

**THE COLLECTION OF LANDFILL
MONITORING DATA AT THE FORMER
CAM-2 DEW LINE SITE**

Gladman Point, Nunavut

FINAL REVISION 1 – 2012

(O/Ref.: CD2656) (Y/Ref.: DLCMON (KITIK))

DEFENCE CONSTRUCTION CANADA

March 2013



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DEFENCE CONSTRUCTION CANADA

March 2013

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1 INTRODUCTION

1.1 OBJECTIVES AND SCOPE OF WORK

The objective of Defence Construction Canada's (DCC) Landfill Monitoring Program is to collect sufficient information to assess the Landfill's performance from a geotechnical and environmental perspective. DCC has specified the requirements for the Landfill Monitoring Program in the document Terms of Reference – Services for the Collection of Landfill Monitoring Data – PIN-3 Lady Franklin Point, CAM-M Cambridge Bay, CAM-2 Gladman Point, CAM-3 Shepherd Bay, and CAM-4 Pelly Bay DEW Line Sites, Nunavut Territory, Kitikmeot Region DCC Project #: DLCLFMP2 (KITIK12), March 20, 2012.

During the 2012 monitoring program a visual inspection was completed to identify erosional features as well as soil sampling was conducted at all landfills. Groundwater sampling was conducted at the Tier II and the Non-Hazardous Waste Landfill (NHWL). Thermal monitoring was conducted at the Tier II facility; the datalogger batteries (ULB-15 and ULB-1) were replaced. Datalogger VT-3 was reinstalled as requested since the Datalogger had been removed for repairs in 2010, no dataset available for VT-3. Table I summarizes the monitoring requirements of the 2012 season.

Table I: 2012 Monitoring Requirements for CAM-2 Landfills

Landfill	Visual Inspection	Soil Sampling	Groundwater Sampling	Thermal Monitoring
Station Landfill	✓	✓		
West Landfill – North	✓	✓		
West Landfill – South	✓	✓		
Tier II Disposal Facility	✓	✓	✓	✓
Non-Hazardous Waste Landfill	✓	✓	✓	

1.2 FIELD PROGRAM STAFF AND TIMING

The 2012 on-site field program at CAM-2 Gladman Point took place from August 24 to 28, 2012. Biogenie sub-contracted Sila Remediation Inc. (Sila) from Igloolik, Nunavut to perform the field work. The Sila field program was executed by Mr. Brandon MacKay and three local Inuit representatives.

The team was comprised of the following individuals:

- Brandon MacKay, Site Technician.
- Jay Evalik Field Assistant
- Dwayne Allukpik, Field Assistant.
- Joe Koaha, Wildlife Monitor.

1.3 2012 WEATHER CONDITIONS

Seasonably average temperatures were observed during the 2012 monitoring program, consisting of an average daily temperature of 5°C. Light precipitation and localized fog occurred during the morning, giving way to sun by afternoon. Night time temperature averaged 0°C.

Further details on weather conditions for each landfill at the time of the visual inspection are provided in the “Visual Inspection” sections of the report (Sections 3.2, 4.2, 5.2, 6.2 and 7.2).

1.4 DEVIATIONS FROM THE TERMS OF REFERENCE

As stipulated by Sections 6.11.1 and 6.12.2 of the Terms of Reference (TOR), inter-laboratory comparison soil and groundwater samples are to be taken and analyzed during each monitoring event. The soil and groundwater samples were taken at a frequency of 10% however, the cooler was lost in transport and consequently the samples were not analyzed. Cambridge Bay experienced several plane delays and cancellations prior to and during the 2012 monitoring program. It is believed the resulting backlog of shipments to and from Cambridge Bay may have resulted in the misplacing of the inter-lab samples.

As stipulated by section 6.11.8 samples are to be collected from two depths at each sampling location; surface (0 – 15 cm) and depth (40 – 50 cm). A depth sample from sampling location C2-2, (sample ID 12-C2-2-B) was not received at the laboratory facility and subsequently not analyzed. As a meticulous inventory of all samples was conducted in the field after returning to the field camp, it is believed the sample was incorrectly placed within the inter-lab cooler by field staff and as stated above this cooler was ultimately lost during transport.

1.5 REPORT FORMAT

This report describes the work carried out in August 2012 at five Landfill sites at CAM-2 Gladman Point. Results from soil and groundwater sampling, thermal monitoring and visual inspection of the Sites are also presented in the formats described in the TOR (Reference B). An electronic version of the report and its component tables, figures and data files is included in an Addendum DVD-ROM, which is appended to this report.

The report is organized with a separate section for each of the Landfill areas. Each section contains all relevant information for that Landfill area for the 2012 Landfill Monitoring Program. The following information is provided in each Landfill section:

- Visual inspection checklist;
- Visual inspection drawing mark-up;
- A selection of visual inspection photos;
- Thermal monitoring summary and inspection reports (where applicable);
- Summary of 2012 soil analytical data;
- Summary of 2012 groundwater analytical data (where applicable); and
- Monitoring well development/sampling reports (where applicable).

For the photographic record, the printed copy of the report only includes an index and thumbnail images of photos for each of the Landfill areas. The full resolution photos are included in electronic format in the Addendum DVD-ROM to this report. Certificates of Analysis, QA/QC analytical results and field notes are attached in the Appendices.

CAM-2.1 Overall Site Plan

2 METHODOLOGY

2.1 VISUAL INSPECTION

Data and information collected during the visual inspection of the CAM-2 Landfills is included in the visual inspection datasheets. These datasheets include inspection data such as the location of settlement, erosion, frost action, sloughing and cracking, animal burrows, vegetation cover and stress, staining, seepage points, exposed debris, and any other features of note.

Each feature was identified with an alphabetical tag to be used consistently each year in an effort to track changes in condition for each specific feature. New features are added to the checklist and are noted as new observations. This letter is shown on the figures for each Landfill along with the symbol for the particular feature.

Digital photos with a measure of scale were taken to show the actual general state of the Landfills, as well as features of interest. Annotated sketches/diagrams are included in this report for each Landfill.

The photos were taken with an Olympus TG-820 iHS 12 megapixel (MP) digital camera. Full resolution digital jpeg copies are available on the DVD-ROM appended with this report. The photo log, including the local coordinates from where the photo was taken, orientation (relative to map north), feature of note and picture numbers are included with each Landfill report. Panoramic photographs were “stitched” using Adobe Photoshop.

2.2 SOIL SAMPLING

The soil sampling methodology conformed to guidance provided in the following Canadian Council of Ministers of the Environment (CCME) documents:

- CCME Guidance Document on the Management of Contaminated Sites in Canada, April 1997, CCME PN 1279. (CCME catalogue - http://www.ccme.ca/pdfs/cat_eng.pdf);
- CCME EPC-NCS62E Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites - Volume I: Main Report, Dec 93 (CCME catalogue - http://www.ccme.ca/pdfs/cat_eng.pdf);
- CCME EPC-NCS66E Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites - Volume II: Analytical Method Summaries, Dec. 93 (CCME catalogue - http://www.ccme.ca/pdfs/cat_eng.pdf);

- Reference method for the Determination of Petroleum Hydrocarbons in Soil – Tier I Method, 2001; and
- CCME Subsurface Assessment Handbook for Contaminated Sites, March 1994, EPC-NCSRP-48E (CCME catalogue - "http://www.ccme.ca/pdfs/cat_eng.pdf").

For the 2012 monitoring program, 22 soil sampling stations were visited. A surface (0-15 cm depth) and subsurface sample (40-50 cm depth below surface) were taken at each sampling station. No frozen ground or frost was encountered at the soil stations during the August 2012 sampling.

As specified in the TOR (Reference B), the following soil sampling procedures were adhered to:

- where required, the soil samples were collected from locations between a two to four metre radius of the monitoring wells;
- blind field duplicates (10%) were collected for QA/QC purposes;
- duplicate samples (10%) were also taken and sent to a second laboratory for quality control purposes; and
- An additional 10% of soil samples taken were sent to the owner's representative (ESG OPS CENTRE) in Kingston for archiving as specified by DCC.

The soil samples were analyzed for requested parameters (TPH (F1-F3), total metals and PCBs) as specified by DCC. Table II below summarizes the soil sampling at CAM-2 during the August, 2012 field program.

Table II: Summary of Soil Sampling at CAM-2, August 2012

Landfill Site	Soil Sample Locations				
Station Landfill	C2-1	C2-2	C2-3	C2-4	C2-5
West Landfill - North	C2-6	C2-7	C2-8	C2-9	C2-10
West Landfill - South	C2-11	C2-12	C2-13	C2-14	
Tier II Disposal Facility	MW-1	MW-2	MW-3	MW-4	
Non-Hazardous Waste Landfill	MW-5	MW-6	MW-7	MW-8	

Notes:

Soil samples annotated as "MW" were collected as per the TOR (Reference B) between two to four metres from monitoring wells. All soil samples were collected from two depths (0-15 cm and 40-50 cm). For 2012 sampling, total number of soil samples = 48 samples (22 samples x two depths + four QA/QC (Intra + Inter-laboratory comparison) + four for Owner's Representative (ESG Archives).

2.3 GROUNDWATER SAMPLING

The groundwater sampling methodology conformed to guidance provided in the following Canadian Council of Ministers of the Environment (CCME) documents:

- CCME EPC-NCS62E Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites - Volume I: Main Report, Dec 93 (CCME catalogue - http://www.ccme.ca/pdfs/cat_eng.pdf); and
- CCME EPC-NCS66E Guidance Manual on Sampling, Analysis, and Data Management for Contaminated Sites - Volume II: Analytical Method Summaries, Dec 93 (CCME catalogue - "http://www.ccme.ca/pdfs/cat_eng.pdf").

Wells were purged as specified and measurements of in-situ temperature, conductivity and pH were taken. Sampling took place when these parameters were stabilized. Turbidity readings were also collected at each station. The samples were not acidified and were not filtered (as directed in the TOR).

The 2012 field program included sampling eight monitoring wells at CAM-2. A summary of the groundwater sampling undertaken at CAM-2 is summarized in Table III.

In sampled wells, no signs of free-phase hydrocarbon products were detected. Monitoring Well Development and Sampling Record forms are included in appropriate sections in this report.

Table III: Summary of Groundwater Sampling at CAM-2, August 2012

Landfill Site	Groundwater Sample Locations			
Tier II Disposal Facility	MW-1	MW-2	MW-3	MW-4
Non-Hazardous Waste Landfill	MW-5	MW-6	MW-7	MW-8

Notes:

All monitoring wells were inspected and found to be in good condition with no significant concerns identified. For 2012 sampling, total number of water samples = 11 samples (eight monitoring well samples + three QA/QC (inter and intra-laboratory duplicates + one field blank) + one travel blank (TPH only).

2.4 THERMAL MONITORING

All thermistors at the Tier II Disposal Facility were inspected and found to be in good condition with no significant concerns not identified previously. Further details on thermal monitoring will be discussed in Section 6.6 of this report.

2.5 FIELD NOTES AND DATA

Field notes from the 2012 Landfill Monitoring Program, including soil and water sampling, are included in Appendix B for reference. Notes were written in field books or entered directly into a field computer (in the case of thermistor and monitoring well data). The notes were scanned to an Adobe pdf document for future reference and back up. Locations of all observations and features

for the visual inspection were recorded using a hand-held Garmin GPSmap 60CSx GPS, which included a combination of continuous tracks and discrete waypoints. Data packages collected from the individual vertical thermistors was downloaded directly to a field laptop computer.

2.6 QUALITY CONTROL

Sila implemented standard sample collection techniques to decrease the likelihood of compromising collected samples. The methods used for sample collection are summarized in Sections 2.4 and 2.5 of this report. The following measures were taken to minimize sample cross-contamination:

- All samples were placed directly into the appropriate laboratory supplied containers (for the particular analysis);
- Soil samples were collected with the use of decontaminated sampling equipment and/or nitrile gloves that were used only once; and
- Water samples were collected through the use of dedicated Waterra foot valves and tubing.

Chain of Custody (COC) forms were completed by the Field Coordinator after sample collection. The samples were refrigerated prior to off-site shipment in chilled coolers by First Air Cargo directly to AGAT in Calgary (via Yellowknife) and ESG in Kingston (via Ottawa), where they were checked in by laboratory representatives. As stated previously, Quality assurance soil and groundwater samples shipped to Maxxam in Montreal were lost during transport and consequently were not received.

2.7 QA/QC PROCEDURES

Sila used standard QA/QC procedures as specified in the TOR and CCME Guidance documents for this project. The following is a summary of the analytical QA/QC samples collected:

- 10% Blind Duplicate Samples of soil and water were sent to AGAT;
- 10% Inter-laboratory Duplicate Samples were sent to Maxxam (looking for variation in procedures causing significant difference in analytical result). These samples were lost during air transportation and consequently, were not analyzed;
- 10% Archival Samples of soil to ESG.
- As well as the respective QA/QC procedures of AGAT

2.8 PROJECT REFERENCES

The following references are specifically relevant to the 2012 Landfill Monitoring activities:

- A. Invitation to Tender – Contractor Services for the Collection of Landfill Monitoring Data Nunavut Territory – Kitikmeot Region at PIN-3 (Lady Franklin Point), CAM-M (Cambridge Bay), CAM-2 (Gladman Point), CAM-3 (Shepherd Bay), CAM-4 (Pelly Bay) – DCC Project Number: DLCMON (KITIK) – March 26, 2012.
- B. Terms of Reference – Services for the collection of Landfill Monitoring Data: PIN-3 (Lady Franklin Point), CAM-M (Cambridge Bay), CAM-2 (Gladman Point), CAM-3 (Shepherd Bay), CAM-4 (Pelly Bay). DEW Line Sites, Nunavut Territory, Kitikmeot Region – DCC Project #: DLCLFMP2 (KITIK12).
- C. Contractor Services for the Collection of Landfill Monitoring Data Nunavut Territory – Kitikmeot Region at PIN-3 (Lady Franklin Point), CAM-M (Cambridge Bay), CAM-2 (Gladman Point), CAM-3 (Shepherd Bay), CAM-4 (Pelly Bay): Technical Proposal – May 2012.
- D. Post-Field Progress Report, CAM-2 Landfill Monitoring 2012, September, 2012

3 STATION LANDFILL

3.1 SUMMARY

During the 2012 monitoring event of the Station Landfill at CAM-2 Gladman Point soil samples were collected at 5 locations (1 upgradient and 4 downgradient locations) and a visual inspection was conducted to identify and assess erosional features on the regraded lobes.

PCBs were not detected in any of the soil samples at the Station Landfill. TPH was detected at all sample locations at surface and depth with the exception of C2-2 and C2-5 where TPH was not detected at depth. TPH concentrations ranged from 12 to 485 mg/kg with the highest concentration detected at the C2-2 at surface (0 – 15 cm). All detected TPH was primarily in the F3 fraction. Currently all TPH readings are below the standard site criteria of 2500 mg/kg and are therefore acceptable. A relatively high concentration of arsenic (13.9 mg/kg) was detected at the surface of C2-1 based on the CCME soil quality guidelines.

Over the course of two years since the last monitoring program of the Station Landfill, there have been increases in settlement, erosion and the onset of plant colonization. Despite the increases in settlement and erosion no significant or unacceptable features were observed. Erosion features on the east slope of Lobe 2 are self-armouring and the newly observed erosion channels on the slope remain minor at this time. The areas of settlement are not currently impacting the overall stability of the lobe.

The current overall performance rating of the Station Landfill is acceptable.

3.2 VISUAL INSPECTION REPORT

The visual inspection of the Station Landfill was conducted on August 26, 2012. The Visual Inspection Checklist/Report has been completed as per the TOR and is included as Table IV of this report. Please refer to Figure CAM-2.2 for the locations of photographs and erosional features at the Station Landfill.

Weather Conditions at Time of Inspection

At the time of the visual inspection of the Station, the temperature was approximately 2°C; skies were overcast with light rain. Little to no wind was observed at the Station Landfill

Settlement

Four areas of minor settlement were noted at the Station Landfill at Lobes: 1 (Feature M), 2 (Feature B) and 5 (Features A and Q) during the 2012 monitoring program.

Feature M, a new observation, consists of two circular depressions (“potholes”) on the northern surface of Lobe 1. Lobe 1 continues to function as designed; the depressions have little to no impact on the overall stability of the Lobe at this time.

Further settlement has been observed in the vicinity of Feature B which was first identified during the 2010 monitoring program; two additional linear depressions were observed within 5 m of the original feature. Despite the increases in the settlement, the features are relatively minor and the Landfill Lobe continues to function as designed.

