such work or activity being within the Nunavut Settlement Area" as defined in the NLCA);
- provide a description of accessory physical works and any other undertakings in relation to the physical works.

Scope of Assessment

The environmental assessment shall include a consideration of the following factors in accordance with Section12.5.2 of the NLCA:

- project description, including the purpose and need for the project;

- anticipated ecosystemic and socio-economic impacts of the project;
- anticipated effects of the environment on the project;
- steps which the proponent proposes to take including any contingency plans,to avoid and mitigate adverse impacts;
- steps which the proponent proposes to take to optimize benefits of the project,with specific consideration being given to expressed community and regional preferences as to benefits;
- steps which the proponent proposes to take to compensate interests adversely
- affected by the project;
- the monitoring program that the proponent proposes to establish with respect to ecosystemic and socio-economic impacts;
- the interests in lands and waters which the proponent has secured, or seeks to secure;
- options for implementing the proposal; and
- any other matters that NIRB considers relevant.

Scope of the Factors

The assessment will consider the potential effects of the proposed project within the spatial and temporal boundaries that encompass the periods and areas during and within which the proposed project may potentially interact with, and have an effect on, components of the environment.

Purpose of the Project and Conformance to Legislation and Policy

The EA Screening of the proposal shall:

- describe the purpose of the project and who would receive a benefit/loss from it;
- estimate the economic and social benefits that project would create;
- estimate the economic and social benefits that would be derived from not remediating the site;
- outline how the project relates to existing conditions, physically, socially, culturally and politically; and
- analyze the project for conformance to territorial legislation.

Description of Project Activities

The Consultant shall:

- list all project activities and outline schedule for each activity;
- for each activity, outline the methods, materials, and equipment to be used;
- outline excavation requirements for both borrow & landfill development (quantity / quality of material removed);
- for any fill or aggregated required describe where such will be obtained;
- identify any additional permitting/licensing requirements for aggregate extraction;
- describe on-site material management including identifying and quantifying all toxic/ hazardous materials to be used, describing how fuels, toxic / hazardous materials will be managed and provide spill contingency plans;
- outline collection, storage and disposal methods for waste including garbage, human waste, trade waste, etc.; and
- identify any requirements for off-site land use and outline site security/signage; and
- identify temporary field camp requirements or other requirements for workforce accommodation (numbers of employees, length of stay, location of camp, waste handling provisions, etc.).

Project Approval and Permit Requirements

The Consultant shall describe the nature of the permits or approvals needed for the project.

Site Description

The consultant will describe the geographical setting; and the environmental components, their interrelationships and sensitivity to disturbance, at the proposed project location. This description will serve to identify and quantify the current site in its existing condition prior to any development. This description will include the following:

- site location (UTM coordinates, geographic positioning, etc.);
- dimensions of the site;
- climate (general, micro);
- geology and hydrogeology (surficial, subsurficial, special resources);
- soil types and geomorphology;
- vegetation;
- hydrology;
- fish and wildlife (species composition, population densities, habitat use, travel corridors, special resources) from previously developed studies.
- site specific land use history (present and past);
- cultural features and special places; and
- aesthetic values.

Note: With the exception of portions of the biophysical inventory, this information will be provided to the Consultant by PWGSC.

Project/Environment Interactions

Wildlife

The identification and assessment of impacts to wildlife will include but not be limited to the following:

- the effects of habitat change, corridor impairment, habitat fragmentation and habitat disruption on wildlife (individually and socially) from the periodic usage of the site and site access until completion of the project. Note that many impacts will likely be positive;
- the change in species composition and distribution, and any impacts to endangered and special species; and
- the effects of noise on wildlife as a result of the project.

Vegetation

The identification and assessment of impacts to vegetation will include but not be limited to the following:

- how the removal of vegetation for site remediation would effect the overall vegetative communities at the site as well as soil stability and possible siltation of adjacent aquatic resources;
- potential changes in species composition or community structure, effects on rare, endangered or special resource species.

Landforms

The identification and assessment of impacts will include but not be limited to the following**:**

- physical changes, erosion potential, soil compaction, changes in soil structure and organic matter content; and
- the potential for long and short term additions of pollutants (man made and natural) to soil and the impacts from such additions.

