The Collection of Landfill Monitoring Data at the CAM-2 Gladman Point – 2007 FINAL Report

Prepared for
Defence Construction Canada

Submitted by
Gartner Lee Limited

January, 2008

Gartner Lee

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Reference: **GLL 70-516**

Distribution:
8 Defence Construction Canada
1 Kitnuna Corporation
2 Gartner Lee Limited

Gartner Lee

Gartner Lee Limited

January 31, 2008

Mr. Thuc Nyugen
Defence Construction Canada
Constitution Square, Suite 1720
350 Albert Street
Ottawa, ON K1A 0K3

Dear Mr. Nyugen:

Re: GLL 70-516 – Final Report for the 2007 Collection of Landfill Monitoring Data at the CAM-2 Dew Line Site, Gladman Point, Nunavut

We are pleased to submit eight printed copies of the 2007 Final Report on the Collection of Landfill Monitoring Data at the CAM-2 Dew Line Site at Gladman Point, Nunavut. The report was previously submitted in draft for review and comments received have been incorporated into this final report. This report documents the data collected from the Gartner Lee Limited site visit to the CAM-2 Site on August 24 - 27, 2007. In addition to the hard copy reports, there are also attached to the report, three digital data discs that contain:

- All numeric data files including analytical results, thermistor data and associated graphs submitted in MS Excel 2000;
- All text files submitted in MS Word 2000;
- All drawings submitted in AutoCAD Version 2008;
- All photographic records of the geotechnical inspection submitted in digital format and in hardcopy in the location specific report as well;
- All photographic records of the soil samples collected at each location. These have been provided as an attachment to the main report and include an index of the photo numbers and the locations;
- All photographic records of the condition of the thermistor casings along with maintenance report forms;
- All photographic records of the condition of the monitoring wells. These have been provided as attachments to the main report and include an index of the photo numbers and the locations; and
- All field notes have been attached to each specific landfill investigation report.

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Visual inspections were conducted at the following landfills: Tier II, Non Hazardous Waste (NHW), Station and West. Both the Station and West landfills appear stable and show no indication of slope movement or significantly degraded cover condition. Thin tension cracks, typically on the order of 1mm to 5mm width, were observed around the crest and perimeter of both the Tier II and NHW landfills. In all instances, the cracks were roughly parallel to the toe of slope and in multiple locations there were several roughly parallel sets of cracks between the toe of slope and crest. The cracks suggest minor slope movement, however, the landfill slopes appear to be stable and are not in imminent danger of large-scale movement. From the visual analysis during the site visit, there does not appear to be any significant erosion or cover issues that require immediate attention or that would be expected to lead to degraded cover performance in the near term. No immediate action is warranted. The tension cracks have been documented in detail to facilitate ongoing monitoring.

Soil samples were collected at two depths from each of the 4 test pits. Sample results are located within each site report. DCC should compare the laboratory results to their internal DEW Line Site Guidelines to confirm whether the analytical results are in compliance.

All four of the wells sampled contained sufficient water for analysis. A full suite of groundwater samples were collected from wells MW-1, MW-2, MW-3 and MW-4 at the Tier II Soil Disposal Facility. Sample results are located within each site report. DCC should compare the laboratory results to their internal DEW Line Site Guidelines to confirm whether the analytical results are in compliance.

All four of the thermistors located at the Tier II Soil Disposal Facility were downloaded successfully. The batteries were also replaced, and data loggers reset in accordance with the instructions provided by other consultants representing DCC.

We trust this report meets your requirements and appreciate the opportunity to assist DCC with this interesting assignment. If you have any questions or comments concerning this report please do not hesitate to call.

Yours very truly,
GARTNER LEE LIMITED

(original signed and stamped)

Darrin C. Johnson, M.Sc., P.Eng.
Senior Geotechnical Engineer and Project Manager

DCJ/pc
Attach.

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Appendices

1. Introduction

The Department of National Defence (DND) in co-operation with Nunavut Tunngavik Incorporated (NTI) has developed a Landfill Monitoring Plan to address post closure monitoring requirements for the landfills at the DEW Line sites. Defence Construction Canada (DCC) is managing the clean-up monitoring programs on behalf of DND. Kitnuna Corporation and Gartner Lee Limited in a joint venture were awarded the contract for the purposes of providing services for the collection of landfill monitoring data at the CAM-2 Gladman Point Site in the Nunavut Settlement Area for 2007. This report will provide the procedures and the results for interpretation of the monitoring completed in 2007.

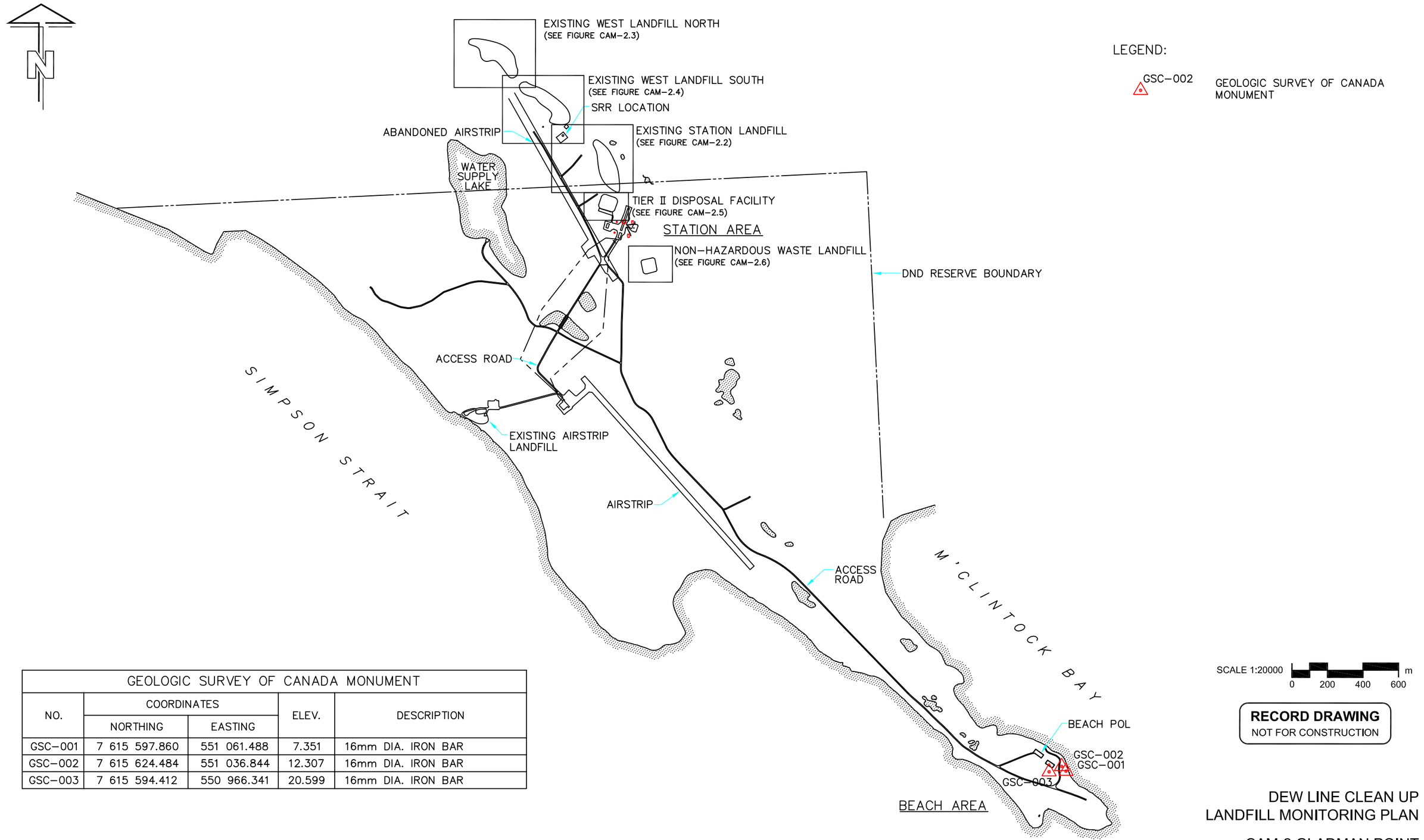
2. Background

The CAM-2 Gladman Point DEW Line site is located on the south side of King William Island, at 68º 40' north latitude and 97º 49' west longitude. The site is located approximately 75 kilometres west of Gjoa Haven and 300 kilometres east of Cambridge Bay.

CAM-2 was converted to a Short Range Radar (SRR) site in the early 1990s. The environmental cleanup and demolition of facilities not required for the operation of the SRR site commenced in 2003 and was completed during the summer of 2005. The cleanup includes the closure and remediation of four existing landfills as well as the construction of a landfill for the disposal of non-hazardous wastes generated from demolition, and collection of site debris. A DCC Tier II soil disposal facility has been constructed at this site. These landfills, as shown on the overall site plan, Figure 1, include:

1. Station Area Landfill;
2. West Landfill – North;
3. West Landfill – South;
4. Airstrip Landfill (completely excavated, no monitoring required);
5. DCC Tier II Soil Disposal Facility; and
6. Non-Hazardous Waste Landfill.

Access to the landfills was gained through on-site roads by way of ATV. The baseline monitoring of the landfills commenced in 2006. Gartner Lee understands that monitoring is to occur every year until 2008, after which, monitoring frequency at this site will decrease.



GEOLOGIC SURVEY OF CANADA MONUMENT				
NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
GSC-001	7 615 597.860	551 061.488	7.351	16mm DIA. IRON BAR
GSC-002	7 615 624.484	551 036.844	12.307	16mm DIA. IRON BAR
GSC-003	7 615 594.412	550 966.341	20.599	16mm DIA. IRON BAR

SCALE 1:20000

0 200 400 600 m

RECORD DRAWING
NOT FOR CONSTRUCTION

UMA | AECOM

DWG NAME: C2-RD01.DWG DMJ - 07/01/29

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

CAM-2 GLADMAN POINT

OVERALL SITE PLAN

FIGURE CAM-2.1

2.1 Project Objectives

The objective of the landfill monitoring program is to collect sufficient information to assess the performance of the landfill from a geotechnical and environmental perspective. The Landfill Monitoring Plan, as described in the Terms of Reference, specified the requirements for the visual inspection as well as the chemical and thermal monitoring of the landfills. The long term monitoring plan consists of visual monitoring for signs of settlement, collection of soil and groundwater samples to evaluate the effectiveness of the leachate containment system, and monitoring of the sub-surface ground temperatures along the toe of and within the main body of the landfill.

2.2 2007 Monitoring Event

Between August 24, and 27, 2007 Gartner Lee attended the CAM-2 DEW Line site to conduct field data collection. The monitoring event consisted of visual geotechnical inspections, soil sampling, groundwater sampling, and thermal monitoring of the landfills at designated locations (see Figure 1). The landfill monitoring requirements as outlined in the Terms of Reference (TOR) are displayed in Table 1 below.

Table 1. Summary of Landfill Monitoring Requirements for 2007

Landfill Designation	Visual Inspection	Soil Sampling	Groundwater Sampling	Thermal Monitoring
PIN-3 Lady Franklin Point				
Station Area Landfill	√			
West Landfill – North	√			
West Landfill – South	√			
DCC Tier II Disposal Facility	√	√	√	√
Non-hazardous Waste Facility	√			

At each of the landfill locations mentioned above, a field inspection was conducted to observe whether there were any visual signs of impact (such as seepage or stressed vegetation caused by the landfill) and for physical stability. Photographic records of the landfill were taken to show the condition of the landfill and any area of concern that was observed. The observations and the photographic record for each of the landfills is discussed individually in the Site reports presented in Appendices A through D.

Soil sampling, and groundwater sampling were only conducted at DCC Tier II Soil Disposal Facility for 2007. Generally, soil samples were collected at depths of 0.1m and approximately 0.4 - 0.5m, although there were some variations in sample depths dependent on the ground conditions. The soil samples were analyzed for Polychlorinated Biphenyls (PCBs) analyzed as Total Aroclors, total

petroleum hydrocarbons (TPHs) as defined by the Canadian Council of Ministers of the Environment (CCME) Canada Wide Standards (CWS) Fraction 1 to Fraction 3, and inorganic elements analyzed for total metals using low level detection limits. The analytical results of these samples are discussed in the Site report presented in Appendix C.

Groundwater elevations were measured at each observation well for the DCC Tier II Soil Disposal Facility in 2007. The monitoring conditions and field measurements were documented and collected at each monitoring well. The field measurements included the following: presence and thickness of free product (if applicable), depth to bottom of well, stick up height and visual condition of the observation well. Groundwater samples were collected from the 2007 designated observation wells that had sufficient water volumes to obtain samples. The water samples were obtained utilizing a peristaltic pump for low flow extraction. Disposable tubing was used in every well. Similar to the soil sampling program, the groundwater samples were analyzed for PCBs, TPHs, and inorganic elements.

The field methods for collecting the groundwater samples followed the QA/QC protocols and sampling requirements as requested in the Terms of Reference. The monitoring wells were purged at a rate equivalent or less than 100 ml/min with a peristaltic pump until at least one well volume had been purged and the field chemistry measurements had stabilized. Field chemistry measurements were taken at monitoring wells using a flow through cell and a digital probe measuring for temperature, pH, and conductivity. Further discussion regarding the field measurements, the field chemistry and the analytical results are discussed in the Site reports presented in Appendix C. The well development records and well condition records are appended to the relevant section in Appendix C.

Thermal Monitoring was conducted at the DCC Tier II Soil Disposal Facility in 2007. The data was downloaded from the system using the Lakewoods Systems Ltd. software. The information downloaded is further discussed in the individual Site Report presented in Appendix C.

3. Landfill Monitoring

As requested by DCC, Gartner Lee has presented the landfill monitoring reports as individual reports under the cover of this main report. The Landfill Monitoring Reports for each locality are presented in the appendices of this main report as follows:

Appendix A Station Area Landfill;
Appendix B West Landfill – North and South;
Appendix C DCC Tier II Soil Disposal Facility; and
Appendix D Non-Hazardous Waste Landfill.

All information collected that is relevant to these individual areas is presented in these sections or as attachments at the end of the sections.

4. Quality Assurance/Quality Control

For the soil and groundwater samples collected, a blind duplicate was collected at a frequency of approximately 1 in 10 samples collected. Tables used for the calculation of RSDs are located in Appendix F.

A total of one (1) blind duplicate soil sample and one (1) blind duplicate groundwater sample were collected for submission. All duplicate samples were submitted to both ALS Environmental and Cantest Ltd. for analysis. As well, a duplicate soil sample was sent to the Environmental Services Group for archival purposes. No blank groundwater sample was collected in the 2007 sampling event. The soil and water samples submitted and the corresponding sample locations are documented in Table 2.

Table 2. Blind Duplicates

Sample Identification	Duplicate of Sample	Sample Location	Depth (m)	Matrix (soil/water)	Landfill
C2-MW-5-2	C2-MW-4-2	MW-4	0.5	Soil	Tier II
C2-MW-5	C2-MW-4	MW-4	-	Water	Tier II

Each soil sample was analyzed for 14 parameters yielding a total of 14 sets of numbers to be calculated for relative standard deviation (RSD). Of the fourteen (14) RSDs calculated, ten (10) returned a value of “n/a” due to one or more concentrations being below the detection limit. Three (3) sets returned an acceptable RSD of below 20% for inorganics. One (1) set returned an unacceptable RSD of above 20% for zinc.

The duplicate soil sample collected at 0.5m depth at MW-4 returned an RSD value of 25% for zinc. The soil at this location ranged from clayey silt with a high organics content at the surface to a silty sand with gravel at depth. A small change in soil matrix within a sample set can cause there to be error in the returned value.

Each water sample was analyzed for 11 parameters yielding a total of 11 sets of numbers to be calculated for RSD. Of the eleven (11) RSDs calculated, nine (9) returned a value of “n/a” due to one or more concentrations being below the detection limit and two (2) RSDs returned a value above the acceptable RSD goal of 20% for inorganics and 30% for organics.

The duplicate water sample from MW-4 returned an RSD value of 46.2% for Chromium and 118.2% for Zinc. At least one of the Chromium concentrations measured was within three times the method detection limit of 0.005 mg/L and as such a higher RSD value is expected. All of the samples collected at MW-4 were re-analyzed for zinc to rule out analytical error however the results did not differ from the original testing. The suspected cause for the poor duplication is that the samples were

not filtered in the field and were analyzed for total metals. Differences in suspended particles and sediment from one sample to the next can cause a large variation in the quantity of total metals in a water sample. Adjustments such as movement of the sample tubing within the well during sampling can result in different amounts of particles and sediments being collected in a given sample, and therefore can have a large influence on the results of total metals testing.

5. Conclusions

Visual inspections were conducted at the following landfills: Tier II, Non Hazardous Waste (NHW), Station and West. Both the Station and West landfills appear stable and show no indication of slope movement or significantly degraded cover condition. Thin tension cracks, typically on the order of 1mm to 5mm width, were observed around the crest and perimeter of both the Tier II and NHW landfills. In all instances, the cracks were roughly parallel to the toe of slope and in multiple locations there were several roughly parallel sets of cracks between the toe of slope and crest. The cracks suggest minor slope movement, however, the landfill slopes appear to be stable and are not in imminent danger of large-scale movement. From the visual analysis during the site visit, there does not appear to be any significant erosion or cover issues that require immediate attention or that would be expected to lead to degraded cover performance in the near term. No immediate action is warranted. The tension cracks have been documented in detail to facilitate ongoing monitoring.

Soil samples were collected at the designated locations in 2007. Two samples were collected at the each location. Minor concentrations of detectable hydrocarbons were noted in one test pit at the DCC Tier II Disposal Facility. Inspections of the chromatograms reveal that the minor hydrocarbon concentrations are likely caused by naturally occurring organics in the peat found on site. The chromatograms and field observations agree with the correlation of naturally occurring organics in the peat layer.

In 2007, groundwater samples were collected from all four of the monitoring wells at the DCC Tier II Disposal Facility. The mid-August timing of the sampling appears to have occurred during maximum thaw. All four monitoring wells returned significant levels of zinc in the groundwater, exceeding the site condition standards in a potable groundwater condition in Ontario of 1.1mg/L, though the values should be compared to the internal DCC Dew Line Cleanup standards as well as in the context of this monitoring program.

6. Limitations

This report has been prepared as an assessment of the environmental condition of the subject site located at Gladman Point, Nunavut. The monitoring and investigation programs as described in this report, were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practising under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.

The assessment of environmental conditions and possible hazards at this Site has been made using the results of chemical analysis of soil/sediment and groundwater from a limited number of locations. The Site conditions between sampling locations have been inferred based on conditions observed at sampling locations. Subsurface conditions may vary from those encountered at the sample locations.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibility of such third parties. GLL accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on the information contained in this report.

The content of this report is based on information collected during our investigation, our present understanding of the Site conditions, and our professional judgement in light of such information at the time of this report. This report provides a professional opinion and therefore no warranty is either expressed, implied, or made as to the conclusions, advice and recommendations offered in this report. This report does not provide a legal opinion regarding compliance with applicable laws. With respect to regulatory compliance issues, it should be noted that regulatory statutes and their interpretation are subject to change.

The findings and conclusions of this report are valid only as of the date of this report. If new information is discovered in future work, including excavations, borings, or other studies, GLL should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

If you should have any questions regarding this report, please contact the undersigned at your convenience.

Report Prepared By:

Kenneth Boldt, B.Sc.
Environmental Engineer-In-Training

Jim Theriault, M.Sc.Eng., P.Eng.
Senior Geological Engineer

Report Reviewed By:

Karl Reimer, M.Sc., P.Eng.
Senior Remediation Engineer

Darrin Johnson, M.Sc., P.Eng.
Senior Geotechnical Engineer

Appendix A

Landfill Monitoring Report – Station Area Landfill

A.1 Station Area Landfill

A.1.1 Landfill Summary

The main landfill is located approximately 800 m west of the main station area and encompasses an area of approximately 61,000 m^2. The average thickness of the landfill is approximately 1.5 m. The landfill configuration and sample locations are shown on Figure A-1. Prior to the remedial work in 2004, DCC had previously classified this site as a moderate to high potential environmental risk. The remedial work for this landfill included the installation of a synthetic liner anchored into the permafrost along the toe of the landfill and re-grading, with the placement of additional granular fill material sufficient to promote permafrost aggradation through the landfill contents. The cover of the landfill has no vegetation. The surface consists of a veneer of pebbles and cobbles overlying the silty sand and gravel cover.

For 2007, the monitoring requirements for the Station Area Landfill included visual inspection only.

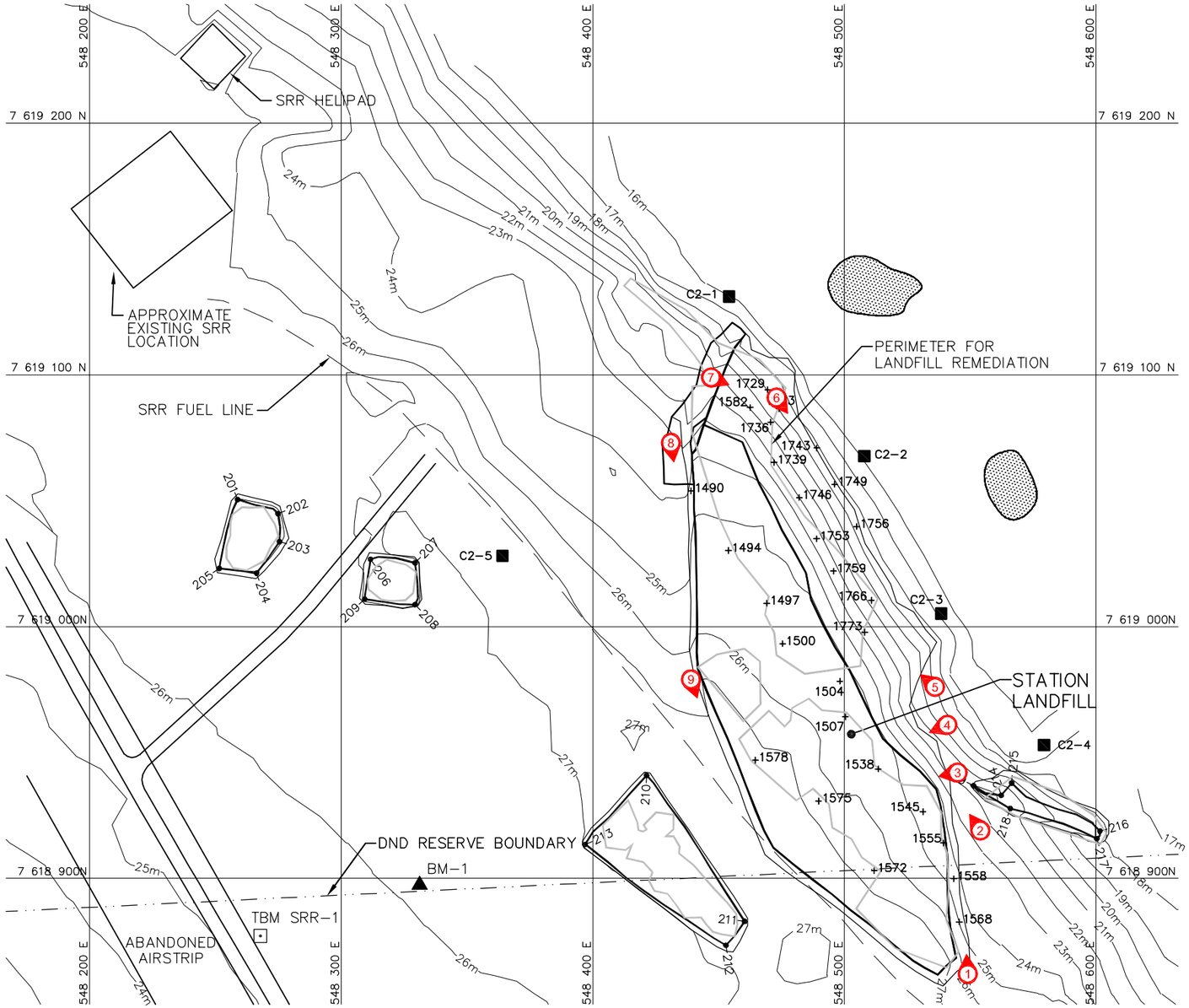
A.1.2 Visual Inspection

A visual inspection of the Station Area Landfill was completed on August 25, 2007. Based on the visual inspection, the Station Area Landfill appears to be in good condition and continues to function as designed. The condition of the Station Area Landfill appears substantially unchanged from the description provided from last year's inspection (previous inspection completed by EBA Engineering Consultants Ltd.). The granular cover shows no evidence of problematic or degraded conditions.

Minor surficial erosion, which appears to be associated with surface runoff, was noted at several locations along the eastern slope of the granular cover (refer to Photos 3 and 4). The granular cover in the areas of observed surficial erosion appears to be self armouring with limited potential for significant further degradation. None of the areas of observed surficial erosion appear to warrant remediation at this time.

A.1.3 Soil Sampling

Soil sampling was not scheduled for the 2007 monitoring year. The next soil sampling event will be 2008.



PERMANENT BENCHMARK				
NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
BM–1	7 618 897.363	548 331.191	26.595	25mm DIA. STEEL PIPE
SRR–1	7 618 877.108	548 267.873	24.975	16mm DIA. IRON BAR

Legend

- TBM4 ⊡ TEMPORARY BENCHMARK
- BM–1 ▲ PERMANENT BENCHMARK
- 101–• COORDINATE POINT
- ■ MONITORING SOIL SAMPLE LOCATION
- +1749 BASELINE SOIL SAMPLE LOCATION
- ⑦ PHOTOGRAPH LOCATION 2007

COORDINATE POINTS (AS–BUILT) STATION LANDFILL AREA REGRADING		
NO.	NORTHING	EASTING
201	7 619 050.5	548 258.8
202	7 619 044.9	548 274.9
203	7 619 033.7	548 275.5
204	7 619 021.2	548 266.3
205	7 619 023.1	548 251.5
206	7 619 026.7	548 311.6
207	7 619 025.4	548 329.4
208	7 619 008.7	548 329.3
209	7 619 010.9	548 309.3
210	7 618 940.9	548 421.4
211	7 618 883.0	548 460.3
212	7 618 873.4	548 452.9
213	7 618 913.4	548 397.0
214	7 618 932.9	548 562.3
215	7 618 937.8	548 566.5
216	7 618 918.8	548 601.5
217	7 618 915.8	548 600.3
218	7 618 927.7	548 565.9
219	7 618 936.8	548 551.3

RECORD DRAWING
NOT FOR CONSTRUCTION

Map Sources / Notes:
Source drawing from UMA: C2-RD02.dwg

0 10 20 40 60 80 m
1 : 2000
UTM Zone 14N, NAD83

File Name: C2-RD02.dwg
Reviewed by: DL
Date Issued: November, 2007
Prepared by: MP
Project Number: 70-516

Defence Construction Canada

2007 DEW Line Monitoring Program
CAM-2 Gladman Point
Nunavut Territory

STATION LANDFILL

Gartner Lee

Figure A-1
Version 1

Date Plotted: October 16, 2006 Path: N:\Projects\2007\70516\2007\Final\ACAD\01-CAM-2\C2-RD02.dwg

Appendix A Attachments

A1 Site Condition/Visual Inspection Records

A2 Geotechnical Inspection Photographic Records

A3 Field Notes

Appendix A1

Site Condition/Visual Inspection Records

Visual Inspection Checklist
Inspection Report – Page 1 of 2

SITE NAME:	CAM-2, Gladman Point
LANDFILL/AREA DESIGNATION:	Station Area Landfill
DATE OF INSPECTION:	August 25, 2007
DATE OF PREVIOUS INSPECTION:	August 20-22, 2006 (inspected by EBA)
INSPECTED BY:	James Theriault (Gartner Lee Limited)
REPORT PREPARED BY:	James Theriault
The preparer represents to the best of the preparer's knowledge, the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.	

Checklist Item	Present Yes/No	Location	Length	Width	Depth	Extent (%)	Description	Photographic Records	Additional Comments/ Preliminary Stability Assessment
Settlement	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Erosion	Yes	See Figure A-1	a) 20 m b) 30 m	a) 60 – 200 mm b) 100 – 250 mm	a) 25 to 60 mm b) 25 to 75 mm	Occasional (<1%)	Minor surficial erosion.	Photo 3, 4	Minor surficial erosion, self-armouring. Not problematic. Acceptable.
Frost Action	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Animal Burrows	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Vegetation	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Staining	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Vegetation Stress	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Seepage Points	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Debris Exposed	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Presence/ Condition of Monitoring Instruments	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Features of Note.	Yes	Refer to Figure A-1	N/A	N/A	N/A	N/A	Additional Photos	Photos 1, 2 and 5 thru 10	General photos for documentation, no features of note

Preliminary Stability Assessment

Feature	Severity Rating	Extent
Settlement	Not Observable	None
Erosion	Acceptable	Isolated
Frost Action	Not Observable	None
Animal Burrows	Not Observable	None
Vegetation	Not Observable	None
Staining	Not Observable	None
Vegetation Stress	Not Observable	None
Seepage Points	Not Observable	None
Debris Exposed	Not Observable	None
Tension Cracks	Not Observable	None
Overall Landfill Performance	**Acceptable**	

Appendix A2

Geotechnical Inspection Photographic Records

Photograph 1. Station Landfill: Looking north along the east side of the landfill from the SE corner. Slope appears shallow and stable. No features of note. ↑

Photograph 2. Station Landfill: Looking NNW along the west side of the landfill. No features of note.↑

Photograph 3. Station Landfill: Looking upslope to an area of minor surficial erosion along the eastern slope of the landfill. Granular cover material appears to be self armouring and stable. ↑

Photograph 4. Station Landfill: Looking upslope (west) to minor surficial slope erosion. The granular cover material appears to be self armouring. ↑

Photograph 5. Station Landfill: Looking NNW along the eastern slope of the landfill towards the NE corner of the landfill. No features of note.