Indications of settlement have increased at Lobe 5 of the Station Landfill. An additional two depressions have been observed at Feature A, for total of four. Feature Q consists of a depression associated with large cobble and vegetation. Based on the size of the extent of the vegetation although small, Feature Q is believed to have existed for some time (potentially since construction, given its associated cobble). Lobe 5 continues to function as designed.

Erosion

Erosion was observed at two of the five Lobes at the Station Landfill, Lobes 2 and 3. Observations of shallow erosion on the east and west side slopes of Lobe 3 remain consistent with the 2010 sampling program. The performance of Lobe 3 is considered acceptable.

Lobe 2 has several pronounced areas of erosion that occur at the geometric inflection points of the Lobe where localized runoff converges on the Landfill surface. Six general areas of erosion (Features D, E, F, G, N and O) have been identified, an addition of two features since 2010. 2012 observations of Features D, E and F are relatively consistent with 2010 measurements with slight increases in the depth of erosion. Each erosion channel appears to be self-armouring and features a large deposition of fine material on the tundra at the toe of the Landfill. Feature O consists of a relatively minor erosion channel located 12 m north of Feature F on the east slope of the Landfill. The feature is self-armouring and of little impact to the stability of the Lobe. Feature N consists of a small erosion channel on the north Landfill surface, the erosion channel does not extend onto the east side slope. Although not indicated on the drawings, the slope at this location has been armoured with a coarser material (Type 2) than at the southern extent of the east slope. Feature N has an acceptable severity rating. Minor erosion was also noted along the base of the engineered drainage channel constructed along the north side of Lobe 2 (Feature G). The level of erosion appears consistent with observations from previous years and planned remedial measures to direct flow around the Landfill. The erosion is not in direct contact with the Landfill.

Frost Action

Evidence of frost action was not noted.

Evidence of Burrowing Animals

Indications of burrowing animals were not noted.

Vegetation

Evidence of vegetation was noted at one location on Lobe 5 of the Station Landfill. Feature R associated with the depression, (Feature Q) consists of a small concentration of vegetation growing on the base of the depression, and a few scattered plants to the north of the depression. At the time of the monitoring program, the plants within the depression had dried with the change in season, making them difficult to identify. During the 2015 monitoring program, an attempt will be made to identify the plants colonizing on Lobe 5.

Staining

One area of rust-coloured staining (Feature H) was observed on the northeast corner of Lobe 2, extending from the Landfill toe to a nearby pond situated approximately 25 m to the east, and from the pond north; encompassing a low lying area approximately 75 x 50 m. Similar staining was observed at other low lying areas not associated with the Landfill, and in keeping with the conclusions drawn in the 2010 monitoring report, appear to be a natural feature of the area. Bacterial sheen was observed on the surface of ponded water at the toe of the Landfill.

A hydrocarbon stain (Feature P) was observed approximately in the middle of Lobe 4. As it was not observed during previous monitoring programs, it is assumed the stain is a result of recent activities or was simply an oversight (although unlikely). A consultation with the Field Assistants and Bear Monitors revealed that the area is frequented by members of a nearby community for Ranger duties and hunting trips. ATVs and snowmobiles are used to access the site and are thus, a potential source of leaks and therefore stains.

Seepage Points

Although there are increases in the extent of rust-coloured staining (Feature H) with this feature, the area of seepage on the northern section of Lobe 2 remains consistent with previous observations. Wet and saturated soil conditions were observed on the down gradient slope within 5 m of the toe.

Debris

There were no observations of exposed debris during the 2012 monitoring program.

Presence/Condition of Monitoring Instruments

There are no monitoring instruments installed at this Landfill.

Other Features of Note

During the 2010 monitoring program, several tension/desiccation cracks were noted on the surface and/side slope of Lobes 2 and 3. During the 2012 monitoring program, Features I, K and L were not observed, and Feature J was $\frac{1}{4}$ the length previously observed. In the week leading up to the monitoring program, as well as during the site visit, the area experienced several precipitation events which may have eliminated any cracks caused by desiccation and/or filled in smaller cracks through erosion processes. Features J and L on Lobe 2 consisted of relatively short parallel cracks that extended approximately 45 degrees to the slope direction. What remains of Feature J has an acceptable severity rating.

Table IV: Visual Inspection Checklist / Report – Station Landfill

**DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
VISUAL INSPECTION CHECKLIST
INSPECTION REPORT – PAGE 1 of 3**

SITE NAME: CAM-2 Gladman Point
LANDFILL/AREA DESIGNATION: Station Landfill (Existing Landfill – Regrade)
DATE OF INSPECTION: August 26, 2012
DATE OF PREVIOUS INSPECTION: August 14, 2010
INSPECTED BY: Brandon MacKay
REPORT PREPARED BY: Brandon MacKay
LANDFILL MONITORING EVENT #: 7
The inspector/reporter represents to the best of his/her knowledge that 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 (m)	Width (m)	Depth (m)	Extent	Description	Photographic Record (2012-C2-Station-)	Severity Rating	Additional Comments
Settlement	Yes	FEATURE A See Figure CAM-2.2 (Lobe 5)	0.3 - 0.5	0.3 - 0.5	0.1	Occasional	Minor depressions	63-66	Acceptable	Number of depressions at this location has increased as of the 2012 monitoring program from one to four.
		FEATURE B See Figure CAM-2.2 (Lobe 2)	1.2 - 3.0	0.2 - 0.4	0.05 - 0.10		Minor depressions	29, 30, 31	Acceptable	Three minor depression along crest of lobe, previously only one depression was observed.
		FEATURE M See Figure CAM-2.2 (Lobe 1)	1	0.7	0.15		Minor depressions	15,16,17	Acceptable	New Observation: Two minor depressions on the northern section of the landfill cap.
		FEATURE Q See Figure CAM-2.2 (Lobe 5)	0.5	0.3	0.1		Minor depressions	67	Acceptable	New Observation: Minor depressions on the northern toe of the landfill, associated with a large cobble stone and vegetation.
Erosion	Yes	FEATURE C See Figure CAM-2.2 (Lobe 3)	2.5 - 3.0	0.1 - 0.2	< 0.05	Occasional	Minor surficial erosion	51 - 55	Acceptable	Minor erosion noted at five locations on the west side and two locations on the east side lobe, extending from top to toe.
		FEATURE D See Figure CAM-2.2 (Lobe 2)	15 8	0.10 - 2.00 0.05 - 0.20	0.10 - 0.15 0.05 - 0.10		Minor surficial erosion	41 - 44	Acceptable	Two areas of minor erosion where water drains from the southern portion of the landfill cap, self-armouring.
		FEATURE E See Figure CAM-2.2 (Lobe 2)	12.2	0.1 0 - 0.50	0.10 - 0.15		Minor surficial erosion	39, 40	Acceptable	Three erosion channels extending from the landfill surface to the toe, depositing fine sediment on the tundra.
		FEATURE F See Figure CAM-2.2 (Lobe 2)	36	0.30 - 2.0	0.05 - 0.20		Minor surficial erosion	36, 37, 38	Acceptable	Minor erosion noted on surface of landfill (2 cm), increasing to 5-20 cm depth on downgradient slope. Self-armouring.
		FEATURE G See Figure CAM-2.2 (drainage channel on north side of Lobe 2)	60	1	0.10 - 0.15		Minor erosion along base of engineered drainage channel	20, 21, 22, 23	Acceptable	Minor erosion noted along drainage channel extending along north side of lobe. Little to no change since previous inspection. Self-armouring.
		FEATURE N See Figure CAM-2.2 (Lobe 2)	10	0.05	0.03		Minor surficial erosion	27, 28	Acceptable	New Observation: Minor erosion channel on the landfill surface extending to the side slope at the north end of the east side slope of the lobe.
		FEATURE O See Figure CAM-2.2 (Lobe 2)	10	0.15 - 0.50	0.05 - 0.25		Minor surficial erosion	34, 35	Acceptable	New Observation: Minor erosion channel on the landfill surface extending to the side slope.

Checklist Item	Present (Yes/No)	Location	Length (m)	Width (m)	Depth (m)	Extent	Description	Photographic Record (2012-C2-Station-)	Severity Rating	Additional Comments
Frost Action	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Animal Burrows	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Vegetation	Yes	FEATURE R See Figure CAM-2.2 (Lobe 2)	N/A	N/A	N/A	N/A	Small vegetation	67	Acceptable	New Observation: Vegetation growing in the base of feature Q, with a few scattered smaller plants around the outside of the depression.
Staining	Yes	FEATURE H See Figure CAM-2.2 (north east of Lobe 2)	~75	~50	Unknown	N/A	Rust coloured staining	24	Acceptable	Rust coloured staining extending from the northeast toe of landfill to adjacent pond and to the northwest for approximately 75 m.
		FEATURE P See Figure CAM-2.2 (Lobe 4)	0.6	0.5	unknown	Isolated	Hydrocarbon stain	58	Acceptable	New Observation: Hydrocarbon stain on the landfill cap, assumed to be from leaking off-road equipment.
Vegetation Stress	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Seepage Points	Yes	FEATURE H See Figure CAM-2.2 (north east area of Lobe 2)	8.0	4.0	N/A	Isolated <1%	Seepage along toe of slope	24, 25, 26	Acceptable	Seepage along the toe extending to the pool of water to the east of the landfill, iron bacteria present on surface of ponded water. Iron staining present on soil in a much larger area than previously reported, potentially the area flooded during spring melt.
Debris Exposed	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Presence/Condition of Monitoring Instruments	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Other Features of Note:	Yes	FEATURE J See Figure CAM-2.2 (south end of Lobe 2)	1.2	0.01 - 0.05	0.05	Isolated <1%	Parallel cracks extending from crest in north east direction	45, 46	Acceptable	Thin tension cracks extending from crest on south end of lobe, no longer visible to the same extent as in 2010.
Additional Photos	Yes	See Figure CAM-2.2 and Photographic Record	N/A	N/A	N/A	N/A	General Photographic Record	N/A	Not Observed	General photos for documentation, no features of note.
Overall Landfill Performance:		Acceptable								

3.3 PRELIMINARY STABILITY ASSESSMENT

The Preliminary Stability Assessment for Station Landfill has been completed as per the TOR and is included as Table V hereafter.

Table V: Preliminary Stability Assessment – Station Landfill

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Acceptable	Occasional
Frost Action	Not observed	None
Staining	Acceptable	Isolated
Vegetation Stress	Not observed	None
Seepage/Ponded Water	Acceptable	Isolated
Debris exposure	Not observed	None
Overall Landfill Performance	Acceptable	

Performance/ Severity Rating	Description
Acceptable	Noted features are of little consequence. The Landfill is performing as designed. Minor deviations in environmental or physical performance may be observed, such as isolated areas of erosion, settlement.
Marginal	Physical/environmental performance appears to be deteriorating with time. Observations may include an increase in size or number of features of note, such as differential settlement, erosion or cracking. No significant impact on Landfill stability to-date, but potential for failure is assessed as low or moderate.
Significant	Significant or potentially significant changes affecting Landfill stability, such as significant changes in slope geometry, significant erosion or differential settlement; scarp development. The potential for failure is assessed as imminent.
Unacceptable	Stability of Landfill is compromised to the extent that ability to contain waste materials is compromised. Examples may include: • Debris exposed in erosion channels or areas of differential settlement; • Liner exposed; and • Slope failure.

Extent	Description
Isolated	Singular feature.
Occasional	Features of note occurring at irregular intervals/locations.
Numerous	Many features of note impacted less than 50% of the surface area of the Landfill.
Extensive	Impacting greater than 50% of the surface area of the Landfill.

3.4 LOCATION PLAN

The Location Plan for the Station Landfill has been completed as per the TOR and is included in the following page as Figure CAM-2.2 Gladman Point – Station Landfill.

Figure 1 : CAM-2.2 Gladman Point – Station Landfill

3.5 PHOTOGRAPHIC RECORDS

The Photographic Record for Station Landfill has been completed as per the TOR and is included as Table VI hereafter. The Photographic Record only contains an index and “thumbnail” photographs. Full-sized photographs are contained in the Addendum DVD-ROM.

Table VI: Landfill Visual Inspection Photo Log – Station Landfill

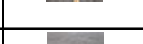
Photo	Thumbnail	Filename	Size (MB)	Date	Vantage Point		Caption
					Easting	Northing	
Lobe 1							
14		2012-C2-Station-14	2.650	26/08/2012	548550	7618938	View SE of the northwestern portion of the Lobe 1 Cap
15		2012-C2-Station-15	2.390	26/08/2012	548567	7618932	Feature M: Close-up view of one of two depressions observed on the landfill surface, this being the western of the two. Depression is marked in photograph by fine material below the field note book.
16		2012-C2-Station-16	2.380	26/08/2012	548567	7618932	Feature M: Close-up view of one of two shallow circular depressions observed on the landfill surface, this being the eastern of the two. Depression is marked in photograph by fine material below the field note book.
17		2012-C2-Station-17	2.290	26/08/2012	548567	7618932	Feature M: View SE of two shallow circular depressions. (1.00 m x 0.70 m x 0.15 m)
18		2012-C2-Station-18	2.820	26/08/2012	548606	7618913	View NW of northern portion of landfill cap, taken from the south west corner
19		2012-C2-Station-19	2.660	26/08/2012	548606	7618920	View NW of southern portion of landfill cap, taken from the south west corner
Lobe 2							
20		2012-C2-Station-20	2.580	26/08/2012	548433	7619069	Feature G: View NNE of engineered drainage channel, minor erosion present along the base of the channel. Taken from the southern end of the channel (highest point).
21		2012-C2-Station-21	2.870	26/08/2012	548443	7619088	Feature G: View NE of engineered drainage channel, minor erosion present along the base of the channel, taken 21 m NNE of southern end of the drainage channel
22		2012-C2-Station-22	2.580	26/08/2012	548448	7619103	Feature G: View NE of engineered drainage channel, minor erosion present along the base of the channel, taken 37 m NNE of southern end of the drainage channel
23		2012-C2-Station-23	2.590	26/08/2012	548458	7619119	Feature G: View SSW of engineered drainage channel, taken at the NNE extent of the channel.
24		2012-C2-Station-24	59.400	26/08/2012	548473	7619104	Feature H: Panoramic view NNW-E of Feature H, seepage/staining.
25		2012-C2-Station-25	2.760	26/08/2012	548473	7619107	Feature H: Close up of iron bacteria present at ponded water at landfill toe
26		2012-C2-Station-26	2.880	26/08/2012	548473	7619107	Feature H: Close up of clumped iron bacteria present at ponded water at landfill toe.
27		2012-C2-Station-27	2.290	26/08/2012	584579	7619070	Feature N: View NE of a minor erosion channel extending from the landfill cap to the side slope. (10 m x 0.05 m x 0.03 m)
28		2012-C2-Station-28	2.570	26/08/2012	584579	7619070	Feature N: Close-up view of minor erosion channel.
29		2012-C2-Station-29	2.390	26/08/2012	548478	7619026	Feature B: 1 of 3 (southern) minor depressions on east crest of lobe, (3 m x 0.4 m x 0.10 m).
30		2012-C2-Station-30	2.430	26/08/2012	548476	7619034	Feature B: 2 of 3 (middle) minor depressions on east crest of lobe, (2 m x 0.2 m x 0.05 m).
31		2012-C2-Station-31	2.500	26/08/2012	548476	7619034	Feature B: 3 of 3 (northern) minor depressions on east crest of lobe, (1.5 m x 0.3 m x 0.10 m).
32		2012-C2-Station-32	38.000	26/08/2012	548543	7619031	Panoramic view S - NNW of East slope of lobe 2.
33		2012-C2-Station-33	52.000	26/08/2012	548476	7619029	Panoramic view SSE - SW of the southern portion of the landfill cap of lobe 2.
34		2012-C2-Station-34	2.530	26/08/2012	548509	7618964	Feature O: View NE of minor superficial erosion starting at the crest of the landfill and continuing across the east slope to the toe. (10 m x 0.15-0.50 m x 0.05 - 0.25 m)
35		2012-C2-Station-35	2.380	26/08/2012	548512	7618967	Feature O: View SW of minor superficial erosion starting at the crest of the landfill and continuing across the east slope to the toe. (10 m x 0.15-0.50 m x 0.05 - 0.25 m)
36		2012-C2-Station-36	2.430	26/08/2012	548504	7618952	Feature F: View NE of minor erosion on the landfill surface. (36 m x 0.30 - 2.0 m x 0.02 - 0.30m).