Aquatics/Hydrological Resources

The identification and assessment of impacts to aquatic resources and hydrology by the Consultant will include but not be limited to the following:

- identification of construction, operation and reclamation activities and timing schedules and how these might affect fish and fish habitat;
- the identification of the potential for long and short term additions of pollutants (man made and natural) to water and the impacts from such additions including the impacts associated with equipment operation and possible contaminant release.
- a description of the mitigation and enhancement measures employed to prevent or minimize adverse effects from the deposit of sediment, deleterious substances and habitat alterations or destruction.
- a description of any monitoring program developed to evaluate the effectiveness of mitigation measures for maintaining habitat quality and of the compensation structures for use by the fish community.

Cultural Features

The Consultant will:

- describe unique cultural sites or special features that have been previously located and the impact of the project on these features;
- outline protective measures such as avoidance which will be taken to prevent disturbance to known sites.
- evaluate the impacts that the project would have on traditional users relative to hunting and trapping in the proposed site areas.
- evaluate how remediation and reclamation of the site will impact the current aesthetic features (both long and short term) to visitors to the site.

Socio-economic Impacts

The Consultant will:

- incorporate information traditional users affected by the project.
- assess both the direct and indirect effects on local or regional businesses, other agencies and their services;
- evaluate the economic effects of the proposed project on the nearby communities;
- identify and describe any potential public health or safety issues related to carrying out this project.

Mitigating Measures

The Consultant will:

- identify measures which will be used to avoid or minimize environmental impact for each of the impacts identified in sections 4.1.1. to 4.1.6. Impact mitigations will focus upon design elements, alternative construction techniques and long-term operational practices, with avoidance of impacts as the preferred option.

Residual Impacts

The Consultant will:

- describe and analyze the environmental changes (residual impacts) that will result with the implementation of mitigation, including an analysis of geographical extent, duration, magnitude, reversibility and frequency of occurrence of these effects based on their impacts to ecosystem values.

Cumulative Environmental Effects

The Consultant will assess the cumulative effects of the proposed project including ancillary activities) as follows:

- identify past and existing stressors (i.e. human land and lake use, resource consumption, pollutants, climate change, etc.) on the environment on a regional basis;
- discuss and attempt to quantify the resulting contribution of this project (i.e. direct loss of habitat, and its effects such as habitat avoidance, individual and social disruption of wildlife) to these existing stressors and the resulting cumulative impact to heritage values as described above:
- discuss and quantify the capacity for renewable resources affected by the construction and operation of the project, to continue to meet the needs of other current and potential future land users;
- discuss the possibility of increased seasonal human activity at the site and its effects to heritage values of the project area;
- identify mitigation measures for the cumulative effects;
- determine whether the residual impacts of the cumulative effects will adversely impact on the environment; and
- identify uncertainties and feedback to evaluate the accuracy of the assessment of cumulative effects and any proposed mitigation.

Knowledge Deficiencies

Knowledge deficiencies and how to address these deficiencies will be described.

Public Concerns

Based on the public consultation results to date, the Consultant will describe any concerns that have been raised by nearby communities such as the community of Clyde River about the proposed project, and how these concerns are being addressed in the environmental assessment. This will include, but not be limited to, concerns expressed by correspondence (mail and electronic), telephone calls, media coverage and community meetings.

Results/Reports

The consultant will determine the areas where residual physical, environmental, cultural, or socio-economic impacts are expected. Each of these areas will be addressed under their own sections within the environmental assessment including separate sections for each of the first ten tasks, although further delineation of these tasks is also acceptable. Further sections shall be incorporated into the report, including Introduction and References, as well as other sections that the consultant believes are required.

Areas will also be identified on maps of appropriate scales that will provide a good overview of the expected impacts**.**

The final report shall include the following sections:

- Background

- Project Rationale
- Project Description
- Site Description (including environmental and socio-economic setting)
- Identification of project-environment interactions
- Assessment of project-environment interactions
- Proposed mitigating measures or monitoring programs.

Public Records

All environmental assessment documents, once completed and approved, become part of the public record, available to anyone making an enquiry through the public registry system. This information will be available through AANDC's current public registry system as well as the NIRB ftp site. Interim documents need to be clearly marked as "Draft" copies. Copies of the associated documents will be placed on file at suitable locations including the local offices of the authorizing agency.