Photograph 6. Station Landfill: Looking SSE along east side of Station LF from near NE corner. Coarse granular cover appears stable and has been contoured to a shallow slope.

Photograph 7. Station Landfill: Looking ESE from near the northern limit of the landfill. The granular cover has been contoured to a shallow slope. Fine tension cracks and indications of minor movement are visible adjacent to where roughly graded granular fill abuts the organics (beyond the limit of the landfill).

Photograph 8. Station Landfill: Looking S along west side of Station Landfill from the north end of the landfill. The granular cover has minimal slope and appears to be very stable. Tier II LF visible in the background.

Photograph 9. Station Landfill: Looking SSE along west side of Station LF to the SW corner. The NE corner of the Tier II landfill is visible in the background. No features of note. ↑

Photograph 10. Station Landfill: Viewed from the crest of the NE corner of the Tier II landfill. Looking NNE. ↑

Appendix A3

Field Notes

Aug 25/2007 CAM-2

79 Terrain crack on slope forming front on northern 1/3 of slope
548746 7618464

80 Terrain crack ends at
548743 7618469 13m south of NE corner (mid-slope)

81, 82, 83 Panorama top of NHW LF from NE corner L to R
548732 7618474

84, 85, 86 3 shot panorama from NW corner L to R
548692 7618461

END OF NHW LF INSPECTION

5°C, drizzle, windy light rain Aug 25 7056

Station Landfill
-completed detailed walkover of toe and perimeter of crest → no problems, few isolated spots of sc/G armouring surficial erosion

87 SE corner looking north from
548549 7618862

88 Looking NNW from 548554 7618919

89 Looking west upslope to area of minor surficial erosion 548545 7618942
-standing 10m east of toe of slope

90 Looking west to minor slope erosion
-self armouring

91 Looking N along midslope to NE corner 548536 7618976

92 Look SSW along east side of Station LF from near NE corner
548473 7619091 (coarse granular cover on slope)

Aug 25/2007 CAM-2

548447

93 Looking SE from 7619099
- ATV in background
- rough grade of loose fill along toe with minor movement and tension cracks appears to be beyond the limit of the landfill

94 Looking SSW along West side of Station Landfill -> minor slope adjacent gravel pad - very stable
548431 7619073
→ Tier II LF in background

95 Looking South along west side of Station LF to SW corner
- Tier II NE corner in background
548438 7618979

96, 97 Station Landfill viewed from NE corner of Tier II crest looking NNE 548522 7618811
GISO done inspections for the day

END OF STATION LF Inspection

Inspection of CAM-2 continued next page

Appendix B

Landfill Monitoring Report – West Landfill – North and South

B.1 West Landfills – North and South

B.1.1 Landfill Summary

The South Landfill consists of an eastern and western portion and is located approximately 1.5 km south of the main facilities area. The area of the south shore landfill has an area of approximately 40,000 m^2 with an estimated depth of 1.0 m. The location of the landfill is shown on Figure C-1.

The original landfills consisted of 4 "lobes" – 3 lobes north of the access road and 1 lobe south of the access road. Based on a previously completed evaluation, the landfills north of the access road have been classified as a low to moderate potential environmental risk and the lobe south of the access road was classified as a moderate potential environmental risk. The lobes north of the access road were remediated by regrading and placing additional granular fill overtop. The lobe south of the access road was completely excavated. No evidence of contaminated soil was detected after remediation.

For 2007, the monitoring requirements for the West Landfills included visual inspection only.

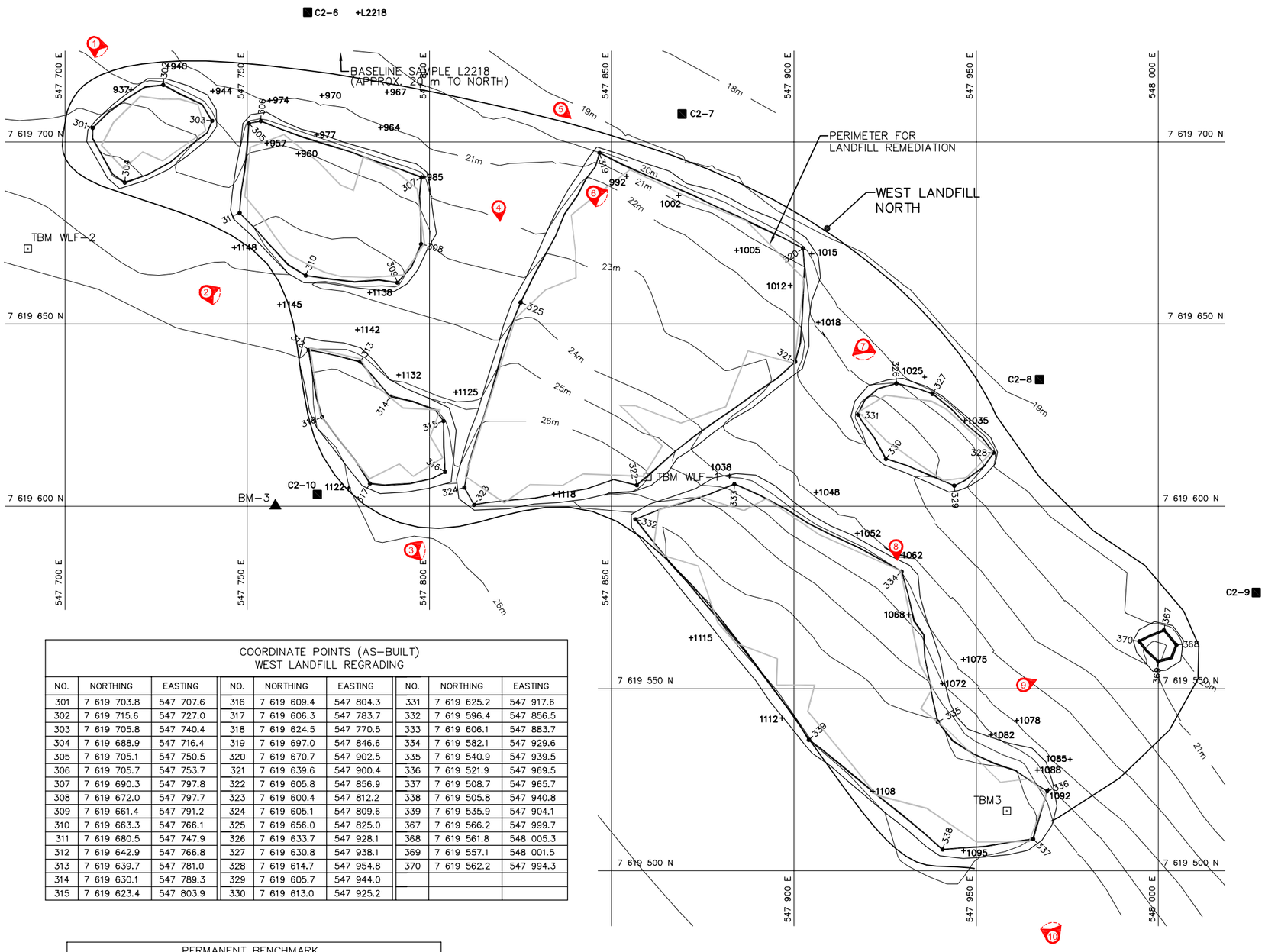
B.1.2 Visual Monitoring

Based on the visual inspection, both the West Landfill North and West Landfill South appear to be in good condition and consistent with the condition depicted in the photographic documentation from last years inspection. The granular covers showed no visible signs of problematic settlement or erosion. There are a few shallow erosion rills on the slopes along the margins of the landfill. However, the cover is relatively coarse and therefore stable.

The site inspection record for the landfill is appended as an attachment to this section. Overall performance of the landfill is considered acceptable.

B.1.3 Soil Sampling

Soil sampling was not scheduled for the 2007 monitoring year. The next soil sampling event will be 2008.



COORDINATE POINTS (AS-BUILT) WEST LANDFILL REGRADING								
NO.	NORTHING	EASTING	NO.	NORTHING	EASTING	NO.	NORTHING	EASTING
301	7 619 703.8	547 707.6	316	7 619 609.4	547 804.3	331	7 619 625.2	547 917.6
302	7 619 715.6	547 727.0	317	7 619 606.3	547 783.7	332	7 619 596.4	547 856.5
303	7 619 705.8	547 740.4	318	7 619 624.5	547 770.5	333	7 619 606.1	547 883.7
304	7 619 688.9	547 716.4	319	7 619 697.0	547 846.6	334	7 619 582.1	547 929.6
305	7 619 705.1	547 750.5	320	7 619 670.7	547 902.5	335	7 619 540.9	547 939.5
306	7 619 705.7	547 753.7	321	7 619 639.6	547 900.4	336	7 619 521.9	547 969.5
307	7 619 690.3	547 797.8	322	7 619 605.8	547 856.9	337	7 619 508.7	547 965.7
308	7 619 672.0	547 797.7	323	7 619 600.4	547 812.2	338	7 619 505.8	547 940.8
309	7 619 661.4	547 791.2	324	7 619 605.1	547 809.6	339	7 619 535.9	547 904.1
310	7 619 663.3	547 766.1	325	7 619 656.0	547 825.0	367	7 619 566.2	547 999.7
311	7 619 680.5	547 747.9	326	7 619 633.7	547 928.1	368	7 619 561.8	548 005.3
312	7 619 642.9	547 766.8	327	7 619 630.8	547 938.1	369	7 619 557.1	548 001.5
313	7 619 639.7	547 781.0	328	7 619 614.7	547 954.8	370	7 619 562.2	547 994.3
314	7 619 630.1	547 789.3	329	7 619 605.7	547 944.0			
315	7 619 623.4	547 803.9	330	7 619 613.0	547 925.2			

PERMANENT BENCHMARK				
NO.	COORDINATES		ELEV.	DESCRIPTION
	NORTHING	EASTING		
BM-3	7 619 600.143	547 757.734	25.763	25mm DIA. STEEL PIPE
TBM3	7 619 516.488	547 958.417	27.318	CARRIAGE BOLT
WLF-1	7 619 608.092	547 859.834	25.563	16mm DIA. IRON BAR
WLF-2	7 619 670.688	547 689.789	24.878	16mm DIA. IRON BAR

Legend

- TBM4 ⊡ TEMPORARY BENCHMARK
- BM-1 ▲ PERMANENT BENCHMARK
- 101→ COORDINATE POINT
- ■ MONITORING SOIL SAMPLE LOCATION
- +1749 BASELINE SOIL SAMPLE LOCATION
- (5) PHOTOGRAPH LOCATION 2007

RECORD DRAWING
NOT FOR CONSTRUCTION

Map Sources / Notes:
Source drawing from UMA: C2-RD03.dwg

N W E S

0 12.5 25 37.5 50 m

1 : 1250
UTM Zone 14N, NAD83

File Name: C2-RD03.dwg
Reviewed by: DL
Date Issued: November, 2007
Prepared by: MP
Project Number: 70-516

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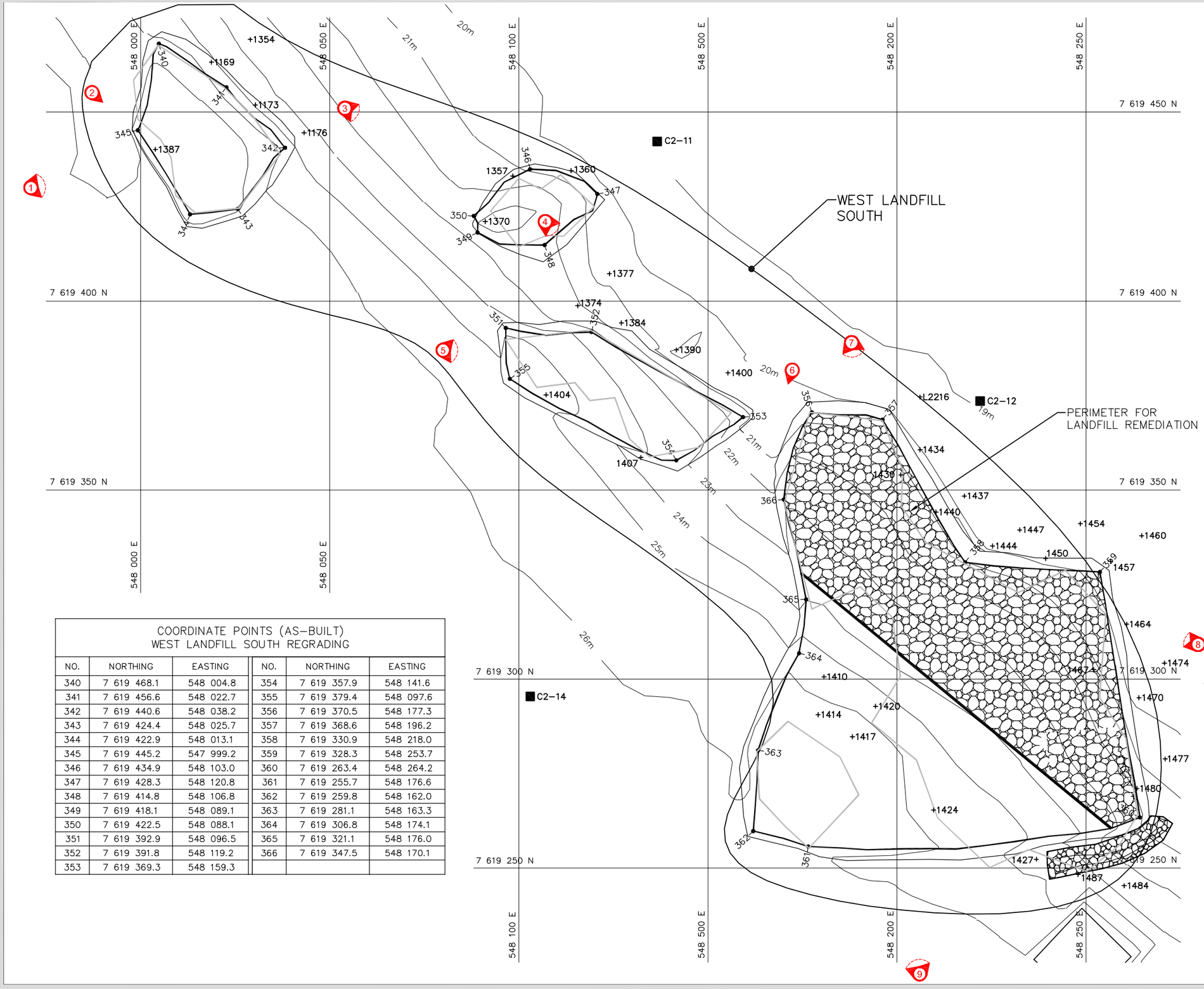
2007 DEW Line Monitoring Program
CAM-2 Gladman Point
Nunavut Territory

WEST LANDFILL NORTH

Gartner Lee

Figure B-1
Version 1

Date Plotted: October 16, 2006 Path: N:\Projects\2007\70516\2007\Final\ACAD\01-CAM-2\C2-RD03.dwg



COORDINATE POINTS (AS–BUILT)
WEST LANDFILL SOUTH REGRADING

NO.	NORTHING	EASTING	NO.	NORTHING	EASTING
340	7 619 468.1	548 004.8	354	7 619 357.9	548 141.6
341	7 619 456.6	548 022.7	355	7 619 379.4	548 097.6
342	7 619 440.6	548 038.2	356	7 619 370.5	548 177.3
343	7 619 424.4	548 025.7	357	7 619 368.6	548 196.2
344	7 619 422.9	548 013.1	358	7 619 330.9	548 218.0
345	7 619 445.2	547 999.2	359	7 619 328.3	548 253.7
346	7 619 434.9	548 103.0	360	7 619 263.4	548 264.2
347	7 619 428.3	548 120.8	361	7 619 255.7	548 176.6
348	7 619 414.8	548 106.8	362	7 619 259.8	548 162.0
349	7 619 418.1	548 089.1	363	7 619 281.1	548 163.3
350	7 619 422.5	548 088.1	364	7 619 306.8	548 174.1
351	7 619 392.9	548 096.5	365	7 619 321.1	548 176.0
352	7 619 391.8	548 119.2	366	7 619 347.5	548 170.1
353	7 619 369.3	548 159.3			

Legend

- TBM4 ⊡ TEMPORARY BENCHMARK
- BM–1 ▲ PERMANENT BENCHMARK
- 101+ COORDINATE POINT
- ■ MONITORING SOIL SAMPLE LOCATION
- +1749 BASELINE SOIL SAMPLE LOCATION
- ② PHOTOGRAPH LOCATION 2007

RECORD DRAWING
NOT FOR CONSTRUCTION

Map Sources / Notes:
Source drawing from UMA: C2-RD04.dwg

N W E S

0 5 10 20 30 40 m

1 : 1000
UTM Zone 14N, NAD83

File Name:	C2-RD04.dwg		
Reviewed by:	DL	Prepared by:	MP
Date Issued:	November, 2007	Project Number:	70-516

Defence Construction Canada

2007 DEW Line Monitoring Program
CAM-2 Gladman Point
Nunavut Territory

WEST LANDFILL SOUTH

Gartner Lee

Figure B-2
Version 1

Date Plotted: October 16, 2006 Path: N:\Projects\2007\70516\2007\Final\ACAD\01-CAM-2\C2-RD04.dwg

Appendix B Attachments

B1 Site Condition/Visual Inspection Records

B2 Geotechnical Inspection Photographic Records

B3 Field Notes

Appendix B1

Site Condition/Visual Inspection Records

Visual Inspection Checklist
Inspection Report – Page 1 of 2

SITE NAME:	CAM-2, Gladman Point
LANDFILL/AREA DESIGNATION:	West Landfill North
DATE OF INSPECTION:	August 26, 2007 (Gartner Lee Limited)
DATE OF PREVIOUS INSPECTION:	August 20-22, 2006 (inspected by EBA)
INSPECTED BY:	James Theriault
REPORT PREPARED BY:	James Theriault
The preparer represents to the best of the preparer's knowledge, the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.	

Inspection Report – Page 2 of 2

Checklist Item	Present Yes/No	Location	Length	Width	Depth	Extent (%)	Description	Photographic Records	Additional Comments/ Preliminary Stability Assessment
Settlement	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Erosion	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Frost Action	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Animal Burrows	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Vegetation	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Staining	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Vegetation Stress	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Seepage Points	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Debris Exposed	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Presence/ Condition of Monitoring Instruments	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Features of Note.	Yes	Refer to Figure B-1	N/A	N/A	N/A	N/A	Inspection photos	Photos 1 thru 10	General photos for documentation, no features of note

Preliminary Stability Assessment

Feature	Severity Rating	Extent
Settlement	Not Observable	None
Erosion	Not Observable	None
Frost Action	Not Observable	None
Animal Burrows	Not Observable	None
Vegetation	Not Observable	None
Staining	Not Observable	None
Vegetation Stress	Not Observable	None
Seepage Points	Not Observable	None
Debris Exposed	Not Observable	None
Tension Cracks	Not Observable	None
Overall Landfill Performance	**Acceptable**	

Visual Inspection Checklist
Inspection Report – Page 1 of 2

SITE NAME:	CAM-2, Gladman Point
LANDFILL/AREA DESIGNATION:	West Landfill South
DATE OF INSPECTION:	August 26, 2007 (Gartner Lee Limited)
DATE OF PREVIOUS INSPECTION:	August 20-22, 2006 (inspected by EBA)
INSPECTED BY:	James Theriault
REPORT PREPARED BY:	James Theriault
The preparer represents to the best of the preparer's knowledge, the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.	

Inspection Report – Page 2 of 2

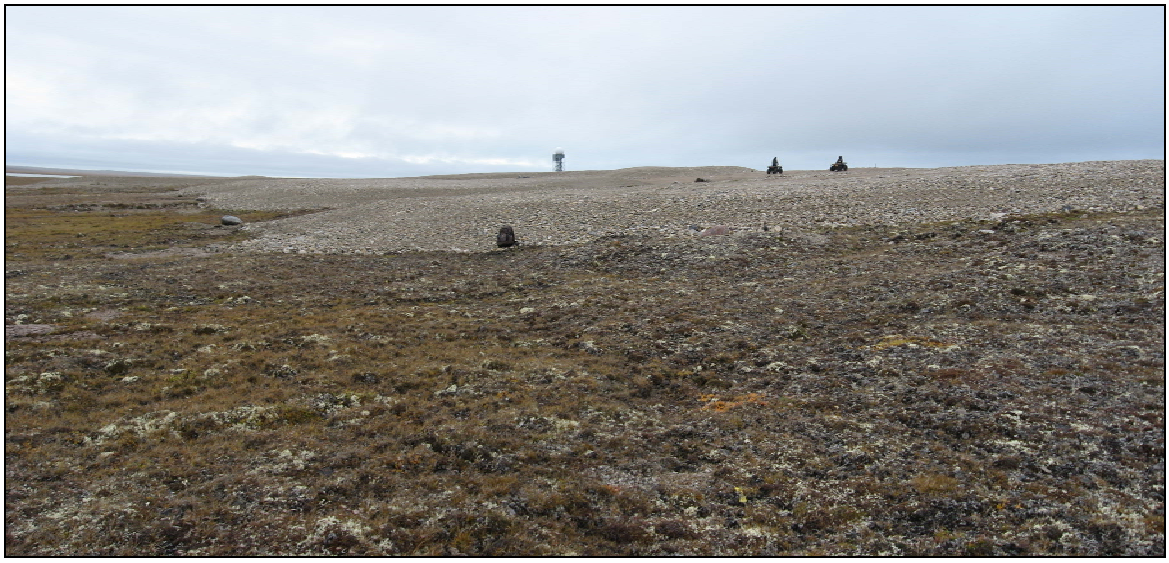
Checklist Item	Present Yes/No	Location	Length	Width	Depth	Extent (%)	Description	Photographic Records	Additional Comments/ Preliminary Stability Assessment
Settlement	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Erosion	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Frost Action	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Animal Burrows	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Vegetation	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Staining	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Vegetation Stress	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Seepage Points	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Debris Exposed	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Presence/ Condition of Monitoring Instruments	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Features of Note.	Yes	Refer to Figure B-2	N/A	N/A	N/A	N/A	Inspection Photos	Photos 1 thru 9	General photos for documentation, no features of note

Preliminary Stability Assessment

Feature	Severity Rating	Extent
Settlement	Not Observable	None
Erosion	Not Observable	None
Frost Action	Not Observable	None
Animal Burrows	Not Observable	None
Vegetation	Not Observable	None
Staining	Not Observable	None
Vegetation Stress	Not Observable	None
Seepage Points	Not Observable	None
Debris Exposed	Not Observable	None
Tension Cracks	Not Observable	None
Overall Landfill Performance	**Acceptable**	

Appendix B2

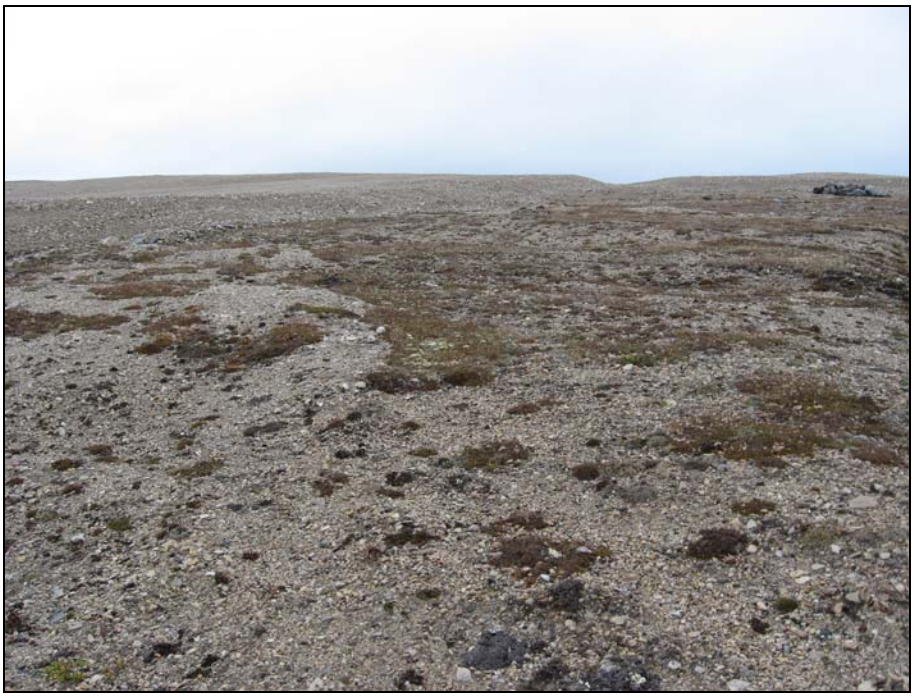
Geotechnical Inspection Photographic Records



Photograph 1. Panoramic looking SW to the NE corner of the two northern most cells of the West Landfill North. No features of note. ↑

Photograph 2. Looking SE to NW corner of 3rd cell from the north along the west side of the landfill. No features of note. Granular cover appears stable. ↑

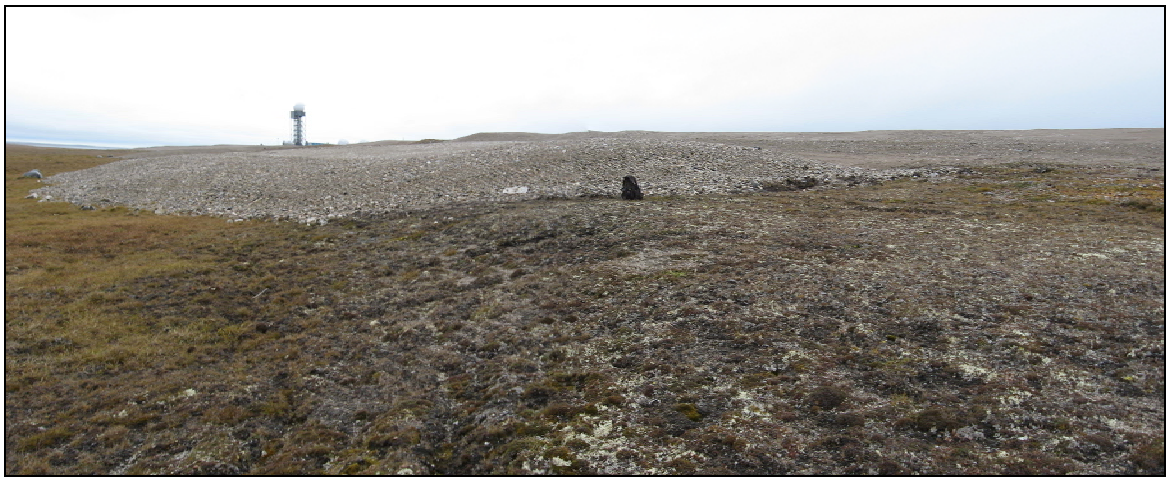
Photograph 3. Looking E across the landfill from the west side. The backpack is on the SW corner of the 4th lobe from N end . The most southerly cell visible to the right. No features of note. ↑



Photograph 4. Looking south between the 3rd and 4th cells from the north of the landfill. No features of note. ↑

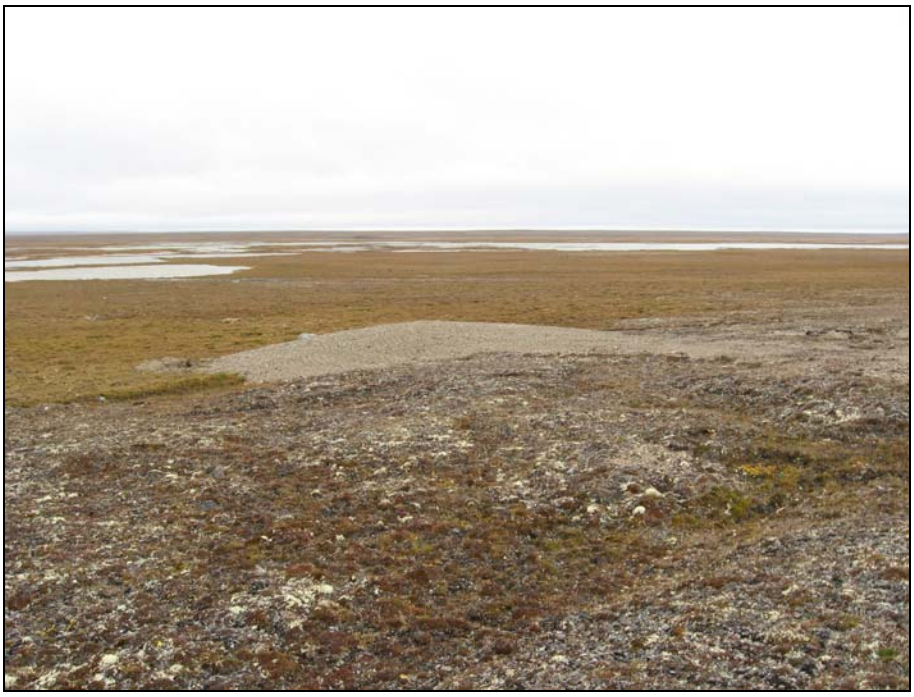
Photograph 5. Looking SW to NE corner of the large central cell. Granular slope appears stable. No features of note. ↑