Photo	Thumbnail	Filename	Size (MB)	Date	Vantage Point		Caption
					Easting	Northing	
Lobe 2							
37		2012-C2-Station-37	2.450	26/08/2012	548510	7618957	Feature F: View NE of the continuation of the erosion channel on the eastern slope of the landfill, self-armouring, taken from the landfill crest (36 m x 0.20 - 2.0 m x 0.02 - 0.30m).
38		2012-C2-Station-38	2.510	26/08/2012	548534	7618974	Feature F: View SW of the erosion channel from the bottom, channel continues onto the local tundra (36 m x 0.30 - 2.0 m x 0.02 - 0.20 m).
39		2012-C2-Station-39	2.520	26/08/2012	548532	7618937	Feature E: View NE from the landfill crest of three erosion channels, sediment can be seen deposited on the local tundra. (12.2 m x 0.10 - 0.50 m x 0.10 - 0.15m)
40		2012-C2-Station-40	2.560	26/08/2012	548542	7618944	Feature E: View SW from the bottom of three erosion channels, sediment can be seen deposited on the local tundra. (12.2 m x 0.10 - 0.50 m x 0.10 - 0.15m)
41		2012-C2-Station-41	2.560	26/08/2012	548538	7618916	Feature D: View east of the northern erosion channels associated with this feature, two channels converge at the landfill toe to form one channel self armouring. (15 m x 0.10 - 1.5 m x 0.10 m)
42		2012-C2-Station-42	2.570	26/08/2012	548553	7618919	Feature D: View west of the southern channels, two channels converge to form a larger channel at the landfill toe. (8 m x 0.20 - 0.50 m x 0.10 - 0.15 m).
43		2012-C2-Station-43	2.490	26/08/2012	548540	7618879	Feature D: View east of smaller erosion channel associated with this feature, to the south of the larger channels, self armouring (8 m x 0.20 - 0.50 m x 0.05 - 0.10 m).
44		2012-C2-Station-44	2.460	26/08/2012	548548	7618882	Feature D: View west of smaller erosion channel associated with this feature, to the south of the larger channels, self armouring (8 m x 0.05 - 0.20 m x 0.10 - 0.15 m).
45		2012-C2-Station-45	2.390	26/08/2012	548538	7618874	Feature J: Tension crack, no longer visible for the full extend observed in 2010. (1.20 m x 0.01 - 0.05 m x 0.05 m)
46		2012-C2-Station-46	2.580	26/08/2012	548538	7618874	Feature J: Close-up of tension crack.
47		2012-C2-Station-47	64.200	26/08/2012	548534	7618861	Panoramic view NNW to NNE of the southern portion of the landfill cap and the western toe/crest. Taken from the S end of the landfill.
48		2012-C2-Station-48	2.640	26/08/2012	548534	7618861	View NW of W toe of the landfill.
49		2012-C2-Station-49	2.480	26/08/2012	548544	7618941	View N of the E toe of the landfill.
Lobe 3							
50		2012-C2-Station-50	75.400	26/08/2012	548454	7618865	Panoramic view NW - NNE of the southeastern section of Lobe 3
51		2012-C2-Station-51	2.490	26/08/2012	548440	7618870	Feature C: View of minor erosion on the west landfill toe
52		2012-C2-Station-52	2.480	26/08/2012	548433	7618882	Feature C: View of minor erosion on the west landfill toe
53		2012-C2-Station-53	2.520	26/08/2012	548430	7618885	Feature C: View of minor erosion on the west landfill toe
54		2012-C2-Station-54	2.440	26/08/2012	548442	7618914	Feature C: View of minor erosion on the east landfill toe
55		2012-C2-Station-55	2.420	26/08/2012	548436	7618922	Feature C: View of minor erosion on the east landfill toe
56		2012-C2-Station-56	2.500	26/08/2012	548414	7618950	View SSE of east toe of landfill, Tier II visible in the background
57		2012-C2-Station-57	2.650	26/08/2012	548383	7618915	View SE of W corner of landfill.

COLLECTION OF LANDFILL MONITORING DATA –FINAL REPORT, 2012
CAM-2 DISTANT EARLY WARNING LINE SITE, GLADMAN POINT, NUNAVUT

Photo	Thumbnail	Filename	Size (MB)	Date	Vantage Point		Caption
					Easting	Northing	
Lobe 4							
58		2012-C2-Station-58	2.390	26/08/2012	548318	7619021	Feature P: Hydrocarbon stain, approximately center on the lobe. (0.60 m x 0.50 m)
59		2012-C2-Station-59	115.000	26/08/2012	548301	7619003	Panoramic view NE - E of landfill
61		2012-C2-Station-61	118.000	26/08/2012	548340	7619034	Panoramic view SSW - WSW of landfill
Lobe 5							
63		2012-C2-Station-63	2.390	26/08/2012	548256	7619023	Feature A: Four minor depressions on the landfill surface, an increase from 2 as previously reported.
64		2012-C2-Station-64	2.390	26/08/2012	548255	7619025	Feature A: Four minor depressions on the landfill surface, an increase from 2 as previously reported.
65		2012-C2-Station-65	2.400	26/08/2012	548254	7619027	Feature A: Four minor depressions on the landfill surface, an increase from 2 as previously reported.
66		2012-C2-Station-66	2.470	26/08/2012	548251	7619026	Feature A: Four minor depressions on the landfill surface, an increase from 2 as previously reported.
67		2012-C2-Station-67	2.500	26/08/2012	548264	7619049	Feature Q/R: Minor depression on the north side of the landfill, associated with a large coble (Q). Vegetation present in the bottom and adjacent to depression (R).
68		2012-C2-Station-68	79.500	26/08/2012	548252	7619062	Panoramic view SE - SSW of landfill
69		2012-C2-Station-69	86.400	26/08/2012	548296	7619024	Panoramic view SW to NW of landfill
General							
11		2012-C2-Station-11	2.620	26/08/2012	548460	7618828	View from Tier II of Lobes 4 and 5 as well as the west corner of lobe 3
12		2012-C2-Station-12	2.240	26/08/2012	548460	7618828	View from the Tier II of lobe 3
13		2012-C2-Station-13	2.200	26/08/2012	548460	7618828	View from Tier II of Lobes 2
70		2012-C2-Station-70	64.500	28/08/2012	Aerial		Aerial view of the Station landfill, taken from a Twin Otter.
Soil Sampling							
1		2012-C2-Station-1	2.420	24/08/2012	548458	7619127	C2-1: Close-up of open soil test pit
2		2012-C2-Station-2	2.340	24/08/2012	548458	7619127	C2-1: Close-up of closed soil test pit
3		2012-C2-Station-3	2.390	24/08/2012	548508	7619065	C2-2: Close-up of open soil test pit
4		2012-C2-Station-4	2.370	24/08/2012	548508	7619065	C2-2: Close-up of closed soil test pit
5		2012-C2-Station-5	2.410	24/08/2012	548537	7618996	C2-3: Close-up of open soil test pit
6		2012-C2-Station-6	2.410	24/08/2012	548537	7618996	C2-3: Close-up of closed soil test pit
7		2012-C2-Station-7	2.370	24/08/2012	548579	7618949	C2-4: Close-up of open soil test pit
8		2012-C2-Station-8	2.300	24/08/2012	548579	7618949	C2-4: Close-up of closed soil test pit
9		2012-C2-Station-9	2.400	24/08/2012	548363	7619022	C2-5: Close-up of open soil test pit
10		2012-C2-Station-10	2.360	24/08/2012	548363	7619022	C2-5: Close-up of closed soil test pit

3.6 SOIL SAMPLE ANALYTICAL DATA

The soil chemical analysis results and evaluation of analytical data for the 2012 Station Landfill samples are presented in Tables VII and VIII respectively. Certificates of Analysis and results from field duplicates collected as part of the QA/QC program are presented in Appendix C at the end of this report.

Table VII: Station Landfill Summary Table of Soil Analytical Results

Sample #	Location	Depth [cm]	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	PHC(F1)	PHC(F2)	PHC(F3)	TPH
													C ₆ -C ₁₀	C ₁₀ -C ₁₆	C ₁₆ -C ₃₄	C ₆ -C ₃₄
Upgradient Samples																
C2-12-5-A	C2-5	0-15	5.5	5.7	2.1	<0.5	3.6	14	6.3	1.0	<0.5	<0.05	<10	<10	101	101
C2-12-5-B		40-50	1.8	3.3	1.1	<0.5	2.5	4	4.2	0.6	<0.5	<0.05	<10	<10	<10	<10
Downgradient Samples																
C2-12-1-A	C2-1	0-15	7.8	4.5	1.3	<0.5	4.0	11	4.7	13.9	<0.5	<0.05	<10	<10	438	438
C2-12-1-B		40-50	1.7	3.3	1.2	<0.5	3.1	6	4.1	0.7	<0.5	<0.05	<10	<10	20	20
C2-12-2-A	C2-2	0-15	5.3	4.5	1.4	<0.5	3.9	12	7.6	1.3	<0.5	<0.05	<10	11	382	393
C2-12-2-A-D		0-15	5.9	3.6	1.2	<0.5	3.5	14	7.0	0.9	<0.5	<0.05	<10	<10	485	485
C2-12-2-B		40-50	1.8	2.8	0.9	<0.5	2.7	8	3.4	<0.5	<0.5	<0.05	<10	<10	<10	<10
C2-12-3-A	C2-3	0-15	2.0	2.9	1.0	<0.5	2.2	5	3.1	0.6	<0.5	<0.05	<10	<10	13	13
C2-12-3-B		40-50	3.9	4.0	1.3	<0.5	3.3	6	4.3	1.0	<0.5	<0.05	<10	<10	21	21
C2-12-4-A	C2-4	0-15	2.3	3.7	1.1	<0.5	2.7	7	4.5	<0.5	<0.5	<0.05	<10	<10	44	44
C2-12-4-B		40-50	1.8	3.1	0.9	<0.5	2.1	4	3.4	<0.5	<0.5	<0.05	<10	<10	12	12

Table VIII: Evaluation of 2012 Soil Analytical Data – Station Landfill

Parameter	Evaluation
Copper (Cu)	Copper was detected at all sample locations. Concentrations ranged from 1.7 – 7.8 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of copper was detected in the surface sample of C2-2. All values were below CCME guidelines.
Nickel (Ni)	Nickel was detected at all sample locations. Results were consistent at upgradient and downgradient locations with concentrations ranging from 2.8 – 5.7 mg/kg. The highest concentration was detected in the surface sample of C2-5, the upgradient sample. All values were below CCME guidelines.
Cobalt (Co)	Cobalt was detected at all sample locations. Concentrations ranged from 0.9 – 2.1 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of cobalt was detected in the surface sample of C2-2. All values were below CCME guidelines.
Cadmium (Cd)	Cadmium was below the method detection limit at all sampling locations.
Lead (Pb)	Lead was detected at all sample locations. Concentrations ranged from 2.1 – 4.0 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of lead was detected in the surface sample of C2-1. All values were below CCME guidelines.
Zinc (Zn)	Zinc was detected at all sample locations. Concentrations ranged from 4 – 14 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of zinc was detected at two locations in the surface sample of C2-2 and C2-5. All values were below CCME guidelines.
Chromium (Cr)	Chromium was detected at all sample locations. Concentrations ranged from 3.1 – 7.6 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of chromium was detected in the surface sample of C2-2. All values were below CCME guidelines.
Arsenic (As)	Arsenic was detected at surface and depth for all locations with the exception of C2-4 where it was not detected and C2-2 where it was only detected in the surface sample. The highest detected concentration 13.9 mg/kg at C2-1 is above the CCME criteria of 12 mg/kg. All other detected arsenic concentrations were relatively low, ranging from 0.6 – 1.3.
Mercury (Hg)	Mercury was below the method detection limit at all sampling locations.
PCBs	PCBs were below the method detection limit at all sampling locations.
TPH	TPH was detected at all sampling locations at surface and depth with the exception of sampling locations C2-2 and C2-5 where TPH was only detected in the surface samples. Detected TPH concentrations ranged from 12 – 485 mg/kg with the highest concentration detected at the surface of C2-2. All TPH concentrations are below standard DEW Line remediation criterion for TPH concentrations in soil.

4 WEST LANDFILL - NORTH

4.1 SUMMARY

During the 2012 monitoring event of the West Landfill - North at CAM-2 Gladman Point soil samples were collected at 5 locations (1 upgradient and 4 downgradient locations) and a visual inspection was conducted to identify and assess erosional features on the regraded lobes.

PCBs or relatively high metal concentrations were not detected at any of the soil sampling locations. TPH was detected at all sampling locations and in all samples with the exception of the surface sample at C2-6. Detectable TPH concentrations ranged from 14 to 446 mg/kg with the highest concentration detected at the surface of the C2-7 sampling location. All detected TPH was primarily in the F3 fraction. Currently all TPH readings are below the standard site criteria of 2500 mg/kg and are therefore acceptable.

During the 2012 monitoring program, little change was observed at the West Landfill – North in comparison to the 2010 monitoring program. No significant or unacceptable erosional features were observed and therefore the West Landfill – North is rated as acceptable.

4.2 VISUAL INSPECTION REPORT

The visual inspection of the West Landfill – North area was conducted on August 26, 2012. The Visual Inspection Checklist/Report has been completed as per the TOR and is included as Table IX of this report. Please refer to Figure CAM-2.3 for the location of photographs and erosional features at the West Landfill – North.

Weather Conditions at Time of Inspection

At the time of the visual inspection of the West Landfill - North, the temperature was approximately 2°C, skies were overcast and winds of 20 km/h from the south were observed.

Settlement

Settlement was noted at two locations during the 2012 monitoring program at Lobe 2 (Feature B) and Lobe 3 (Feature C). Feature B on the south/middle surface of Lobe 2 is a long shallow depression of little consequence to the stability of the Lobe. Feature C consists of three depressions, one on the south side slope, a linear depression running parallel to the toe and a

group depression on the southeast surface of the Landfill. The cover of the Landfill continues to remain stable. Feature B and C have acceptable severity ratings.

Erosion

Minor surface erosion was noted along a runoff channel that extends between two closely spaced Lobes (Lobes 4 and 5) in the central area of the Landfill (Feature A). The erosion extends along the toe of Lobe 4 and is not in direct contact with the Landfill. 2012 observations of Feature A remain consistent with the 2010 findings.

Frost Action

Evidence of frost action was not noted.

Evidence of Burrowing Animals

Evidence of an animal was observed at the south corner (on the side slope) of Lobe 4, Feature D. Similar burrows were observed at different areas on the Site but the feature at Lobe 4 was the only burrow observed on a Landfill Lobe. The small size of the burrow suggests it was made by a small rodent of an unknown type, no animals were observed entering or leaving the burrow. Feature D has an acceptable severity rating.

Vegetation

Evidence of vegetation was not noted.

Staining

Areas of staining were not observed at the time of the inspection.

Seepage Points

No seepage points were observed at this Landfill.

Debris

There was no evidence of exposed debris at this Landfill.

Presence/Condition of Monitoring Instruments

There are no monitoring instruments installed at this Landfill.

Other Features of Note

A single area of ponding water was noted at the toe of one of the down gradient Lobes. The ponded water was contained to a small dugout area located immediately adjacent to Lobe 6.

Another feature of note (Feature E) was observed on the north eastern surface of Lobe 4, a raised area approximately 10 m in diameter and 1.5 m above the grade of the surrounding Landfill surface. The change in gradient is not indicated on the drawings and was not mentioned in the 2010 report.

Table IX: Visual Inspection Checklist / Report – West Landfill – North

**DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
VISUAL INSPECTION CHECKLIST
INSPECTION REPORT – PAGE 1 of 2**

SITE NAME: CAM-2 Gladman Point
LANDFILL DESIGNATION: West Landfill - North (Existing Landfill – Regrade)
DATE OF INSPECTION: August 27, 2012
DATE OF PREVIOUS INSPECTION: August 16, 2010
INSPECTED BY: B. MacKay
REPORT PREPARED BY: B. MacKay
LANDFILL MONITORING EVENT #: 7
The inspector/reporter represents to the best of his/her knowledge that 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 (m)	Width (m)	Depth (m)	Extent (m)	Description	Photographic Record (2012-C2-West-N)	Severity Rating	Additional Comments
Settlement	Yes	FEATURE B See Figure CAM-2.3 (between Lobe 2)	2.5	0.4	0.1	Occasional	Linear depression	18	Acceptable	New Observation: Singular depression of the landfill surface.
		FEATURE C See Figure CAM-2.3 (between Lobe 3)	1.5 - 4.0	0.20 - 0.50	0.10 - 0.15		Depression	22, 22B	Acceptable	New Observation: Three areas of settlement including a linear depression of the north landfill toe, and two areas of settlement on the landfill surface.
Erosion	Yes	FEATURE A See Figure CAM-2.3 (between Lobes 4 and 5)	20 m	0.4 m	5 cm	Isolated <1%	Minor erosion between regrade lobes	23, 24	Acceptable	Runoff channel located between regrade areas, extending NE along the toe of Lobe 4. Feature has not significantly changed in size since the previous inspection.
Frost Action	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Animal Burrows	Yes	FEATURE D See Figure CAM-2.3 (between Lobe 4)	0.05	0.04	Unknown	Isolated	Small animal burrow	30	Acceptable	New Observation: Small animal burrow in the side of the landfill, suspected to be of a lemming due to the dimensions of the hole.
Vegetation	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Staining	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Vegetation Stress	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Seepage Points	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Debris Exposed	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Presence/Condition of Monitoring Instruments	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Other Features of Note:	Yes	Feature E	10	10	1.5	Isolated	Above grade section	31	Acceptable	New Observation: Area 10 m in diameter that is 1.5 m above the surrounding grade of the landfill - not previously reported and not indicated on drawings as part of the natural contours of the landfill cap.
		See Figure CAM-2.3 (ponding)	3	2	0.2	<1	Isolated	38	Acceptable	Dug-out area at edge of regrade area.
Additional Photos	Yes	See Figure CAM-2.3 and Photographic Record	N/A	N/A	N/A	N/A	General Photographic Record	N/A	Not Observed	General photos for documentation, no features of note.
Overall Landfill Performance:		Acceptable								

4.3 PRELIMINARY STABILITY ASSESSMENT

The Preliminary Stability Assessment for West Landfill – North has been completed as per the TOR and is included as Table X hereafter.