APPENDIX B
MATERIALS INVENTORY

Appendix B: Ennadai Lake RAP Inventory Table

APEC #	Material Type	Material Description	Volume (m^3)
1 Stain 1	N/A	N/A	N/A
2 Stain 2	N/A	N/A	N/A
3 Stain 3	N/A	N/A	N/A
4 Tank 5	Non-Hazardous	Other Waste	46
	Hazardous	Liquid Organic Waste in Tank	722 L
5 Drums on Shore	Non-Hazardous	Drums	43 drums
	Hazardous	Liquid Organic Waste in Drums	50 L
		Other Liquid Hazardous Waste	205 L
		Total Lead and Leachable Lead Paint on Drums	27 drums
6 Medium Cabin	Non-Hazardous	Wood Waste	7
		Other Waste Metal	3
	Hazardous	Liquid Hazardous Waste	1 L
		Total and Leachable Lead Painted Wood	5
		Total Lead and Leachable Lead Paint on Drums	2 drums
		Asbestos Waste	0.2
7 Small Cabin	Non-Hazardous	Wood Waste	2
		Other Waste	1
	Hazardous	Asbestos Waste	1
		Total and Leachable Lead Painted Wood	5
8 Pipeline	Non-Hazardous	Other Waste	10
	Hazardous	Liquid Organic Waste in Pipeline	950 L
9 Tank 1	Non-Hazardous	Other Waste	36
		Concrete (IOL)	2
	Hazardous	Liquid Organic Waste in Tank	1935 L
		Asbestos Waste	0.02
10 Tank 2	Non-Hazardous	Other Waste	36
		Concrete (IOL)	2
	Hazardous	Liquid Organic Waste in Tank	1868 L
		Asbestos Waste	0.02
11 Tank 3	Non-Hazardous	Wood Waste	2
		Other Waste	37
	Hazardous	Liquid Organic Waste in Tank	0 L
		Asbestos Waste	0.02
12 Tank 4	Non-Hazardous	Wood Waste	1
		Other Waste	37
	Hazardous	Liquid Organic Waste in Tank	3531 L
		Asbestos Waste	0.02
13 Overhead Piping	Non-Hazardous	Other Waste	20
		Concrete (IOL)	3
	Hazardous	Total Lead and Leachable Lead Paint on Concrete	1
		Liquid Organic Waste in Pipeline	400 L

Notes:

1. All volumes are uncrushed
2. Volumes of total lead and leachable lead paint include the painted substrate, except concrete
3. Drum volumes are the number of drums, not m^3
4. Liquid volumes are in litres, not m^3

N/A = Not Applicable

Appendix B: Ennadai Lake RAP Inventory Table

APEC #	Material Type	Material Description	Volume (m^3)
14 Building 1	Non-Hazardous	Wood Waste	240
		Other Waste	29
		Concrete (IOL)	74
	Hazardous	Asbestos Waste	153
		Total Lead and Leachable Lead Paint on Asbestos Panels and Ceiling Tile	17
		Total Lead and Leachable Lead Paint on Wood, Particulate Board	15
		Total Lead and Leachable Lead Paint on Drums	1 drum
		Total and Leachable Lead Paint on Concrete	5
		Other Hazardous Waste	4
		Fire Extinguisher	0.06
		Compressed Gas Cylinders	0.1
		Liquid Organic Waste in Drums	410 L
		Other Liquid Hazardous Waste	27 L
15 Building 2	Non-hazardous	Wood Waste	1
		Other Waste	432
		Concrete (IOL)	42
	Hazardous	Asbestos Waste	0.02
		Lead Base Paint	29 L
		Total Lead, Leachable Lead and PCB Paint on Wood and Equipment	7
		Total and Leachable Lead Paint on Concrete	4
		Total and Leachable Lead Painted Metal	45
		Fire Extinguishers	0.1
		Other Hazardous Waste	2
		Liquid Organic Waste in Drums/ASTs	2264 L
		Other Liquid Hazardous Waste	261 L
16 Building 3	Non-hazardous	Wood Waste	10
		Other Waste	3
	Hazardous	Asbestos Waste	11
		Total Lead and Leachable Lead Paint on Wood	5
		Compressed Gas Cylinders	0.3
		Fire Extinguisher	0.04
		Other Hazardous Waste	0.1
		Liquid Hazardous Waste	17 L
17 Building 4	Non-hazardous	Wood Waste	30
		Other Waste	3
	Hazardous	Asbestos Waste	13
		Total Lead and Leachable Lead Paint on Asbestos Ceiling Tile	1
		Total Lead and Leachable Lead Paint on Wood	6
		Creosote Soaked Wood	2
		Other Hazardous Waste	0.02

Notes:

1. All volumes are uncrushed
2. Volumes of total lead and leachable lead paint include the painted substrate, except concrete
3. Drum volumes are the number of drums, not m^3
4. Liquid volumes are in litres, not m^3