Photograph 6. Panoramic of the upper landfill surface of the large central cell viewed from the NE corner. No features of note. Two other cells visible in distance along with radar ball tower. ↑



Photograph 7. Panoramic looking SSW to SW towards the small central east lobe and large southern lobe. No features of note. ↑

Photograph 8. Looking south along eastern edge of large southern cell. No featues of note. No problematic conditions observed. ↑

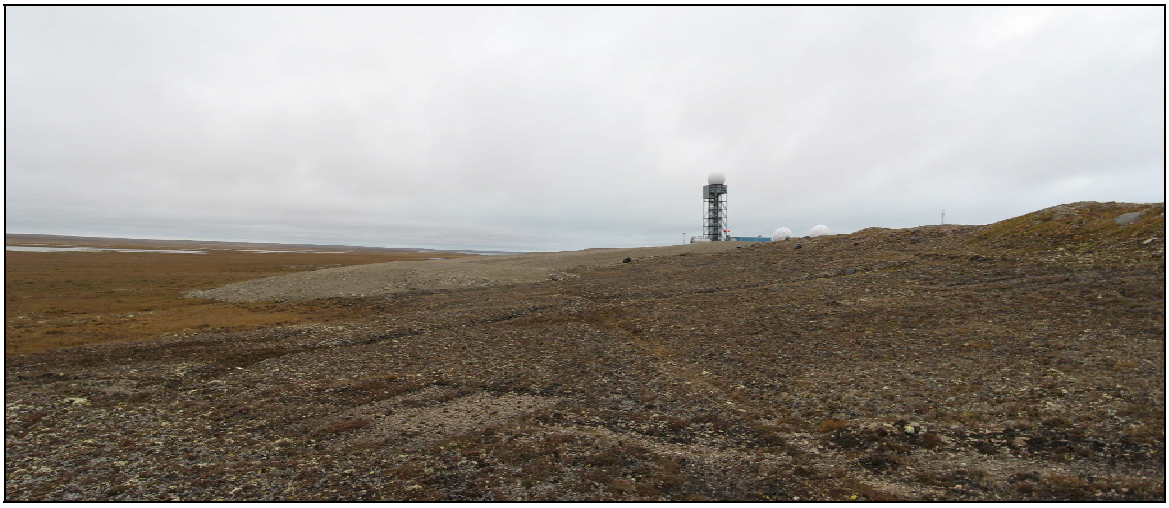


Photograph 9. Looking east to the small , isolated SE cell. Granular cover appears stable. No features of note. ↑

Photograph 10. Looking N to south end of southern cell. No features of note. ↑

Photograph 1. Looking east to north end of West Landfill South . No features of note. ↑

Photograph 2. Looking S along west side of northern most cell. No features of note. ↑

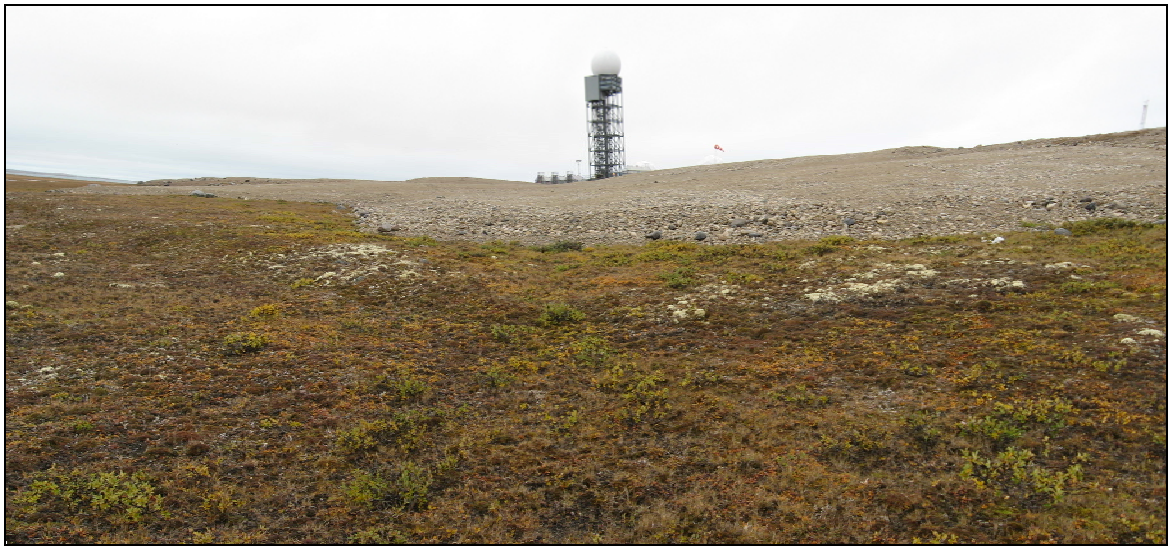


Photograph 3. Panoramic looking SW from the east side of the northernmost cell. The small NE cell and larger central cell are both visible. No features of note. ↑

Photograph 4. Looking S-SE from small eastern cell. The central cell is visible in the centre of the frame and the large souther cell is visible in the background to the left. No features of note. ↑

Photograph 5. Looking SE from the NW corner of central landfill cell (2nd from the south). The granular cover appears stable. No features of note. ↑

Photograph 6. Looking SSW to the north end of the southern (largest) granular covered cell. Note ponded water. Slope appears stable. ↑



Photograph 7. Looking roughly south to the NE corner and eastern side of the large southern cell. No features of note. ↑

Photograph 8. Looking N to NW towards the south end of the most southerly cell. Granular cover is stable and low profile. ↑

Photograph 9. Looking N to NNE towards the SW corner of south cell. Granular cover appears stable. No features of note. ↑

Appendix B3

Field Notes

Aug 26/2007 CAM-M 70516

Cold, rainy windy

Finishing up visual inspections in North Landfill

~~West~~ ~~North~~ Landfill ~~South~~ North

103-1 View of Camp

103-2, 3 Panoramic looking SW to the NE corner of the two Northern most lobes of ~~the West~~ North Landfill
547708 7619727 Radar ball in background

Detailed visual inspection showed no major problematic settlement

4, 5 Looking SE to NW corner of 3rd N lobe → no problem
547742 7619630

6, 7 Looking SE to NW corner of 4th lobe from N end → view along west end looking S
547795 7619538

8 Looking W between 3rd & 4th lobes from 547819 7619682
→ North side 4th lobe shown in part

9 Looking SW to NE corner of 4th lobe from N ~~west~~ on ~~North~~ LF North
547836 7619709

10, 11, 12 3 shot panoramic from NE corner of 4th lobe of West LF North
→ two other lobes visible in distance along with radar ball tower
547845 7619686

13, 14 2 shot panoramic looking SSW to SW from 547919 7619644
- looking at small central east lobe and large southern lobe

33,34 Look N to NNE toward SW
corner of South Lobe of # West LF South
548206 7619222

Appendix C

Landfill Monitoring Report – DCC Tier II Soil Disposal Facility

C.1 Tier II Disposal Facility

C.1.1 Landfill Summary

The Tier II Disposal Facility is located south of the eastern portion of the airstrip and encompasses an area of approximately 16,250 m^2. This landfill was constructed to contain contaminated soils. The landfill configuration is shown on Figure F-1.

The landfill has a double containment system that consists of a liner and the placement of granular fill overtop of the landfill to promote permafrost aggradation through the landfill contents. The liner was placed across the bottom of the landfill, along the berms and over the top of the landfill contents, thus fully encapsulating them.

For 2007, the monitoring requirements for the DCC Tier II Disposal Facility included visual inspection, soil sampling, groundwater sampling, and thermal monitoring.

C.1.2 Visual Monitoring

A visual inspection of the Tier II Landfill was completed on August 25, 2007. Based on the visual inspection, the Tier II Soil Disposal Facility appears to be in reasonably good condition overall.

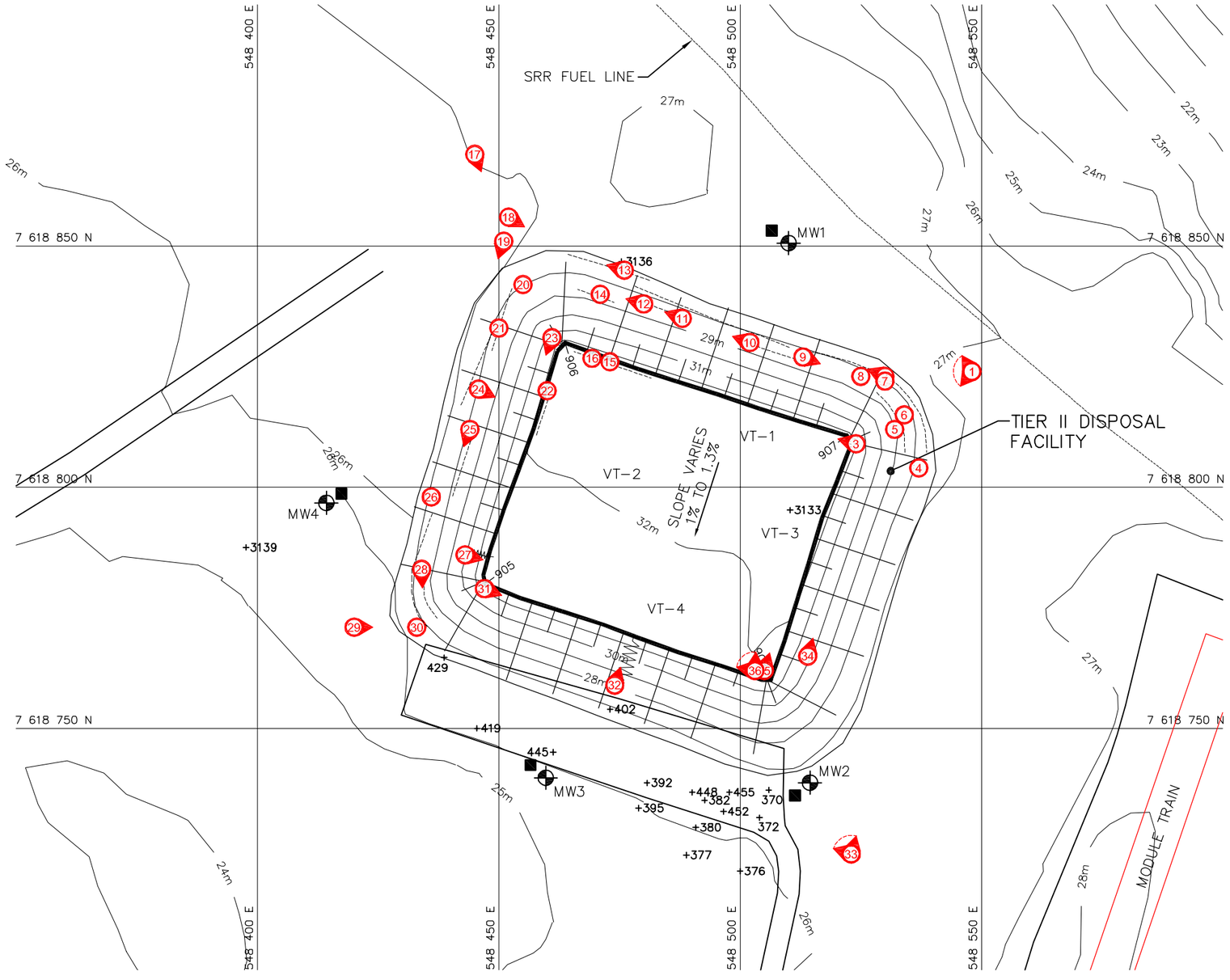
Surficial erosion features were noted along the western and southern slopes of the landfill (Photos 27 and 28). The granular cover appears to be self armouring and the erosional features, which consist of the washing out of finer material from the coarse granular matrix, appear to have stabilized and do not warrant remediation at this time.

Numerous thin tension cracks, typically on the order of 1mm to 5mm width, were observed around the crest and perimeter of the north and west sides of the Tier II landfill. In all instances, the cracks were roughly parallel to the toe of slope and in multiple locations there were several roughly parallel sets of cracks between the toe of slope and crest. The tension cracks along the lower portion of the slope are essentially continuous, although portions of the crack were largely obscured by sediment infilling associated with fines washing out of the granular fill and being deposited in the cracks. Photos 4 thru 16 and 18 document the tension cracks along the north face of the landfill. Photos 20, 21, 22, 24, 25, 26, 28 and 29 document the observed tension cracks along the western slope of the landfill.

Based on a visual assessment, the granular cover material appears to contain sufficient fines (i.e., >5% silt sized particles) to make it potentially frost susceptible. Given the gradation of the granular cover, it is anticipated that some of the observed tension cracks may be related to freeze/thaw induced desiccation. Overall, the orientation and spacing of the tension cracks suggests minor slope movement, however, the landfill slopes appear to be stable and do not appear to be in imminent danger of large-scale movement.

The condition of the side slopes and landfill cap appear consistent with the site photos available from the previous inspection in 2006, with the notable exception that additional tension cracks appear to have developed on the north and west slopes of the landfill. Some tension cracks were noted during the 2006 inspection; however, the cracks were not documented in detail. Given the relatively large number of hairline cracks that were observed in 2007, combined with the tendency of washed fines to obscure visual identification of the tension cracks over time, it would appear that the bulk of the tension cracks that were observed in 2007 are recent.

From the visual analysis during the site visit, there does not appear to be any significant erosion or cover issues that require immediate attention or that would be expected to lead to degraded cover performance in the near term. No immediate action is warranted. The tension cracks have been documented in detail to facilitate on-going monitoring. The overall preliminary stability assessment of the Tier II landfill is marginal.



Legend

- COORDINATE POINT
- MONITORING SOIL SAMPLE LOCATION
- MONITORING WELL LOCATION
- VERTICAL THERMISTOR LOCATION
- +1749 BASELINE SOIL SAMPLE LOCATION
- PHOTOGRAPH LOCATION 2007
- EROSION
- TENSION CRACK

COORDINATE POINTS (AS-BUILT) FINAL LANDFILL SURFACE

NO.	NORTHING	EASTING	ELEV.
905	7 618 780.0	548 447.2	31.6
906	7 618 829.9	548 463.7	32.3
907	7 618 810.7	548 522.1	32.4
908	7 618 760.1	548 506.3	31.9

COORDINATE POINTS (AS-BUILT) VERTICAL THERMISTORS

NO.	NORTHING	EASTING
VT-1	7 618 809.6	548 510.4
VT-2	7 618 800.6	548 469.3
VT-3	7 618 787.8	548 502.1
VT-4	7 618 772.0	548 478.4

COORDINATE POINTS (AS BUILT) MONITORING WELLS

NO.	NORTHING	EASTING	ELEV.
MW1	7 618 850.6	548 510.0	27.3
MW2	7 618 738.8	548 514.5	26.1
MW3	7 618 739.8	548 459.7	25.5
MW4	7 618 796.7	548 414.3	26.0

RECORD DRAWING
NOT FOR CONSTRUCTION

Map Sources / Notes:
Source drawing from UMA: C2-RD05.dwg

0 5 10 20 30 40 m
1 : 1000
UTM Zone 14N, NAD83

File Name: C2-RD05.dwg
Reviewed by: DL
Date Issued: November, 2007
Prepared by: MP
Project Number: 70-516

Defence Construction Canada

2007 DEW Line Monitoring Program
CAM-2 Gladman Point
Nunavut Territory

TIER II DISPOSAL FACILITY

Gartner Lee

Figure C-1
Version 1

Date Plotted: October 16, 2006 Path: N:\Projects\2007\70516\2007FinalVCAD\01-CAM-2\C2-RD05.dwg

C.1.3 Soil Sampling

Soil samples were collected at the designated locations of MW-1, MW-2, MW-3 and MW-4. The sampling locations are shown on Figure C-1. At each location, wherever possible, two samples were collected at approximately 0.10 m below ground and between 0.40-0.50 m below ground. The photographs of each test pit for each location sampled are shown in Appendix C3.

No staining or free product was observed during the sampling event. There were no odours documented during the sampling event at the DCC Tier II Soil Facility.

The laboratory analyses detected low concentrations of TPH (C6-34) in the test pit from soil sample location MW-3. The concentrations noted are not considered to be of significance. However these results should be evaluated in the context of the Landfill Monitoring Plan.

The analytical results and depths of samples are provided in Table C-1 and the laboratory certificate is provided in Appendix E.

Table C-1. CAM-2 Gladman Point, Summary of 2007 Soil Analysis - Tier II Soil Disposal Facility

Sample Ident.	Sample Location	Depth (m)	Arsenic (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)	Petroleum Hydrocarbons				PCB Total Aroclors (mg/kg)
												TPH (C6-34) (mg/kg)	C6-C10 (mg/kg)	C10-C16 (mg/kg)	C16-C34 (mg/kg)	
Upgradient Samples																
C2-MW-1-1	MW-1	0.1	1.0	<0.50	3.8	<2.0	6.2	<30	<0.0050	<5.0	6	11	<10	11	<5	<0.010
C2-MW-1-2	MW-1	0.5	1.0	<0.50	3.6	<2.0	4.3	<30	0.0057	<5.0	8.3	26	<10	10	16	<0.010
Downgradient Samples																
C2-MW-2-1	MW-2	0.1	0.8	<0.50	3	<2.0	2.1	<30	<0.0050	<5.0	7.2	31	<10	<5	31	0.019
C2-MW-2-2	MW-2	0.5	1.1	<0.50	3.3	<2.0	2.2	<30	<0.0050	<5.0	5.9	6	<10	<5	6	<0.010
C2-MW-3-1	MW-3	0.1	1.2	<0.50	5.6	<2.0	5.4	<30	0.0122	<5.0	12	5	<10	5	<5	<0.010
C2-MW-3-2	MW-3	0.5	0.9	<0.50	2.6	<2.0	1.6	<30	<0.0050	<5.0	4.3	98	<10	10	88	<0.010
C2-MW-4-1	MW-4	0.1	0.9	<0.50	3.8	<2.0	3	<30	0.0081	<5.0	10	35	<10	<5	35	<0.010
C2-MW-4-2	MW-4	0.5	0.9	<0.50	3.1	<2.0	2.9	<30	<0.0050	<5.0	6.1	0	<10	<5	<5	<0.010
C2-MW-5-2*	MW-4	0.5	1.0	<0.50	3.2	<2.0	2.4	<30	<0.0050	<5.0	5.8	10	<10	10	<5	<0.010

***** *Denotes duplicate sample. (Further information located in Table 2 of main report)*

Note: mg/kg = ug/g

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C.1.4 Groundwater

Groundwater measurements and monitoring system condition records were documented for observation wells MW-1, MW-2, MW-3, and MW-4. These records are appended as attachments in Appendix C4.

All four wells surrounding the Tier II Soil Disposal Facility contained sufficient amounts of water to permit groundwater sampling. Samples were collected at a maximum flow rate of 100 mL/min using a peristaltic pump, and disposable LDPE tubing. The groundwater samples were not filtered and not preserved and were analyzed for total concentration of inorganics, TPH (C6-C34) and PCBs. The results are presented in Table C-2 and the laboratory certificate is provided in Appendix E.

All of the monitoring wells at the Tier II Soil Disposal Facility returned significant concentrations of Zinc. The results should be evaluated in the context of the Landfill Monitoring Plan as well as compared with DCC internal standards.

Table C-2. CAM-2 Gladman Point, Summary of 2007 Groundwater Analysis - Tier II Soil Disposal Facility

Sample Ident.	Location	Groundwater Elevation (masl)	Arsenic (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Nickel (mg/L)	Zinc (mg/L)	Petroleum Hydrocarbons				PCB Total Aroclors (mg/L)
												TPH (C6-34) (mg/L)	C6-C10 (mg/L)	C10-C16 (mg/L)	C16-C34 (mg/L)	
Upgradient Samples																
C2-MW-1	MW-1	26.430	<0.010	0.00029	0.013	0.0093	0.011	0.0096	<0.000020	0.029	10.4	1.25				<0.0010
Downgradient Samples																
C2-MW-2	MW-2	25.420	<0.010	0.00024	<0.010	0.0098	0.012	<0.0050	<0.000020	0.041	45.9	<0.25				<0.0010
C2-MW-3	MW-3	24.940	<0.010	0.000124	0.013	<0.0015	0.0152	<0.0025	<0.000020	0.0697	1.16	0.44				<0.0010
C2-MW-4	MW-4	25.310	<0.0070	<0.00017	0.016	<0.0030	<0.010	<0.0050	<0.000020	0.016	31.8	<0.25				<0.0010
C2-MW-5*	MW-4	25.310	<0.0050	<0.00017	0.016	<0.0030	<0.010	<0.0050	<0.000020	<0.010	0.722	<0.25				<0.0010

***** *Denotes duplicate sample. (Further information located in Table 2 of main report)*
Note: mg/L = 1000 ug/L

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C.1.5 Thermal Monitoring

The manual readings taken from each thermistor from the DCC Tier II Soil Disposal Facility are provided in the thermistor maintenance reports located in Appendix C5. The data from the thermistors is located in Appendix C5. The graphs for the 2007 data for these thermistors are shown in Graphs 1 through 4 and are located in Appendix C6.

The data logger connected to thermistor VT-1 was programmed incorrectly to record data each minute as opposed to every 12 hours. This caused the memory to reach capacity on November 9th, 2006. The data logger was reprogrammed to correctly record temperature data every 12 hours. Beads #12 on Thermistor VT-2, #9 and #12 on VT-3, and #16 on VT-4 were not reading correctly through their respective data loggers, however bead #16 on VT-4 did read correctly during the manual readings.

Data from all thermistors were downloaded, the data loggers were reset and had their batteries replaced. A thermistor maintenance report was completed and is located in Appendix C5. A full download of the thermistor data loggers is scheduled to be completed the summer of 2008.

Appendix C Attachments

C1 Site Condition/Visual Inspection Records

C2 Geotechnical Inspection Photographic Records

C3 Monitoring Photographic Records

C4 Monitoring Well Development Records

C5 Thermistor Data Tables and Maintenance Records 2007

C6 Thermistor Graphs 2007

C7 Field Notes

Appendix C1

Site Condition/Visual Inspection Records

Visual Inspection Checklist
Inspection Report – Page 1 of 2

SITE NAME:	CAM-2, Gladman Point
LANDFILL/AREA DESIGNATION:	Tier II Landfill
DATE OF INSPECTION:	August 25, 2007 (Gartner Lee Limited)
DATE OF PREVIOUS INSPECTION:	August 20-22, 2006 (inspected by EBA)
INSPECTED BY:	James Theriault
REPORT PREPARED BY:	James Theriault
The preparer represents to the best of the preparer's knowledge, the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.	

Visual Inspection Checklist
Inspection Report – Page 2 of 2

Checklist Item	Present Yes/No	Location	Length	Width	Depth	Extent (%)	Description	Photographic Records (Photos referenced in photolog and in figures)	Additional Comments/ Preliminary Stability Assessment
Settlement	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Erosion	Yes	a) west slope b) south slope	a) 3m b) 15m	a) 0.7m b) 0.7m	a) 10 to 30mm b) 10 to 30mm	<1%	a) minor washing of fines b) minor surface erosion	a) Photo 27 b) Photo 32	Granular fill is self armouring (Acceptable)
Frost Action	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Animal Burrows	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Vegetation	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Staining	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Vegetation Stress	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Seepage Points	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Debris Exposed	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Presence/ Condition of Monitoring Instruments	Good	Refer to Figure C1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Features of Note.	Yes	Tension cracks along entire north and west slopes and NE corner of east slope (along toe, mid-slope and crest)	Variable, 5m to 50m	Hairline to 5mm	unknown	< 10%	Numerous thin tension cracks running parallel to the landfill slopes	Photos 4 thru 16, 18 (North slope) Photos 20-22, 24-26, 28, 29 (West Slope)	Cracks likely, in part, related to freeze/thaw desiccation, but appear to be consistent with small-scale slope movement. Sediment infilling obscures cracks. (Marginal)
Additional Photos	Yes	Refer to Figure C1	N/A	N/A	N/A	N/A	Additional photos	Photos 1, 2, 3, 17, 19, 23,30, 31, 33 to 36	General photos for documentation, no features of note

Preliminary Stability Assessment

Feature	Severity Rating	Extent
Settlement	Not Observable	None
Erosion	Acceptable	Occasional
Frost Action	Not Observable	None
Animal Burrows	Not Observable	None
Vegetation	Not Observable	None
Staining	Not Observable	None
Vegetation Stress	Not Observable	None
Seepage Points	Not Observable	None
Debris Exposed	Not Observable	None
Tension Crack	Marginal	Numerous
Overall Landfill Performance	**Marginal**	

Appendix C2

Geotechnical Inspection Photographic Records

Photograph 1. Looking west to the NE corner and north slope of the landfill from about 25m NE of NE corner. VT-1 visible on top of landfill and MW1 visible on the right side of the photo. ↑

Photograph 2. Looking WNW along northern toe of the landfill from the NE corner . Granular cover has even slope and level construction finish. ↑

Photograph 3. Looking west along north crest of the landfill from the NE corner. VT-1 in frame. ↑

Photograph 4. Close-up of two fine parallel tension cracks that start on NE side of the landfill, about 5m up-slope from toe, and extend essentially all the way to the NW corner. Orange field book for scale. ↑

Photograph 5. Looking N following the lower fine tension crack noted above. The crack is obscured by fines that have washed in. ↑

Photograph 6. Close-up of typical crack at NE corner 5m up-slope. Crack fades in and out as some fines have washed in, completely filling some portions of the thin crack. ↑

Photograph 7. Tracking the lower (most consistent) tension crack that originated near Photo 4. Looking WNW along the northern toe of the landfill from near the NE corner. ↑

Photograph 8. Close-up photo. Continuing to tracking the tension crack westward along the toe. The pens bracket two tension cracks. The upper crack ends and lower crack continues with a 0.6m offset. ↑

Photograph 9. Looking east along the north toe of the landfill. Continuing to follow the lower tension crack. ↑

Photograph 10. Continuing to track the lower (most consistent) tension crack along the north toe of the landfill. Looking west along toe of north slope. Field book for scale. ↑

Photograph 11. Looking west following crack where it splays and shifts downslope to 3m from toe. Still no indication of additional tension cracks upslope. ↑

Photograph 12. Tension crack in parallel. Cracks remain fine, but geometry is becoming consistent with slow retrogression. Looking west to NW corner. Hints of tension cracks upslope but sediment infilling prevents clear diagnosis. ↑

Photograph 13. Looking WNW along toe of slope to larger (up to 2cm wide) tension crack near the NW corner. Additional fine cracks continue 3m upslope. Large crack continues until it is obscured by sediment infilling. ↑

Photograph 14. Fine tension crack about 10 m upslope from the wider crack noted in Photo 13. The crack is parallel to the slope and suggests entire slope may be moving. ↑

Photograph 15. Close-up of tension crack at top of slope along the NW corner of the landfill. This tension crack is parallel to the cracks noted in Photos 13 and 14. Note sediment infilling. ↑

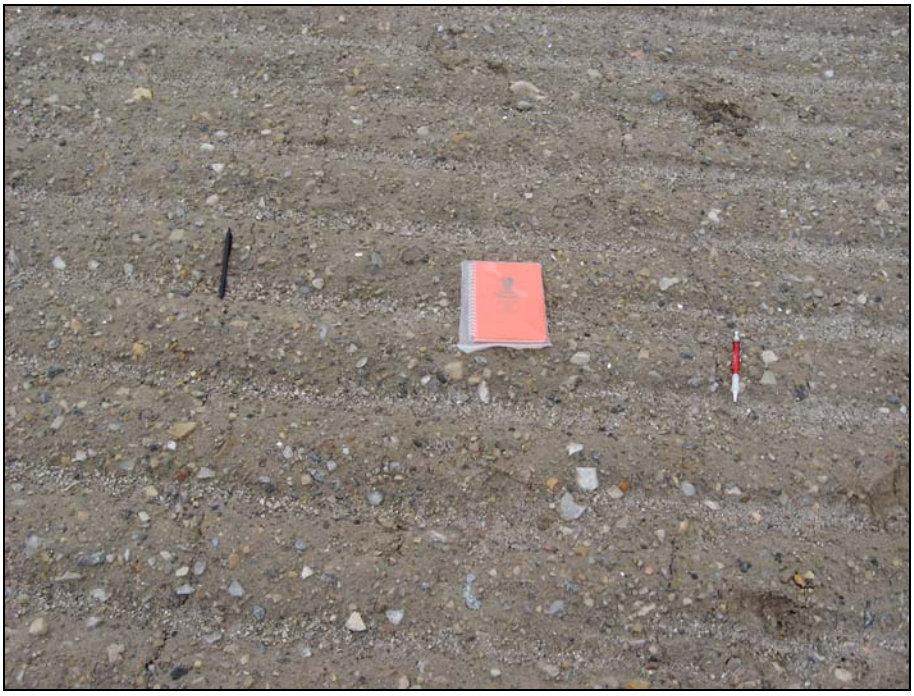
Photograph 16. Close-up of tension crack observed in Photo 15. ↑

Photograph 17. Looking SE to NW corner of landfill (Tier II) from about 30 m NW of the NW corner of the landfill. West side of the landfill is on the right side of the frame. ↑

Photograph 18. Looking east along the toe of slope from the NW corner of the landfill. Note the tension crack with field book for scale. Crack is shown in Photo 13 from the opposite direction. ↑

Photograph 19. Looking south along the toe of the west side of the landfill from NW corner. ↑