Table X: Preliminary Stability Assessment – West Landfill – North

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Acceptable	Isolated
Frost Action	Not observed	None
Staining	Not observed	None
Vegetation Stress	Not observed	None
Seepage/Ponded Water	Acceptable	Isolated
Debris exposure	Not observed	None
Overall Landfill Performance	Acceptable	

4.4 LOCATION PLAN

The Location Plan for the West Landfill – North has been completed as per the TOR and is included in the following page as Figure CAM-2.3 Gladman Point – West Landfill – North.

Figure 2 : CAM-2.3 Gladman Point – West Landfill – North

4.5 PHOTOGRAPHIC RECORDS

The Photographic Record for the West Landfill – North has been completed as per the TOR and is included in the following pages as Table XI. The Photographic Record only contains an index and “thumbnail” photographs. Full-sized photographs are contained in the Addendum DVD-ROM.

Table XI: Landfill Visual Inspection Photo Log – West Landfill – North

Photo	Thumbnail	Filename	Size (MB)	Date	Vantage Point		Caption
					Easting	Northing	
Lobe 1							
11		2012-C2-West-N-11	116.000	27/08/2012	547713	7619688	Panoramic view NW - NNE of SW side of landfill
12		2012-C2-West-N-12	82.500	27/08/2012	547745	7619716	Panoramic view SE - SW of the north side of the landfill
13		2012-C2-West-N-13	2.600	27/08/2012	547735	7619708	View SW of the landfill cap from the NE corner
Lobe 2							
14		2012-C2-West-N-14	111.000	27/08/2012	547749	7619716	Panoramic view ESE - S of the N and W landfill toes
15		2012-C2-West-N-15	95.000	27/08/2012	547804	7619700	Panoramic view SSW - W of the N and E landfill toes
16		2012-C2-West-N-16	66.800	27/08/2012	547758	7619662	Panoramic view NW - E of the south landfill toe and a portion of the eastern cap.
17		2012-C2-West-N-17	85.000	27/08/2012	547743	7619673	Panoramic view N - ESE taken from the SW corner of the lobe
18		2012-C2-West-N-18	2.430	27/08/2012	547773	7619672	Feature B: Close-up of a minor depression on the landfill surface (2.5 m x 0.40 m x 0.10 m)
Lobe 3							
19		2012-C2-West-N-19	80.300	27/08/2012	547761	7619658	Panoramic view E - SE of regraded area between Lobes 2 and 3
20		2012-C2-West-N-20	174.000	27/08/2012	547759	7619649	Panoramic view E - SE of the NE corner and associated toes of the lobe.
21		2012-C2-West-N-21	57.900	27/08/2012	547784	7619606	Panoramic view NNW - E of the landfill cap, taken from the southern corner of the lobe
22		2012-C2-West-N-22	2.480	27/08/2012	547793	7619605	Feature C: View E of linear depression on the south toe of the landfill (4 m x 0.25 m x 0.15 m)
22B		2012-C2-West-N-22B	2.450	27/08/2012	547801	7619607	Feature C: View of two shallow depressions on the landfill surface, GPS device is in the middle of the two depressions. (1.5 m x 0.20 - 0.50 m x 0.10 m)
Lobe 4							
23		2012-C2-West-N-23	2.530	27/08/2012	547860	7619603	Feature A: View NE of minor erosion of the base of the runoff channel between lobes 4 and 5. (20 m x 0.40 m x 0.05 m)
24		2012-C2-West-N-24	2.650	27/08/2012	547871	7619612	Feature A: View SW of minor erosion of the base of the runoff channel between lobes 4 and 5. (20 m x 0.40 m x 0.05 m)
25		2012-C2-West-N-25	51.000	27/08/2012	547854	7619605	Panoramic view WSW - NNE of the landfill cap, taken from the SE corner of the lobe, adjacent to the drainage channel
26		2012-C2-West-N-26	87.800	27/08/2012	547845	7619690	Panoramic view SE - SSE of the landfill cap, taken from the NW corner of the lobe.
27		2012-C2-West-N-27	60.400	27/08/2012	547901	7619664	Panoramic view S - NW of the landfill cap, taken from the NE corner of the lobe.
28		2012-C2-West-N-28	64.100	27/08/2012	547923	7619666	Panoramic view SW - NW of the landfill cap, taken from the tundra, 20 m ENE of the NE corner.
29		2012-C2-West-N-29	112.000	27/08/2012	547810	7619597	Panoramic view N - W of the landfill cap, taken from the SW corner of the landfill.
30		2012-C2-West-N-30	2.580	27/08/2012	547810	7619597	Feature D: Close-up of an animal burrow at the SW corner of the landfill.
31		2012-C2-West-N-31	2.850	27/08/2012	547843	7619664	View E of a portion of the regrade that is 1.5 m then the surrounding grade, approximately 10 m in diameter.

COLLECTION OF LANDFILL MONITORING DATA – FINAL REPORT, 2012
CAM-2 DISTANT EARLY WARNING LINE SITE, GLADMAN POINT, NUNAVUT

Photo	Thumbnail	Filename	Size (MB)	Date	Vantage Point		Caption
					Easting	Northing	
Lobe 5							
32		2012-C2-West-N-32	123.000	27/08/2012	547855	7619596	Panoramic view SE - NE of the landfill cap, taken from the NW corner of the lobe adjacent to the drainage channel. Lobe 6 is visible in the background of the photo.
33		2012-C2-West-N-33	64.700	27/08/2012	547934	7619588	Panoramic view SE - NW of the northern landfill toe.
34		2012-C2-West-N-34	70.000	27/08/2012	547972	7619544	Panoramic view SE - NW of the northern landfill toe.
35		2012-C2-West-N-35	2.660	27/08/2012	547946	7619514	View NW of landfill cap taken from the SE corner of the landfill.
36		2012-C2-West-N-36	66.900	27/08/2012	547936	7619498	Panoramic view NW - NE of southern landfill toe, taken from the SE corner of the landfill
Lobe 6							
37		2012-C2-West-N-37	96.200	27/08/2012	547964	7619614	Panoramic view SW - WNW of NE landfill toe.
38		2012-C2-West-N-38	2.530	27/08/2012	547944	7619605	View SE of water pooled in a dug-out area adjacent to the lobe.
39		2012-C2-West-N-39	178.000	27/08/2012	547902	7619627	Panoramic view NE - E of the S landfill toe
40		2012-C2-West-N-40	101.000	27/08/2012	547934	7619588	Panoramic view NNW - NE of the SE landfill toe.
41		2012-C2-West-N-41	2.600	27/08/2012	547998	7619543	View N of lobe.
General							
42		2012-C2-West-N-42	6.400	28/08/2012	Aerial		Aerial view of the regrades
Soil Samples							
1		2012-C2-West-N-1	2.430	25/08/2012	547771	7619712	C2-6: Close-up of open soil test pit
2		2012-C2-West-N-2	2.350	25/08/2012	547771	7619712	C2-6: Close-up of closed soil test pit
3		2012-C2-West-N-3	2.470	25/08/2012	547872	7619696	C2-7: Close-up of open soil test pit
4		2012-C2-West-N-4	2.340	25/08/2012	547872	7619696	C2-7: Close-up of closed soil test pit
5		2012-C2-West-N-5	2.440	25/08/2012	547966	7619632	C2-8: Close-up of open soil test pit
6		2012-C2-West-N-6	2.440	25/08/2012	547966	7619632	C2-8: Close-up of closed soil test pit
7		2012-C2-West-N-7	2.630	25/08/2012	548025	7619574	C2-9: Close-up of open soil test pit
8		2012-C2-West-N-8	2.360	25/08/2012	548025	7619574	C2-9: Close-up of closed soil test pit
9		2012-C2-West-N-9	2.410	25/08/2012	547768	7619599	C2-10: Close-up of open soil test pit
10		2012-C2-West-N-10	2.410	25/08/2012	547768	7619599	C2-10: Close-up of closed soil test pit

4.6 SOIL SAMPLE ANALYTICAL DATA

The soil chemical analysis results and evaluation of analytical data for the 2010 West Landfill – North area samples are presented in Tables XII and XIII hereafter. Certificates of Analysis and results from field duplicates collected as part of the QA/QC program are presented in Appendix C at the end of this report.

Table XII: West Landfill – North Summary Table for Soil Analytical Results

Sample #	Location	Depth [cm]	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	PHC(F1)	PHC(F2)	PHC(F3)	TPH
													C ₆ -C ₁₀	C ₁₀ -C ₁₆	C ₁₆ -C ₃₄	C ₆ -C ₃₄
Upgradient Samples																
C2-12-10-A	C2-10	0-15	3.3	6.0	2.0	<0.5	3.9	11	6.8	1.1	<0.5	<0.05	<10	<10	32	32
C2-12-10-B		40-50	3.0	5.4	2.1	<0.5	3.4	11	6.4	1.2	<0.5	<0.05	<10	<10	14	14
Downgradient Samples																
C2-12-6-A	C2-6	0-15	2.2	1.9	0.7	<0.5	1.2	6	2.9	<0.5	<0.5	<0.05	<10	<10	<10	<10
C2-12-6-B		40-50	1.3	2.9	0.7	<0.5	1.3	3	2.6	<0.5	<0.5	<0.05	<10	<10	31	31
C2-12-7-A	C2-7	0-15	20.8	6.6	1.4	<0.5	3.0	6	5.4	1.4	<0.5	<0.05	<10	11	435	446
C2-12-7-B		40-50	3.9	3.9	1.0	<0.5	2.2	5	4.5	0.6	<0.5	<0.05	<10	<10	115	115
C2-12-8-A	C2-8	0-15	5.7	4.3	2.4	<0.5	2.3	6	4.6	2.2	<0.5	<0.05	<10	<10	106	106
C2-12-8-B		40-50	16.2	15.4	6.9	<0.5	14.7	37	24.6	2.9	<0.5	<0.05	<10	<10	59	59
C2-12-9-A	C2-9	0-15	3.3	7.6	3.4	<0.5	2.8	18	8.8	1.9	<0.5	<0.05	<10	<10	24	24
C2-12-9-B		40-50	11.5	12.6	5.5	<0.5	10.4	32	21.9	2.9	<0.5	<0.05	<10	<10	42	42

Table XIII: Evaluation of 2012 Soil Analytical Data – West Landfill – North

Parameter	Evaluation
Copper (Cu)	Copper was detected at all sample locations. Concentrations ranged from 1.3 – 20.8 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of copper was detected at the surface of C2-7. All values were below CCME guidelines.
Nickel (Ni)	Nickel was detected at all sample locations. Results were consistent at upgradient and downgradient locations with concentrations ranging from 1.9 – 15.4 mg/kg. The highest concentration was detected at depth at C2-8, a downgradient sample. All values were below CCME guidelines.
Cobalt (Co)	Cobalt was detected at all sample locations. Concentrations ranged from 0.7 – 6.9 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of cobalt was detected at depth at C2-8, a downgradient sample. All values were below CCME guidelines.
Cadmium (Cd)	Cadmium was below the method detection limit at all sampling locations.
Lead (Pb)	Lead was detected at all sample locations. Concentrations ranged from 1.2 – 14.7mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of lead was detected at depth at C2-8, a downgradient sample 1. All values were below CCME guidelines.
Zinc (Zn)	Zinc was detected at all sample locations. Concentrations ranged from 3 – 37 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of zinc was detected at depth at C2-8, a downgradient sample. All values were below CCME guidelines.
Chromium (Cr)	Chromium was detected at all sample locations. Concentrations ranged from 2.6 – 24.6 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of chromium was detected at depth at C2-8, a downgradient sample. All values were below CCME guidelines.
Arsenic (As)	Arsenic was detected at all sample locations with the exception of C2-6. Detected concentrations ranged from 0.6 – 2.9 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of arsenic was detected at depth at two locations C2-8 and C2-9, a downgradient samples. All values were below CCME guidelines.
Mercury (Hg)	Mercury was below the method detection limit at all sampling locations.
PCBs	PCBs were below the method detection limit at all sampling locations.
TPH	TPH was detected at all sampling locations at surface and depth with the exception of C2-6 where TPH was only detected at depth. Detected TPH concentrations ranged from 14 – 446 mg/kg with the highest concentration detected at the surface of C2-7. All TPH concentrations are below standard DEW Line remediation criterion for TPH concentrations in soil.

5 WEST LANDFILL – SOUTH

5.1 SUMMARY

During the 2012 monitoring event of the West Landfill - South at CAM-2 Gladman Point soil samples were collected at 4 locations (1 upgradient and 3 downgradient locations) and a visual inspection was conducted to identify and assess erosional features on the regraded lobes.

PCBs or relatively high metal concentrations were not detected at any of the soil sampling locations. TPH was detected at all sampling locations and in all samples with the exception of the depth samples at locations C2-12, 13 and 14. Detectable TPH concentrations ranged from 12 to 210 mg/kg with the highest concentration detected at the surface of the C2-11 sampling location. All detected TPH was in the F3 fraction. Currently all TPH readings are below the standard site criteria of 2500 mg/kg and are therefore acceptable.

The West Landfill – South has experienced little change in the overall stability since the 2010 monitoring program, with only a few indications of increased settlement and one area of seepage. As all of the features present at the West Landfill – South have an acceptable severity rating and soil analytical results are acceptable, the Landfill's overall performance is rated as acceptable.

5.2 VISUAL INSPECTION REPORT

The visual inspection of the West Landfill – South area was conducted on August 27, 2012. The Visual Inspection Checklist/Report has been completed as per the TOR and is included as Table XIV of this report. Please refer to Figure CAM-2.4 for the location of photographs and erosional features at the West Landfill – South.

Weather at Time of Visual Inspection

At the time of the visual inspection of the West Landfill - South, the temperature was approximately 2°C, skies were partly cloudy and winds of 20 km/h from the south were observed.

Settlement

During the 2012 monitoring program, minor indications of settlement were noted at three locations at the West Landfill – South, including two areas at Lobe 8 (Feature A and C) and a third location at Lobe 10 (Feature E)

Feature A, first noted in the 2010 monitoring program, showed a series of three closely spaced depressions on the east surface of Lobe 8, which have experienced little to no significant change. Feature C includes six depressions east of Feature A on the surface of the Lobe, four of which are a tight cluster of potholes, while two slightly to the south appear to be the remnants of pick-up tire tracks. It appears as though settlement has increased since the 2010 monitoring program however, at least two of the depressions are a relic of the remediation contract.

Feature E, a new observation, consists of a small linear depression on the northern slope of Lobe 10, which runs parallel to the Landfill toe.

All areas of settlement observed at the West Landfill – South are considered to have an acceptable severity rating.

Erosion

Indications of erosion were not noted.

Frost Action

Evidence of frost action was not noted.

Evidence of Burrowing Animals

Indications of burrowing animals were not noted.

Re-establishment of Vegetation

Evidence of vegetation was not noted.

Staining

Areas of staining were not observed at the time of the inspection.

Seepage Points

Feature D, first noted during the 2012 monitoring program, consists of surface wetting across the north portion of the Landfill toe, extending 5 m onto the surface of the Lobe. Ponded water in direct contact with the toe is present in two locations, on the northwest and the northeast side of the landfill. The tundra on the northwest side has evidence of rutting from machinery traffic which is now collecting water.

Debris

Feature B, a piece of partially exposed black geotextile associated with the engineered drainage channel at the southeast end of Lobe 11 remains unchanged from previous years.

Presence/Condition of Monitoring Instruments

There are no monitoring instruments installed at this Landfill.