N/A = Not Applicable

Appendix B: Ennadai Lake RAP Inventory Table

APEC #	Material Type	Material Description	Volume (m^3)
18 Building 5	Non-Hazardous	Wood Waste	115
		Concrete (IOL)	15
		Other Waste	14
	Hazardous	Asbestos Waste	4
		Total Lead and Leachable Lead Paint on Wood	1
		Total lead, leachable lead and PCB Painted Equipment	1
		Total and Leachable Lead Paint on Equipment	20
		Other Hazardous Waste	0.7
		Liquid Organic Waste in Drums/ASTs	591 L
		Other Liquid Hazardous Waste	180 L
19 Building 6	Non-hazardous	Wood Waste	2
		Other Waste	1
	Hazardous	Total and Leachable Lead Paint on Wood	6
20 Building 7	Non-Hazardous	Wood Waste	28
		Other Waste	9
	Hazardous	Asbestos Waste	4
		Total Lead and Leachable Lead Paint on Wood and Metal	2
		Other Hazardous Waste	0.5
		Liquid Hazardous Waste	535 L
21 Building 8	Non-Hazardous	Wood Waste	12
		Other Waste	12
	Hazardous	Asbestos Waste	4
		Total Lead and Leachable Lead Paint on Equipment	0.5
		Liquid Organic Waste in Drums	660 L
		Other Liquid Hazardous Waste	220 L
22 Building 9	Non-hazardous	Wood Waste	15
		Concrete (Crown land)	12
		Other Waste	71
	Hazardous	Other Hazardous Waste	0.1
		Asbestos Waste	3
		Total Lead and Leachable Lead Paint on Drums	11 drums
		Liquid Organic Waste in Drums	220 L
		Fire Extinguisher	0.02

Notes:

1. All volumes are uncrushed
2. Volumes of total lead and leachable lead paint include the painted substrate, except concrete
3. Drum volumes are the number of drums, not m^3
4. Liquid volumes are in litres, not m^3

N/A = Not Applicable

Appendix B: Ennadai Lake RAP Inventory Table

APEC #	Material Type	Material Description	Volume (m^3)
23 Drum Cache 1	Hazardous	Liquid Organic Waste in Drums	106 L
		Asbestos Waste	2
		Total Lead and Leachable Lead Paint on Drums	178 drums
24 Drum Cache 2	Non-Hazardous	Liquid Organic Waste in Drums	50 L
		Other Waste	30 drums
	Hazardous	Total Lead and Leachable Lead Paint on Drums	75 drums
25 Drum Cache 3	Non-Hazardous	Other Waste	317 drums
	Hazardous	Liquid Organic Waste in Drums	50 L
		Total Lead and Leachable Lead Paint on Drums	3 drums
26 Drum Cache 4	Non-Hazardous	Other Waste	130 drums
	Hazardous	Total Lead and Leachable Lead Paint on Drums	5 drums
27 Drum Cache 5	Non-Hazardous	Other Waste	225 drums
	Hazardous	Total Lead and Leachable Lead Paint on Drums	5 drums
28 Main Debris Area	Non-Hazardous	Wood Waste	2
		Drums	17 drums
		Other Waste	8
	Hazardous	Total Lead and Leachable Lead Paint on Wood and Metal	4
		Total Lead and Leachable Lead Paint on Drums	1 drum
		Other Hazardous Waste	1
29 Shoreline Debris Area and Pump house	Non-Hazardous	Wood Waste	18
		Other Waste	6
		Concrete (Crown land)	0.6
	Hazardous	Other Hazardous Waste	0.1
		Total Lead and Leachable Lead Paint on Equipment and Wood	2
		Asbestos Waste	0.2
		Creosote Soaked Wood	1
30	N/A	N/A	N/A
31	N/A	N/A	N/A
N/A Building 10	Non-hazardous	Wood Waste	7
		Other Waste	2
	Hazardous	Total Lead and Leachable Lead Paint on Wood	9
		Asbestos Waste	0.02
N/A Scattered Debris throughout and adjacent to the Site	Non-Hazardous	Wood Waste	2
		Other Waste	31
		Concrete (Crown land)	11
	Hazardous	Asbestos Waste	1
		Total Lead and Leachable Lead Paint on Metal, Wood and Metal Towers	10
		Total Lead and Leachable Lead Paint on Drums	31 drums
		Other Hazardous Waste	11
		Liquid Organic Waste in Drums	3075 L