Photograph 20. Following a thin tension crack along west side of landfill from the NW corner. Crack runs parallel to slope about 4m upslope from downslope toe. Appears to continue from the north side of the landfill. ↑

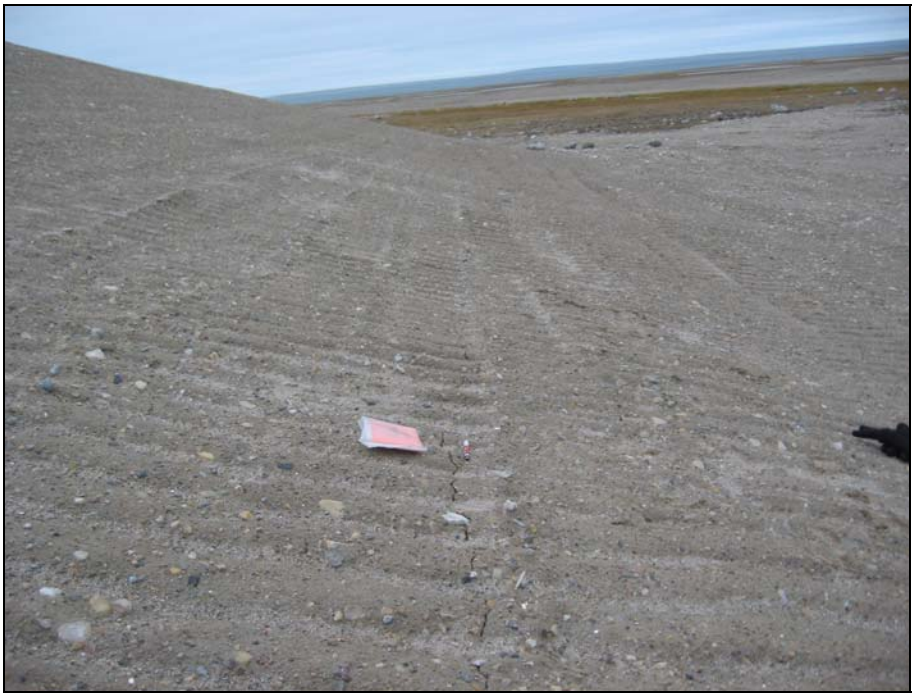


Photograph 21. Following continuation of tension crack noted in Photo 20 (black pen) and noting the start of a second lower crack (red pen). Sediment infilling partially masks cracking. ↑

Photograph 22. Possible tension crack (faint and infilled) near top of slope (2m from top). ↑

Photograph 23. Looking south along Tier II crest from NW corner. ↑

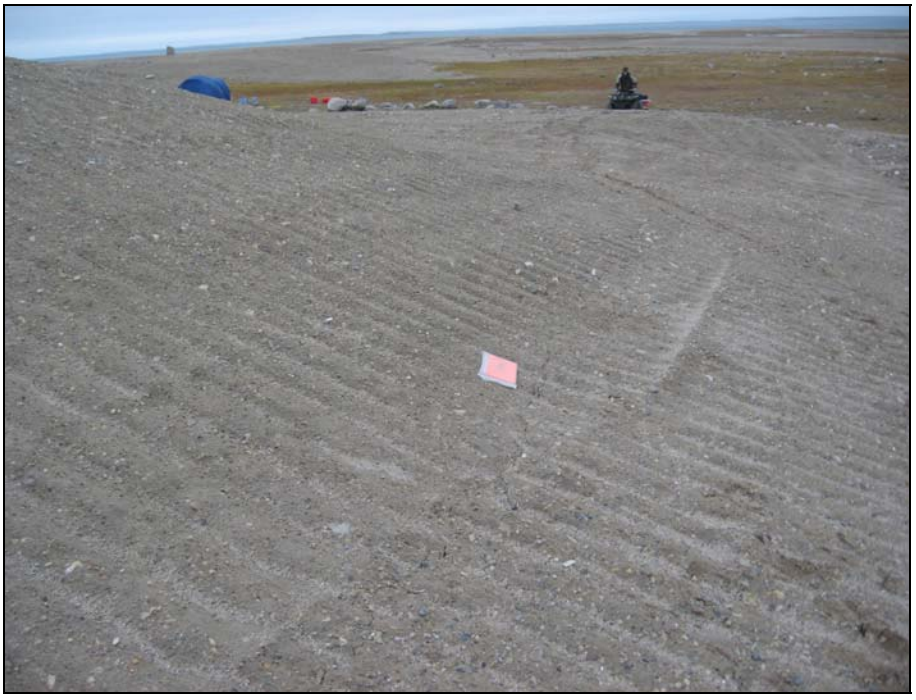
Photograph 24. Area where two parallel cracks (5m and 6m upslope from toe) merge into one. Note additional cracks perpendicular to slope. The cracks that are perpendicular to slope appear to be related to erosion/weathering of fine cover material in dozer tracks. Looking upslope. ↑



Photograph 25. Typical tension crack looking south along west slope. Fine tension cracks (up to 3 sets) often appear adjacent to and parallel to the larger (e.g. 1 to 2 cm width) cracks . ↑

Photograph 26. Following the tension crack along the toe of slope. Moving S, the cracking appears to shift upslope to approx. 7m from toe. Portions obscured by sediment infilling. ↑

Photograph 27. Minor surface erosion (3m long, 0.7m wide) near crest of west slope about 10m N of the SW corner. Granular cover appears to be self armouring. Excess sand shifted exposing gravel. ↑



Photograph 28. Looking S towards SW corner. Continuation of tension crack observed (adjacent to field book) but disappears around the corner. ↑

Photograph 29. South slope Tier II landfill viewed looking east from 10 m west of the SW corner. Field book marks the end of tension crack observed in Photo 28. ↑

Photograph 30. Tension crack observed in Photo 28 appear to end (likely due to stabilizing influence of downslope granular pad). ↑

Photograph 31. Looking ESE along the south crest of the landfill from SW corner. VT-4 visible along the crest. ↑

Photograph 32. Minor surface erosion and gullying adjacent to VT-4 downslope to within 4m of toe of slope. Surface runoff appears to have been concentrated in equipment tracks. Granular cover appears to be self-armouring. ↑

Photograph 33. Panoramic of Tier II looking NW to SE corner from SE of MW2. ↑

Photograph 34. Looking N from mid-slope east side Tier II . Note minor depression in upslope foreground. There are no indications of recent movement or problematic conditions. ↑

Photograph 35. Looking N from the crest of the SE corner of the landfill. ↑

Photograph 36. Upper surface of the landfill viewed from SE corner. No problematic conditions observed.↑

Appendix C3

Monitoring Photographic Records

Test Pits

Photograph 1. Test pit C2-MW-1 (Upgradient). Samples C2-MW-1-1 and C2-MW-1-2 collected.↑

Photograph 2. Test Pit C2-MW-2. Samples C2-MW-2-1 and C2-MW-2-2 collected. ↑

Test Pits

Photograph 3. Test Pit C2-MW-3. Samples C2-MW-3-1 and C2-MW-3-2 collected. ↑

Photograph 4. Test Pit C2-MW-4. Samples C2-MW-4-1, C2-MW-4-2, and C2-MW-5-2 (Duplicate of C2-MW-4-2) collected. ↑

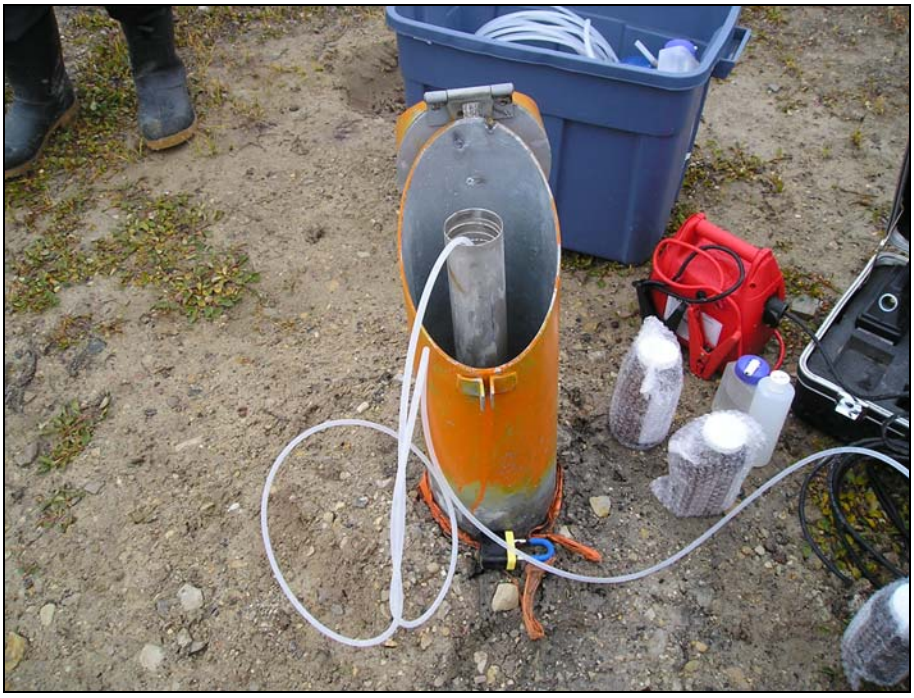
Monitoring Wells

Photograph 1. Monitoring well MW-1 (Upgradient). Sample C2-MW-1 collected. ↑

Photograph 2. Monitoring well MW-1 (Upgradient). Sample C2-MW-1 collected. ↑

Monitoring Wells

Photograph 3. Monitoring well MW-2. Sample C2-MW-2 collected. ↑



Photograph 4. Monitoring well MW-3. Sample C2-MW-3 collected. ↑

Thermistors

Photograph 1: Vertical thermistor VT-1.

Photograph 2. Vertical thermistor VT-2. ↑

Thermistors

Photograph 3. Vertical thermistor VT-3. ↑

Photograph 4. Vertical thermistor VT-4. ↑

Thermistors

Photograph 5. Example of a typical lock at CAM-2, PIN-3, and CAM-M. Locks are very rusted, and most are difficult to insert key into and turn. ↑

Appendix C4

Monitoring Well Development Records

Monitoring Well Observations (MW-01)

Development of Monitoring Wells (2007)			
Site Name:	CAM-2		
Date of Sampling Event:	25-Aug-07	Time:	9:50
Names of Samplers:	Ken Boldt		
Landfill Name:	Tier II Soil Disposal Facility		
Monitoring Well ID:	MW-1		
Sample Number:	C2-MW-1		
Condition of Well:	Good		
Measured Data			
Well height above ground=	53		
Diameter of well (cm)=	5		
Depth of installation (cm)=	350	From ground surface	
Length screened section (cm)=	187		
Depth to top of screen=	60	From ground surface	
Depth to water surface (cm)=	143	Method:	Interface meter
Static water level (cm)=	90	From ground surface	
Depth to bottom (cm)=	200	Evidence of sludge or siltation:	no
Depth of water (cm)=	57		
Well volume of water (mL)=	1119.19		
Free product thickness (mm)=	N/A	Method:	Interface meter
Purging: (Y/N)	Y	Procedure/Equipment:	Peristaltic Pump, LDPE Tubing
Volume Purged Water (L)=	2.0		
Decontamination required: (Y/N)	Y	*Notes:*	
Number washes:	1		
Number rinses:	1		
pH=	7.42		
Conductivity (uS/cm)=	2840		
Temperature (degC)=	2.8		

n/a=not applicable
TOP = Top Of Pipe

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Monitoring Well Observations (MW-02)

Development of Monitoring Wells (2007)			
Site Name:	CAM-2		
Date of Sampling Event:	25-Aug-07	Time:	10:30
Names of Samplers:	Ken Boldt		
Landfill Name:	Tier II Soil Disposal Facility		
Monitoring Well ID:	MW-2		
Sample Number:	C2-MW-2		
Condition of Well:	Good		
Measured Data			
Well height above ground=	30		
Diameter of well (cm)=	5		
Depth of installation (cm)=	350	From ground surface	
Length screened section (cm)=	185		
Depth to top of screen=	65	From ground surface	
Depth to water surface (cm)=	101	Method:	Interface meter
Static water level (cm)=	71	From ground surface	
Depth to bottom (cm)=	169	Evidence of sludge or siltation:	no
Depth of water (cm)=	68		
Well volume of water (mL)=	1335.18		
Free product thickness (mm)=	N/A	Method:	Interface meter
Purging: (Y/N)	Y	Procedure/Equipment:	Peristaltic Pump, LDPE Tubing
Volume Purged Water (L)=	2.0		
Decontamination required: (Y/N)	Y	*Notes:*	
Number washes:	1	Checked conductivity meter with distilled water after purging and had appropriate readings. Error indicates the conductivity of the sample water was outside of the meter's range.	
Number rinses:	1		
pH=	7.22		
Conductivity (uS/cm)=	Error		
Temperature (degC)=	3.2		

n/a=not applicable
TOP = Top Of Pipe

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Monitoring Well Observations (MW-03)

Development of Monitoring Wells (2007)			
Site Name:	CAM-2		
Date of Sampling Event:	25-Aug-07	Time:	11:15
Names of Samplers:	Ken Boldt		
Landfill Name:	Tier II Soil Disposal Facility		
Monitoring Well ID:	MW-3		
Sample Number:	C2-MW-3		
Condition of Well:	Good		
Measured Data			
Well height above ground=	47		
Diameter of well (cm)=	5		
Depth of installation (cm)=	360	From ground surface	
Length screened section (cm)=	200		
Depth to top of screen=	50	From ground surface	
Depth to water surface (cm)=	100	Method:	Interface meter
Static water level (cm)=	53	From ground surface	
Depth to bottom (cm)=	182	Evidence of sludge or siltation:	no
Depth of water (cm)=	82		
Well volume of water (mL)=	1610.07		
Free product thickness (mm)=	N/A	Method:	Interface meter
Purging: (Y/N)	Y	Procedure/Equipment:	Peristaltic Pump, LDPE Tubing
Volume Purged Water (L)=	2.0		
Decontamination required: (Y/N)	Y	*Notes:*	
Number washes:	1		
Number rinses:	1		
pH=	12.48		
Conductivity (uS/cm)=	2630		
Temperature (degC)=	3.4		

n/a=not applicable
TOP = Top Of Pipe

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Monitoring Well Observations (MW-04)

Development of Monitoring Wells (2007)			
Site Name:	CAM-2		
Date of Sampling Event:	25-Aug-07	Time:	14:05
Names of Samplers:	Ken Boldt		
Landfill Name:	Tier II Soil Disposal Facility		
Monitoring Well ID:	MW-4		
Sample Number:	C2-MW-4, C2-MW-5 (Duplicate)		
Condition of Well:	Good		
Measured Data			
Well height above ground=	75		
Diameter of well (cm)=	5		
Depth of installation (cm)=	330	From ground surface	
Length screened section (cm)=	100		
Depth to top of screen=	40	From ground surface	
Depth to water surface (cm)=	146	Method:	Interface meter
Static water level (cm)=	71	From ground surface	
Depth to bottom (cm)=	220	Evidence of sludge or siltation:	no
Depth of water (cm)=	74		
Well volume of water (mL)=	1452.99		
Free product thickness (mm)=	N/A	Method:	Interface meter
Purging: (Y/N)	Y	Procedure/Equipment:	Peristaltic Pump, LDPE Tubing
Volume Purged Water (L)=	2.0		
Decontamination required: (Y/N)	Y	*Notes:*	
Number washes:	1		
Number rinses:	1		
pH=	7.46		
Conductivity (uS/cm)=	2900		
Temperature (degC)=	3.4		

n/a=not applicable
TOP = Top Of Pipe

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Appendix C5

Thermistor Data Tables and Maintenance Records 2007

Thermal Monitoring
Ground Temperature Annual Maintenance Report

Contarctor Name:	**Gartner Lee Limited**	Inspection Date:	**25-Aug-07**
Prepared By:	**Ken Boldt**		

Thermistor Information

Site Name:	**CAM-2**		Thermistor Location		**Tier II Disposal Facility**		
Thermistor Number:	**VT1**		Inclination		**Vertical**		
Install Date:	**30-Aug-05**		First Date Event		**22-Aug-06**	Last Date Event	**9-Nov-06**
Coordinates and Elevation		N	**7618811**	E	**548508.81**	Elev	**32.48**
Length of Cable (m)	**?**		Cable Lead Above Ground (m)	**0**	Nodal Points	**16**	
Datalogger Serial #	**207019**				Cable Serial Number		**0**

Code CAM-2VT1

Thermistor Inspection

	Good	Needs Maintenance
Casing	☑	☐
Cover	☑	☐
Data Logger	☑	☐
Cable	☑	☐
Beads	☑	☐

Battery Installation Date **25-Aug-07**

Battery Levels Main **11.34 V** Aux **13.50 V**

Manual Ground Temperature Readings

Bead	ohms	Temp. (ºC)
1	**10220**	**9.5**
2	**934**	**45.8**
3	**12430**	**5.4**
4	**13170**	**4.3**
5	**13710**	**3.5**
6	**14550**	**2.3**
7	**17410**	**-1.2**
8	**18390**	**-2.2**

Bead	ohms	Temp. (ºC)
9	**19400**	**-3.3**
10	**20230**	**-4.1**
11	**21040**	**-4.8**
12	**21830**	**-5.5**
13	**22590**	**-6.2**
14	**23330**	**-6.8**
15	**24130**	**-7.4**
16	**24650**	**-7.8**

Observations and Proposed Maintenance

Datalogger was incorrectly programmed to record only until full and every 1 hour. The Datalogger was reprogrammed to correctly record every 12 hours and to not stop when the memory is full.

Thermal Monitoring
Ground Temperature Annual Maintenance Report

Contarctor Name:	**Gartner Lee Limited**	Inspection Date:	**25-Aug-07**
Prepared By:	**Ken Boldt**		

Thermistor Information

Site Name:	**CAM-2**		Thermistor Location		**Tier II Disposal Facility**		
Thermistor Number:	**VT2**		Inclination		**Vertical**		
Install Date:	**30-Aug-05**		First Date Event		**22-Aug-06**	Last Date Event	**25-Aug-07**
Coordinates and Elevation		N	**7618799**	E	**548474.24**	Elev	**32.072**
Length of Cable (m)	**?**		Cable Lead Above Ground (m)	**0**	Nodal Points	**12**	
Datalogger Serial #	**207107**				Cable Serial Number		**0**

Code CAM-2VT2

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☐	☑	**Bead 12 not reading manually**
Battery Installation Date	**25-Aug-07**		
Battery Levels	Main **11.34 V**	Aux	**12.77 V**

Manual Ground Temperature Readings

Bead	ohms	Temp. (ºC)
1	**11480**	**7.1**
2	**12880**	**4.7**
3	**13300**	**4.0**
4	**14080**	**3.0**
5	**16310**	**0.1**
6	**17460**	**-1.2**
7	**18400**	**-2.2**
8	**19560**	**-3.4**

Bead	ohms	Temp. (ºC)
9	**20660**	**-4.4**
10	**21550**	**-5.2**
11	**22270**	**-5.9**
12	**-**	**#VALUE!**

Observations and Proposed Maintenance

Thermal Monitoring
Ground Temperature Annual Maintenance Report

Contarctor Name:	**Gartner Lee Limited**	Inspection Date:	**25-Aug-07**
Prepared By:	**Ken Boldt**		

Thermistor Information

Site Name:	**CAM-2**		Thermistor Location		**Tier II Disposal Facility**		
Thermistor Number:	**VT3**		Inclination		**Vertical**		
Install Date:	**30-Aug-05**		First Date Event		**22-Aug-06**	Last Date Event	**25-Aug-07**
Coordinates and Elevation		N	**7618792**	E	**548495.38**	Elev	**32.06**
Length of Cable (m)	**?**		Cable Lead Above Ground (m)	**0**	Nodal Points	**12**	
Datalogger Serial #	**5070039**				Cable Serial Number		**0**

Code CAM-2VT3

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☐	☑	**9 & 12 not responding**
Battery Installation Date	**25-Aug-07**		
Battery Levels	Main **11.34 V**	Aux	**13.02 V**

Manual Ground Temperature Readings

Bead	ohms	Temp. (ºC)
1	**10080**	**9.8**
2	**12640**	**5.1**
3	**13160**	**4.3**
4	**13950**	**3.1**
5	**15710**	**0.8**
6	**16880**	**-0.6**
7	**17970**	**-1.8**
8	**19610**	**-3.5**

Bead	ohms	Temp. (ºC)
9	**-**	**#VALUE!**
10	**21630**	**-5.3**
11	**22350**	**-5.9**
12	**-**	**#VALUE!**

Observations and Proposed Maintenance

Thermal Monitoring
Ground Temperature Annual Maintenance Report

Contarctor Name:	**Gartner Lee Limited**	Inspection Date:	**25-Aug-07**
Prepared By:	**Ken Boldt**		

Thermistor Information

Site Name:	**CAM-2**		Thermistor Location		**Tier II Disposal Facility**		
Thermistor Number:	**VT4**		Inclination		**Vertical**		
Install Date:	**30-Aug-05**		First Date Event		**22-Aug-06**	Last Date Event	**25-Aug-07**
Coordinates and Elevation		N	**7618772**	E	**548479.02**	Elev	**31.89**
Length of Cable (m)	**?**		Cable Lead Above Ground (m)	**0**	Nodal Points	**16**	
Datalogger Serial #	**2020130**				Cable Serial Number		**0**

Code CAM-2VT4

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☐	☑	**16 not responding to data logger**
Battery Installation Date	**25-Aug-07**		
Battery Levels	Main **11.34 V**	Aux	**13.02 V**

Manual Ground Temperature Readings

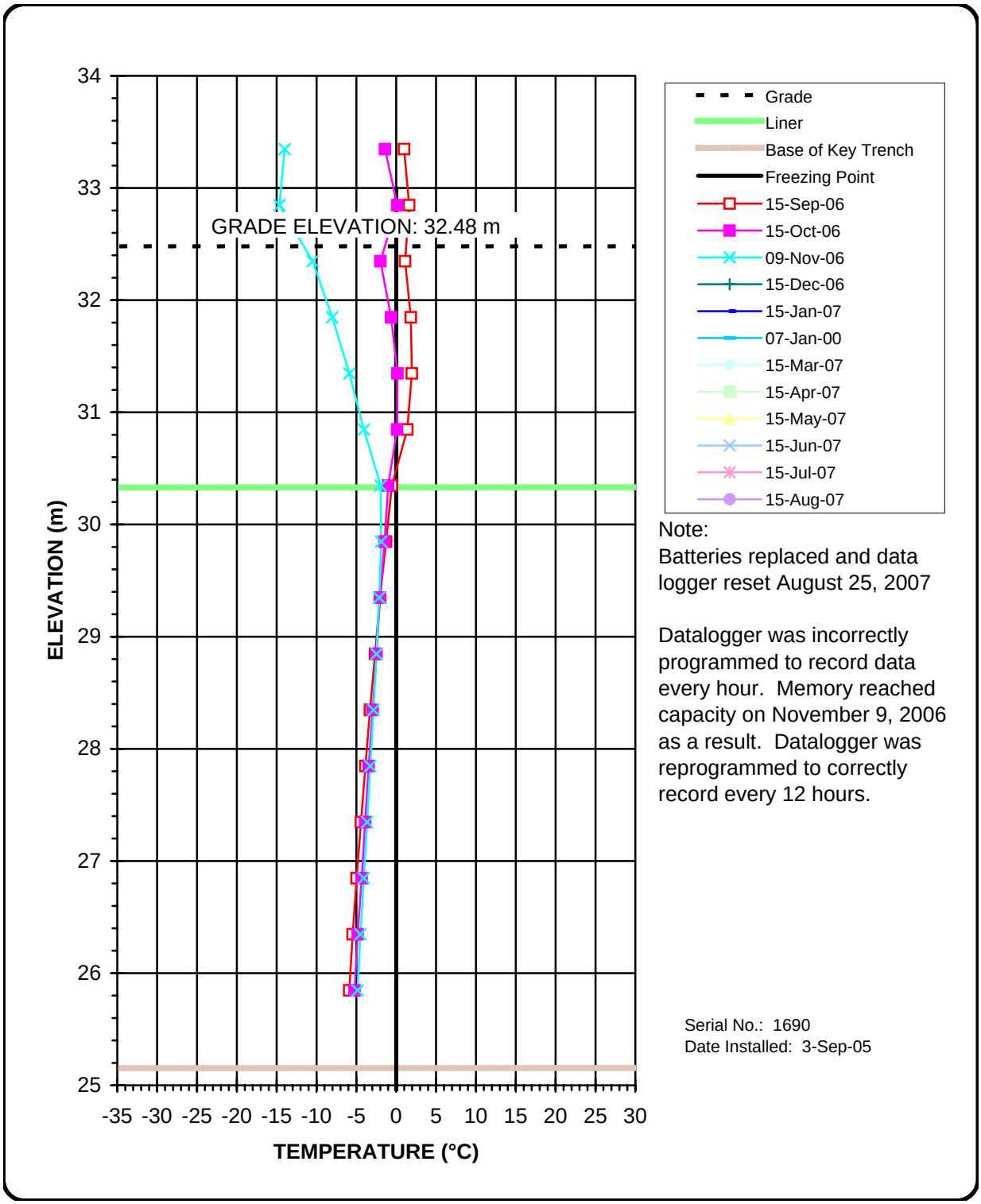
Bead	ohms	Temp. (ºC)
1	**9800**	**10.4**
2	**10030**	**9.9**
3	**12590**	**5.2**
4	**13460**	**3.8**
5	**14150**	**2.8**
6	**16670**	**-0.3**
7	**17450**	**-1.2**
8	**18350**	**-2.2**

Bead	ohms	Temp. (ºC)
9	**19210**	**-3.0**
10	**20000**	**-3.8**
11	**20800**	**-4.6**
12	**21550**	**-5.2**
13	**22230**	**-5.8**
14	**22910**	**-6.4**
15	**23520**	**-6.9**
16	**24110**	**-7.4**