Other Features of Note

A single area of ponding water was noted in a low lying area extending between Lobe 11 and adjacent to Lobe 10 to the north. There were no seepage points or staining associated with the ponded water.

Table XIV: Visual Inspection Checklist / Report – West Landfill – South

**DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
VISUAL INSPECTION CHECKLIST
INSPECTION REPORT – PAGE 1 of 2**

SITE NAME: CAM-2 Gladman Point
LANDFILL DESIGNATION: West Landfill – South (Existing Landfill – Regrade)
DATE OF INSPECTION: August 27, 2012
DATE OF PREVIOUS INSPECTION: August 14, 2010
INSPECTED BY: B. MacKay
REPORT PREPARED BY: B. MacKay
LANDFILL MONITORING EVENT #: 7
The inspector/reporter represents to the best of his/her knowledge that 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 (m)	Width (m)	Depth (m)	Extent	Description	Photographic Record	Severity Rating	Additional Comments
Settlement	Yes	FEATURE A See Figure CAM-2.4 (east side of Lobe 8)	0.5 - 0.8	0.5 - 0.8	0.05 - 0.15	Occasional	Three small depressions (potholes) on surface of lobe	11, 12	Acceptable	Three small depressions on the east side of the lobe, shows little or no change in dimension since the previous inspection in 2010.
		FEATURE C See Figure CAM-2.4 (east side of Lobe 8)	0.5 - 2.0	0.5 - 1.0	0.1 - 0.2		Six small depressions (potholes) on surface of lobe	13, 14, 15	Acceptable	New Observation: Six small depressions on the surface of the landfill, four of which are located in the east corner of the landfill with the remaining two on the south west side of the landfill. Depressions on the south west side appear to be from a pick-up truck and thus, an oversight on previous inspections.
		FEATURE E See Figure CAM-2.4 (Lobe 10)	0.3	0.2	0.1		Small depression on the north slope	22	Acceptable	New Observation: Small depression on the north slope of Lobe 10.
Erosion	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Frost Action	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Animal Burrows	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Vegetation	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Staining	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Vegetation Stress	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Seepage Points	Yes	FEATURE D See Figure CAM-2.4 (North side of Lobe 9)	20	5	Unknown	Isolated	Seepage, surface wetting and ponded water	18, 19	Acceptable	New Observation: Feature consists of surface wetting across the north portion of the landfill toe, extending 5 m onto the surface of the lobe. Ponded water in direct contact with toe is present in two locations, on the northwest side of the landfill and the north east. The tundra on the northwest side has evidence of rutting from machinery traffic which is now collecting water.
Debris Exposed	Yes	FEATURE B See Figure CAM-2.4 (east end of drainage channel - Lobe 11)	0.3	0.4	Unknown	Isolated	Black geotextile fabric	28, 29	Acceptable	Similar material used in construction of drainage channel.
Presence/Condition of Monitoring Instruments	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Other Features of Note	Yes	See Figure CAM-2.4 (ponding north of Lobe 11)	25	41186	41187	N/A	Ponding in downgradient area north of Lobe 11	25	Acceptable	Localized ponding between lobes.
Additional Photos	Yes	See Figure CAM-2.4 and Photographic Record	N/A	N/A	N/A	N/A	General Photographic Record	N/A	Not Observed	General photos for documentation, no features of note.
Overall Landfill Performance:		Acceptable								

5.3 PRELIMINARY STABILITY ASSESSMENT

The Preliminary Stability Assessment for West Landfill – South has been completed as per the TOR and is included as Table XV hereafter.

Table XV: Preliminary Stability Assessment – West Landfill – South

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Not observed	None
Frost Action	Not observed	None
Staining	Not observed	None
Vegetation Stress	Not observed	None
Seepage/Ponded Water	Acceptable	Isolated
Debris exposure	Acceptable	Isolated
Overall Landfill Performance	Acceptable	

5.4 LOCATION PLAN

The Location Plan for the West Landfill – South has been completed as per the TOR and is included in the following page as Figure CAM-2.4 Gladman Point – West Landfill – South.

Figure 3 : CAM-2.4 Gladman Point – West Landfill – South

5.5 PHOTOGRAPHIC RECORDS

The Photographic Record for the West Landfill – South has been completed as per the TOR and is included in the following pages as Table XVI. The Photographic Record only contains an index and “thumbnail” photographs. Full-sized photographs are contained in the Addendum DVD-ROM.

Table XVI: Landfill Visual Inspection Photo Log – West Landfill – South

Photo	Thumbnail	Filename	Size (MB)	Date	Vantage Point		Caption
					Easting	Northing	
Lobe 8							
9		2012-C2-West-S-9	2.650	27/08/2012	547989	7619441	View SE of the NE portion of the landfill cap.
10		2012-C2-West-S-10	100.000	27/08/2012	547989	7619441	Panoramic view NNE - SSE of the W toe of the landfill.
11		2012-C2-West-S-11	2.420	27/08/2012	548012	7619456	Feature A: View E of three small depressions on the E side of Lobe 8, the GPS indicates the middle and most prominent depression (0.5-0.8 m x 0.5-0.8 m x 0.05 - 0.15 m)
12		2012-C2-West-S-12	2.410	27/08/2012	548012	7619456	Feature A: Close-up of the most prominent of the three depressions (0.80 m x 0.75 m x 0.15 m)
13		2012-C2-West-S-13	2.440	27/08/2012	548025	7619442	Feature C: View E of 4 of 6 new depressions observed on the landfill surface. These particular depressions are in the E corner of the lobe. (0.5-2.0 m x 0.5-1.0 m x 0.1-0.20 m)
14		2012-C2-West-S-14	2.400	27/08/2012	548025	7619442	Feature C: Close-up of depression
15		2012-C2-West-S-15	2.410	27/08/2012	548030	7619434	Feature C: View of 2 of 6 depressions along the SW side of the lobe
16		2012-C2-West-S-16	1.050	27/08/2012	548052	7619436	Panoramic view SW - NW of the E landfill toe.
Lobe 9							
17		2012-C2-West-S-17	2.800	27/08/2012	548052	7619436	View SE of the W portion of the lobe.
18		2012-C2-West-S-18	2.410	27/08/2012	548093	7619432	Feature D: Close-up of seepage/ponded water at the N landfill toe.
19		2012-C2-West-S-19	2.460	27/08/2012	548130	7619427	Feature D: View SW of NE portion of the landfill, ponded water is visible along the toe in the ruts of heavy machinery.
20		2012-C2-West-S-20	1.420	27/08/2012	548109	7619388	Panoramic view WNW - NNW of S portion of the landfill cap.
Lobe 10							
21		2012-C2-West-S-21	2.700	27/08/2012	548109	7619388	View SE of N landfill toe and cap, taken from the north corner of the landfill (Coordinate 352)
22		2012-C2-West-S-22	2.520	27/08/2012	548122	7619382	Feature E: Close-up linear depression on the N slope of the landfill.
23		2012-C2-West-S-23	7.810	27/08/2012	548112	7619359	Panoramic view NNW - NE of the landfill cap and S toe.
24		2012-C2-West-S-24	2.720	27/08/2012	548171	7619361	View NW of the E corner of the lobe, taken from Lobe 11.

COLLECTION OF LANDFILL MONITORING DATA – FINAL REPORT, 2012
CAM-2 DISTANT EARLY WARNING LINE SITE, GLADMAN POINT, NUNAVUT

Photo	Thumbnail	Filename	Size (MB)	Date	Vantage Point		Caption
					Easting	Northing	
Lobe 11							
25		2012-C2-West-S-25	2.660	27/08/2012	548172	7619361	View NW of ponded water at the NW corner of the lobe
26		2012-C2-West-S-26	7.240	27/08/2012	548201	7619369	Panoramic view SSE - W of northern portion of the landfill cap and associated toe.
27		2012-C2-West-S-27	9.990	27/08/2012	548262	7619331	Panoramic view S - W of NE portion of the landfill cap and associated toe, taken from the NE corner of the lobe (Coordinate 359)
28		2012-C2-West-S-28	2.350	27/08/2012	548269	7619262	Feature B: Close-up of exposed geotextile debris in the engineered drainage channel along the SE toe of the lobe.
29		2012-C2-West-S-29	2.460	27/08/2012	548269	7619262	Feature B: View E of exposed geotextile debris
30		2012-C2-West-S-30	2.590	27/08/2012	548225	7619251	View ENE of engineered channel
31		2012-C2-West-S-31	2.590	27/08/2012	548226	7619251	View W of S landfill toe
32		2012-C2-West-S-32	8.728	27/08/2012	548175	7619251	Panoramic view NNW - E of the S portion of the landfill, including the S toe and SE corner.
33		2012-C2-West-S-33	7.380	27/08/2012	548159	7619261	Panoramic view N - E of S portion of the landfill cap, taken from the NW corner.
34		2012-C2-West-S-34	17.400	27/08/2012	548172	7619308	Panoramic view N-S of landfill cap taken at the approximate midpoint of the W side of the landfill.
Soil Sampling							
1		2012-C2-West-S-1	2.590	25/08/2012	548133	7619437	C2-11: Close-up of open soil test pit
2		2012-C2-West-S-2	2.350	25/08/2012	548133	7619437	C2-11: Close-up of closed soil test pit
3		2012-C2-West-S-3	2.290	25/08/2012	548222	7619371	C2-12: Close-up of open soil test pit
4		2012-C2-West-S-4	2.370	25/08/2012	548222	7619371	C2-12: Close-up of closed soil test pit
5		2012-C2-West-S-5	2.380	25/08/2012	548266	7619315	C2-13: Close-up of open soil test pit
6		2012-C2-West-S-6	2.400	25/08/2012	548266	7619315	C2-13: Close-up of closed soil test pit
7		2012-C2-West-S-7	2.430	25/08/2012	548147	7619262	C2-14: Close-up of open soil test pit
8		2012-C2-West-S-8	2.360	25/08/2012	548147	7619262	C2-14: Close-up of closed soil test pit

5.6 SOIL SAMPLE ANALYTICAL DATA

The soil chemical analysis results and evaluation of 2012 analytical data for the West Landfill – South area samples are presented in Tables XVII and XVIII respectively. Certificates of Analysis and results from field duplicates collected as part of the QA/QC program are presented in Appendix C at the end of this report.

Table XVII: West Landfill – South Summary Table of Soil Analytical Data

Sample #	Location	Depth [cm]	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	PHC(F1)	PHC(F2)	PHC(F3)	TPH
													C ₆ -C ₁₀	C ₁₀ -C ₁₆	C ₁₆ -C ₃₄	C ₆ -C ₃₄
Upgradient Samples																
C2-12-14-A	C2-14	0-15	3.3	4.5	1.6	<0.5	2.9	16	4.9	0.8	<0.5	<0.05	<10	<10	58.0	58.0
C2-12-14-B		40-50	2.8	3.5	1.3	<0.5	2.3	6	4.3	0.8	<0.5	<0.05	<10	<10	<10	<10
Downgradient Samples																
C2-12-11-A	C2-11	0-15	4.2	5.7	1.7	<0.5	3.6	10	6.8	0.6	<0.5	<0.05	<10	<10	130.0	130.0
C2-12-11-A-D		0-15	5.7	4.9	1.4	<0.5	3.0	9	6.6	0.7	<0.5	<0.05	<10	<10	210.0	210.0
C2-12-11-B		40-50	5.3	6.3	2.2	<0.5	3.1	12	7.7	0.8	<0.5	<0.05	<10	<10	12.0	12.0
C2-12-12-A	C2-12	0-15	2.0	4.7	2.1	<0.5	2.1	14	7.0	0.6	<0.5	<0.05	<10	<10	32.0	32.0
C2-12-12-B		0-15	4.0	4.2	1.9	<0.5	1.3	11	6.3	<0.5	<0.5	<0.05	<10	<10	<10	<10
C2-12-13-A	C2-13	0-15	1.3	3.4	1.2	<0.5	2.0	5	3.0	<0.5	<0.5	<0.05	<10	<10	14.0	14.0
C2-12-13-B		40-50	1.6	3.5	0.9	<0.5	2.1	4	3.3	0.7	<0.5	<0.05	<10	<10	<10	<10

Table XVIII: Evaluation of 2012 Soil Analytical Data – West Landfill – South

Parameter	Evaluation
Copper (Cu)	Copper was detected at all sample locations. Concentrations ranged from 1.3 – 5.7 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of copper was detected at the surface of C2-11. All values were below CCME guidelines.
Nickel (Ni)	Nickel was detected at all sample locations. Results were consistent at upgradient and downgradient locations with concentrations ranging from 3.4 – 6.3 mg/kg. The highest concentration was detected at depth at C2-11, a downgradient sample. All values were below CCME guidelines.
Cobalt (Co)	Cobalt was detected at all sample locations. Concentrations ranged from 0.9 – 2.2 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of cobalt was detected at depth at C2-11, a downgradient sample. All values were below CCME guidelines.
Cadmium (Cd)	Cadmium was below the method detection limit at all sampling locations.
Lead (Pb)	Lead was detected at all sample locations. Concentrations ranged from 1.3 – 3.6 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of lead was detected at surface at C2-11, a downgradient sample. All values were below CCME guidelines.
Zinc (Zn)	Zinc was detected at all sample locations. Concentrations ranged from 4 – 16 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of zinc was detected at depth at C2-14, the upgradient sample. All values were below CCME guidelines.
Chromium (Cr)	Chromium was detected at all sample locations. Concentrations ranged from 3.0 – 7.7 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of chromium was detected at depth at C2-11, a downgradient sample. All values were below CCME guidelines.
Arsenic (As)	Arsenic was detected at all sample locations; at C2-12 it was not detected at depth while at C2-13 it was not detected at surface, at all other locations it was detected at the surface and at depth. Detected concentrations ranged from 0.6 – 0.8 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of arsenic was detected at two locations C2-11 at depth and C2-14 at surface and depth. All values were below CCME guidelines.
Mercury (Hg)	Mercury was below the method detection limit at all sampling locations.
PCBs	PCBs were below the method detection limit at all sampling locations.
TPH	TPH was detected at all sampling locations at surface and depth with the exception of C2-12, 13 and 14 where TPH was only detected at the surface. Detected TPH concentrations ranged from 14 – 210 mg/kg with the highest concentration detected at the surface of C2-11. All TPH concentrations are below standard DEW Line remediation criterion for TPH concentrations in soil.

6 TIER II DISPOSAL FACILITY

6.1 SUMMARY

During the 2012 monitoring event of the Tier II Disposal Facility at CAM-2 Gladman Point soil and groundwater samples were collected at 4 locations (1 upgradient and 3 downgradient), a visual inspection was conducted to identify and assess erosional features on the facility and thermal monitoring data was downloaded from three locations, the datalogger for a fourth location was reinstalled this year. Manual readings of thermistors were conducted at all four locations, the batteries were also replaced.

PCBs or relatively high metal concentrations were not detected at any of the soil sampling locations. TPH was detected at all sampling locations and in all samples with the exception of the depth sample at MW4. Detectable TPH concentrations ranged from 11 to 162 mg/kg with the highest concentration detected at the surface of the MW3. All detected TPH was primarily in the F3 fraction. Currently all TPH readings are below the standard site criteria of 2500 mg/kg and are therefore acceptable.

PCBs were not detected in any of the groundwater samples. No relatively high metal concentrations were detected in the Tier II groundwater samples. Low concentrations of TPH were detected at two monitoring wells MW1 (upgradient) and MW3 (downgradient). As the relatively high metal concentrations and TPH were detected at both up and downgradient wells, it does not appear to be reflection of the performance of the Tier II facility.

Upon comparing the 2010 and 2012 monitoring program results, it is clear the Tier II Disposal Facility has experienced little in the way of changes over the past two years. There are currently no significant or unacceptable features at the Tier II facility.

Thermal monitoring equipment is functioning properly.

Based on the results of the soil and groundwater results as well as the visual inspection the Tier II facility has an acceptable overall performance rating.

6.2 VISUAL INSPECTION REPORT

The visual inspection of the Tier II Disposal Facility was conducted on August 26, 2012. The Visual Inspection Checklist/Report has been completed as per the TOR and is included as Table XIX of this report. Please refer to Figure CAM-2.5 for the location of photographs and erosional features at the Tier II Disposal Facility.

Weather at Time of Visual Inspection

At the time of the visual inspection of the Tier II Disposal, the temperature was approximately 5°C, skies were overcast with light rain, fog was observed and little to no wind was observed. Precipitation was heavier during the early morning hours of August 26, 2012.

Settlement

Indications of settlement were noted at five locations (Features A through D and K) on the surface and side slopes of the Tier II Disposal Facility, an increase of one area from the 2010 monitoring program.