Notes:

1. All volumes are uncrushed
2. Volumes of total lead and leachable lead paint include the painted substrate, except concrete
3. Drum volumes are the number of drums, not m^3
4. Liquid volumes are in litres, not m^3

N/A = Not Applicable

Appendix B: Ennadai Lake RAP Inventory Table

APEC #	Material Type	Material Description	Volume (m^3)
Totals: (m^3)	Non-Hazardous	Wood Waste	494
		Other Waste and Concrete (crown land)	871
		Drums	762 drums
		Concrete (IOL)	137
	Hazardous	Asbestos Waste	196
		Liquid Organic Waste in Tanks	8056 L
		Liquid Organic Waste in Drums	7476 L
		Liquid Organic Waste in Pipeline	1350 L
		Compressed Gas Cylinders	0.4
		Fire Extinguishers	0.2
		Creosote Soaked Wood	3
		Other Liquid Hazardous Waste	1475 L
		Total Lead, Leachable Lead and PCB Paint on Equipment, Metal, Particulate Board, Wood and Metal Towers	143
		Total Lead and Leachable Lead Paint on Drums	339 drums
		Total Lead and Leachable Lead Paint on Concrete	10
		Total Lead and Leachable Lead Paint on Asbestos Panels and Ceiling Tiles	18
		Other Hazardous Waste	19

Notes:

1. All volumes are uncrushed
2. Volumes of total lead and leachable lead paint include the painted substrate, except concrete
3. Drum volumes are the number of drums, not m^3
4. Liquid volumes are in litres, not m^3

N/A = Not Applicable

APPENDIX C
PHOTO LOG

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General Site Photographs and Aerial Photographs

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Photo 3: View of the Site, looking east

Photo 4: View of the drum caches and buildings, looking southeast

Photo 5: View of the main building cluster, looking north

Photo 6: View of the Site, looking northeast

Photo 7: Floatplane docked at the beach at the Ennadai Lake Former Weather Station site

Photo 8: Typical trail system on esker

Photo 9: Trail through main esker complex looking south toward Landfarm 1

Photo 10: Airstrip at Ennadai Lake, Former Weather Station, looking north from above

Photo 11: Airstrip looking east

Environmental Photographs

Photo E-1: APEC 1 - Stain 1 - Flag markers depicting soil delineation samples APEC 1-SS001, SS002 and SS003

Photo E-2: APEC 1 - Stain 1 - Flag locations for delineation soil samples APEC 1-SS004 and SS005 in a low lying depressional area

Photo E-3: APEC 2 - Stain 2 - Flag locations for delineation soil samples APEC 2-SS001, SS002 and SS003; coarse-grained sand and cobbles were prevalent throughout the esker

Photo E-4: APEC 3 Stain 3 - Delineating terminal extent of the pipeline

Photo E-5: APEC 3 - Stain 3 - Terminal extent of pipeline facing up-gradient from the shoreline

Photo E-6: APEC 4b - Tank 5 - Delineation of tanks; staining can be seen at the valve

Photo E-7: APEC 4a - Tank 5 - Flag locations for delineation soil samples facing up-gradient toward the tank

Photo E-8: APEC 4a - Tank 5 - Flag locations for soil samples APEC 4a- SS001, staining was noted at the valve of the AST

Photo E-9: APEC 8 - Pipeline - Flag locations for delineation soil samples APEC 8- SS004, SS005 and SS006; staining was noted along the pipeline at a junction

Photo E-10: APEC 8 - Pipeline - Sample location taken down-gradient of APEC1; delineation soil sample APEC 8-SS011 is shown; both samples taken in a low-lying depressional area, hydrocarbon odour was noted

Photo E-11: APEC 9 - 12 - Delineation soil sample APEC 9-SS004 and Tanks 1 - 4 are shown; the picture was taken looking east up-gradient toward the tank farm; sand fill was present on the slope

Photo E-12: APEC 9 - Tank 1- Soil sample location APEC 9-SS001; the soil sample was taken down-gradient of the fuel distribution lines; significant hydrocarbon odour and staining around the valves was noted

Photo E-13: APEC 12 - Tank 4 - Delineation soil sample APEC 12-SS007 is shown looking north toward the tank farm; in the background soil samples APEC 12- SS001 to SS005 can be seen delineating the hydrocarbon plume