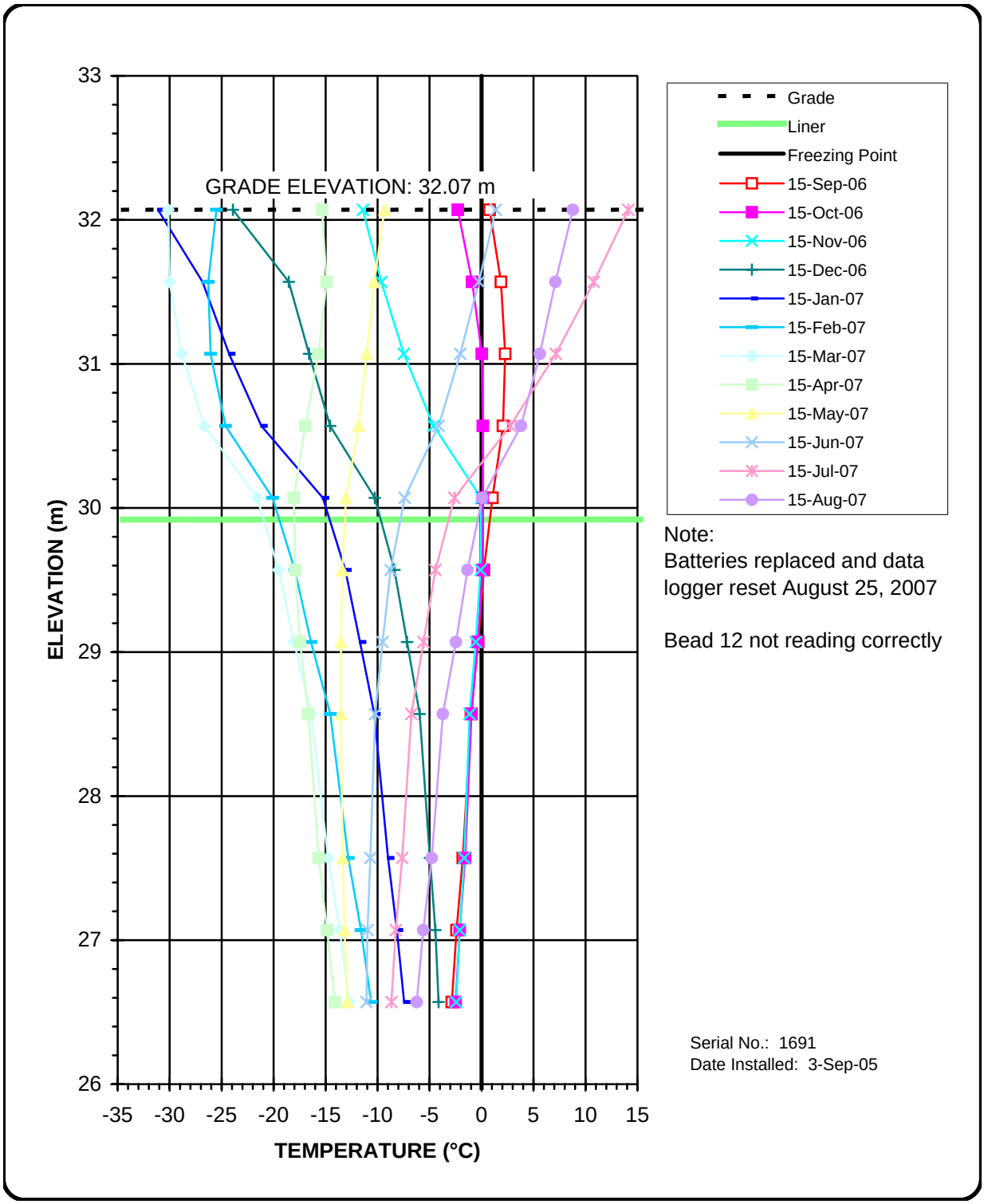
Observations and Proposed Maintenance

Appendix C6

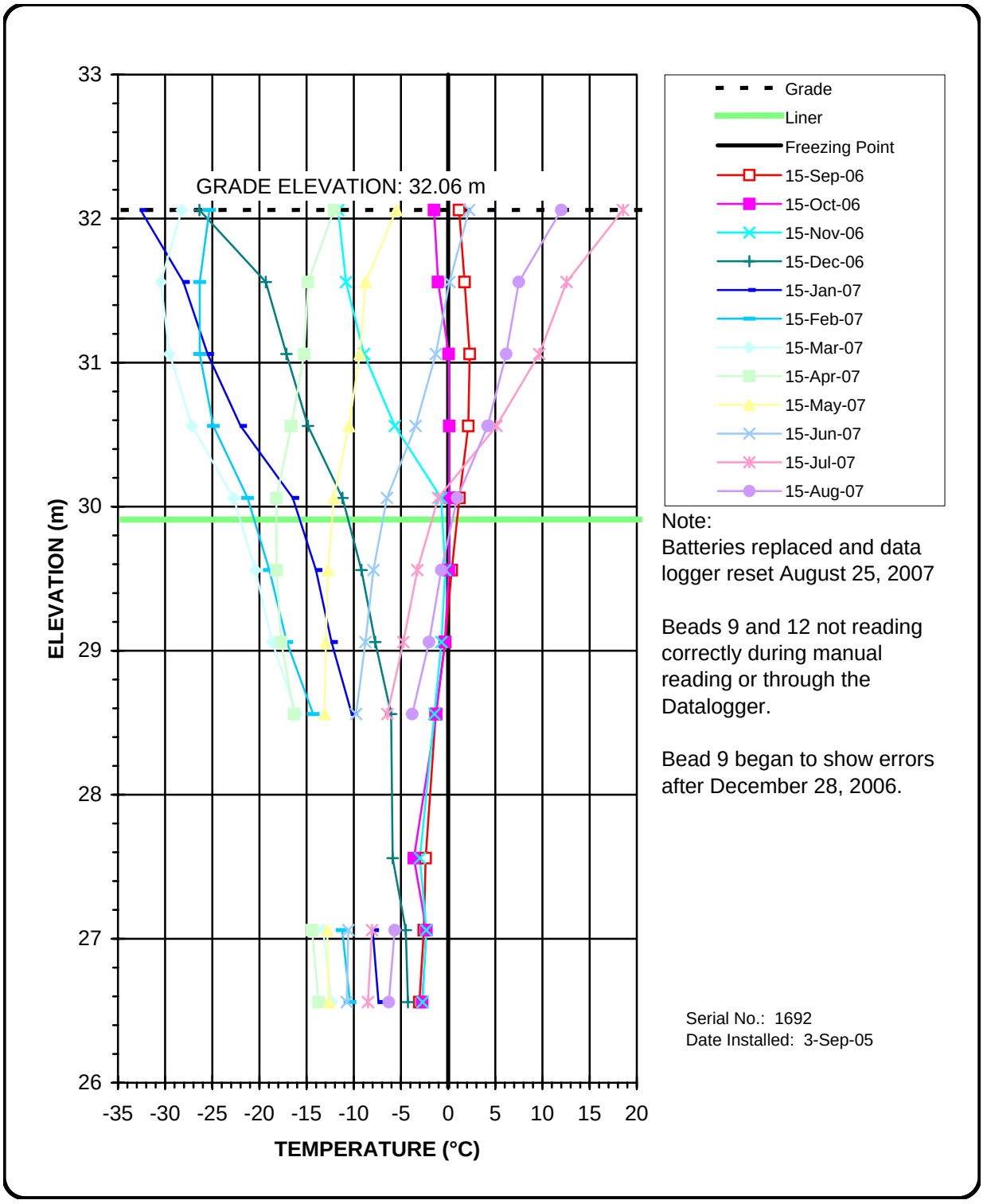
Thermistor Graphs 2007



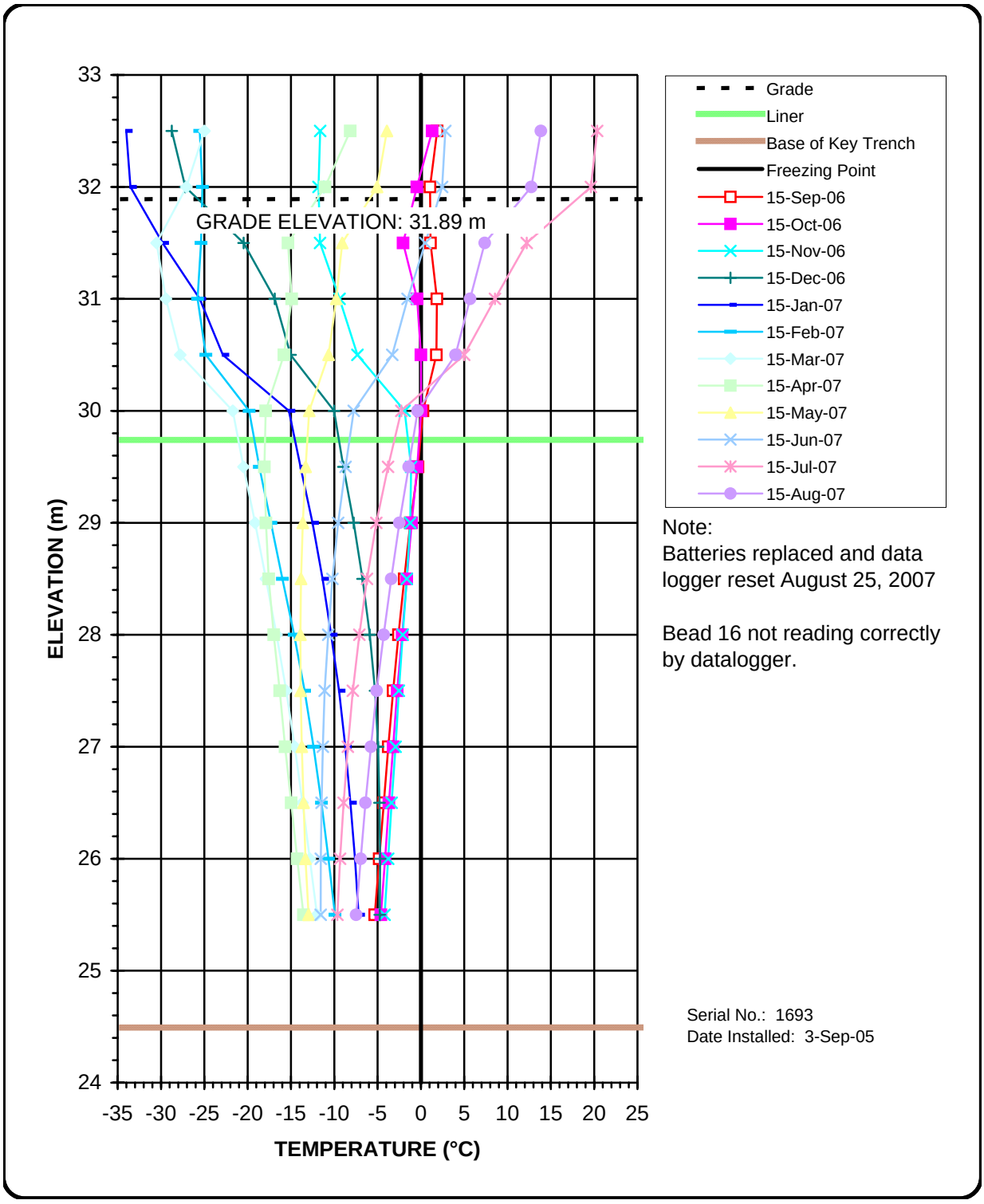
Graph 1
Ground Temperature Profile
Tier II Soil Disposal Facility
Vertical GTC VT-1



Graph 2
Ground Temperature Profile
Tier II Soil Disposal Facility
Vertical GTC VT-2



Graph 3
Ground Temperature Profile
Tier II Soil Disposal Facility
Vertical GTC VT-3



Graph 4
Ground Temperature Profile
Tier II Soil Disposal Facility
Vertical GTC VT-4

Appendix C7

Field Notes

Aug 24/2007

In Cambridge Bay (fly in from PIN-3 last night)

Flying to CAM-2 → first flight on Adlair @ 11am

Terrible winds on site
- had to move camp 2x
- one large tent broken due to strong winds (snapped frame)

8:30pm by the time camp fully set up

Matt (Nazituk) offered to let us sleep indoors - but generator is far too loud and we opted to continue setting up outdoors

3°C rainy, windy

Aug 25/2007 CAM-2

Heavy rain and strong winds overnight Raining until past 9am resulted in delayed start because we could sense it would let up

Starting visual inspection @ Tier II as it is right next to camp and easily identified VERY WINDY

Completed initial detailed walk-over (no photos) and noted several areas of probable slope movement

- North slope has a thin tension crack running the entire length of the toe from the NW corner to the NE corner about 2m ~~from~~ to 4m upslope from the dls toe (≈1mm width)
  - 2nd tension crack noted slightly higher up slope in NW corner possibly indicating early stage retrogressive slope failure
  - addition tension crack noted

70516 4°C, very windy, light rain

at top of slope along crest in NW corner
- detailed photo documentation to follow

East slope → appears stable w/ no cracking
- some minor depressions and surface irregularities observed but appear to be construction finish related

South slope
- minor surface erosion noted adjacent to VT-4 running ↓ downslope in minor gully → origin likely surface runoff - self armouring

* thin 1mm - 2mm tension crack observed along SW toe running from about 20m east of SW toe to the toe of West side → parallel to toe and about 2 m u/s from toe

Aug 25 CAM-2

TIER II cont...

West Slope
- tension crack 1mm to 2mm observed along entire slope parallel to toe and about 2 m up from toe

Detailed photographic record to follow TOO WINDY for work again → hopefully small field book will not blow away

Starting in NE corner and working CC

TIER II

1,2 2 photo panoramic of north slope TIER II viewed look SW from about 25m NE of NE toe 548548 7618824

3 Looking west along north toe from NE corner 548530 7618823

4 Looking west along north crest from NE corner 548524 7618809

VT-1 in frame

Aug 25/2007

5 Close-up of tension crack starts on ne side on north end of east slope 5m upslope
548537 7618804 looking N

6 looking N from 548532 7618812
crack hard to see

7 Close-up of typical crack at NE corner 5m up slope
548534 7618815
* crack fades in and out as some fines have washed into portion

8 Tracking tension crack → looking east along N slope from NE corner
548530 7618822

9 Close-up Tracking crack - pens bracket two tension cracks where upper crack ends and lower crack continues (0.6m offset)
548525 7618823

10 Looking east along crack from 548513 7618827

11 looking west along toe of north slope - following crack from 548502 7618830

12 Looking west following crack where it splays and shifts downslope to 3m from toe 548488 7618835
* still no indication of additional tension cracks upslope

13 Tension crack in parallel, thin but hinting at retrogression
Looking west to NW corner 548480 7618838
- hints of tension cracks upslope but sediment infill prevents clear diagnosis

14 Larger crack at toe near NW corner, start
Looking west from 548476 7618845
→ additional fine cracks continue 3m upslope of toe
→ large crack continues to 548459 7618851 until it is obscured by sediment infilling

15 Fine tension crack upslope from start of larger toe crack 548471 7618840

Aug 25/2007

16 Top slope NW corner on N side
Photo of tension crack largely sediment infilled
548473 7618826 to 548464 7618826 (then infilled)

17 extra close-up of tension crack at top of slope eastern end

stopping for lunch and to dry off

1:15pm

18 Looking SE to NE corner of landfill (Tier II) and West side 548445 7618869

19 Looking east along d/s toe from NW corner note lower crack in field book for scale
548452 7618856

20 Looking south along west side of LF from NW corner 548451 7618851

CAM-2 70516

21 Following tension crack along west side of landfill from start 548455 7618842 4m d/s from d/s toe

22 Original tension crack continues (black pen) and second lower crack starts red pen 548450 7618833 + sediment infilling partially masks cracking

> both cracks merge into one at 548452 7618834

No cracks observed higher up slope

23 Possible tension crack (faint and infilled mean top of slope (2m from top) at 548460 7618820

24 Looking south along Tier II crest from NW corner 548461 7618831

25 Area where two parallel cracks 5m & 6m d/s from toe merge into one → note additional cracks perpendicular to slope 548449 7618819
Looking upslope (west side) Tier II

Aug 25

5m u/s from toe

26 Typical tension crack looking south along West slope from 548444 7618812
& very fine tension cracks often appear within ~~an~~ 0.5m parallel to the larger cracks → sometimes up to 3 sets

27 Moving S the cracking appears to shift u/s to ± 7m from toe
→ portions obscured by sediment infilling

~~28~~ Two thin parallel tension cracks 6m up from toe @ 548436 7618798

29 Main surface erosion near crest of west slope 10m N of corner → SC/farmouring 8m long, 0.7m wide, excess sand shifted exposing gravel top @ 548443 7618786

Tension crack wraps around corner (SW) to the south slope at same elevation

~~29~~ Looking S from 548434 7618783 Towards SW corner → note crack

30 View of South slope Tier II viewed Looking east from 548420 7618771
- tuckd fork on end of tension crack

31 Tension cracks appear to end (likely due to stabilizing influence of d/s granular pad) @ 548438 7618771
End of crack

32 Looking east along crest from SW corner 548447 7618799

33 Main surface erosion and gullying adjacent to VT-4 d/s to within 4m toe of slope → surface runoff concentrated S of armoring
Looking upslope from 548474 7618759

34, 35 Panorama of Tier II looking NW to SW corner 548523 7618724

36 Looking N from mid-slope east side Tier II → note minor depression, no signs of recent movement, likely construction fence
548514 7618765

Aug 25/2007

37 looking N along east crest from SE corner 548505 7618762

38, 39, 40 3 shot panoramic of top of Tier II viewed from SE corner scanning L to R 548503 7618762

3pm

N on Hazardous Waste Landfill

41, 42, 43 Looking SW towards NE corner of NHW LF 3 shot pano 548749 7618498

44 Looking west along toe of NHW NE corner 548744 7618487 slope stable, no cracking

45 Looking west along crest from NE corner

* Tension cracks ~~were~~ noted ~~for~~ along crest 1m ~~ols~~ going west and south from NE corner

CAM-2 7056

46 Closeup of crack looking west from crest @ 548735 7618473

47 Tension crack gradually migrates to top of cut → some portions infilled with sediment, some crack up to 4mm wide → close-up 548722 7618473

Tension crack appears to end along crest of north slope @ 548713 7618471 25m from NE corner

Tension crack extends along the rest of the east slope for ≈ 48m to within ≈ 3m of the SE corner → distorted photos will follow

Continuing CC from NE corner where last crack left off → no tension cracks visible for about 13m

48 Tension crack resumes along north slope @ 548701 7618469

close-up looking W

Aug 25.07

CAM-2

Weather: Cloudy, cool (5-6°c), rainy, windy
Crew: Ken Boldt
Suzie Koaha
Joe Koaha (Bear Monitor)

Tier II

MW-1

Well in good condition
Sample collected C2-MW-1
4x 500 mL amber glass
2x VOC vials
1x 250 mL plastic
Picture 001 of MW-1

Soil sampling
C2-MW-1-1 @ 0-10 cm
C2-MW-1-2 @ 40-50cm
Picture 002 of test pit.

MW-2

Good Condition
Sample collected
C2MW-2

Aug 25

4x 500 mL amber glass
2x VOC vials
1x plastic 250 mL
Picture 003 of MW-2

Soil Sampling
C2-MW-2-1 @ 0-10cm
C2-MW-2-2 @ 40-50cm
Picture 004 of ~~MW~~ Test pit

MW-3

Monitoring well in good condition
Sample collected C2-MW-3
4x 500mL amber glass
2x VOC vials
1x 250mL plastic
Picture 005 of MW-3

Soil Sampling
C2-MW-3-1 @ 0-10cm
C2-MW-3-2 @ 40-50cm
Picture 006 of test pit

Aug 25

MW-4

Well in good condition
Sample Collected C2-MW-4
4 x 500 mL amber glass
2 x VOC Vials
1 x 250mL plastic
Duplicate C2-MW-5
4x1000 mL amber glass
4x500 mL amber glass
2x VOC vials
2x 250 mL plastic
1 x 250 mL amber glass
Picture 007 of MW-4

Soil sampling
C2-MW-4-1 @ 0-10cm
C2-MW-4-2 @ 40-50cm
C2-MW-5-2 Duplicate of 4-2 @ 40-50cm
Picture 008 of test pit

VT-1

good condition
Picture 009 of VT-1

Aug 25

VT-2

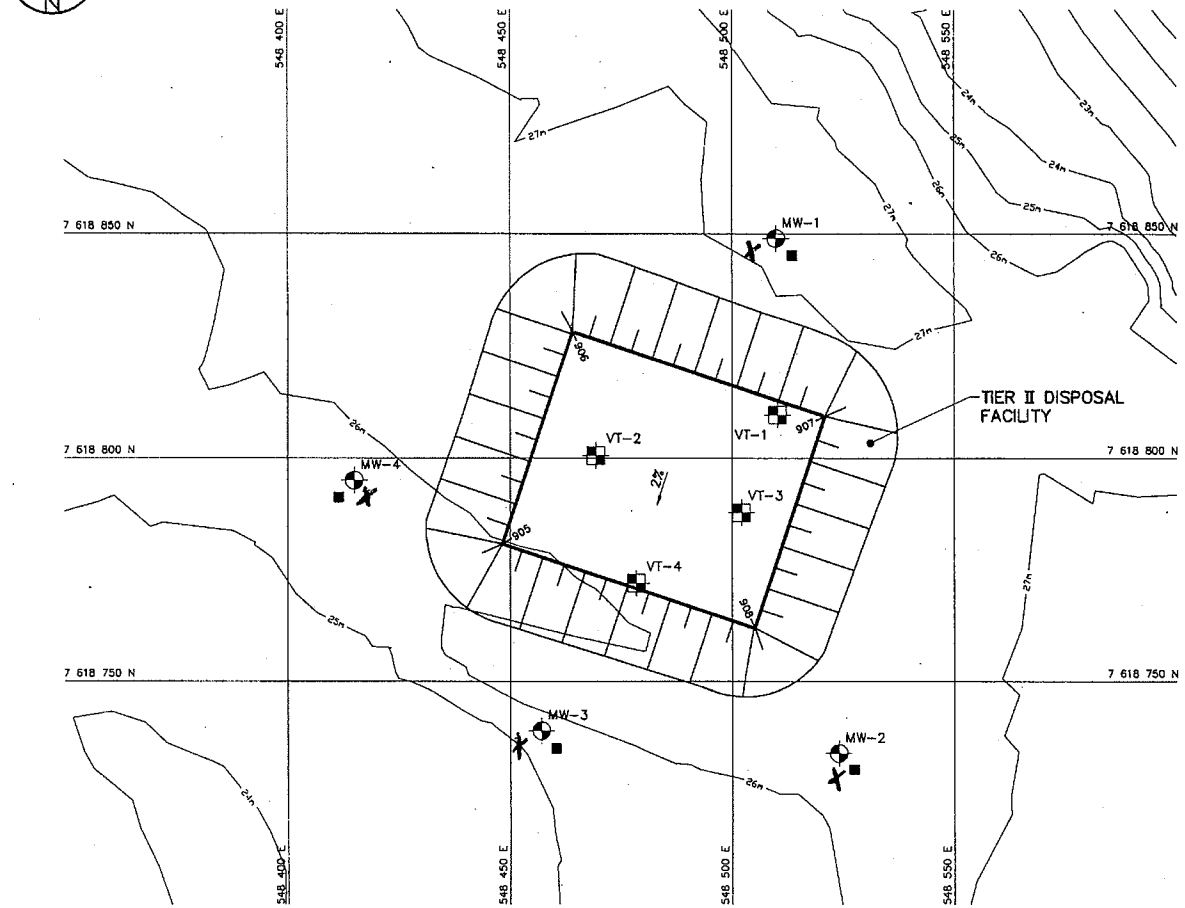
good condition
Picture 010 of VT-2

VT-3

good condition
Picture 011 of VT-3
Picture 012 of typical rusted lock

VT-4

good condition
Picture 013 of VT-4



LEGEND:

- ■ MONITORING SOIL SAMPLE LOCATION
- MW-4 PROPOSED MONITORING WELL LOCATION
- VT-2 VERTICAL THERMISTOR

COORDINATE POINTS FINAL LANDFILL SURFACE			
NO.	NORTHING	EASTING	ELEV.
905	7 618 760.8	548 448.2	32.1
906	7 618 828.2	548 464.0	33.1
907	7 618 809.3	548 521.0	33.1
908	7 618 761.9	548 505.2	32.1

PLAN TO BE UPDATED WITH RECORD INFORMATION FOLLOWING CONSTRUCTION (2006)

DRAFT

0 10 20 30m
10 5 1:1000

DEW LINE CLEAN UP
LANDFILL MONITORING PLAN

CAM-2 - GLADMAN POINT

TIER II DISPOSAL FACILITY SITE PLAN

FIGURE CAM-2.4

uma

DGN FILE: P1-R001.DWG Date: 04/02/07

Monitoring Well Sampling Record

Site Name:	CAM-2		
Date of Sampling Event:	25-Aug-07	Time:	9:50 AM
Names of Samplers:	Ken Boldt		
Landfill Name:	DCC Tier II		
Monitoring Well ID:	MW-1		
Sample Number:	C2-MW-1		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	53		
Diameter of well (cm)=			
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (cm)= (from top of pipe)	143	Measurement method: (meter, tape, etc)	
Static water level (cm)= (below ground surface)	90		
Measured well refusal depth (cm)= (i.e. depth to frozen ground)	200	Evidence of sludge or siltation:	No
Thickness of water column (cm)=			
Static volume of water in well (mL)=			
Free product thickness (mm)=	N/A	Measurement method: (meter, paste, etc)	
Purging: (Y/N)	Y	Purging/Sampling Equipment:	
Volume Purged Water=	2.0L		
Decontamination required: (Y/N)	Y		
Number washes:	1		
Number rinses:	1		
Final pH=	7.42		
Final Conductivity (uS/cm)=	2840		
Final Temperature (degC)=	2.8		

Monitoring Well Sampling Record

Site Name:	CAM-2		
Date of Sampling Event:	25-Aug-07	Time:	10:30 AM
Names of Samplers:	Ken Boldt		
Landfill Name:	DCC Tier II		
Monitoring Well ID:	MW-2		
Sample Number:	C2-MW-2		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	30		
Diameter of well (cm)=			
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (cm)= (from top of pipe)	101	Measurement method: (meter, tape, etc)	
Static water level (cm)= (below ground surface)	71		
Measured well refusal depth (cm)= (i.e. depth to frozen ground)	169	Evidence of sludge or siltation:	NO
Thickness of water column (cm)=			
Static volume of water in well (mL)=			
Free product thickness (mm)=	N/A	Measurement method: (meter, paste, etc)	
Purging: (Y/N)	Y	Purging/Sampling Equipment:	
Volume Purged Water=	2.0L		
Decontamination required: (Y/N)	Y		
Number washes:	1		
Number rinses:	1		
Final pH=	7.22		
Final Conductivity (uS/cm)=	Error		
Final Temperature (degC)=	3.2		

Monitoring Well Sampling Record

Site Name:	CAM-2		
Date of Sampling Event:	Aug 25. 07	Time:	11:15 AM
Names of Samplers:			
Landfill Name:	DCC Tier II		
Monitoring Well ID:	MW-3		
Sample Number:	CZ-MW-3		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	47		
Diameter of well (cm)=			
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (cm)= (from top of pipe)	100	Measurement method: (meter, tape, etc)	
Static water level (cm)= (below ground surface)	53		
Measured well refusal depth (cm)= (i.e. depth to frozen ground)	182	Evidence of sludge or siltation:	NO
Thickness of water column (cm)=			
Static volume of water in well (mL)=			
Free product thickness (mm)=	N/A	Measurement method: (meter, paste, etc)	
Purging: (Y/N)	Y	Purging/Sampling Equipment:	
Volume Purged Water=	210 L		
Decontamination required: (Y/N)	Y		
Number washes:	1		
Number rinses:	1		
Final pH=	12.48		
Final Conductivity (uS/cm)=	2630		
Final Temperature (degC)=	3.4		

Monitoring Well Sampling Record

Site Name:	CAM-2		
Date of Sampling Event:	25-Aug-07	Time:	2:05 PM
Names of Samplers:	Ken Boldt		
Landfill Name:	DCC Tier II		
Monitoring Well ID:	MW-4		
Sample Number:	C2-MW-4, (C2-MW-5 Duplicate)		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	75		
Diameter of well (cm)=			
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (cm)= (from top of pipe)	146	Measurement method: (meter, tape, etc)	
Static water level (cm)= (below ground surface)	71		
Measured well refusal depth (cm)= (i.e. depth to frozen ground)	220	Evidence of sludge or siltation:	No
Thickness of water column (cm)=			
Static volume of water in well (mL)=			
Free product thickness (mm)=	N/A	Measurement method: (meter, paste, etc)	
Purging: (Y/N)	Y	Purging/Sampling Equipment:	
Volume Purged Water=	2.0		
Decontamination required: (Y/N)	Y		
Number washes:	1		
Number rinses:	1		
Final pH=	7.46		
Final Conductivity (uS/cm)=	2900		
Final Temperature (degC)=	3.4		

Thermal Monitoring

Ground Temperature Annual Maintenance Report

Contractor Name: GLL	Inspection Date: 25-Aug-07
Prepared By: Ken Boldt	

Thermistor Information

Site Name: **CAM-2**	Thermistor Location: **Tier II Disposal Facility**	
Thermistor Number: **VT-1**	Inclination: **Vertical**	
Install Date: **30-Aug-05**	First Date Event: 22/08/06	Last Date Event: 09/11/06
Coordinates and Elevation N: **7618811.09**	E: **548508.81**	Elev: **32.48**
Length of Cable (m):	Cable Lead Above Ground (m):	Nodal Points: **16**
Datalogger Serial #: ~~207019~~ 06030071	Cable Serial Number:	

Code CAM-2VT1

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Battery Installation Date			
Battery Levels	Main 11.34V	Aux 13.50 V	

Manual Ground Bead Temperature Readings

Bead	k Ohms	Temp. (°C)
1	10.22	
2	9.34	
3	12.43	
4	13.17	
5	13.71	
6	14.55	
7	17.41	
8	18.39	

Bead	k Ohms	Temp. (°C)
9	19.40	
10	20.23	
11	21.04	
12	21.83	
13	22.59	
14	23.33	
15	24.13	
16	24.65	

Observations and Proposed Maintenance

Datalogger incorrectly programmed to record only until full and every 1 hour.