Feature A consists of subtle narrow linear depressions extending along the north and south crests of the landfill, whereas Features B, C, D and K consist of more localized depressions. Observations of Feature A are consistent with the dimensions observed during the 2010 monitoring program however, the small tension crack associated with this feature is no longer visible. Feature B on the eastern slope of the Landfill has decreased in size from the 2010 monitoring program, potentially the result of deposition of material eroded from further up the slope. Feature C, a relatively small depression at the time of the 2010 monitoring program at 0.4 m in length, has increased to 12 m in length extending along the crest of the Landfill. Feature D remains constant in size and extent. Newly observed Feature K consists of a small linear depression close to the middle of the slope and runs parallel to the Landfill toe.

Currently the severity rating of the observed depressions is rated as acceptable.

Erosion

Evidence of minor surface erosion was noted at two locations on the surface of the Tier II Disposal Facility including Feature E located on the slope southwest of VT-4 and Feature F located on the northeast corner of the Landfill. Both features extend perpendicular to the slope, appear to be self-armouring, and have an acceptable severity rating. Features E and F exhibited little to no change since 2009 and have an acceptable severity rating.

One additional area (Feature G), of minor erosion, was noted along the northwest toe and is not in direct contact with the Tier II Disposal Facility. Overall, the Tier II Disposal Facility cover appears stable and relatively unchanged from the 2010 report.

Frost Action

Evidence of frost action was not noted.

Evidence of Burrowing Animals

Indications of burrowing animals were not noted.

Vegetation

Indications of vegetation were noted on the southern slope of the Tier II Disposal Facility. Plants have colonized the slope at an approximate density of 1 plant per 3 m².

Staining

Areas of staining were not observed at the time of the inspection.

Seepage Points

Due to precipitation events in the timeframe of the monitoring program, it is difficult to assess the extent of the seepage at the Tier II Disposal Facility, as all slopes were to some degree wet for the duration of the monitoring program.

Debris

Evidence of debris was noted at one location on the northwest toe of the Tier II Disposal Facility (Feature I), consisting of a partially exposed piece of 50 mm diameter iron pipe. The iron pipe was subsequently removed and disposed of. Feature I will not be included in 2015 monitoring program.

Presence/Condition of Monitoring Instruments

All monitoring well and thermistor installations were found to be in good condition at the Tier II Disposal Facility.

Other Features of Note

Tension and desiccation cracks were not as numerous as reported in the 2010 monitoring program with only Feature J observed on the north slope of the Landfill. The previously observed desiccation cracks were likely eliminated by the precipitation events experienced during the monitoring program and the week leading up to the monitoring program. A new discontinuous crack (Feature K) was observed on the east slope of the Landfill.

Table XIX: Visual Inspection Checklist / Report – Tier II Disposal Facility

**DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
VISUAL INSPECTION CHECKLIST
INSPECTION REPORT – PAGE 1 of 2**

SITE NAME: CAM-2 Gladman Point
LANDFILL DESIGNATION: Tier II Disposal Facility (New Landfill)
DATE OF INSPECTION: August 26, 2012
DATE OF PREVIOUS INSPECTION: August 13-14, 2010
INSPECTED BY: B. MacKay
REPORT PREPARED BY: B. MacKay
LANDFILL MONITORING EVENT #: 7
The inspector/reporter represents to the best of his/her knowledge that 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 (m)	Width (m)	Depth (m)	Extent	Description	Photographic Record	Severity Rating	Additional Comments
Settlement	Yes	Feature A See Figure CAM-2.5 (north and south crests)	20 - 30	0.2 - 0.4	0.05 - 0.1	Occasional	Linear depressions extending along north and south crests	9, 10, 11, 12	Acceptable	Cover and slopes appear stable. Small tension crack previously noted associated with the depression on the north crest was not visible during the 2012 field program.
		Feature B See Figure CAM-2.5 (east of VT-3)	2	0.75	0.1		Localized depression on slope perpendicular to toe	35	Acceptable	Feature has decreased slightly in size from 2010, potentially as a result of erosion and deposition on the side slopes of the facility.
		Feature C See Figure CAM-2.5 (south east corner)	12	0.1 - 0.5	0.1		Linear depressions extending along east crest	42, 43	Acceptable	Feature has increased significantly in length, now extending 12 m along the landfill crest. The previously identified area was clearly observed, however as of 2012, an additional area of linear settlement was observed extending the length of the depression from 0.4 m to 12 m.
		Feature D See Figure CAM-2.5 (south of VT-4)	1	0.05 - 0.2	0.05 - 0.15		Localized linear depression on surface	37	Acceptable	Dimensions of feature have remained relatively constant, feature appears stable.
		Feature K See Figure CAM-2.5 (east of VT-3)	0.75	0.2	0.05		Localized linear depression on surface	36	Acceptable	New Observation: Minor depression on the east slope of the landfill running parallel to the landfill toe.
Erosion	Yes	Feature E See Figure CAM-2.5 (south of VT-4)	16	1 - 1.25	0.05 - 0.10	Occasional	Minor surficial erosion	38, 39	Acceptable	Minor erosion noted on surface of landfill. Slope appears stable with minor change from 2010 and consequently from 2009 (based on 2010 Report). Self-armouring.
		Feature F See Figure CAM-2.5 (north east corner)	15	0.5	0.05 - 0.1		Minor surficial erosion	34	Acceptable	Minor erosion noted on surface of landfill. Cover appears stable and unchanged from 2010 and consequently 2009. Self armouring.
		Feature G See Figure CAM-2.5 (north west toe)	10	0.5 m	2 cm		Minor surficial erosion	12	Acceptable	Minor erosion noted along toe of landfill, little change since 2010. Self-armouring.
Frost Action	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Animal Burrows	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Vegetation	Yes	Feature L See Figure CAM-2.5 (south slope)	N/A	N/A	N/A	N/A	Small plants colonizing the south slope of the landfill	41, 45	Acceptable	Plants have begun to colonize the south slope of the Tier II Facility, plant density is approximately 1 plant/3 m ²

Checklist Item	Present (Yes/No)	Location	Length (m)	Width (m)	Depth (m)	Extent	Description	Photographic Record	Severity Rating	Additional Comments
Settlement	Yes	Feature A See Figure CAM-2.5 (north and south crests)	20 - 30	0.2 - 0.4	0.05 - 0.1	Occasional	Linear depressions extending along north and south crests	9, 10, 11, 12	Acceptable	Cover and slopes appear stable. Small tension crack previously noted associated with the depression on the north crest was not visible during the 2012 field program.
Staining	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Vegetation Stress	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not Observed	N/A
Seepage Points	Yes	Feature H See Figure CAM-2.5 (south west, south and north slopes)	Unknown	Unknown	N/A	Occasional	Wetted areas on side slopes	N/A	Acceptable	Unable to properly assess wetting on slopes of Tier II Facility due to precipitation events experienced throughout the field program.
Debris Exposed	Yes	Feature I See Figure CAM-2.5 (north west toe)	1.65	0.05	N/A	Isolated	Partially exposed iron pipe at toe of landfill	17, 18, 19, 20	Acceptable	Iron pipe was removed from the landfill cover, Feature I will no longer be a concern for future monitoring programs.
Presence/Condition of Monitoring Instruments	Yes	See Figure CAM-2.5	N/A	N/A	N/A	N/A	Thermistors and monitoring wells	Various	N/A	Sampled and monitored in 2012, monitoring equipment is functioning properly
Other Features of Note	Yes	Feature J See Figure CAM-2.5 (north slope)	Variable, 5.0 - 10.0	0 - 0.05	Unknown	Occasional	Continuous and discontinuous tension cracks extending perpendicular to side slopes (majority within 1 - 5 m of toe)	22, 23, 27, 28, 29, 40	Acceptable	Cracks less frequent than 2010, being only observed on the north slope where observed previously.
		Feature M See Figure CAM-2.5 (East slope)	2.0 - 4.0	0.01 - 0.05	Unknown		Discontinuous tension cracks extending parallel to side slopes	27-29	Acceptable	New Observation: Two cracks running parallel to the toe of the landfill, located on the east side slope of the landfill
Additional Photos	Yes	See Figure CAM-2.5 and Photographic Record	N/A	N/A	N/A	N/A	General Photographic Record	N/A	Not Observed	General photos for documentation, no features of note.
Overall Landfill Performance:		Acceptable								

6.3 PRELIMINARY STABILITY ASSESSMENT

The Preliminary Stability Assessment for Tier II Disposal Facility has been completed as per the TOR and is included as Table XX hereafter.

Table XX: Preliminary Stability Assessment – Tier II Disposal Facility

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Acceptable	Occasional
Frost Action	Not observed	None
Staining	Not observed	None
Vegetation Stress	Not observed	None
Seepage/Ponded Water	Acceptable	Occasional
Debris exposure	Not Observed (removed)	None
Overall Landfill Performance	Acceptable	

6.4 LOCATION PLAN

The Location Plan for the Tier II Disposal Facility has been completed as per the TOR and is included in the following page as Figure CAM-2.5 Gladman Point – Tier II Disposal Facility.

Figure 4 : CAM-2.5 Gladman Point – Tier II Disposal Facility

6.5 THERMAL MONITORING DATA

Manual readings and monitoring program results for each thermistor are presented on the Thermistor Annual Maintenance Reports included in this report as well as Table XXI as requested by the TOR. A complete datalogger RAW data set for the 2010 - 2012 period has been forwarded to DCC under separate cover as per the TOR and is provided in the attached DVD.

All thermistors at the Tier II Disposal Facility were inspected and found to be in good condition with no significant concerns identified. VT-3, which was removed during the 2010 monitoring program, was successfully reinstalled.

Manual resistive and temperature data readings were collected from the thermistor strings as per the TOR. All analogues/thermocouples were observed to be functioning properly at the time of the monitoring program, with the exception of the bottom sensors at VT-2 (#12), VT-3 (#12) and VT-4 (#16), consistent with observations from the previous 2010 monitoring program. New to 2012, the #9 sensor of VT-3 was observed to be off-line. Further review of the downloaded data identified a consistent error in temperature readings obtained from these sensors throughout the monitoring period.

Batteries were replaced in all dataloggers on August 25 and 26, 2012 as specified in the TOR. All clocks exhibited slight drift and were synchronized using the Prolog software.

It is suggested that two of the locks be replaced during the next monitoring event, the locks are still functional but heavily rusted and required extra effort to be removed, it is anticipated the locks will need to be cut during the next monitoring event. As well VT-2 is missing a cover for the small P1/25 port.

Table XXI: Tabulated Thermistor Data – Tier II Disposal Facility

Thermistor	Bead	Ohms	Degrees °C
1	1	7.968	14.676
	2	7.644	15.565
	3	11.116	7.716
	4	10.983	7.963
	5	12.985	4.567
	6	14.334	2.596
	7	17.188	-0.964
	8	18.255	-2.128
	9	19.306	-3.202
	10	20.100	-3.971
	11	21.000	-4.802
	12	21.720	-5.439
	13	22.500	-6.103
	14	23.250	-6.718
	15	24.070	-7.365
	16	24.590	-7.763
2	1	10.186	9.514
	2	11.676	6.714
	3	12.626	5.131
	4	13.952	3.132
	5	16.594	-0.281
	6	17.797	-1.638
	7	18.903	-2.798
	8	20.220	-4.084
	9	21.520	-5.265
	10	22.540	-6.137
	11	23.370	-6.814
	12	OL	N/A
3	1	9.195	11.646
	2	11.338	7.312
	3	12.287	5.68
	4	13.608	3.629
	5	16.094	0.316
	6	17.191	-0.968
	7	18.440	-2.322
	8	20.400	-4.253
	9	OL	N/A
	10	22.750	-6.311
	11	23.610	-7.005
	12	OL	N/A
4	1	7.530	15.888
	2	8.824	12.511
	3	11.231	7.506
	4	12.365	5.552
	5	13.525	3.751
	6	16.649	-0.345
	7	17.418	-1.222
	8	18.275	-2.149
	9	19.141	-3.038
	10	19.914	-3.794
	11	20.640	-4.475
	12	21.370	-5.133
	13	21.540	-5.282
	14	22.730	-6.294
	15	23.350	-6.798
	16	23.930	-7.256

6.6 THERMISTOR ANNUAL MAINTENANCE REPORTS

The Thermistor Annual Maintenance Reports, VT-1 to VT-4, are presented in this section.

Thermistor Annual Maintenance Report							
Contractor Name: Biogenie/ Sila Remediation			Inspection Date: 26-Aug-12				
Prepared By: Brandon MacKay							
Thermistor Information							
Site Name: CAM-2 Gladman Point		Thermistor Location: Tier II Disposal Facility					
Thermistor Number: VT-1		Inclination: Vertical					
Install Date: 08/30/2005		First Date Event: August 14, 2012		Last Date Event: August 26, 2012			
Coordinates and Elevation		N 7618811		E 548508.81 Elev 32.48			
Length of Cable (m) 10.5		Cable Lead Above Ground (m) 3.6		Nodal Points 16			
Datalogger Serial # 207019		Cable Serial Number 1690					
Thermistor Inspection							
		Good		Needs Maintenance			
Casing	X		☐				
Cover	X		☐				
Data Logger	X		☐				
Cable	X		☐				
Beads	X		☐				
Battery Installation Date	August 26/2012						
Battery Levels	Main	11.34	Aux	13.4			
Manual Ground Temperature Readings							
	Bead	ohms	Degrees C		Bead	ohms	Degrees C
	1	7.968	14.676		9	19.306	-3.202
	2	7.644	15.565		10	20.1	-3.971
	3	11.116	7.716		11	21	-4.802
	4	10.983	7.963		12	21.72	-5.439
	5	12.985	4.567		13	22.5	-6.103
	6	14.334	2.596		14	23.25	-6.718
	7	17.188	-0.964		15	24.07	-7.365
	8	18.255	-2.128		16	24.59	-7.763
Observations and Proposed Maintenance							
Clock was 1 hour and 10 minutes slow, reset using prolog software.							
Verified known Data: Yes							

Thermistor Annual Maintenance Report

Contractor Name:	Biogenie/ Sila Remediation	Inspection Date:	August 26, 2012
Prepared By:	Brandon MacKay		
Thermistor Information			
Site Name:	CAM-2 Gladman Point	Thermistor Location	Tier II Disposal Facility
Thermistor Number:	VT-2	Inclination:	Vertical
Install Date:	08/30/2005	First Date Event:	August 14, 2010
		Last Date Event:	August 26, 2012
Coordinates and Elevation	N 7618799	E 548474.24	Elev 32.07
Length of Cable (m)	8	Cable Lead Above Ground (m)	2.75
		Nodal Points	12
Datalogger Serial #	207107	Cable Serial Number	1691

Thermistor Inspection

	Good	Needs Maintenance
Casing	X	☐
Cover	X	☐
Data Logger	X	☐
Cable	X	☐
Beads	X	☐
Battery Installation Date	August 26/2012	
Battery Levels	Main 11.34	Aux 12.9

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	10.186	9.514
2	11.676	6.714
3	12.626	5.131
4	13.952	3.132
5	16.594	-0.281
6	17.797	-1.638
7	18.903	-2.798
8	20.22	-4.084

Bead	ohms	Degrees C
9	21.52	-5.265
10	22.54	-6.137
11	23.37	-6.814
12	OL	N/A

Observations and Proposed Maintenance

Original bolts are not used to keep cover in place, a smaller set has been used - functional.
Missing cover to port P1/15, may need replacement.
Clock was 1 hour and 5 minutes slow, reset using prolog software.
Bead 12 is offline, consistent with 2010 observations.

Verified known Data: Yes

Thermistor Annual Maintenance Report

Contractor Name: Biogenie/ Sila Remediation

Inspection Date: August 25, 2012

Prepared By: Brandon MacKay

Thermistor Information

Site Name: CAM-2 Gladman Point

Thermistor Location Tier II Disposal Facility

Thermistor Number: VT-3

Inclination: Vertical

Install Date: 08/30/2005

First Date Event: N/A

Last Date Event: N/A

Coordinates and Elevation

N

7618792

E

548495.38

Elev

32.06

Length of Cable (m)

8

Cable Lead Above Ground (m)

2.9

Nodal Points

12

Datalogger Serial #

5070039

Cable Serial Number

1692

Thermistor Inspection

	Good	Needs Maintenance
Casing	X	☐
Cover	☐	X Lock will need replacement
Data Logger	X	☐
Cable	X	☐
Beads	X	☐
Battery Installation Date	Aug-25	
Battery Levels	Main 11.34	Aux 13.9

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	9.195	11.646
2	11.338	7.312
3	12.287	5.680
4	13.608	3.629
5	16.094	0.316
6	17.191	-0.968
7	18.44	-2.322
8	20.4	-4.253

Bead	ohms	Degrees C
9	OL	N/A
10	22.75	-6.311
11	23.61	-7.005
12	OL	N/A
13		
14		
15		
16		

Observations and Proposed Maintenance

Reinstalled data logger.
Data logger is functioning properly.
Reset memory.
Beads 9 and 12 are offline.
Lock will need replacement during next monitoring event, was oiled but is heavily rusted.