Photo E-14: APEC 13-Overhead Pipeline- Delineation soil samples APEC 13 SS002 to SS009 are seen between Building 3 (APEC 16) and Building 5 (APEC 18). An active leak was present at the time of the Site investigation

Photo E-15: APEC 13/APEC 14 - Overhead Pipeline/Building 1 - Delineation soil sample locations APEC 13-SS010 to SS017 are shown; hydrocarbon odour was noted at the base of the foundation

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Photo E-23: APEC 19 - Building 7 - A drainage/seepage pathway was located behind the APECs running toward Ennadai Lake; sediment and surface water samples APEC 20-SW001 and APEC 20-SD-01 are shown

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Photo E-30: General Soil Condition at APEC 13 (Central Buildings) - Well sorted sand with some gravel

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Photo G-4: Trail on top of main esker complex near Environment Canada Weather Station

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Photo G-40: Potential Landfarm 2, looking northwest

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Hazardous and Non-Hazardous Materials Photos

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Photo H-2: APEC 4 – Tank 5 (42000L) – Organic content remaining in Tank 5

Photo H-3: APEC 5 – Drums (Located on the shore of Ennadai Lake) - Total and leachable lead painted drums

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Photo H-5: APEC 7 – Small Cabin – Asbestos black felt and panels, and total and leachable painted wood

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Photo H-7: APEC 8 – Pipeline – View from end of the pipeline and the esker, looking northeast

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Photo H-14: APEC 14 – Building 1 – Basement northwest wall

Photo H-15: APEC 14 – Building 1 – Basement unknown crystallized white material (possibly a cleaning product)

Photo H-16: APEC 14 – Building 1 – Basement two drums and jerry cans, assumed to be full of diesel, new, Labeled: Paul Anowtalik and Tony V's property

Photo H-17: APEC 14 – Building 1 – Leachable lead seals on cast iron piping and tanks behind

Photo H-18: APEC 14 – Building 1 – Main floor hallway, viewing northeast; asbestos flooring wall panels and ceiling, total lead and leachable lead painted asbestos panels on walls and second layer of ceiling particulate board

Photo H-19: APEC 14 – Building 1 – Main floor kitchen; asbestos flooring, wall panels and ceiling, total lead and leachable lead painted wood shelves, mercury vapor in lights and PCBs in light ballasts

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Photo H-22: APEC 14 – Building 1 – Main floor electrical box. Asbestos walls and ceiling, PCBs, mercury and lead solder in electrical parts

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Photo H-27: APEC 15 – Building 2 – Miscellaneous chemicals, total lead and leachable lead painted metal walls, ceiling and concrete floor

Photo H-28: APEC 16 – Building 3 – Asbestos black felt, attic insulation, window caulking and total lead and leachable lead painted wood

Photo H-29: APEC 16 – Building 3 – Total lead and leachable lead painted wood and compressed gas cylinder

Photo H-30: APEC 16 – Building 3 – Total lead and leachable lead painted wood and miscellaneous containers of oil/lubricants/fuel

Photo H-31: APEC 17 – Building 4 – Asbestos black felt, attic insulation, window caulking, walls panels and total lead and leachable lead painted wood

Photo H-32: APEC 17 – Building 4 – Asbestos chimney tile and ceiling tile, and total lead and leachable lead painted wood

Photo H-33: APEC 17 – Building 4 – Asbestos insulation, and total lead and leachable lead painted wood

Photo H-34: APEC 18 – Building 5 - Asbestos exterior panels, black felt, attic insulation, window caulking, and total lead and leachable lead painted wood

Photo H-35: APEC 18 – Building 5 - Total lead and leachable lead painted wood and equipment, lead acid batteries and miscellaneous containers of oil/lubricants

Photo H-36: APEC 18 – Building 5 - Total lead and leachable lead painted wood, AST organic contents and miscellaneous containers of oil/lubricants

Photo H-37: APEC 18 – Building 5 - Total lead and leachable lead painted caterpillar

Photo H-38: APEC 18 – Building 5 – Fibre glass insulation (not containing asbestos)

Photo H-39: APEC 19 – Building 6 – Total lead and leachable lead painted wood

Photo H-40: APEC 20 – Building 7 – Asbestos exterior asphalt shingles and total lead and leachable lead painted wood

Photo H-41: APEC 20 - Building 7 - Asbestos flooring, asbestos white piping, asbestos black felt, total and leachable lead painted wood and metal, miscellaneous containers of oil/lubricants, drum content (clear, flammable) and PCBs in light ballasts and electrical equipment