Thermal Monitoring

Ground Temperature Annual Maintenance Report

Contractor Name: GLL	Inspection Date: 25-Aug-07
Prepared By: Ken Boldt	

Thermistor Information

Site Name: **CAM-2**		Thermistor Location: **Tier II Disposal Facility**			
Thermistor Number: **VT-2**		Inclination: **Vertical**			
Install Date: **30-Aug-05**	First Date Event: 22/08/06		Last Date Event: 25/08/07		
Coordinates and Elevation N: **7618798.771**		E: **548474.24**		Elev: **32.072**	
Length of Cable (m):	Cable Lead Above Ground (m):			Nodal Points: **12**	
Datalogger Serial #: **207107**		Cable Serial Number:			

Code CAM-2VT2

Thermistor Inspection

	Good	Needs Maintenance
Casing	☑	☐
Cover	☑	☐
Data Logger	☑	☐
Cable	☑	☐
Beads	☑	☒ Bead 12 not reading manually
Battery Installation Date		
Battery Levels	Main 11.34	Aux 12.77

Manual Ground Bead Temperature Readings

Bead	Ohms	Temp. (°C)
1	11.48	
2	12.88	
3	13.30	
4	14.08	
5	16.31	
6	17.46	
7	18.40	
8	19.56	

Bead	Ohms	Temp. (°C)
9	20.66	
10	21.55	
11	22.27	
12	—	
13		
14		
15		
16		

Observations and Proposed Maintenance

Bead 12 not reading manually

Thermal Monitoring

Ground Temperature Annual Maintenance Report

Contractor Name:	Inspection Date:
Prepared By:	

Thermistor Information

Site Name:	**CAM-2**	Thermistor Location:	**Tier II Disposal Facility**		
Thermistor Number:	**VT-3**	Inclination:	**Vertical**		
Install Date:	**30-Aug-05**	First Date Event:		Last Date Event:	
Coordinates and Elevation	N: **7618792.22**	E: **548495.38**		Elev: **32.06**	
Length of Cable (m):		Cable Lead Above Ground (m):		Nodal Points:	**12**
Datalogger Serial #:	**5070039**	Cable Serial Number:			

Code CAM-2VT3

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☐	☒	9 & 12 aren't reading
Battery Installation Date			
Battery Levels	Main 11.34 V	Aux 13.02 V	

Manual Ground Bead Temperature Readings

Bead	Ohms	Temp. (°C)
1	10.08	
2	12.64	
3	13.16	
4	13.95	
5	15.71	
6	16.88	
7	17.97	
8	19.61	

Bead	Ohms	Temp. (°C)
9	—	
10	21.63	
11	22.35	
12	—	
13		
14		
15		
16		

Observations and Proposed Maintenance

Thermal Monitoring

Ground Temperature Annual Maintenance Report

Contractor Name:	Inspection Date:
Prepared By:	

Thermistor Information

Site Name: **CAM-2**		Thermistor Location: **Tier II Disposal Facility**	
Thermistor Number: **VT-4**		Inclination: **Vertical**	
Install Date: **30-Aug-05**	First Date Event: 23/08/06		Last Date Event: 25/08/07
Coordinates and Elevation N: **7618772.1**		E: **548479.02**	Elev: **31.89**
Length of Cable (m):	Cable Lead Above Ground (m):		Nodal Points: **16**
Datalogger Serial #: **2020130**		Cable Serial Number:	

Code CAM-2VT4

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☐	☒	16 not reading by datalogger
Battery Installation Date			
Battery Levels	Main 11.34V	Aux 13.02V	

Manual Ground Bead Temperature Readings

Bead	kOhms	Temp. (°C)
1	9.80	
2	10.03	
3	12.54	
4	13.46	
5	14.15	
6	16.67	
7	17.45	
8	18.35	

Bead	Ohms	Temp. (°C)
9	19.21	
10	20.00	
11	20.80	
12	21.55	
13	22.23	
14	22.91	
15	23.52	
16	24.11	

Observations and Proposed Maintenance

Monitoring Well Sampling Record

Site Name:	CAM-2		
Date of Sampling Event:	25-Aug-07	Time:	10:30 AM
Names of Samplers:	Ken Boldt		
Landfill Name:	DCC Tier II		
Monitoring Well ID:	MW-2		
Sample Number:	C2-MW-2		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	30		
Diameter of well (cm)=			
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (cm)= (from top of pipe)	101	Measurement method: (meter, tape, etc)	
Static water level (cm)= (below ground surface)	71		
Measured well refusal depth (cm)= (i.e. depth to frozen ground)	169	Evidence of sludge or siltation:	NO
Thickness of water column (cm)=			
Static volume of water in well (mL)=			
Free product thickness (mm)=	N/A	Measurement method: (meter, paste, etc)	
Purging: (Y/N)	Y	Purging/Sampling Equipment:	
Volume Purged Water=	2.0L		
Decontamination required: (Y/N)	Y		
Number washes:	1		
Number rinses:	1		
Final pH=	7.22		
Final Conductivity (uS/cm)=	Error		
Final Temperature (degC)=	3.2		

Monitoring Well Sampling Record

Site Name:	CAM-2		
Date of Sampling Event:	Aug 25. 07	Time:	11:15 AM
Names of Samplers:			
Landfill Name:	DCC Tier II		
Monitoring Well ID:	MW-3		
Sample Number:	CZ-MW-3		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	47		
Diameter of well (cm)=			
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (cm)= (from top of pipe)	100	Measurement method: (meter, tape, etc)	
Static water level (cm)= (below ground surface)	53		
Measured well refusal depth (cm)= (i.e. depth to frozen ground)	182	Evidence of sludge or siltation:	NO
Thickness of water column (cm)=			
Static volume of water in well (mL)=			
Free product thickness (mm)=	N/A	Measurement method: (meter, paste, etc)	
Purging: (Y/N)	Y	Purging/Sampling Equipment:	
Volume Purged Water=	210 L		
Decontamination required: (Y/N)	Y		
Number washes:	1		
Number rinses:	1		
Final pH=	12.48		
Final Conductivity (uS/cm)=	2630		
Final Temperature (degC)=	3.4		

Monitoring Well Sampling Record

Site Name:	CAM-2		
Date of Sampling Event:	25-Aug-07	Time:	2:05 PM
Names of Samplers:	Ken Boldt		
Landfill Name:	DCC Tier II		
Monitoring Well ID:	MW-4		
Sample Number:	C2-MW-4, (C2-MW-5 Duplicate)		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm)=	75		
Diameter of well (cm)=			
Depth of well installation (cm)= (from ground surface)			
Length screened section (cm)=			
Depth to top of screen (cm)= (from ground surface)			
Depth to water surface (cm)= (from top of pipe)	146	Measurement method: (meter, tape, etc)	
Static water level (cm)= (below ground surface)	71		
Measured well refusal depth (cm)= (i.e. depth to frozen ground)	220	Evidence of sludge or siltation:	No
Thickness of water column (cm)=			
Static volume of water in well (mL)=			
Free product thickness (mm)=	N/A	Measurement method: (meter, paste, etc)	
Purging: (Y/N)	Y	Purging/Sampling Equipment:	
Volume Purged Water=	2.0		
Decontamination required: (Y/N)	Y		
Number washes:	1		
Number rinses:	1		
Final pH=	7.46		
Final Conductivity (uS/cm)=	2900		
Final Temperature (degC)=	3.4		

Thermal Monitoring

Ground Temperature Annual Maintenance Report

Contractor Name: GLL	Inspection Date: 25-Aug-07
Prepared By: Ken Boldt	

Thermistor Information

Site Name: **CAM-2**	Thermistor Location: **Tier II Disposal Facility**	
Thermistor Number: **VT-1**	Inclination: **Vertical**	
Install Date: **30-Aug-05**	First Date Event: 22/08/06	Last Date Event: 09/11/06
Coordinates and Elevation N: **7618811.09**	E: **548508.81**	Elev: **32.48**
Length of Cable (m):	Cable Lead Above Ground (m):	Nodal Points: **16**
Datalogger Serial #: ~~207019~~ 06030071	Cable Serial Number:	

Code CAM-2VT1

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☑	☐	
Battery Installation Date			
Battery Levels	Main 11.34V	Aux 13.50 V	

Manual Ground Bead Temperature Readings

Bead	k Ohms	Temp. (°C)
1	10.22	
2	9.34	
3	12.43	
4	13.17	
5	13.71	
6	14.55	
7	17.41	
8	18.39	

Bead	k Ohms	Temp. (°C)
9	19.40	
10	20.23	
11	21.04	
12	21.83	
13	22.59	
14	23.33	
15	24.13	
16	24.65	

Observations and Proposed Maintenance

Datalogger incorrectly programmed to record only until full and every 1 hour.

Thermal Monitoring

Ground Temperature Annual Maintenance Report

Contractor Name: GLL	Inspection Date: 25-Aug-07
Prepared By: Ken Boldt	

Thermistor Information

Site Name: **CAM-2**		Thermistor Location: **Tier II Disposal Facility**			
Thermistor Number: **VT-2**		Inclination: **Vertical**			
Install Date: **30-Aug-05**	First Date Event: 22/08/06		Last Date Event: 25/08/07		
Coordinates and Elevation N: **7618798.771**		E: **548474.24**		Elev: **32.072**	
Length of Cable (m):	Cable Lead Above Ground (m):			Nodal Points: **12**	
Datalogger Serial #: **207107**		Cable Serial Number:			

Code CAM-2VT2

Thermistor Inspection

	Good	Needs Maintenance
Casing	☑	☐
Cover	☑	☐
Data Logger	☑	☐
Cable	☑	☐
Beads	☑	☒ Bead 12 not reading manually
Battery Installation Date		
Battery Levels	Main 11.34	Aux 12.77

Manual Ground Bead Temperature Readings

Bead	Ohms	Temp. (°C)
1	11.48	
2	12.88	
3	13.30	
4	14.08	
5	16.31	
6	17.46	
7	18.40	
8	19.56	

Bead	Ohms	Temp. (°C)
9	20.66	
10	21.55	
11	22.27	
12	—	
13		
14		
15		
16		

Observations and Proposed Maintenance

Bead 12 not reading manually

Thermal Monitoring

Ground Temperature Annual Maintenance Report

Contractor Name:	Inspection Date:
Prepared By:	

Thermistor Information

Site Name:	**CAM-2**	Thermistor Location:	**Tier II Disposal Facility**		
Thermistor Number:	**VT-3**	Inclination:	**Vertical**		
Install Date:	**30-Aug-05**	First Date Event:		Last Date Event:	
Coordinates and Elevation	N: **7618792.22**	E: **548495.38**		Elev: **32.06**	
Length of Cable (m):		Cable Lead Above Ground (m):		Nodal Points:	**12**
Datalogger Serial #:	**5070039**	Cable Serial Number:			

Code CAM-2VT3

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☐	☒	9 & 12 aren't reading
Battery Installation Date			
Battery Levels	Main 11.34 V	Aux 13.02 V	

Manual Ground Bead Temperature Readings

Bead	Ohms	Temp. (°C)
1	10.08	
2	12.64	
3	13.16	
4	13.95	
5	15.71	
6	16.88	
7	17.97	
8	19.61	

Bead	Ohms	Temp. (°C)
9	—	
10	21.63	
11	22.35	
12	—	
13		
14		
15		
16		

Observations and Proposed Maintenance

Thermal Monitoring

Ground Temperature Annual Maintenance Report

Contractor Name:	Inspection Date:
Prepared By:	

Thermistor Information

Site Name: **CAM-2**		Thermistor Location: **Tier II Disposal Facility**	
Thermistor Number: **VT-4**		Inclination: **Vertical**	
Install Date: **30-Aug-05**	First Date Event: 23/08/06		Last Date Event: 25/08/07
Coordinates and Elevation N: **7618772.1**		E: **548479.02**	Elev: **31.89**
Length of Cable (m):	Cable Lead Above Ground (m):		Nodal Points: **16**
Datalogger Serial #: **2020130**		Cable Serial Number:	

Code CAM-2VT4

Thermistor Inspection

	Good	Needs Maintenance	
Casing	☑	☐	
Cover	☑	☐	
Data Logger	☑	☐	
Cable	☑	☐	
Beads	☐	☒	16 not reading by datalogger
Battery Installation Date			
Battery Levels	Main 11.34V	Aux 13.02V	

Manual Ground Bead Temperature Readings

Bead	kOhms	Temp. (°C)
1	9.80	
2	10.03	
3	12.54	
4	13.46	
5	14.15	
6	16.67	
7	17.45	
8	18.35	

Bead	Ohms	Temp. (°C)
9	19.21	
10	20.00	
11	20.80	
12	21.55	
13	22.23	
14	22.91	
15	23.52	
16	24.11	

Observations and Proposed Maintenance

Appendix D

Landfill Monitoring Report – Non-Hazardous Waste Landfill

D.1 Non-Hazardous Waste Landfill

D.1.1 Landfill Summary

The Non-Hazardous Waste Landfill is located north of the airstrip, approximately 800 m from the main station facilities and covers an area of approximately 5000 m^2 and an estimated depth of 2 m. The landfill configuration is shown on Figure E-1.

The design of this landfill includes perimeter berms, and placement of a granular fill cover over the material. The material in the landfill consists of DCC Tier I and Type A hydrocarbon (lubricating oil and greases) contaminated soil. Four groundwater monitoring wells were installed at the landfill perimeter.

For 2007, the monitoring requirements for the Non-hazardous Waste Landfill included visual inspection only.

D.1.2 Visual Monitoring

A visual inspection of the Non-Hazardous Waste (NHW) Landfill was completed on August 25, 2007. Based on the visual inspection, the NHW landfill appears to be in reasonably good condition overall.

Minor surficial erosion was noted along the western and southern slopes of the landfill towards the southeast corner of the landfill (Photos 28). Runoff in this location has been concentrated in dozer tracks that were oriented parallel to the slope during final grading. The granular cover appears to be self armouring and the erosional features, which consist of the washing out of finer material from the coarse granular matrix, appear to have stabilized and do not warrant remediation at this time. Other minor rutting from construction related vehicle traffic were also noted, but not documented in detail as they showed no sign of degraded condition and the granular fill is self armouring in the event that these minor surface irregularities concentrate surface runoff in the future.

Numerous thin tension cracks, typically on the order of 1mm to 5mm width, were observed around the perimeter and mid-slope of all four sides of the landfill (Refer to Photos 7-10, 12-18, 22-25 and 35 to 38). Thin tension cracks were also observed along the crest of the landfill along the east and west sides of the north slope (Photos 4 thru-6), the eastern portion of the southern crest (Photos 26, 27 and 29) and along the entire length of the eastern crest (Photos 29, 30, 31, 32 and 33). In all instances, the cracks were roughly parallel to the toe of slope and in multiple locations there were several roughly parallel sets of cracks between the toe of slope and crest. The tension cracks along the lower portion of the slope are essentially continuous, although portions of the crack were largely obscured by sediment infilling associated with fines washing out of the granular fill and being deposited in the cracks.

Based on a visual assessment, the granular cover material appears to contain sufficient fines (i.e., >5% silt sized particles) to make it potentially frost susceptible. Given the gradation of the granular cover, it is

anticipated that some of the observed tension cracks may be related to freeze/thaw induced desiccation. Overall, the orientation and spacing of the tension cracks suggests minor slope movement, however, the landfill slopes appear to be stable and do not appear to be in imminent danger of large-scale movement.

The condition of the side slopes and landfill cap appear consistent with the site photos available from the previous inspection in 2006, with the notable exception that additional tension cracks appear to have developed around the crest and perimeter of the landfill. Some tension cracks were noted during the 2006 inspection; however, the cracks were not documented in detail. Given the relatively large number of hairline cracks that were observed in 2007, combined with the tendency of washed fines to obscure visual identification of the tension cracks over time, it would appear that the bulk of the tension cracks that were observed in 2007 are recent.

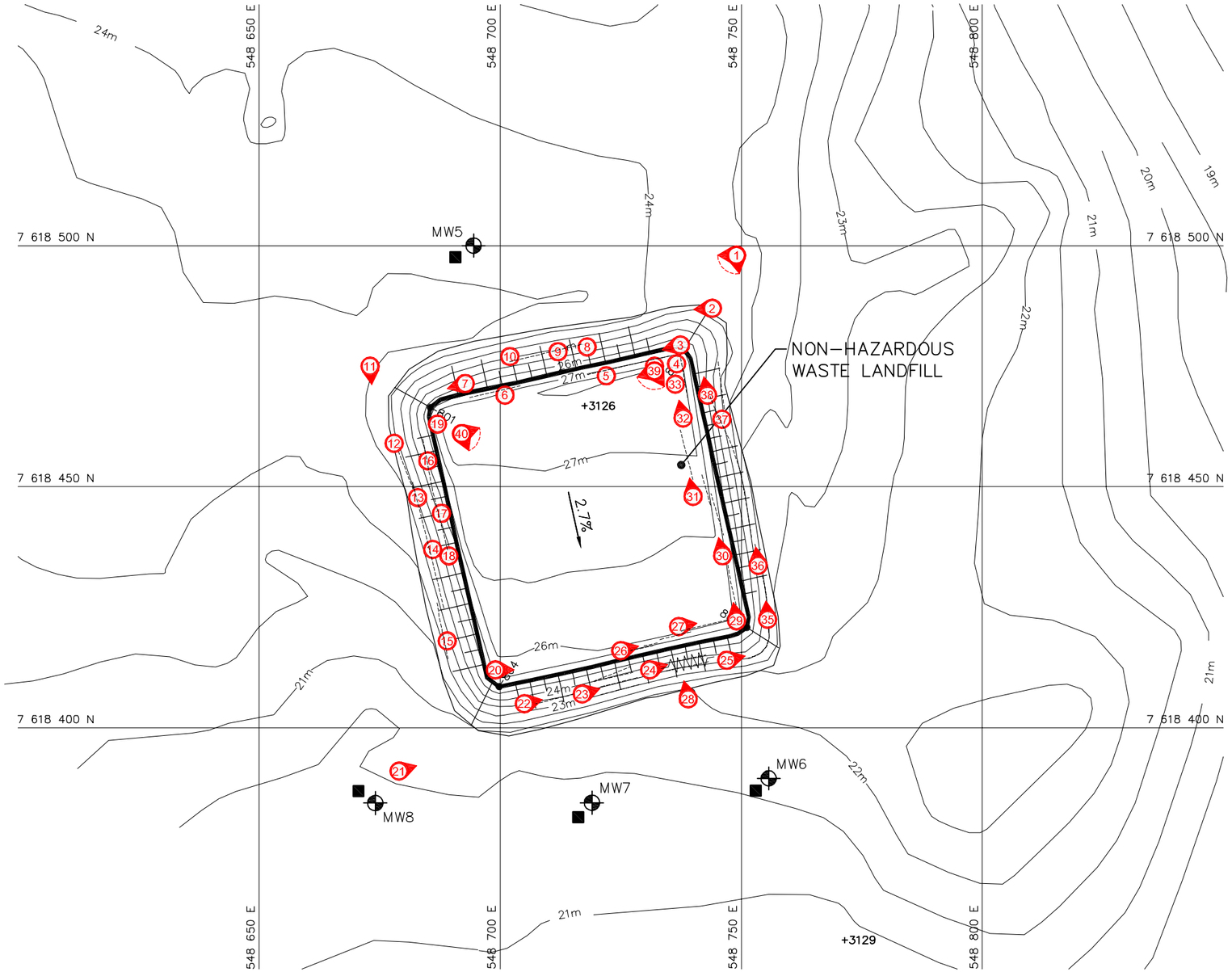
From the visual analysis during the site visit, there does not appear to be any significant erosion or cover issues that require immediate attention or that would be expected to lead to degraded cover performance in the near term. No immediate action is warranted. The tension cracks have been documented in detail to facilitate on-going monitoring. The overall preliminary stability assessment of the NHW landfill is marginal.

D.1.3 Soil Sampling

Soil sampling was not scheduled for the 2007 monitoring year. The next soil sampling event will be 2008.

D.1.4 Groundwater Sampling

Groundwater sampling was not scheduled for the 2007 monitoring year. The next groundwater sampling event will be 2008.



Legend

- COORDINATE POINT
- MONITORING SOIL SAMPLE LOCATION
- MONITORING WELL LOCATION
- +1749 BASELINE SOIL SAMPLE LOCATION
- PHOTOGRAPH LOCATION 2007
- EROSION
- TENSION CRACK

COORDINATE POINTS (AS BUILT) MONITORING WELLS			
NO.	NORTHING	EASTING	ELEV.
MW5	7 618 500.0	548 694.5	23.8
MW6	7 618 389.5	548 755.7	21.8
MW7	7 618 384.4	548 719.0	21.5
MW8	7 618 384.4	548 674.1	21.4

COORDINATE POINTS (AS-BUILT) NON-HAZARDOUS WASTE LANDFILL			
NO.	NORTHING	EASTING	ELEV.
801	7 618 466.4	548 685.5	26.3
802	7 618 478.5	548 738.2	26.4
803	7 618 420.8	548 751.2	25.0
804	7 618 408.5	548 699.8	25.0

RECORD DRAWING
NOT FOR CONSTRUCTION

Map Sources / Notes:
Source drawing from UMA: C2-RD06.dwg

0 5 10 20 30 40 m

1 : 1000
UTM Zone 14N, NAD83

File Name: C2-RD06.dwg
Reviewed by: DL
Date Issued: November, 2007
Prepared by: MP
Project Number: 70-516

Defence Construction Canada

2007 DEW Line Monitoring Program
CAM-2 Gladman Point
Nunavut Territory

NON-HAZARDOUS WASTE LANDFILL

Gartner Lee

Figure D-1
Version 1

Date Plotted: October 16, 2006 Path: N:\Projects\2007\70516\2007\Final\ACAD\01-CAM-2\C2-RD06.dwg

Appendix D Attachments

D1 Site Condition/Visual Inspection Records

D2 Geotechnical Inspection Photographic Records

D3 Field Notes

Appendix D1

Site Condition/Visual Inspection Records

Visual Inspection Checklist
Inspection Report – Page 1 of 2

SITE NAME:	CAM-2, Gladman Point
LANDFILL/AREA DESIGNATION:	Non-Hazardous Waste Landfill
DATE OF INSPECTION:	August 25, 2007 (Gartner Lee Limited)
DATE OF PREVIOUS INSPECTION:	August 20-22, 2006 (inspected by EBA)
INSPECTED BY:	James Theriault
REPORT PREPARED BY:	James Theriault
The preparer represents to the best of the preparer's knowledge, the following statements and observations are true and correct and to the best of the preparer's actual knowledge, no material facts have been suppressed or misstated.	

Visual Inspection Checklist
Inspection Report – Page 2 of 2

Checklist Item	Present Yes/No	Location	Length	Width	Depth	Extent (%)	Description	Photographic Records (Photos referenced in photolog and in figures)	Additional Comments/ Preliminary Stability Assessment
Settlement	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Erosion	Yes	a) South slope	a) 12m	a) 10m	a) 50 mm	<1%	Surficial erosion concentrated in dozer tracks	a) Photo 28	Dozer tracks oriented parallels to landfill slopes tend to concentrate runoff. Granular fill is self armouring (Acceptable)
Frost Action	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Animal Burrows	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Vegetation	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Staining	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Vegetation Stress	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Seepage Points	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Debris Exposed	No	N/A	N/A	N/A	N/A	None	N/A	N/A	N/A
Presence/ Condition of Monitoring Instruments	Good	Refer to Figure C1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Features of Note.	Yes	Tension cracks observed along all four sides of the landfill (along toe, mid-slope and crest)	Variable, 5m to 50m	Hairline to 5mm	unknown	< 10%	Numerous thin tension cracks running parallel to the landfill slopes	Photos 2-10, 12-18, 22-27, 29-38	Cracks likely, in part, related to freeze/thaw desiccation, but appear to be consistent with small-scale slope movement. Sediment infilling obscures cracks. (Marginal)
Additional Photos	Yes	Refer to Figure D1	N/A	N/A	N/A	N/A	Additional photos	Photos 1, 11, 19, 20, 21, 39, 40	General photos for documentation, no features of note

Preliminary Stability Assessment

Feature	Severity Rating	Extent
Settlement	Not Observable	None
Erosion	Acceptable	Isolated
Frost Action	Not Observable	None
Animal Burrows	Not Observable	None
Vegetation	Not Observable	None
Staining	Not Observable	None
Vegetation Stress	Not Observable	None
Seepage Points	Not Observable	None
Debris Exposed	Not Observable	None
Tension Crack	Marginal	Numerous
Overall Landfill Performance	**Marginal**	

Appendix D2

Geotechnical Inspection Photographic Records

Photograph 1. Looking SW towards NE corner of the landfill. ↑

Photograph 2. Looking west along the toe of the north side of the landfill from the NE corner Granular slope is graded uniformly and appears stable. ↑

Photograph 3. Looking west along crest from NE corner. Faint tension crack visible along the top of slope. ↑

Photograph 4. Closeup of crack identified in Photo 3 looking west from crest. Field book for scale. ↑

Photograph 5. Tension crack extends from the NE corner and appears to gradually migrate from 1 m inside the crest to the lip of crest. Portions of the crack are infilled with sediment. Width of crack varies from barely discernable to up to 5mm wide. ↑

Photograph 6. Tension crack resumes along the crest of the north slope. Crack was not readily apparent between Photos 5 and 6. ↑

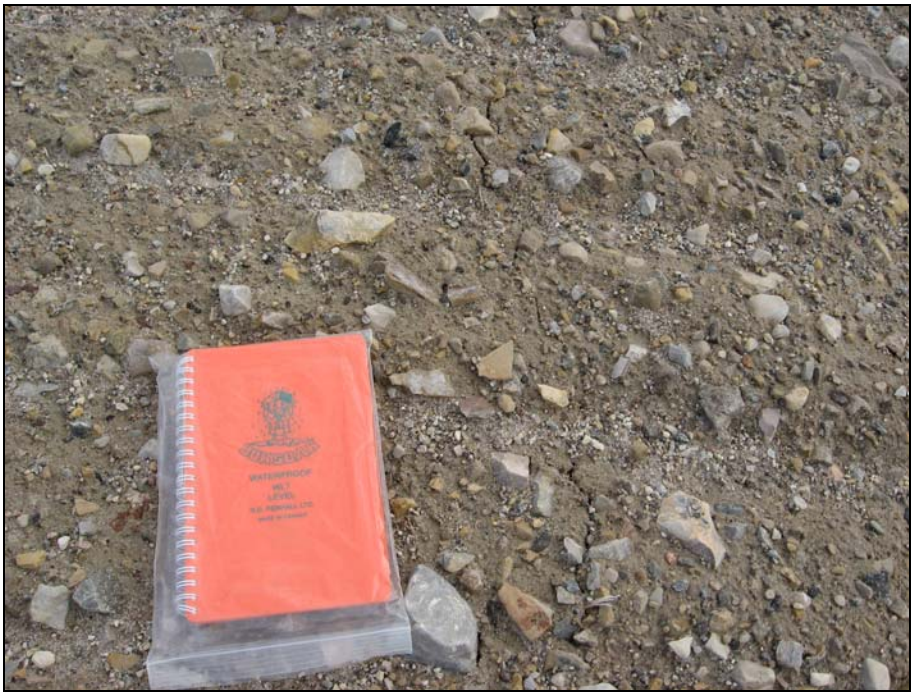
Photograph 7. Tension crack ends about 7m from the NW corner about 1m from top of crest. Field book at end of crack. ↑

Photograph 8. Tension crack observed midslope on north face about 5m upslope from toe. Field book for scale. ↑

Photograph 9. Following mid-slope tension crack on north face (continues from Photo 8) . Crack splays into minor parallel cracks about 0.5m to 1.0m apart and rejoins. ↑

Photograph 10. Tension crack appears to end, possibly infilled with sediments, about 4m up from toe of slope. ↑

Photograph 11. Looking south along the toe of west side of the landfill from about 6 m NW of the NW corner. ↑



Photograph 12. Closeup of tension crack along the toe of slope, looking south. ↑

Photograph 13. Tracking the continuous tension crack from Photo 12 along the toe of the west side of the landfill. ↑

Photograph 14. Tracking the lower tension crack south along the toe of the slope. The tension crack appears to run along the entire toe of slope. ↑

Photograph 15. Following the lower tension crack, near southern limit on the west slope looking S. ↑

Photograph 16. Tension crack along the upper slope west side looking south (5m from crest). Crack runs parallel to the crest. ↑

Photograph 17. Following the tension crack noted in Photo 16 to the south. Field book at the end of the visible crack (see Photo 18 for close-up). ↑

Photograph 18. Close-up of the southern end of the crack that originated near the NW corner, at Photo 16. ↑

Photograph 19. Looking S from crest at NW corner. No tension cracks observed along top of crest. ↑

Photograph 20. Looking east along the crest of the southern slope of the landfill from the SW corner. ↑

Photograph 21. Looking east along the southern toe of the landfill from about 20 m west of the SW corner. ↑

Photograph 22. Tension crack observed mid-slope of the south side of the landfill. Looking E from about 10m east for the SW corner. ↑

Photograph 23. Tension crack mid-slope on the south slope splays into two cracks with 0.6m to 1.5m roughly parallel spacing. ↑

Photograph 24. Following cracks east along the south slope looking east from midslope. The crack originated near the SW corner. ↑

Photograph 25. Tension crack approaching the SE corner. Midslope tension crack continues around SE corner from where it turns north shifting to 1/3 up the slope. ↑

Photograph 26. Tension crack along the crest of the south slope. Looking east to SE corner. The crack is largely infilled with sediments and migrates from 0.5m to 2m in. ↑

Photograph 27. Following crack along crest from Photo 26 to the SE corner. Looking east to the SE corner. ↑

Photograph 28. Minor surfacial erosion, self armouring, along east side of south slope looking north from downslope of toe. ↑

Photograph 29. Looking N along east crest from SE corner. Tension crack along entire crest. ↑

Photograph 30. Following tension crack N along east crest from Photo 29. ↑

Photograph 31. Following the tension crack north. Crack is essentially continuous from the SE corner and splays and migrates up to 6 m from the crest. ↑

Photograph 32. Single tension crack continues to NE corner along the east crest of the landfill. ↑

Photograph 33. Tension crack from east side of the landfill curves and joins up with tension crack on the north slope. ↑

Photograph 34. Tension crack in NE corner curves and continues. ↑

Photograph 35. Tension crack on east slope starting at SE corner and 1/3 up slope (continues from south side). ↑

Photograph 36. Following crack N along the east side of the landfill. Crack is essentially continuous from the SE corner. ↑

Photograph 37. Following the tension crack north along the east slope of the landfill. Tension crack becomes faint on the northern 1/3 of slope. ↑

Photograph 38. Tension crack ends mid-slope about 13m south of NE corner. ↑

Photograph 39. Top surface of the landfill looking SW from the NE corner. ↑

Photograph 40. Top surface of the landfil looking SE from the NW corner. ↑

Appendix D3

Field Notes

Aug 25/2007

37 looking N along east crest from SE corner 548505 7618762

38, 39, 40 3 shot panoramic of top of Tier II viewed from SE corner scanning L to R 548503 7618762

3pm

N on Hazardous Waste Landfill

41, 42, 43 Looking SW towards NE corner of NHW LF 3 shot pano 548749 7618498

44 Looking west along toe of NHW NE corner 548744 7618487 slope stable, no cracking

45 Looking west along crest from NE corner

* Tension cracks ~~were~~ noted ~~for~~ along crest 1m ~~ols~~ going west and south from NE corner

CAM-2 7056

46 Closeup of crack looking west from crest @ 548735 7618473

47 Tension crack gradually migrates to top of cut → some portions infilled with sediment, some crack up to 4mm wide → close-up 548722 7618473

Tension crack appears to end along crest of north slope @ 548713 7618471 25m from NE corner

Tension crack extends along the rest of the east slope for ≈ 48m to within ≈ 3m of the SE corner → distorted photos will follow

Continuing CC from NE corner where last crack left off → no tension cracks visible for about 13m

48 Tension crack resumes along north slope @ 548701 7618469

close-up looking W

Aug 25/2007

Many wet from crest, it is obscured by infilling and shift 0.5m d/s to top of slope