Verified known Data: Yes

Thermistor Annual Maintenance Report

Contractor Name:	Biogenie/ Sila Remediation	Inspection Date:	August 25, 2012
Prepared By:	Brandon MacKay		
Thermistor Information			
Site Name:	CAM-2 Gladman Point	Thermistor Location	Tier II Disposal Facility
Thermistor Number:	VT-4	Inclination:	Vertical
Install Date:	08/30/2005	First Date Ev	14-Aug-10
		Last Date Event	25-Aug-12
Coordinates and Elevation	N 7618772	E 548479.02	Elev 31.89
Length of Cable (m)	10.5	Cable Lead Above Ground (m)	3.5
		Nodal Points	16
Datalogger Serial #	2020130	Cable Serial Number	1693

Thermistor Inspection

	Good	Needs Maintenance	
Casing	X	☐	Some flaking of Paint
Cover	☐	X	Lock should be replaced next monitoring even
Data Logger	X	☐	
Cable	X	☐	
Beads	X	☐	
Battery Installation Date	Aug-25		
Battery Levels	Main	11.34	Aux 11.4

Manual Ground Temperature Readings

Bead	ohms	Degrees C
1	7.53	15.888
2	8.824	12.511
3	11.231	7.506
4	12.365	5.552
5	13.525	3.751
6	16.649	-0.345
7	17.418	-1.222
8	18.275	-2.149

Bead	ohms	Degrees C
9	19.141	-3.038
10	19.914	-3.794
11	20.64	-4.475
12	21.37	-5.133
13	21.54	-5.282
14	22.73	-6.294
15	23.35	-6.798
16	23.93	-7.256

Observations and Proposed Maintenance

Clock was 1 hour and 5 minutes slow, reset using prolog software
Lock will need replacement during next monitoring event, was oiled but is heavily rusted.

Verified known Data: Yes

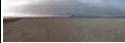
6.7 PHOTOGRAPHIC RECORDS

The Photographic Record for the Tier II Disposal Facility has been completed as per the TOR and is included in the following pages as Table XXII. The Photographic Record only contains an index and “thumbnail” photographs. Full-sized photographs are contained in the Addendum DVD-ROM.

Table XXII: Landfill Visual Inspection Photo Log – Tier II Disposal Facility

Photo (2012-C2-Tier II-)	Thumbnail	Filename	Size (MB)	Date	Vantage Point		Caption
					Easting	Northing	
General Photos							
9		2012-C2-Tier II-9	2.570	26/08/2012	548478	7618824	Feature A: View ESE of linear depression running parallel to the N crest of the landfill surface, taken from the W most point of the feature.
10		2012-C2-Tier II-10	2.570	26/08/2012	548484	7618821	Feature A: Close-up of the depression
11		2012-C2-Tier II-11	2.630	26/08/2012	548493	7618817	Feature A: View ESE of linear depression running parallel to the N crest of the landfill surface, taken from the midpoint of the feature.
12		2012-C2-Tier II-12	2.630	26/08/2012	548511	7618811	Feature A: View WNW of linear depression running parallel to the N crest of the landfill surface, taken from the NE corner of the landfill
13		2012-C2-Tier II-13	2.860	26/08/2012	548463	7618829	View ESE from the NW corner of the the N side slope.
14		2012-C2-Tier II-14	2.670	26/08/2012	548463	7618829	View SSW from the NW corner of the W side slope.
15		2012-C2-Tier II-15	2.490	26/08/2012	548466	7618849	Feature G: View ESE of minor erosion along the N landfill toe
16		2012-C2-Tier II-16	2.510	26/08/2012	548466	7618849	Feature G: Close-up of minor erosion along the toe of the landfill
17		2012-C2-Tier II-17	2.530	26/08/2012	548453	7618849	Feature I: Metal debris on the side slope of the NW corner of the landfill
18		2012-C2-Tier II-18	2.460	26/08/2012	548453	7618849	Feature I: Exposure of the metal debris to determine its full extent
19		2012-C2-Tier II-19	2.520	26/08/2012	548453	7618849	Feature I: Removal of metal debris from side slope of facility.
20		2012-C2-Tier II-20	2.440	26/08/2012	548453	7618849	Feature I: Soil was placed to fill the void left by the metal debris.
21		2012-C2-Tier II-21	2.230	26/08/2012	548505	7618836	View N of MW-1, taken from the N toe of the landfill.
22		2012-C2-Tier II-22	2.510	26/08/2012	548447	7618857	Feature J: View WNW of tension crack on the N side slope of the landfill, taken roughly center on the side slope, 3 m from the landfill toe.
23		2012-C2-Tier II-23	2.530	26/08/2012	548447	7618857	Feature J: Close-up of tension crack on the N side slope.
24		2012-C2-Tier II-24	0.467	26/08/2012	548420	7618768	Panoramic view ESE - SSW of NW corner of the landfill.
25		2012-C2-Tier II-25	0.463	26/08/2012	548415	7618777	Panoramic view NNE - ESE of SW corner of the landfill.
26		2012-C2-Tier II-26	0.454	26/08/2012	548510	7618728	Panoramic view WNW - NNE of SE corner of the landfill.
27		2012-C2-Tier II-27	2.490	26/08/2012	548510	7618750	Feature K: View N of discontinuous tension crack on the E side slope. Crack runs parallel to the landfill toe.
28		2012-C2-Tier II-28	2.640	26/08/2012	548510	7618750	Feature K: Close up of tension crack
29		2012-C2-Tier II-29	2.490	26/08/2012	548519	7618760	Feature K: Close-up of second tension crack 13 m NE of other crack on the east slope.

COLLECTION OF LANDFILL MONITORING DATA – FINAL REPORT, 2012
CAM-2 DISTANT EARLY WARNING LINE SITE, GLADMAN POINT, NUNAVUT

Photo (Tier II-)	Thumbnail	Filename	Size (MB)	Date	Vantage Point		Caption
					Easting	Northing	
General Photos							
30		2012-C2-Tier II-30	0.533	26/08/2012	548548	7618852	Panoramic view SSW - WNW of E corner of the landfill.
31		2012-C2-Tier II-31	0.435	26/08/2012	548545	7618842	Close-up of debris removed from Tier II landfill and surrounding area.
32		2012-C2-Tier II-32	2.580	26/08/2012	548478	7618823	View NE of ponded water off the N slope of the landfill, Lobe 2 of the Station landfill is visible in the background.
33		2012-C2-Tier II-33	2.440	26/08/2012	548514	7618783	View SE of ponded water of the E slope of the landfill, the former Module train area is visible in the background.
34		2012-C2-Tier II-34	2.510	26/08/2012	548523	7618809	Feature F: View NE of minor erosion extending 15 m from the crest of landfill.
35		2012-C2-Tier II-35	2.430	26/08/2012	548522	7618795	Feature B: Minor depression on E side slope of the landfill, the depression runs perpendicular to the toe of the landfill. (2 m x 0.75 m x 0.10 m)
36		2012-C2-Tier II-36	2.500	26/08/2012	548521	7618784	Feature K: Minor depression on the E slope of the landfill, running parallel to the landfill toe. (0.75 m x 0.20 m x 0.05 m)
37		2012-C2-Tier II-37	2.410	26/08/2012	548480	7618770	Feature D: Minor depression on the landfill surface, running parallel to the crest of the S crest of the landfill. (1 m x 0.20 m x 0.15 m).
38		2012-C2-Tier II-38	2.450	26/08/2012	548480	7618770	Feature E: View SSW from the landfill surface of minor erosion extending from the landfill surface to the toe. (16 m x 1.0 - 1.25 m x 0.05 - 0.10 m).
39		2012-C2-Tier II-39	2.580	26/08/2012	548475	7618755	Feature E: View NNE from the landfill toe of erosion channel.
40		2012-C2-Tier II-40	2.420	26/08/2012	548476	7618751	Feature J: Small section of crack along the south toe of the landfill.
41		2012-C2-Tier II-41	2.650	26/08/2012	548478	7618768	Feature L: Close-up of an example of the vegetation growing on the S slope of the Tier II facility, plant density is approximately 1 plant/3 m².
42		2012-C2-Tier II-42	2.560	26/08/2012	548511	7618761	Feature C: View NNE of linear depression at the crest of the landfill crest. (12 m x 0.10 - 0.50 m x 0.10 m)
43		2012-C2-Tier II-43	2.440	26/08/2012	548511	7618773	Feature C: View SSW of linear depression at the crest of the landfill crest. (12 m x 0.10 - 0.50 m x 0.10 m)
45		2012-C2-Tier II-45	2.440	26/08/2012	548478	7618768	Feature L: View W of small vegetation growing on the S slope of the landfill.
46		2012-C2-Tier II-46	9.280	26/08/2012	548507	7618761	Panoramic view WNW - NNE of the landfill surface from the SE corner.
47		2012-C2-Tier II-47	11.700	26/08/2012	548521	7618810	Panoramic view SSW - WNW of the landfill surface from the NE corner.
48		2012-C2-Tier II-48	12.800	26/08/2012	548560	7618828	Panoramic view ESE - SSW of the landfill surface from the NW corner.
49		2012-C2-Tier II-49	12.000	26/08/2012	548446	7618780	Panoramic view NNE - ESE of the landfill surface from the SW corner.
Soil Sampling							
1		2012-C2-Tier II-1	2.35	25/08/2012	548556	76118738	MW-1: Close-up of open soil test pit
2		2012-C2-Tier II-2	2.360	25/08/2012	548556	76118738	MW-1: Close-up of closed soil test pit
3		2012-C2-Tier II-3	2.570	25/08/2012	548526	7618731	MW-2: Close-up of open soil test pit
4		2012-C2-Tier II-4	2.510	25/08/2012	548526	7618731	MW-2: Close-up of closed soil test pit
5		2012-C2-Tier II-5	2.400	25/08/2012	548509	7618853	MW-3: Close-up of open soil test pit
6		2012-C2-Tier II-6	2.320	25/08/2012	548509	7618853	MW-3: Close-up of closed soil test pit
7		2012-C2-Tier II-7	2.340	25/08/2012	548412	7618797	MW-4: Close-up of open soil test pit
8		2012-C2-Tier II-8	2.350	25/08/2012	548412	7618797	MW-4: Close-up of closed soil test pit

6.8 SOIL SAMPLE ANALYTICAL DATA

The soil chemical analysis results and evaluation of the analytical data for the 2012 Tier II Disposal Facility samples are presented in Tables XXIII and XXIV hereafter. Certificates of Analysis and results of field duplicates collected as part of the QA/QC program are presented in Appendix C at the end of this report.

Table XXIII: Tier II Disposal Facility Summary Table for Soil Analytical Data

Sample #	Location	Depth [cm]	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	PHC(F1)	PHC(F2)	PHC(F3)	TPH
													C ₆ -C ₁₀	C ₁₀ -C ₁₆	C ₁₆ -C ₃₄	C ₆ -C ₃₄
Upgradient Samples																
C2-12-MW1-A	MW1	0-15	2.5	2.9	0.9	<0.5	2.5	6.0	0.1	0.7	<0.5	<0.05	<10	<10	29.0	29.0
C2-12-MW1-B		40-50	5.7	5.2	1.6	<0.5	4.3	13.0	4.0	1.0	<0.5	<0.05	<10	17.0	52.0	69.0
Downgradient Samples																
C2-12-MW2-A	MW2	0-15	5.7	6.5	2.1	<0.5	11.7	15.0	6.9	1.3	<0.5	<0.05	<10	<10	47.0	47.0
C2-12-MW2-A-D		0-15	5.4	6.6	2.0	<0.5	9.5	15.0	6.4	1.4	<0.5	<0.05	<10	<10	47.0	47.0
C2-12-MW2-B*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C2-12-MW3-A	MW3	0-15	9.3	8.2	2.5	<0.5	10.9	16.0	8.4	1.4	<0.5	<0.05	<10	<10	162.0	162.0
C2-12-MW3-B		40-50	13.1	10.9	3.2	<0.5	6.2	13.0	7.8	1.8	<0.5	<0.05	<10	<10	11.0	11.0
C2-12-MW4-A	MW4	0-15	16.7	5.9	2.0	<0.5	7.1	20.0	5.9	1.3	<0.5	<0.05	<10	<10	119.0	119.0
C2-12-MW4-B		40-50	8.3	10.1	4.3	<0.5	7.0	21.0	11.1	1.8	<0.5	<0.05	<10	<10	<10	<10

*Sample C2-12-MW2-B was not analyzed please refer to Section 1.4

Table XXIV: Evaluation of 2012 Soil Analytical Data – Tier II Disposal Facility

Parameter	Evaluation
Copper (Cu)	Copper was detected at all sample locations. Concentrations ranged from 2.5 – 16.7 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of copper was detected at the surface of MW4, a downgradient location. All values were below CCME guidelines.
Nickel (Ni)	Nickel was detected at all sample locations. Results were consistent at upgradient and downgradient locations with concentrations ranging from 2.9 – 10.9 mg/kg. The highest concentration was detected at depth at MW3, a downgradient sample. All values were below CCME guidelines.
Cobalt (Co)	Cobalt was detected at all sample locations. Concentrations ranged from 0.9 – 4.3 mg/kg. Concentrations were slightly higher at downgradient sample locations. The highest concentration of cobalt was detected at depth at MW4, a downgradient sample. All values were below CCME guidelines.
Cadmium (Cd)	Cadmium was below the method detection limit at all sampling locations.
Lead (Pb)	Lead was detected at all sample locations. Concentrations ranged from 2.5 – 10.9 mg/kg. Concentrations were slightly higher at downgradient sample locations. The highest concentration of lead was detected at surface at MW3, a downgradient location. All values were below CCME guidelines.
Zinc (Zn)	Zinc was detected at all sample locations. Concentrations ranged from 6 – 21 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of zinc was detected at depth MW4, a downgradient sample. All values were below CCME guidelines.
Chromium (Cr)	Chromium was detected at all sample locations. Concentrations ranged from 0.1 – 11.1 mg/kg. Concentrations were slightly higher at downgradient sample locations. The highest concentration of chromium was detected at depth at MW4, a downgradient sample. All values were below CCME guidelines.
Arsenic (As)	Arsenic was detected at all sample locations. Concentrations ranged from 0.7 – 1.8 mg/kg. Concentrations were slightly higher at downgradient sample locations. The highest concentration of arsenic was detected at two locations at depth MW3 and MW4 both downgradient locations. All values were below CCME guidelines.
Mercury (Hg)	Mercury was below the method detection limit at all sampling locations.
PCBs	PCBs were below the method detection limit at all sampling locations.
TPH	TPH was detected at all sampling locations at surface and depth with the exception of MW4 where TPH was not detected at depth. Detected TPH concentrations ranged from 11 – 162 mg/kg with the highest concentration detected at the surface of MW3. All TPH concentrations are below standard DEW Line remediation criterion for TPH concentrations in soil.

6.9 GROUNDWATER SAMPLE ANALYTICAL DATA

The groundwater chemical analysis results and evaluation for the analytical data for the 2012 Tier II Disposal Facility samples are presented in Tables XXV and XXVI hereafter. Certificates of Analysis and results for groundwater samples collected as part of the QA/QC program are presented in Appendix C, at the end of this report.