Photo H-42: APEC 21 – Building 8 - Asbestos exterior asphalt shingles and black felt

Photo H-43: APEC 21 – Building 8 - Miscellaneous containers of oil/lubricants

Photo H-44: APEC 21 – Cement mixer, painted with total lead and leachable lead paint

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Photo H-49: APEC 24 – Drum Cache 2 - Total lead and leachable lead painted drums and drum content (organic)

Photo H-50: APEC 24 – Drum Cache 2 - Total lead and leachable lead painted drum and some organic drum content

Photo H-51: APEC 25 – Drum Cache 3 - Total lead and leachable lead painted drums and drum content (organic)

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Photo H-53: APEC 27 – Drum Cache 5 - Total lead and leachable lead painted drums

Photo H-54: APEC 25-27 – Drum Cache 3 on the right, Drum Cache 4 in the center and Drum Cache 5 on the left - Total lead and leachable lead painted drum and drum content (organic)

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Photo H-59: APEC 29 – Total lead and leachable lead painted drum with blue, flammable content

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Photo H-61: APEC N/A – Building 10 - Antenna Tuning Unit Shelter, Total lead and leachable lead painted wood and asbestos panel

Photo H-62: APEC N/A – Building 10 - Antenna Tuning Unit Shelter interior

Photo H-63: APEC N/A – Scattered Debris throughout and adjacent to the site – metal cans debris west of the main building cluster on the hill

Photo H-64: APEC N/A – Scattered Debris throughout and adjacent to the site – Two total lead and leachable lead painted metal towers west of the main building cluster, on the top of the hill

Photo H-65: APEC N/A – Scattered Debris throughout and adjacent to the site – New drums and organic drum content by the airstrip