49 Tension crack ends about 7m from NW corner about 1m from top of crest Field book at end of crack 548691 7618468

50 Tension crack observed mid-slope on north face 5m u/s from toe starting 548719 761847

51 Following mid-slope tension crack on north face 548712 7618473
* crack splays into minor parallel cracks about 0.5m to 1.0m apart and rejoins

52 Tension crack appears to end @ 548702 7618477 (infilled?)
Close-up 4m up from toe

Only hints of cracking to NW corner no photos lost 30m (infilled or no present)

CAM-2 70516

53 West slope of NHW LF viewed 548673 looking South from NW corner 7618475

Tension crack observed mid slope over most of length hint of circular going slightly higher up slope in middle

Start around 548673 7618459
*Photo 54 close-up of looking south

Crack ended, finely, for about 40+m to south about 15m of the SW corner
→ several metres at a time are obscured by sediment infilling (but certainly there)

55 Following crack along west scarp 548683 7618447

56 Following tension crack looking S parallel to toe (5m up) 548680 7618437

57 Following crack, near southern element on the west slope looking S 548689 7618418

Aug 25/2007

Several additional (1 or 2) sets of parallel tension cracks observed further up slope along length of west slope

58 Tension crack upper slope west side looking south (5m from crest)
548678 7618457

End of upper crack observed at
548686 7618430

59 Looking S to end of crack on west and upper slope - field book at end
Standing for photo @ 548685 7618436

60 Close-up of crack with pen in same location as photo 59

61 Looking S from crest @ NW corner
→ no tension cracks observed along crest
548687 7618463

62 Looking east from crest of SW corner 548699 7618412

* No tension cracks observed along South crest from SW corner for first 26m

→ Carry down slope to get long shot of toe

63 Looking east along d/s toe of south slope of NHW from 548679 7618391

* Mid-slope cracks observed SW corner good

64 Mid-slope crack starts @ 548705 7618405

65 Crack splays into two cracks with @ 6m to 1.5m (roughly) parallel spacing
548717 7618407

66 Following cracks east looking east from midslope 548731 7618412

Aug 25/2007

67 Mid-slope tension crack continues around SE corner from where it turns north slightly to ⅓ up the slope
548741 7618414

Shifting back up to crest of south slope where tension crack continues to the SE crest corner

68 South slope crest looking east to SE corner. 548725 7618416
→ faint, largely infilled tension crack parallel to crest in about 0.5m to 2m

69 Following crack along crest to the SE corner 548737 7618421
- looking east

70 Minor surficial erosion, self armoring along east side of south slope
548739 7618406 looking north from d/s of toe

71 Looking N along east crest from SE corner
* tension crack along entire crest

72 Following tension crack N along east crest 548742 7618435

73 Parallel tension cracks along east crest looking N 548740 7618448

74 Single tension crack continues to NE corner 548734 7618463

75 Tension crack from east slope curves to run up until tension crack on the north slope

76 Tension crack in NE corner curves and continues 548732 7618475

77 Tension crack on east slope starts at ~~to or N of~~ SE corner and ⅓ up slope (continues from south side)
548753 7618422

78 Following crack N 548750 7618433

Aug 25/2007 CAM-2

79 Terrain crack on slope forming front on northern 1/3 of slope
548746 7618464

80 Terrain crack ends at
548743 7618469 13m south of NE corner (mid-slope)

81, 82, 83 Panorama top of NHW LF from NE corner L to R
548732 7618474

84, 85, 86 3 shot panorama from NW corner L to R
548692 7618461

END OF NHW LF INSPECTION

5°C, drizzle, windy light rain Aug 25 7056

Station Landfill
-completed detailed walkover of toe and perimeter of crest → no problems, few isolated spots of sc/G armouring surficial erosion

87 SE corner looking north from
548549 7618862

88 Looking NNW from 548554 7618919

89 Looking west upslope to area of minor surficial erosion 548545 7618942
-standing 10m east of toe of slope

90 Looking west to minor slope erosion
-self armouring

91 Looking N along midslope to NE corner 548536 7618976

92 Look SSW along east side of Station LF from near NE corner
548473 7619091 (coarse granular cover on slope)

Appendix E

Laboratory Reports

Analysis Report

REPORT ON: Analysis of Soil, Water Samples

REPORTED TO: Gartner Lee Limited
Suite 300
300 Town Centre Boulevard
Markham, ON
L3R 5Z6

Att'n: Ken Boldt

CHAIN OF CUSTODY: 2090868
PROJECT NAME: CAM-2
PROJECT NUMBER: 70516

NUMBER OF SAMPLES: 2

REPORT DATE: September 10, 2007

DATE SUBMITTED: August 29, 2007

GROUP NUMBER: 80829159

SAMPLE TYPE: Water, Soil

NOTE: Results contained in this report refer only to the testing of samples as submitted. Other information is available on request.

TEST METHODS:

Aromatic Volatile Organic Compounds in Water and Soil - analysis was performed using procedures based on U.S. EPA Methods 624/8240, involving sparging/collection with a Purge and Trap apparatus and analysis using GC/MS.

Volatile Hydrocarbons - analysis was performed by sparging/collection with a Purge and Trap apparatus, followed by analysis using GC/FID. The components present in the boiling range of C5 to C10 were quantified with m & p-xylenes.

CCME Petroleum Hydrocarbons in Soil - analysis was performed using Canadian Council of Ministers of the Environment (CCME) "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil" approved December 2000. The method involves extraction of the different hydrocarbon fractions and analysis by gas chromatography with flame ionization detection (GC/FID).

Canada-Wide Standard for Petroleum Hydrocarbons in Soil (F1 Fraction) - The F1 Fraction (nC6 to nC10) was analyzed based on the CCME Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method (2001). Analysis involves methanol extraction and quantitation using GasChromatography with Flame Ionization Detector (GC-FID). The F1 Fraction is reported with the BTEX compounds (benzene, toluene, ethylbenzene, and ortho, meta and para-xylenes) subtracted (e.g. corrected). These BTEX compounds analyzed by GCMS may be included in this report on request by the customer.

Moisture in Soil - analysis was performed gravimetrically by heating a separate sample portion at 105 C

(Continued)

CANTEST LTD.

Richard S. Jornitz
Supervisor, Inorganic Testing

4606 Canada Way, Burnaby, BC V5G 1K5
Tel: 604 734 7276 Fax: 604 731 2386

Moisture in Soil

and measuring the weight loss.

pH in Soil or Solid - analysis was performed based on procedures described in the Manual on Soil Sampling and Methods of Analysis, published by the Canadian Society of Soil Science,1993. The test was performed using a deionized water leach with measurement by pH meter.

Conventional Parameters - analyses were performed using procedures based on those described in the most current editions of "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials", (2005 edition) Province of British Columbia and "Standard Methods for the Examination of Water and Wastewater" (21st Edition), published by the American Public Health Association.

Petroleum Hydrocarbons (C10-16 and C16-C34) in Water - analysis was performed by extraction, silica gel clean-up and analysis by Gas Chromatography with flame ionization detection (GC/FID).

Petroleum Hydrocarbons (C34-50) in Water - analysis was performed by extraction, silica gel clean-up and analysis by Gas Chromatography with flame ionization detection (GC/FID).

Mercury in Water - analysis was performed using procedures based on U. S. EPA Method 245.7, oxidative digestion using bromination, and analysis using Cold Vapour Atomic Fluorescence Spectroscopy.

Metals in Water - analysis was performed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP), Inductively Coupled Plasma-Mass Spectroscopy (ICP/MS).

Polychlorinated Biphenyls - analysis was performed using procedures based upon U.S. EPA Methods 608/8080, involving extraction, clean-up steps, and analysis using GC/ECD. Arochlors 1242, 1248, 1254 and 1260 were included.

Silver in Soil - analysis was performed using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

Arsenic in Soil - analysis was performed using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

Cadmium in Soil - analysis was performed using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

Mercury in Soil - analysis was performed using Cold Vapour Atomic Fluorescence.

Molybdenum in Soil - analysis was performed using an acid digestion followed by determination using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

Strong Acid Leachable Metals in Soil - analysis was performed using B.C. MOELP Method "Strong Acid Leachable Metals in Soil, Version 1.0". The method involves drying the sample at 60 C, sieving using a 2 mm (10 mesh) sieve and digestion using a mixture of hydrochloric and nitric acids. Analysis was performed using Inductively Coupled Argon Plasma Spectroscopy (ICAP) or by specific techniques as described.

(Continued)

Selenium in Soil - analysis was using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

Thallium in Soil - analysis was performed using Inductively Coupled Plasma Mass Spectrometry (ICP/MS).

Semi-Volatile Hydrocarbons - analysis was performed using procedures based on U.S. EPA Method 8015, involving dichloromethane extraction and analysis using GC/FID. Components in the C10 to C30 range are included, using an alkane standard for quantitation.

Total Petroleum Hydrocarbons - analysis was performed using procedures based on Alberta Environment Site Investigation requirements, involving summation of the total volatile (purgeable) and semi-volatile (extractable) hydrocarbons.

TEST RESULTS:

(See following pages)

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

Conventional Parameters in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Hardness (Total) CaCO3
C2-MW-5	Aug 25/07	708290634	1080
DETECTION LIMIT			0.2
UNITS			mg/L

mg/L = milligrams per liter

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		C2-MW-5		
SAMPLE PREPARATION:		TOTAL		
DATE SAMPLED:		Aug 25/07	DETECTION LIMIT	UNITS
CANTEST ID:		708290634		
Aluminum	Al	0.072	0.001	mg/L
Antimony	Sb	<	0.0002	mg/L
Arsenic	As	0.0008	0.0002	mg/L
Barium	Ba	0.052	0.0002	mg/L
Beryllium	Be	<	0.0002	mg/L
Bismuth	Bi	<	0.0002	mg/L
Boron	B	0.93	0.01	mg/L
Cadmium	Cd	0.00005	0.00004	mg/L
Calcium	Ca	122	0.01	mg/L
Chromium	Cr	0.0059	0.0002	mg/L
Cobalt	Co	0.0009	0.0002	mg/L
Copper	Cu	0.0036	0.0002	mg/L
Iron	Fe	0.19	0.01	mg/L
Lead	Pb	<	0.0002	mg/L
Lithium	Li	0.075	0.001	mg/L
Magnesium	Mg	188	0.01	mg/L
Manganese	Mn	0.104	0.0002	mg/L
Mercury	Hg	<	0.02	µg/L
Molybdenum	Mo	0.0097	0.0001	mg/L
Nickel	Ni	0.0074	0.0002	mg/L
Phosphorus	P	<	0.03	mg/L
Potassium	K	46.9	0.02	mg/L
Selenium	Se	<	0.0002	mg/L
Silicon	Si	5.24	0.05	mg/L
Silver	Ag	<	0.00005	mg/L
Sodium	Na	743	0.01	mg/L
Strontium	Sr	1.26	0.0002	mg/L
Tellurium	Te	<	0.0002	mg/L
Thallium	Tl	0.00008	0.00002	mg/L
Thorium	Th	<	0.0001	mg/L
Tin	Sn	<	0.0002	mg/L

(Continued on next page)

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

Metals Analysis in Water

CLIENT SAMPLE IDENTIFICATION:		C2-MW-5		
SAMPLE PREPARATION:		TOTAL		
DATE SAMPLED:		Aug 25/07	DETECTION LIMIT	UNITS
CANTEST ID:		708290634		
Titanium	Ti	0.0056	0.0002	mg/L
Uranium	U	0.0024	0.0001	mg/L
Vanadium	V	0.0005	0.0002	mg/L
Zinc	Zn	8.52	0.001	mg/L
Zirconium	Zr	<	0.002	mg/L

mg/L = milligrams per liter
< = Less than detection limit

μg/L = micrograms per liter

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

Polychlorinated Biphenyls in Water

CLIENT SAMPLE IDENTIFICATION:	C2-MW-5	
DATE SAMPLED:	Aug 25/07	DETECTION LIMIT
CANTEST ID:	708290634	
Arochlor 1242	<	0.1
Arochlor 1248	<	0.1
Arochlor 1254	<	0.1
Arochlor 1260	<	0.1
Total PCB	<	0.4
Surrogate Recovery		
2,2',4,4',6,6'-hexabromobiphenyl	96	-

Results expressed as micrograms per liter (μg/L)
Surrogate recoveries expressed as percent (%)
< = Less than detection limit

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

Semi-Volatile Hydrocarbons in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Total Extractable Hydrocarbons
C2-MW-5	Aug 25/07	708290634	180
DETECTION LIMIT			100
UNITS			µg/L

µg/L = micrograms per liter

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

Extractable Petroleum Hydrocarbons - Silica-gel Cleanup in Water

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Petroleum Hydrocarbons C10-16	Petroleum Hydrocarbons C16-34	Petroleum Hydrocarbons C34-50
C2-MW-5	Aug 25/07	708290634	<	<	<
DETECTION LIMIT			100	250	250
UNITS			µg/L	µg/L	µg/L

µg/L = micrograms per liter
< = Less than detection limit

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

Conventional Parameters in Soil

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Moisture	pH
C2-MW-5-2	Aug 25/07	708290635	5.3	7.9
DETECTION LIMIT			0.1	0.1
UNITS			%	pH units

% = percent

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

Polychlorinated Biphenyls in Soil

CLIENT SAMPLE IDENTIFICATION:	C2-MW-5-2	
DATE SAMPLED:	Aug 25/07	DETECTION LIMIT
CANTEST ID:	708290635	
Arochlor 1242	<	0.03
Arochlor 1248	<	0.03
Arochlor 1254	<	0.03
Arochlor 1260	<	0.03
Total PCB	<	0.03
Surrogate Recovery		
2,2',4,4',6,6'-hexabromobiphenyl	100	-

Results expressed as micrograms per gram, on a dry weight basis. (μg/g)
Surrogate recoveries expressed as percent (%)
< = Less than detection limit

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

Semi-Volatile Hydrocarbons in Soil

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Total Extractable Hydrocarbons
C2-MW-5-2	Aug 25/07	708290635	<
DETECTION LIMIT			20
UNITS			µg/g

µg/g = micrograms per gram, on a dry weight basis.
< = Less than detection limit

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

Total Petroleum Hydrocarbons in Soil

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	Total Petroleum Hydrocarbons
C2-MW-5-2	Aug 25/07	708290635	<
DETECTION LIMIT			20
UNITS			µg/g

µg/g = micrograms per gram, on a dry weight basis.
< = Less than detection limit

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

CCME Petroleum Hydrocarbons in Soil

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	F2 uncorrected (C10-C16)	F3 uncorrected (C16-C34)
C2-MW-5-2	Aug 25/07	708290635	<	<
DETECTION LIMIT			80	250
UNITS			µg/g	µg/g

µg/g = micrograms per gram, on a dry weight basis.
< = Less than detection limit

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

CCME Petroleum Hydrocarbons in Soil

CLIENT SAMPLE IDENTIFICATION:	SAMPLE DATE	CANTEST ID	F1 (C6-C10) uncorrected
C2-MW-5-2	Aug 25/07	708290635	<
DETECTION LIMIT			5
UNITS			µg/g

µg/g = micrograms per gram, on a dry weight basis.
< = Less than detection limit

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

Strong Acid Soluble Metals in Soil

CLIENT SAMPLE IDENTIFICATION:		C2-MW-5-2	
DATE SAMPLED:		Aug 25/07	DETECTION LIMIT
CANTEST ID:		708290635	
Antimony	Sb	<	0.1
Arsenic	As	1.0	0.1
Barium	Ba	11	1
Beryllium	Be	<	1
Cadmium	Cd	<	0.2
Chromium	Cr	3	2
Cobalt	Co	1	1
Copper	Cu	2	1
Lead	Pb	4.7	0.2
Mercury	Hg	0.01	0.01
Molybdenum	Mo	0.2	0.1
Nickel	Ni	2	2
Selenium	Se	0.6	0.2
Silver	Ag	<	0.1
Thallium	Tl	<	0.1
Tin	Sn	<	5
Vanadium	V	7	1
Zinc	Zn	9	1
Aluminum	Al	1410	10
Boron	B	13	1
Calcium	Ca	71000	1
Iron	Fe	3730	2
Magnesium	Mg	46500	1
Manganese	Mn	114	1
Phosphorus	P	160	20
Potassium	K	612	10
Sodium	Na	89	5
Strontium	Sr	24	1
Titanium	Ti	135	1
Zirconium	Zr	<	1

Results expressed as micrograms per gram, on a dry weight basis. (μg/g)
< = Less than detection limit

REPORTED TO: Gartner Lee Limited

REPORT DATE: September 10, 2007

GROUP NUMBER: 80829159

CANTEST

Aromatic Volatile Organic Compounds in Soil

CLIENT SAMPLE IDENTIFICATION:	C2-MW-5-2	
DATE SAMPLED:	Aug 25/07	DETECTION LIMIT
CANTEST ID:	708290635	
Benzene	<	0.03
Ethylbenzene	<	0.03
Toluene	<	0.03
Xylenes	<	0.03
Volatile Hydrocarbons	<	2
Surrogate Recovery		
Toluene-d8	107	-
Bromofluorobenzene	86	-

Results expressed as micrograms per gram, on a dry weight basis. (μg/g)
Surrogate recoveries expressed as percent (%)
< = Less than detection limit

CHROMATOGRAM COVER SHEET

CANTEST

CONTACT	COMPANY NAME	
Ken Boldt.	Gartner Lee Ltd.	
FAX NUMBER	**DATE**	**PGS INCL. COVER**
1(905)477-1456.	Sept 7'07.	2.
FROM	**RETURN FAX**	**TELEPHONE**
CANTEST LTD	604 731 2386	604 734 7276

SUBJECT

Chromatogram(s).

Please find the attached chromatograms associated with:

CANTEST Group # 80829159

Your Project Name CAM-2

Your Project Number 70516

Sample Matrix ..... WATER.

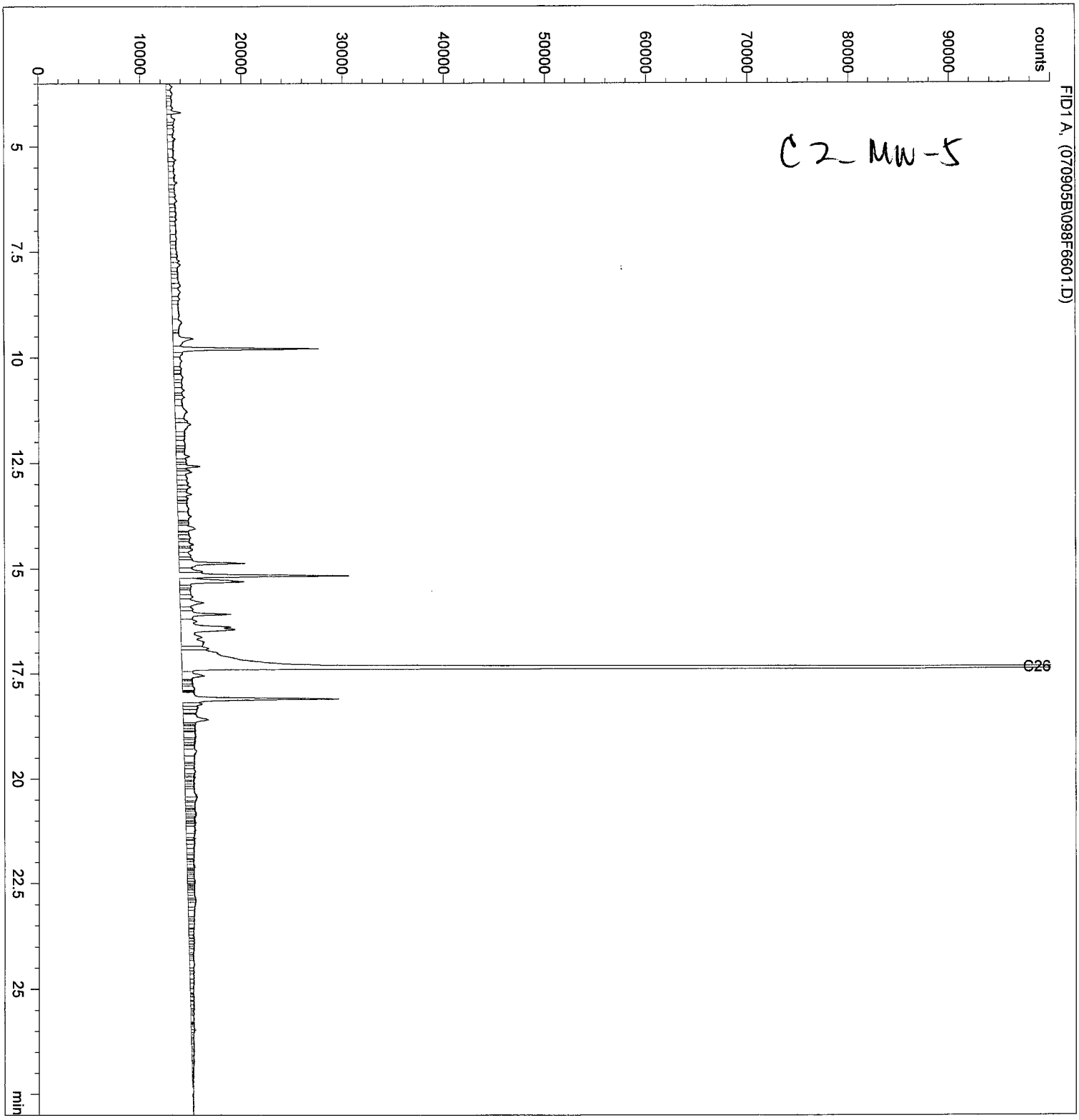
The originals will follow with the report.

Data File D:\HPCHEM\1\DATA\070905B\098F6601.D Sample Name: 708290634

Injection Date : 9/7/07 4:38:26 AM Seq. Line : 66
Sample Name : 708290634 Vial : 98
Acq. Operator : pcn Inj : 1
Inj Volume : 2 µl

8082915g
GAR005

Acq. Method : D:\HPCHEM~1\1\METHODS\!EPH.M
Last changed : 9/6/07 10:29:09 PM by pcn
Analysis Method : D:\HPCHEM~1\1\METHODS\!TEH_NAP.M
Last changed : 9/4/07 10:40:55 AM by pcn
Total Extractable Hydrocarbons. Soils and Waters are extracted using methylene chloride and then analyzed using an HPGC-FID. Calculations are based on an internal standard and reported in ug/L for waters and ug/g for soils.



ANALYTICAL REPORT

GARTNER LEE LTD.

ATTN: KEN BOLDT

Reported On: 24-SEP-07 10:25 AM

300 TOWN CENTRE BOULVARD
SUITE 300
MARKHAM ON L3R 5Z6

Lab Work Order #: **L548105** **Date Received:** **28-AUG-07**

Project P.O. #: ALSEQ07-487
Job Reference: 70516
Legal Site Desc: CAM-2
CofC Numbers: A018235

Other Information:

Comments:

Timothy Guy Crowther
General Manager, Vancouver

For any questions about this report please contact your Account Manager:

NATASHA MARKOVIC-MIROVIC

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L548105-1	L548105-2	L548105-3	L548105-4	
	Description					
	Sampled Date	25-AUG-07	25-AUG-07	25-AUG-07	25-AUG-07	
	Sampled Time	09:50	10:30	11:15	14:05	
	Client ID	C2-MW-1	C2-MW-2	C2-MW-3	C2-MW-4	
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	1420	1070	791	887	
Total Metals	Aluminum (Al)-Total (mg/L)	5.75	0.160	37.7	0.314	
	Antimony (Sb)-Total (mg/L)	<0.0050	<0.0050	<0.0025	<0.0050	
	Arsenic (As)-Total (mg/L)	<0.010	<0.010	<0.010	<0.0070	
	Barium (Ba)-Total (mg/L)	0.069	0.070	0.045	0.051	
	Beryllium (Be)-Total (mg/L)	<0.010	<0.010	<0.0050	<0.010	
	Boron (B)-Total (mg/L)	0.67	0.20	0.22	0.63	
	Cadmium (Cd)-Total (mg/L)	0.00029	0.00024	0.000124	<0.00017	
	Calcium (Ca)-Total (mg/L)	201	147	165	110	
	Chromium (Cr)-Total (mg/L)	0.013	<0.010	0.0130	0.016	
	Cobalt (Co)-Total (mg/L)	0.0093	0.0098	<0.0015	<0.0030	
	Copper (Cu)-Total (mg/L)	0.011	0.012	0.0152	<0.010	
	Iron (Fe)-Total (mg/L)	6.21	0.177	1.44	0.309	
	Lead (Pb)-Total (mg/L)	0.0096	<0.0050	<0.0025	<0.0050	
	Lithium (Li)-Total (mg/L)	0.102	0.097	<0.025	0.055	
	Magnesium (Mg)-Total (mg/L)	222	170	92.1	149	
	Manganese (Mn)-Total (mg/L)	0.231	0.863	0.0450	0.115	
	Mercury (Hg)-Total (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	
	Molybdenum (Mo)-Total (mg/L)	0.030	<0.010	0.0291	<0.010	
	Nickel (Ni)-Total (mg/L)	0.029	0.041	0.0697	0.016	
	Potassium (K)-Total (mg/L)	36.4	24.5	41.8	35.8	
	Selenium (Se)-Total (mg/L)	<0.020	<0.050	<0.025	<0.030	
	Silver (Ag)-Total (mg/L)	<0.00020	<0.00020	<0.00010	<0.00020	
	Sodium (Na)-Total (mg/L)	370	784	461	616	
	Thallium (Tl)-Total (mg/L)	<0.0020	<0.0020	<0.0010	<0.0020	
	Tin (Sn)-Total (mg/L)	<0.0050	<0.0050	<0.0025	<0.0050	
	Titanium (Ti)-Total (mg/L)	0.292	0.013	0.067	0.018	
	Uranium (U)-Total (mg/L)	0.0109	0.0074	<0.0010	<0.0020	
	Vanadium (V)-Total (mg/L)	<0.030	<0.030	<0.030	<0.030	
	Zinc (Zn)-Total (mg/L)	10.4	45.9	1.16	31.8	
Non-Halogenated Volatiles	Benzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Ethylbenzene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Methyl t-butyl ether (MTBE) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Styrene (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	
	Toluene (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	meta- & para-Xylene (mg/L)	0.00143	<0.00050	<0.00050	<0.00050	
	ortho-Xylene (mg/L)	0.00102	<0.00050	<0.00050	<0.00050	
	Xylenes (mg/L)	0.0024	<0.0010	<0.0010	<0.0010	
	Volatile Hydrocarbons (VH6-10) (mg/L)	<0.10	<0.10	<0.10	<0.10	

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L548105-1	L548105-2	L548105-3	L548105-4	
	Description					
	Sampled Date	25-AUG-07	25-AUG-07	25-AUG-07	25-AUG-07	
	Sampled Time	09:50	10:30	11:15	14:05	
	Client ID	C2-MW-1	C2-MW-2	C2-MW-3	C2-MW-4	
Grouping	**Analyte**					
WATER						
Non-Halogenated Volatiles	VPH (C6-C10) (mg/L)	<0.10	<0.10	<0.10	<0.10	
	Surrogate: 4-Bromofluorobenzene (SS) (%)	99	100	98	101	
	Surrogate: 2,4-Dichlorotoluene (SS) (%)	95	98	92	92	
	Surrogate: Fluorobenzene (SS) (%)	98	103	99	98	
Extractable Hydrocarbons	TEH10-30 (mg/L)	1.25	<0.25	0.44	<0.25	
Polychlorinated Biphenyls	PCB-1016 (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	PCB-1221 (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	PCB-1232 (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	PCB-1242 (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	PCB-1248 (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	PCB-1254 (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	PCB-1260 (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	PCB-1262 (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	PCB-1268 (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Polychlorinated Biphenyls (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
EPH-SF-FID-VA	Water	EPH in Water by GCFID	BCMOE EPH GCFID

This analysis is carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Extractable Petroleum Hydrocarbons in Water by GC/FID" (Version 2.1, July 1999). The procedure involves extraction of the entire water sample with dichloromethane. The extract is then solvent exchanged to toluene and analysed by capillary column gas chromatography with flame ionization detection (GC/FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.

HG-TOT-CCME-CVAFS-VA	Water	Total Mercury in Water by CVAFS (CCME)	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

PCB-SF-ECD-VA	Water	PCB by Extraction with GCECD	EPA 3510/8082 Liq-Liq GCECD

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3510, 3620, 3660, 3665 & 8082, published by the United States Environmental Protection Agency (EPA). The procedure involves a liquid-liquid extraction of the entire water sample using dichloromethane. The extract is then solvent exchanged to hexane followed by one or more of the following clean-up procedures (if required): florisil clean-up, sulphur clean-up and/or sulphuric acid clean-up. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).

VH-PT-FID-VA	Water	VH by Purge Trap GCFID	EPA 8260b, BCMELP CSR Method

This procedure involves the purge and trap extraction of the sample prior to analysis for Volatile Hydrocarbons (VH) by capillary column gas chromatography with flame-ionization detection (GC/FID). The VH analysis is carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Volatile Hydrocarbons in Water by GC/FID" (Version 2.1, July 1999).

VOC7-PT-MS-VA	Water	BTEX by Purge Trap GCMS	EPA 8260b, BCMELP CSR Method

This procedure involves the purge and trap extraction of the sample prior to analysis for specific Volatile Organic Compounds (VOC) by capillary column gas chromatography with mass spectrometric detection (GC/MS). The VOC analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA). Note: For chlorinated waters certain conditions may cause the formation of trihalomethanes after sample collection. Appropriate chemical treatment of chlorinated waters will prevent trihalomethane formation in the samples. Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.