Photo 1: View of the Site from above

Photo 2: View of the main building cluster, looking southeast

Photo 3: View of the Site, looking east

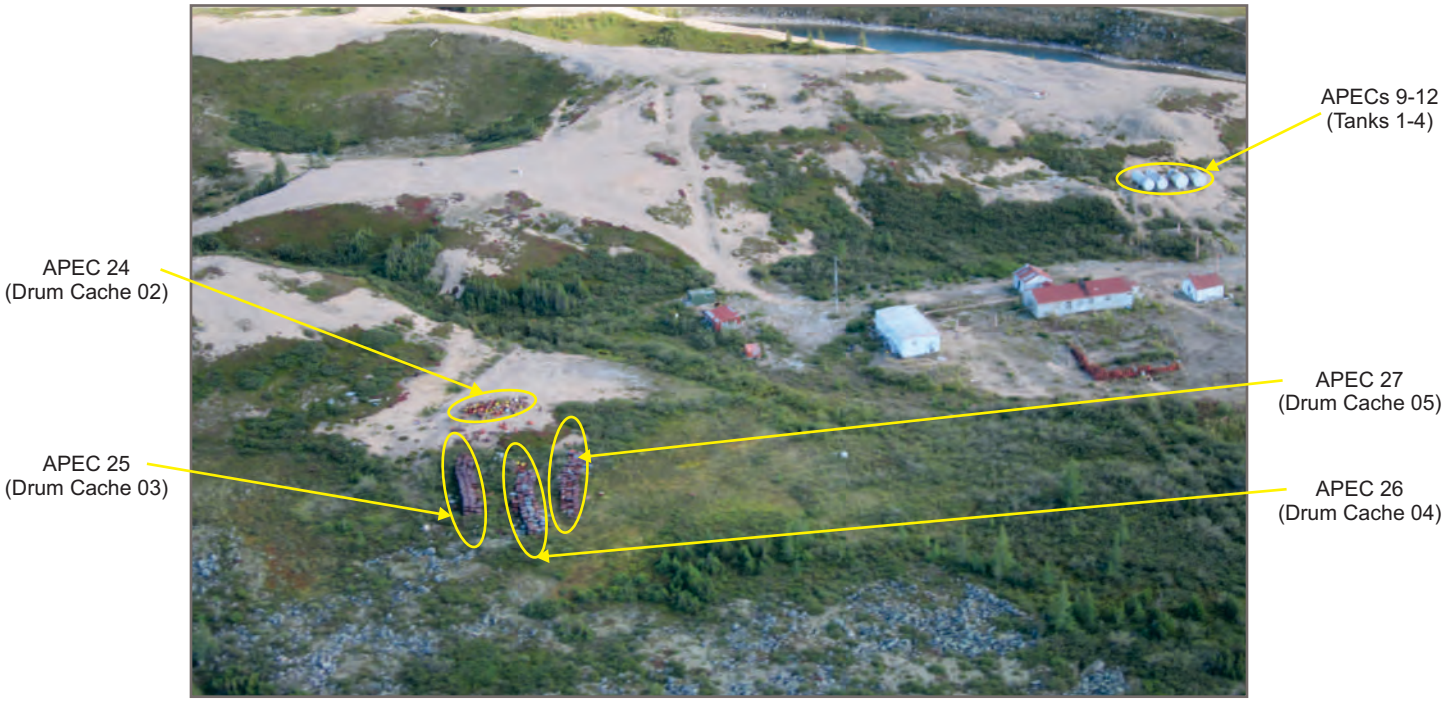

Photo 4: View of the drum caches and buildings, looking southeast

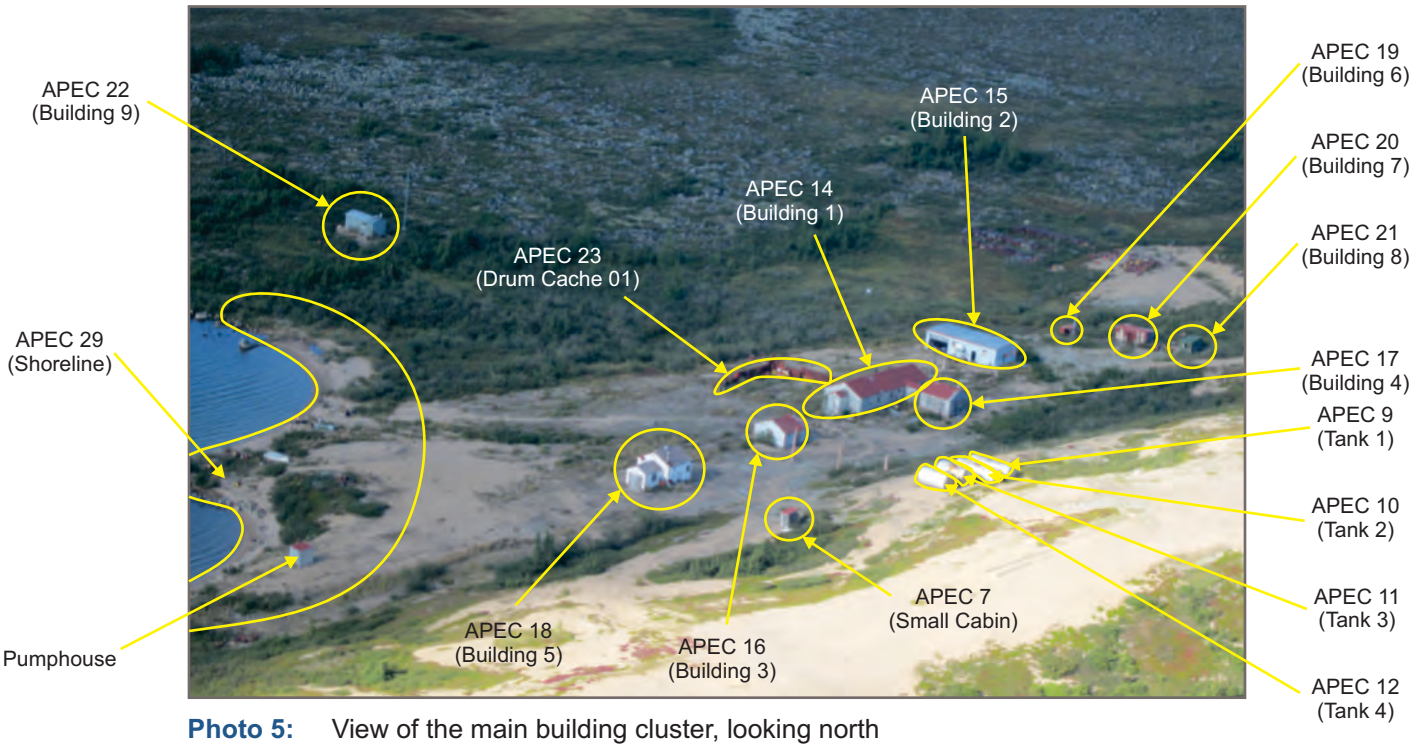

Photo 5: View of the main building cluster, looking north

Photo 6: View of the Site, looking northeast