VPH-CALC-VA	Water	BC MOE Laboratory Manual (2005)	BC MOE LABORATORY MANUAL (2005)

These results are determined according to the British Columbia Ministry of Environment, Lands, and Parks Analytical Method for Contaminated Sites "Calculation of Volatile Petroleum Hydrocarbons in Solids or Water" (Version 2.1, July 20, 1999). According to this method, the concentrations of specific Monocyclic Aromatic Hydrocarbons (Benzene, Toluene, Ethylbenzene, Xylenes and Styrene) are subtracted from the collective concentration of Volatile Hydrocarbons (VH) that elute between n-hexane (nC6) and n-decane (nC10). Analysis of Volatile Hydrocarbons adheres to all prescribed elements of BCMELP method "Volatile Hydrocarbons in Solids by GC/FID" (Version 2.1, July 20, 1999).

XYLENES-CALC-VA	Water	CSR VOC7 by MeOH with DI GCMS	CALCULATION

Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.
The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA		

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM

CANADA TOLL FREE 1-800-668-9878

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COC # A018235

Page ____ of ____

REPORT TO:	REPORT FORMAT / DISTRIBUTION	SERVICE REQUESTED
COMPANY: Gartner Lee Limited	STANDARD ✓ OTHER ____	✓ REGULAR SERVICE (DEFAULT)
CONTACT: Ken Boldt	PDF ✓ EXCEL ✓ CUSTOM ____ FAX ____	RUSH SERVICE (2-3 DAYS)
ADDRESS: 300 Town Centre Blvd, Suite 300	EMAIL 1: kboldt@gartnerlee.com	PRIORITY SERVICE (1 DAY or ASAP)
Markham, ON L3R 5Z6	EMAIL 2: mherrell@gartnerlee.com	EMERGENCY SERVICE (<1 DAY / WEEKEND) - CONTACT ALS
PHONE: 905-477-8400 x 351 FAX: 905-477-1456		ANALYSIS REQUEST
INVOICE TO: SAME AS REPORT ? YES / (NO)	INDICATE BOTTLES: FILTERED / PRESERVED (F/P) → → →	
COMPANY: Kitikmeot Projects Inc	CLIENT / PROJECT INFORMATION:	
CONTACT: Ed Powell	JOB #: 70516	
ADDRESS: Box 92 Cambridge Bay, Nu X0B0C0	PO /AFE:	
	Legal Site Description: CAM-2	
PHONE: 867-983-7500 FAX: 867-983-7501	QUOTE #: ALSEQ07-487	
Lab Work Order # (lab use only): L518105	SAMPLER (Initials): KB	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals CCME	Total PCB	BTEX/TVH (C6-10 + BTEX)	TEH C10-32	Filtration for dissolved Metals	HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	C2-MW-1	Aug 25, 07	09:50	Water								7
	C2-MW-2	Aug 25, 07	10:30	Water								7
	C2-MW-3	Aug 25, 07	11:15	Water								7
	C2-MW-4	Aug 25, 07	14:05	Water								7

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS
	See Quote

Failure to complete all portions of this form may delay analysis. Please fill in this form *LEGIBLY*.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the reverse page of the white report copy.

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:	SAMPLE CONDITION (lab use only)	
Ken Boldt		Kenny Gillingham 10:15	Aug. 28/07	TEMPERATURE 7°C	SAMPLES RECEIVED IN GOOD CONDITION ? (YES) / NO (If no provide details)
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME: Aug 29/07 14:59		

REFER TO BACK PAGE FOR REGIONAL LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF14.00

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Environmental Division

ANALYTICAL REPORT

GARTNER LEE LTD.

ATTN: KEN BOLDT

Reported On: 24-SEP-07 10:17 AM

300 TOWN CENTRE BOULVARD
SUITE 300
MARKHAM ON L3R 5Z6

Lab Work Order #: **L548108** **Date Received:** **29-AUG-07**

Project P.O. #: ALSEQ07-487
Job Reference: 70516
Legal Site Desc:
CofC Numbers: A018234

Other Information:

Comments: Please note that certain metals have been increased for water sample due to the interferences encountered during the analysis.

Timothy Guy Crowther
General Manager, Vancouver

For any questions about this report please contact your Account Manager:

NATASHA MARKOVIC-MIROVIC

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L548108-2	L548108-3	L548108-4	L548108-5	L548108-6
	Description					
	Sampled Date	25-AUG-07	25-AUG-07	25-AUG-07	25-AUG-07	25-AUG-07
	Sampled Time	09:30	09:35	10:00	10:05	10:45
	Client ID	C2-MW-1-1	C2-MW-1-2	C2-MW-2-1	C2-MW-2-2	C2-MW-3-1
Grouping	**Analyte**					
SOIL						
Physical Tests	% Moisture (%)	6.0	9.1	6.9	7.9	5.9
	pH (pH)	8.48	8.24	8.70	8.37	8.06
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	<10
	Arsenic (As) (mg/kg)	0.993	0.989	0.831	1.10	1.23
		<5.0	<5.0	<5.0	<5.0	<5.0
	Barium (Ba) (mg/kg)	6.5	13.0	7.7	6.3	13.1
	Beryllium (Be) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	<0.50
	Chromium (Cr) (mg/kg)	3.8	3.6	3.0	3.3	5.6
	Cobalt (Co) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Copper (Cu) (mg/kg)	6.2	4.3	2.1	2.2	5.4
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	<30
	Mercury (Hg) (mg/kg)	<0.0050	0.0057	<0.0050	<0.0050	0.0122
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	<4.0	<4.0
	Nickel (Ni) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Selenium (Se) (mg/kg)	<2.0	<2.0	<3.0	<2.0	<2.0
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	<2.0
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	<1.0
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	<5.0
	Vanadium (V) (mg/kg)	6.4	6.8	5.2	5.2	9.3
	Zinc (Zn) (mg/kg)	6.0	8.3	7.2	5.9	12.0
Non-Halogenated Volatiles	Benzene (mg/kg)	<0.040	<0.040	<0.040	<0.040	<0.040
	Ethylbenzene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Methyl t-butyl ether (MTBE) (mg/kg)	<0.20	<0.20	<0.20	<0.20	<0.20
	Styrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Toluene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	meta- & para-Xylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	ortho-Xylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	<0.050
	Xylenes (mg/kg)	<0.10	<0.10	<0.10	<0.10	<0.10
	F1-BTEX (mg/kg)	<10	<10	<10	<10	<10
	Surrogate: 4-Bromofluorobenzene (SS) (%)	114	96	100	103	98
	Surrogate: 2,4-Dichlorotoluene (SS) (%)	92	95	94	96	92
	Surrogate: Fluorobenzene (SS) (%)	118	94	99	103	96
Extractable Hydrocarbons	F1 (C6-C10) (mg/kg)	<10	<10	<10	<10	<10
	F2 (C10-C16) (mg/kg)	11	10	<5	<5	5
	F3 (C16-C34) (mg/kg)	<5	16	31	6	<5
	F4 (C34-C50) (mg/kg)	<5	<5	<5	<5	<5
	Surrogate: 2-Bromobenzotrifluoride (%)	46	98	119	118	138

ALS LABORATORY GROUP ANALYTICAL REPORT

Grouping	Analyte	Sample ID: L548108-7 Description: Sampled Date: 25-AUG-07 Sampled Time: 10:50 Client ID: C2-MW-3-2	L548108-8 25-AUG-07 11:30 C2-MW-4-1	L548108-9 25-AUG-07 11:35 C2-MW-4-2	L548108-10 25-AUG-07 11:40 C2-MW-5-2	
SOIL						
Physical Tests	% Moisture (%)	23	17	3.4	3.2	
	pH (pH)	8.36	7.94	8.43	8.57	
Metals	Antimony (Sb) (mg/kg)	<10	<10	<10	<10	
	Arsenic (As) (mg/kg)	0.904	0.886	0.894	1.00	
		<5.0	<5.0	<5.0	<5.0	
	Barium (Ba) (mg/kg)	5.7	8.7	8.0	7.6	
	Beryllium (Be) (mg/kg)	<0.50	<0.50	<0.50	<0.50	
	Cadmium (Cd) (mg/kg)	<0.50	<0.50	<0.50	<0.50	
	Chromium (Cr) (mg/kg)	2.6	3.8	3.1	3.2	
	Cobalt (Co) (mg/kg)	<2.0	<2.0	<2.0	<2.0	
	Copper (Cu) (mg/kg)	1.6	3.0	2.9	2.4	
	Lead (Pb) (mg/kg)	<30	<30	<30	<30	
	Mercury (Hg) (mg/kg)	<0.0050	0.0081	<0.0050	<0.0050	
	Molybdenum (Mo) (mg/kg)	<4.0	<4.0	<4.0	<4.0	
	Nickel (Ni) (mg/kg)	<5.0	<5.0	<5.0	<5.0	
	Selenium (Se) (mg/kg)	<2.0	<2.0	<2.0	<2.0	
	Silver (Ag) (mg/kg)	<2.0	<2.0	<2.0	<2.0	
	Thallium (Tl) (mg/kg)	<1.0	<1.0	<1.0	<1.0	
	Tin (Sn) (mg/kg)	<5.0	<5.0	<5.0	<5.0	
	Vanadium (V) (mg/kg)	5.0	7.1	7.2	7.0	
	Zinc (Zn) (mg/kg)	4.3	10.0	6.1	5.8	
Non-Halogenated Volatiles	Benzene (mg/kg)	<0.040	<0.040	<0.040	<0.040	
	Ethylbenzene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Methyl t-butyl ether (MTBE) (mg/kg)	<0.20	<0.20	<0.20	<0.20	
	Styrene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Toluene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	meta- & para-Xylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	ortho-Xylene (mg/kg)	<0.050	<0.050	<0.050	<0.050	
	Xylenes (mg/kg)	<0.10	<0.10	<0.10	<0.10	
	F1-BTEX (mg/kg)	<10	<10	<10	<10	
	Surrogate: 4-Bromofluorobenzene (SS) (%)	99	93	95	97	
	Surrogate: 2,4-Dichlorotoluene (SS) (%)	88	91	94	92	
	Surrogate: Fluorobenzene (SS) (%)	102	92	94	94	
Extractable Hydrocarbons	F1 (C6-C10) (mg/kg)	<10	<10	<10	<10	
	F2 (C10-C16) (mg/kg)	10	<5	<5	10	
	F3 (C16-C34) (mg/kg)	88	35	<5	<5	
	F4 (C34-C50) (mg/kg)	50	18	<5	<5	
	Surrogate: 2-Bromobenzotrifluoride (%)	134	126	130	110	

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L548108-2	L548108-3	L548108-4	L548108-5	L548108-6
	Description					
	Sampled Date	25-AUG-07	25-AUG-07	25-AUG-07	25-AUG-07	25-AUG-07
	Sampled Time	09:30	09:35	10:00	10:05	10:45
	Client ID	C2-MW-1-1	C2-MW-1-2	C2-MW-2-1	C2-MW-2-2	C2-MW-3-1
Grouping	**Analyte**					
SOIL						
Extractable Hydrocarbons	Surrogate: Hexatriacontane (%)	41	90	118	110	118
	Chromatogram to baseline at nC50	YES	YES	YES	YES	YES
Polychlorinated Biphenyls	PCB-1016 (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	PCB-1221 (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	PCB-1232 (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	PCB-1242 (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	PCB-1248 (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	PCB-1254 (mg/kg)	<0.010	<0.010	0.019	<0.010	<0.010
	PCB-1260 (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	PCB-1262 (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	PCB-1268 (mg/kg)	<0.010	<0.010	<0.010	<0.010	<0.010
	Total Polychlorinated Biphenyls (mg/kg)	<0.010	<0.010	0.019	<0.010	<0.010

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L548108-7	L548108-8	L548108-9	L548108-10	
	Description					
	Sampled Date	25-AUG-07	25-AUG-07	25-AUG-07	25-AUG-07	
	Sampled Time	10:50	11:30	11:35	11:40	
	Client ID	C2-MW-3-2	C2-MW-4-1	C2-MW-4-2	C2-MW-5-2	
Grouping	**Analyte**					
SOIL						
Extractable Hydrocarbons	Surrogate: Hexatriacontane (%)	116	121	114	98	
	Chromatogram to baseline at nC50	NO	NO	YES	YES	
Polychlorinated Biphenyls	PCB-1016 (mg/kg)	<0.010	<0.010	<0.010	<0.010	
	PCB-1221 (mg/kg)	<0.010	<0.010	<0.010	<0.010	
	PCB-1232 (mg/kg)	<0.010	<0.010	<0.010	<0.010	
	PCB-1242 (mg/kg)	<0.010	<0.010	<0.010	<0.010	
	PCB-1248 (mg/kg)	<0.010	<0.010	<0.010	<0.010	
	PCB-1254 (mg/kg)	<0.010	<0.010	<0.010	<0.010	
	PCB-1260 (mg/kg)	<0.010	<0.010	<0.010	<0.010	
	PCB-1262 (mg/kg)	<0.010	<0.010	<0.010	<0.010	
	PCB-1268 (mg/kg)	<0.010	<0.010	<0.010	<0.010	
	Total Polychlorinated Biphenyls (mg/kg)	<0.010	<0.010	<0.010	<0.010	

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L548108-1				
	Description					
	Sampled Date	25-AUG-07				
	Sampled Time	14:05				
	Client ID	C2-MW-5				
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	1280				
Total Metals	Aluminum (Al)-Total (mg/L)	0.213				
	Antimony (Sb)-Total (mg/L)	<0.0050				
	Arsenic (As)-Total (mg/L)	<0.0050				
	Barium (Ba)-Total (mg/L)	0.040				
	Beryllium (Be)-Total (mg/L)	<0.010				
	Boron (B)-Total (mg/L)	1.00				
	Cadmium (Cd)-Total (mg/L)	<0.00017				
	Calcium (Ca)-Total (mg/L)	121				
	Chromium (Cr)-Total (mg/L)	0.016				
	Cobalt (Co)-Total (mg/L)	<0.0030				
	Copper (Cu)-Total (mg/L)	<0.010				
	Iron (Fe)-Total (mg/L)	0.202				
	Lead (Pb)-Total (mg/L)	<0.0050				
	Lithium (Li)-Total (mg/L)	0.083				
	Magnesium (Mg)-Total (mg/L)	238				
	Manganese (Mn)-Total (mg/L)	0.101				
	Mercury (Hg)-Total (mg/L)	<0.000020				
	Molybdenum (Mo)-Total (mg/L)	0.011				
	Nickel (Ni)-Total (mg/L)	<0.010				
	Potassium (K)-Total (mg/L)	65.5				
	Selenium (Se)-Total (mg/L)	<0.020				
	Silver (Ag)-Total (mg/L)	<0.00020				
	Sodium (Na)-Total (mg/L)	903				
	Thallium (Tl)-Total (mg/L)	<0.0020				
	Tin (Sn)-Total (mg/L)	<0.0050				
	Titanium (Ti)-Total (mg/L)	<0.010				
	Uranium (U)-Total (mg/L)	<0.0020				
	Vanadium (V)-Total (mg/L)	<0.030				
	Zinc (Zn)-Total (mg/L)	0.722				
Non-Halogenated Volatiles	Benzene (mg/L)	<0.00050				
	Ethylbenzene (mg/L)	<0.00050				
	Methyl t-butyl ether (MTBE) (mg/L)	<0.0010				
	Styrene (mg/L)	<0.00050				
	Toluene (mg/L)	<0.0010				
	meta- & para-Xylene (mg/L)	<0.00050				
	ortho-Xylene (mg/L)	<0.00050				
	Xylenes (mg/L)	<0.0010				
	Volatile Hydrocarbons (VH6-10) (mg/L)	<0.10				

ALS LABORATORY GROUP ANALYTICAL REPORT

	Sample ID	L548108-1				
	Description					
	Sampled Date	25-AUG-07				
	Sampled Time	14:05				
	Client ID	C2-MW-5				
Grouping	**Analyte**					
WATER						
Non-Halogenated Volatiles	VPH (C6-C10) (mg/L)	<0.10				
	Surrogate: 4-Bromofluorobenzene (SS) (%)	99				
	Surrogate: 2,4-Dichlorotoluene (SS) (%)	100				
	Surrogate: Fluorobenzene (SS) (%)	100				
Extractable Hydrocarbons	TEH10-30 (mg/L)	<0.25				
Polychlorinated Biphenyls	PCB-1016 (mg/L)	<0.0010				
	PCB-1221 (mg/L)	<0.0010				
	PCB-1232 (mg/L)	<0.0010				
	PCB-1242 (mg/L)	<0.0010				
	PCB-1248 (mg/L)	<0.0010				
	PCB-1254 (mg/L)	<0.0010				
	PCB-1260 (mg/L)	<0.0010				
	PCB-1262 (mg/L)	<0.0010				
	PCB-1268 (mg/L)	<0.0010				
	Total Polychlorinated Biphenyls (mg/L)	<0.0010				

Reference Information

Qualifiers for Individual Parameters Listed:

Qualifier	Description
G	Outlier - No assignable cause for nonconformity has been determined.
RAMB	Result Adjusted For Method Blank

Samples with Qualifiers for Individual Parameters as listed above:

Sample Number	Client Sample ID	Qualifier
L548108-2	C2-MW-1-1	G
L548108-3	C2-MW-1-2	RAMB
L548108-4	C2-MW-2-1	RAMB
L548108-5	C2-MW-2-2	RAMB
L548108-6	C2-MW-3-1	RAMB
L548108-7	C2-MW-3-2	RAMB
L548108-8	C2-MW-4-1	RAMB
L548108-9	C2-MW-4-2	RAMB

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
AS-CSR-HVAAS-VA	Soil	As in Soil by HVAAS (CSR SALM)	BCMELP CSR SALM Method 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic absorption spectrophotometry (EPA Method 7000 series).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

EPH-SF-FID-VA	Water	EPH in Water by GCFID	BCMOE EPH GCFID

This analysis is carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Extractable Petroleum Hydrocarbons in Water by GC/FID" (Version 2.1, July 1999). The procedure involves extraction of the entire water sample with dichloromethane. The extract is then solvent exchanged to toluene and analysed by capillary column gas chromatography with flame ionization detection (GC/FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

ETL-TEH-CCME-ED	Soil	CCME Total Extractable Hydrocarbons	CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TVH,TEH-CCME-ED	Soil	CCME Total Hydrocarbons	CCME CWS-PHC Dec-2000 - Pub# 1310

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)

3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-BTX-CALC-VA Soil F1-Total BTX CCME CWS PHC TIER 1 (2001)

Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard) This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The various extraction fractions are analysed as follows:

CWS Fractions 1 and 1-BTEX:
This procedure involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analysed by capillary column gas chromatography with flame-ionization detection (GC/FID) for CWS Fraction 1, and by capillary column gas chromatography with mass spectrometric detection (GC/MS) for the BTEX compounds.

Reported results may include any or all of the following:
CWS Fraction 1 (C6-10): sum of all petroleum hydrocarbon compounds that elute between nC6 and nC10 obtained by GC/FID analysis CWS Fraction 1-BTEX:CWS Fraction 1 (C6-10), minus BTEX compounds

F1-MET-PT-FID-VA Soil CCME by Purge and Trap with GCMS EPA 8260B & 524.2

Volatile Organic Compounds (VOC) are extracted from sediment or soil with methanol, following a procedure from the British Columbia Ministry of Water Land and Air Protection (BCWLAP) Analytical Method for Contaminated Sites "Volatile Hydrocarbons in Solids by GC/FID" (Version 2.1 July 1999). Aliquots of the extract are analyzed by direct injection capillary column gas chromatography with mass spectrometric detection (GC/MS), using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260B, published by the United States Environmental Protection Agency (EPA).

HARDNESS-CALC-VA Water Hardness APHA 2340B

Hardness is calculated from Calcium and Magnesium concentrations, and is expressed as calcium carbonate equivalents.

HG-CCME-CVAFS-VA Soil CVAFS Hg in Soil (CCME) CCME

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic fluorescence spectrophotometry (EPA Method 7000 series).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

HG-TOT-CCME-CVAFS-VA Water Total Mercury in Water by CVAFS (CCME) EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

MET-CSR-FULL-ICP-VA Soil Metals in Soil by ICPOES (CSR SALM) BCMELP CSR SALM METHOD 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
MET-TOT-CCME-ICP-VA	Water	Total Metals in Water by ICPOES (CCME)	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-TOT-CCME-MS-VA	Water	Total Metals in Water by ICPMS (CCME)	EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

PCB-SE-ECD-VA	Soil	PCB by Extraction with GCECD	EPA 3630/8082 GCECD

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3500, 3620, 3630, 3660, 3665 & 8082, published by the United States Environmental Protection Agency (EPA). The procedure involves a solid-liquid extraction of a subsample of the sediment/soil using a mixture of hexane and acetone. Water is added to the extract and the resulting hexane extract undergoes one or more of the following clean-up procedures (if required): florisil clean-up, silica gel clean-up, sulphur clean-up and/or sulphuric acid clean-up. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).

PCB-SF-ECD-VA	Water	PCB by Extraction with GCECD	EPA 3510/8082 Liq-Liq GCECD

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3510, 3620, 3660, 3665 & 8082, published by the United States Environmental Protection Agency (EPA). The procedure involves a liquid-liquid extraction of the entire water sample using dichloromethane. The extract is then solvent exchanged to hexane followed by one or more of the following clean-up procedures (if required): florisil clean-up, sulphur clean-up and/or sulphuric acid clean-up. The final extract is analysed by capillary column gas chromatography with electron capture detection (GC/ECD).

PH-1:2-VA	Soil	CSR pH by 1:2 Water Leach	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL

This analysis is carried out in accordance with procedures described in the BC WLAP method: pH, Electrometric, Soil and Sediment. The procedure involves mixing the dried (at <60°C) and seived (10 mesh/2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water. The pH of the solution is then measured using a standard pH probe.

PREP-MOISTURE-ED	Soil	% Moisture	Oven dry 105C-Gravimetric

TL-CSR-MS-VA	Soil	ICPMS Tl in Soil by CSR SALM	BCMELP CSR SALM Method 8

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

VH-PT-FID-VA	Water	VH by Purge Trap GCFID	EPA 8260b, BCMELP CSR Method

This procedure involves the purge and trap extraction of the sample prior to analysis for Volatile Hydrocarbons (VH) by capillary column gas chromatography with flame-ionization detection (GC/FID). The VH analysis is carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Volatile Hydrocarbons in Water by GC/FID" (Version 2.1, July 1999).

VOC7-MET-PT-MS-VA	Soil	BTEX by MeOH with Purge and Trap GCMS	EPA 8260B & 524.2

Volatile Organic Compounds (VOC) are extracted from sediment or soil with methanol, following a procedure from the British Columbia Ministry of Water Land and Air Protection (BCWLAP) Analytical Method for Contaminated Sites "Volatile Hydrocarbons in Solids by GC/FID" (Version 2.1 July 1999). Aliquots of the extract are analyzed by direct injection capillary column gas chromatography with mass spectrometric detection (GC/MS), using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260B, published by the United States Environmental Protection Agency (EPA). Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Analytical Method Reference(Based On)
VOC7-PT-MS-VA	Water	BTEX by Purge Trap GCMS	EPA 8260b, BCMELP CSR Method

This procedure involves the purge and trap extraction of the sample prior to analysis for specific Volatile Organic Compounds (VOC) by capillary column gas chromatography with mass spectrometric detection (GC/MS). The VOC analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA). Note: For chlorinated waters certain conditions may cause the formation of trihalomethanes after sample collection. Appropriate chemical treatment of chlorinated waters will prevent trihalomethane formation in the samples. Surrogate recoveries may not be reported in cases where interferences from the sample matrix prevent accurate quantitation.

VPH-CALC-VA	Water	BC MOE Laboratory Manual (2005)	BC MOE LABORATORY MANUAL (2005)

These results are determined according to the British Columbia Ministry of Environment, Lands, and Parks Analytical Method for Contaminated Sites "Calculation of Volatile Petroleum Hydrocarbons in Solids or Water" (Version 2.1, July 20, 1999). According to this method, the concentrations of specific Monocyclic Aromatic Hydrocarbons (Benzene, Toluene, Ethylbenzene, Xylenes and Styrene) are subtracted from the collective concentration of Volatile Hydrocarbons (VH) that elute between n-hexane (nC6) and n-decane (nC10). Analysis of Volatile Hydrocarbons adheres to all prescribed elements of BCMELP method "Volatile Hydrocarbons in Solids by GC/FID" (Version 2.1, July 20, 1999).

XYLENES-CALC-VA	Water	CSR VOC7 by MeOH with DI GCMS	CALCULATION

Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

XYLENES-CALC-VA	Soil	CSR VOC7 by MeOH with DI GCMS	EPA 8260B & 524.2

Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.
The last two letters of the above ALS Test Code column indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
ED	ALS LABORATORY GROUP - EDMONTON, ALBERTA, CANADA	VA	ALS LABORATORY GROUP - VANCOUVER, BC, CANADA

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

ALS Laboratory Group has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

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Lab Work Order # (lab use only): L548108	SAMPLER (Initials): KB	

Sample #	SAMPLE IDENTIFICATION (This description will appear on the report)	DATE	TIME	SAMPLE TYPE	Total Metals CCME	Total PCB	CCME-CWS F1 +BTEX	CCME-CWS F2, F3, F4	BTEX/TVH (C6-10 +BTEX)	TEH (C10-32)	Filtration for dissolved Metals					HAZARDOUS ?	HIGHLY CONTAMINATED ?	NUMBER OF CONTAINERS
	C2-MW-5	Aug 25, 07	11:05	Water	X	X			X	X	X							7
	C2-MW-8-1	Aug 25, 07	9:30	Soil	X	X	X	X										2
	C2-MW-1-2	Aug 25, 07	9:35	Soil	X	X	X	X										2
	C2-MW-2-1	Aug 25, 07	10:00	Soil	X	X	X	X										2
	C2-MW-2-2	Aug 25, 07	10:05	Soil	X	X	X	X										2
	C2-MW-3-1	Aug 25, 07	10:45	Soil	X	X	X	X										2
	C2-MW-3-2	Aug 25, 07	10:50	Soil	X	X	X	X										2
	C2-MW-4-1	Aug 25, 07	11:30	Soil	X	X	X	X										2
	C2-MW-4-2	Aug 25, 07	11:35	Soil	X	X	X	X										2
	C2-MW-5-2	Aug 25, 07	11:40	Soil	X	X	X	X										2

GUIDELINES / REGULATIONS	SPECIAL INSTRUCTIONS / HAZARDOUS DETAILS
	See Quote

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		[signature]	Aug 29/07 14:35

SAMPLE CONDITION (lab use only)

TEMPERATURE	SAMPLES RECEIVED IN GOOD CONDITION ? YES / NO (If no provide details)
6°C	

Appendix F

QA/QC

Table F 1 - QAQC - Soil

	Sample Ident.	Sample Location	Depth (m)	Laboratory	Arsenic (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)	Petroleum Hydrocarbons				PCB Total Aroclors (mg/kg)
														TPH C6-C34 (mg/kg)	C6-C10 (mg/kg)	C10-C16 (mg/kg)	C16-C34 (mg/kg)	
	C2-MW-4-2	MW-4	0.5	ALS	0.894	<0.50	3.1	<2.0	2.9	<30	<0.0050	<5.0	6.1	0	<10	<5	<5	<0.010
	C2-MW-5-2*	MW-4	0.5	ALS	1	<0.50	3.2	<2.0	2.4	<30	<0.0050	<5.0	5.8	10	<10	10	<5	<0.010
	C2-MW-5-2*	MW-4	0.5	Cantest	1	< 0.2	3	1	2	4.7	0.01	2	9	< 20	< 5	< 80	< 250	< 0.03
Average					0.96	-	3.10	-	2.43	-	-	-	6.97	-	-	-	-	-
RSD					6%	-	3%	-	19%	-	-	-	25%	-	-	-	-	-

Notes: *Relative Standard Deviation (RSDs) calculated by dividing the standard deviation of the comparitive set by the average.*

** Denotes duplicate sample*

- Denotes RSD not calculable

xx% *Exceeds QA/QC goal of 20% for inorganics or 30% for organics.*

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Table F2 - QAQC - Water

	Sample Ident.	Sample Location	Laboratory	Arsenic (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Nickel (mg/L)	Zinc (mg/L)	Petroleum Hydrocarbons				PCB Total Aroclors (mg/L)
													TPH C6-C34 (mg/L)	C6-C10 (mg/L)	C10-C16 (mg/L)	C16-C34 (mg/L)	
	C2-MW-4	MW-4	ALS	<0.0070	<0.00017	0.016	<0.0030	<0.010	<0.0050	<0.000020	0.016	31.8	<0.25				<0.0010
	C2-MW-5*	MW-4	ALS	<0.0050	<0.00017	0.016	<0.0030	<0.010	<0.0050	<0.000020	<0.010	0.722	<0.25				<0.0010
	C2-MW-5*	MW-4	Cantest	0.0008	0.00005	0.0059	0.0009	0.0036	< 0.0002	< 0.00002	0.0074	8.52	0.18	< 0.005	< 0.1	< 0.25	< 0.0004
Average				-	-	0.01	-	-	-	-	-	13.68	-	-	-	-	-
RPD				-	-	46.2%	-	-	-	-	-	118.2%	-	-	-	-	-

Notes: *Relative Standard Deviation (RSDs) calculated by dividing the standard deviation of the comparitive set by the average.*

** Denotes duplicate sample*

- Denotes RSD not calculable

xx% *Exceeds QA/QC goal of 20% for inorganics or 30% for organics.*

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