Table XXV: Tier II Disposal Facility Summary Table for Groundwater Analytical Data

Sample #	Location	Groundwater Elevation (masl)	Cu [mg/L]	Ni [mg/L]	Co [mg/L]	Cd [mg/L]	Pb [mg/L]	Zn [mg/L]	Cr [mg/L]	As [mg/L]	Hg [mg/L]	PCBs [μg/L]	PHC(F1)	PHC(F2)	PHC(F3)	TPH
													C ₆ -C ₁₀	C ₁₀ -C ₁₆	C ₁₆ -C ₃₄	C ₆ -C ₃₄
Upgradient Samples																
C2-12-MW1	MW1	12.5*	0.011	0.05	0.013	0.000102	0.003	18.4	0.007	0.005	<0.000025	<0.01	<0.1	0.2	<0.1	0.2
Downgradient Samples																
C2-12-MW2	MW2	12.6*	0.019	0.14	0.007	0.000071	0.004	10.3	0.165	0.006	<0.000025	<0.01	<0.1	<0.1	<0.1	<0.1
C2-12-MW3	MW3	12.4*	0.018	0.06	0.003	0.000043	0.004	0.978	0.020	0.007	<0.000025	<0.01	<0.1	<0.1	0.2	0.2
C2-12-MW4	MW4	12.4*	0.015	0.03	0.002	0.000104	0.001	26.0	0.348	0.005	<0.000025	<0.01	<0.1	<0.1	<0.1	<0.1

*masl values are to be considered within +/- 3 m as elevations were not provided in the TOR and masl was measured with a handheld GPS

**Table XXVI: Evaluation of 2012 Groundwater Analytical Data –
Tier II Disposal Facility**

Parameter	Evaluation
Copper (Cu)	Copper was detected at all monitoring well locations, concentrations ranged from 0.011 – 0.019 mg/L with the highest concentration occurring at MW2. Results were consistent at upgradient and downgradient locations.
Nickel (Ni)	Nickel was detected at all monitoring well locations, concentrations ranged from 0.03 – 0.14 mg/L with the highest concentration occurring at MW2. Results are consistent at upgradient and downgradient locations.
Cobalt (Co)	Cobalt was detected at all monitoring locations, concentrations ranged from 0.002 – 0.013 mg/L with the highest concentration occurring at the upgradient sample MW1. Results were consistent at upgradient and downgradient locations.
Cadmium (Cd)	Cadmium was detected at all monitoring well locations, concentrations ranging from 0.000043 – 0.000104 mg/L with the highest concentration occurring at MW4.
Lead (Pb)	Lead was detected at all monitoring well locations, concentrations ranged from 0.001 – 0.004 mg/L with the highest concentration occurring at MW3. Results were consistent at upgradient and downgradient locations.
Zinc (Zn)	Zinc was detected at all monitoring well locations, concentrations ranged from 0.978 – 26.0 mg/L, with the highest concentration occurring at MW4. Results were consistent at upgradient and downgradient locations.
Chromium (Cr)	Chromium was detected at all monitoring well locations, concentrations ranged from 0.007 – 0.348 mg/L, with the highest concentration occurring at MW4. Results were consistent at upgradient and downgradient locations.
Arsenic (As)	Arsenic was detected at all monitoring well locations, concentrations ranged from 0.05 – 0.007 mg/L, with the highest concentration occurring at MW4. Results were consistent at upgradient and downgradient locations.
Mercury (Hg)	Mercury was not detected at any monitoring well locations
PCBs	Mercury was not detected at any monitoring well locations
TPH	TPH was detected at two locations, MW1 the upgradient location and MW3, a downgradient location. TPH concentrations were 0.2 mg/L at both locations. Free Phase was not detected at either of these locations during sampling.

6.10 MONITORING WELL SAMPLING / INSPECTION LOGS

The monitoring well sampling logs for MW-1 to MW-4 are presented in this section.

Monitoring Well Sampling Record			
Site Name:	CAM-2	Gladman Point	Nunavut
Date of Sampling Event	25-Aug-12	Time:	9:50 AM
Names of Samplers:	Brandon MacKay	Dwayne Allukpik	Jay Evalik
Landfill Name:	Tier II Disposal Facility		
Monitoring Well ID:	MW1		
Sample Number:	12-C2-MW1		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm) =	50.0		
Diameter of well (cm) =	5		
Depth of well installation (cm) = (from ground surface)	350		
Length screened section (cm) =	200		
Depth to top of screen (cm) = (from ground surface)	50		
Depth to water surface (cm) = (from top of pipe)	112.5	Measurement method: (meter, tape, etc.)	Interface Meter
Static water level (cm) = (below ground surface)	62.5		
Measured well refusal depth (cm) = (i.e. depth to frozen ground)	215.0	Evidence of sludge or siltation:	No evidence of sludge or siltation, probable freezing at well bottom
Thickness of water column (cm) =	102.5		
Static volume of water in well (mL) =	2013.0		
Free product thickness (mm) =	N/A	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra Tubing and Foot Valve
Volume Purged Water =	3000 mL		Oakton Turbidimeter T-100
Decontamination required: (Y/N)	N - Dedicated waterra tubing		WTW 3401 pH/conductivity meter
Number washes:	N/A		
Number rinses:	N/A		
Final pH =	6.92		
Final Conductivity (uS/cm) =	5120		
Final Temperature (°C) =	4.9		

Monitoring Well Sampling Record			
Site Name:	CAM-2	Gladman Point	Nunavut
Date of Sampling Event	25-Aug-12	Time:	9:10 AM
Names of Samplers:	Brandon MacKay	Dwayne Allukpik	Jay Evalik
Landfill Name:	Tier II Disposal Facility		
Monitoring Well ID:	MW2		
Sample Number:	12-C2-MW2		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm) =	20.0		
Diameter of well (cm) =	5		
Depth of well installation (cm) = (from ground surface)	350		
Length screened section (cm) =	200		
Depth to top of screen (cm) = (from ground surface)	50		
Depth to water surface (cm) = (from top of pipe)	57.0	Measurement method: (meter, tape, etc.)	Interface Meter
Static water level (cm) = (below ground surface)	37.0		
Measured well refusal depth (cm) = (i.e. depth to frozen ground)	178.0	Evidence of sludge or siltation:	No evidence of sludge or siltation, probable freezing at well bottom
Thickness of water column (cm) =	121.0		
Static volume of water in well (mL) =	2375.8		
Free product thickness (mm) =	N/A	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra Tubing and Foot Valve
Volume Purged Water =	3500 mL		Oakton Turbidimeter T-100
Decontamination required: (Y/N)	N - Dedicated waterra tubing		WTW 3401 pH/conductivity meter
Number washes:	N/A		
Number rinses:	N/A		
Final pH =	7.11		
Final Conductivity (uS/cm) =	7010		
Final Temperature (°C) =	5.1		

Monitoring Well Sampling Record			
Site Name:	CAM-2	Gladman Point	Nunavut
Date of Sampling Event	25-Aug-12	Time:	8:30 AM
Names of Samplers:	Brandon MacKay	Dwayne Allukpik	Jay Evalik
Landfill Name:	Tier II Disposal Facility		
Monitoring Well ID:	MW3		
Sample Number:	12-C2-MW3		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm) =	54.0		
Diameter of well (cm) =	5		
Depth of well installation (cm) = (from ground surface)	350		
Length screened section (cm) =	200		
Depth to top of screen (cm) = (from ground surface)	50		
Depth to water surface (cm) = (from top of pipe)	80.0	Measurement method: (meter, tape, etc.)	Interface Meter
Static water level (cm) = (below ground surface)	26.0		
Measured well refusal depth (cm) = (i.e. depth to frozen ground)	190.0	Evidence of sludge or siltation:	No evidence of sludge or siltation, probable freezing at well bottom
Thickness of water column (cm) =	110.0		
Static volume of water in well (mL) =	2159.8		
Free product thickness (mm) =	N/A	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra Tubing and Foot Valve
Volume Purged Water =	3000 mL		Oakton Turbidimeter T-100
Decontamination required: (Y/N)	N - Dedicated waterra tubing		WTW 3401 pH/conductivity meter
Number washes:	N/A		
Number rinses:	N/A		
Final pH =	9.62		
Final Conductivity (uS/cm) =	6710		
Final Temperature (°C) =	5.3		

Monitoring Well Sampling Record			
Site Name:	CAM-2	Gladman Point	Nunavut
Date of Sampling Event	25-Aug-12	Time:	10:05 AM
Names of Samplers:	Brandon MacKay	Dwayne Allukpik	Jay Evalik
Landfill Name:	Tier II Disposal Facility		
Monitoring Well ID:	MW4		
Sample Number:	12-C2-MW4		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm) =	70.0		
Diameter of well (cm) =	5		
Depth of well installation (cm) = (from ground surface)	350		
Length screened section (cm) =	200		
Depth to top of screen (cm) = (from ground surface)	50		
Depth to water surface (cm) = (from top of pipe)	134.0	Measurement method: (meter, tape, etc.)	Interface Meter
Static water level (cm) = (below ground surface)	64.0		
Measured well refusal depth (cm) = (i.e. depth to frozen ground)	223.0	Evidence of sludge or siltation:	No evidence of sludge or siltation, probable freezing at well bottom
Thickness of water column (cm) =	89		
Static volume of water in well (mL) =	1747.5		
Free product thickness (mm) =	N/A	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra Tubing and Foot Valve
Volume Purged Water =	2500 mL		Oakton Turbidimeter T-100
Decontamination required: (Y/N)	N - Dedicated waterra tubing		WTW 3401 pH/conductivity meter
Number washes:	N/A		
Number rinses:	N/A		
Final pH =	7.34		
Final Conductivity (uS/cm) =	7160		
Final Temperature (°C) =	5		

7 NON-HAZARDOUS WASTE LANDFILL (NHWL)

7.1 SUMMARY

During the 2012 monitoring event of the Non-Hazardous Waste Landfill at CAM-2 Gladman Point soil and groundwater samples were collected at 4 locations (1 upgradient and 3 downgradient), and a visual inspection was conducted to identify and assess erosional features on the facility.

A PCB concentration of 123 mg/kg was detected at depth at MW5, at this concentration the soil is classified as hazardous. MW5 is the upgradient monitoring well location and therefore it is unlikely that the NHWL is the source as well as PCBs were not detected at any other location at site cross contamination is very unlikely. No relatively high metal concentrations were detected at the NHWL. TPH was detected at all sampling locations and in all samples with the exception of the depth sample at MW5 and MW6. Detectable TPH concentrations ranged from 25 to 1366 mg/kg with the highest concentration detected at the surface of the MW3. All detected TPH was primarily in the F3 fraction. Although relatively high, currently all TPH readings are below the standard site criteria of 2500 mg/kg and are therefore acceptable.

A relatively high concentration of chromium was detected at the MW7 monitoring well, at 1.02 mg/L the concentration was significantly higher than results from other wells sampled at the NHWL. A TPH concentration of 1.2 mg/L was detected at MW8. PCBs were not detected in any groundwater samples.

The NHWL has experienced slight changes since the 2010 monitoring program, including slight increases in settlement and small increases in erosion. Currently there are no erosional features with significant or unacceptable severity ratings. The erosion features on the southern slope of the Landfill are the most severe observed at the CAM-2 site however, they pose little to no concern for the near future as the erosion channels are self-armouring and have changed little in a three year period. The overall performance of the NHWL is considered acceptable

7.2 VISUAL INSPECTION REPORT

The visual inspection of the NHWL was conducted on August 27, 2012. The Visual Inspection Checklist/Report has been completed as per the TOR and is included as Table XXVII of this

report. Please refer to Figure CAM-2.6 for the location of photographs and erosional features at the NHWL.

Weather Conditions at the Time of the Visual Inspection

At the time of the visual inspection of the NHWL, the temperature was approximately 8°C; skies were clear and sunny with a light wind of approximately 10 km/hr. The precipitation from earlier in the morning stopped by noon, giving way to clear skies.

Settlement

Settlement indications were noted at six areas, three previously identified (Features A, B and C), and three new observations (Features I, J and M). Feature A, a subtle depression on the south slope of the Landfill, has decreased in size since the 2010 monitoring program, potentially due to the relatively high rates of erosion and deposition on the south slope of the Facility. Feature B consists of two depressions on the side slope below the southwest corner of the Landfill. Depressions have remained relatively consistent since the 2010 observations and consequently, the 2009 monitoring program (as indicated by the 2010 monitoring report). Feature C, comprised of subtle depressions on the north side slope of the NHWL, observed small changes in size from the 2010 monitoring program and the addition of a third depression adjacent to the previously observed depressions. Feature I, on the northern slope at the northwest corner of the Landfill, consists of a small linear depression. Feature J, located along the northern toe at its approximate midpoint, consists of a minor depression and associated tension crack. Feature M, located on the southern slope of the Landfill, consists of a small depression associated with large cobble, which may have inhibited proper compaction at this location.

Previously observed indications of settlement have shown little change since the 2010 monitoring program. While the newly observed depressions are all minor, all areas of settlement have an acceptable severity rating.

Erosion

Erosion is most prominent on the southern slope of the NHWL, with five prominent erosion channels (Feature D), extending from the Landfill surface to the toe. The channels are self-armouring and have experienced relatively small increases in depth and width since 2010. A sixth relatively small erosion channel was observed on the southern slope of the Landfill which was not previously reported. Feature D has an acceptable severity rating.

Feature F, a minor erosion channel on the eastern slope of the Landfill, is barely discernible, only apparent due to the small deposit of sediment at the Landfill toe. Feature F has an acceptable

severity rating. The minor erosion extending along the eastern toe of the Landfill, Feature E, remains consistent with previous observations and has an acceptable severity rating.

Frost Action

Evidence of frost action was not noted.

Evidence of Burrowing Animals

Indications of burrowing animals were not noted.

Re-establishment of Vegetation

Evidence of vegetation was not noted.

Staining

Areas of staining were not observed at the time of the monitoring program.

Seepage Points

There was no seepage observed at this Landfill.

Debris

Feature G (partially exposed metal rod) was removed by the Field Technician. Unfortunately, no picture was taken prior to removal.

Presence/Condition of Monitoring Instruments

All monitoring well installations were found to be in good condition at the Landfill.

Other Features of Note

At the time of the 2012 monitoring program, Feature H was no longer visible, while three new tension cracks were observed on the slopes of the Landfill, Feature J, K and L. Feature J, a small tension crack, is associated with a minor depression along the northern toe of the Landfill. Feature K, a discontinuous partially in-filled tension crack, extends for 6 m on the east slope of the Landfill. Feature L, a discontinuous tension crack on the south slope of the Landfill, extends the length of the slope at the approximate middle of the slope. All features are considered to have an acceptable severity rating.

Table XXVII: Visual Inspection Checklist / Report – NHWL

**DEW LINE CLEANUP: POST-CONSTRUCTION - LANDFILL MONITORING
VISUAL INSPECTION CHECKLIST
INSPECTION REPORT – PAGE 1 of 2**

SITE NAME: CAM-2 Gladman Point
LANDFILL DESIGNATION: NHWL (New Landfill)
DATE OF INSPECTION: August 27, 2012
DATE OF PREVIOUS INSPECTION: August 13-14, 2010
INSPECTED BY: B. MacKay
REPORT PREPARED BY: B. MacKay
LANDFILL MONITORING EVENT #: 7
The inspector/reporter represents to the best of his/her knowledge that 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 (m)	Width (m)	Depth (m)	Extent	Description	Photographic Record	Severity Rating	Additional Comments
Settlement	Yes	Feature A See Figure CAM-2.6 (south west corner)	3	0.2	0.05	Occasional	Linear depressions (three locations)	47	Acceptable	Subtle depressions on south slope of landfill, has decreased in size since the 2010 inspection, potentially due to the relatively high rates of erosion and deposition on the south slope of the facility.
		Feature B See Figure CAM-2.6 (south east corner)	0.2 - 0.3	0.2	0.05		Isolated depressions	29, 30	Acceptable	Two depressions on the side slope below the south west corner of the landfill. Depressions have increased in length and width but decreased in depth, potentially due to erosion forces on the side slope.
		Feature C See Figure CAM-2.6 (north east and north west corners)	0.75 - 2	0.05 - 0.8	0.05 - 0.2		Linear depressions (three locations)	12, 13, 17	Acceptable	Subtle depressions on north side slope of NHWLF, observed small changes in size from the 2010 investigation and the addition of a third depression adjacent to the previously observed depressions.
		Feature I See Figure CAM-2.6 (north west corner)	1	0.3	0.1		Linear depressions (three locations)	11	Acceptable	New Observation: Subtle depressions located on the north side slope at the north west corner.
		Feature J See Figure CAM-2.6 (north slope middle)	1	0.75	0.05 - 0.2		Isolated depressions	15	Acceptable	New Observation: Subtle depressions located along the toe of the north slope at the approximate mid point. Small tension crack is associated with this feature.
		Feature M See Figure CAM-2.6 (south west corner)	0.3	0.2	0.15		Depressions	48, 49, 50	Acceptable	New Observation: Small depression associated with a large cobble on the south slope of the landfill at the south west corner, 1 m from the crest of the landfill.
Erosion	Yes	Feature D See Figure CAM-2.6 (6 areas on south slope)	10	Variable, 0.1 - 2.0	0.02 - 0.25	Occasional	Minor surficial erosion	31 - 39	Acceptable	Minor erosion noted on downgradient side slope of landfill. Cover appears stable with minor increases in depth and width from 2010 (and consequently 2009). However, 2012 has seen the addition of a very minor sixth erosion channel not previously observed.
		Feature E See Figure CAM-2.6 (extending along east toe)	25	0.1 - 0.2	0.05		Minor surficial erosion	22	Acceptable	Runoff channel along toe of landfill, appears relatively stable in size since the 2010 investigation. Self-armouring.
		Feature F See Figure CAM-2.6 (east slope)	10	0.1 - 0.2	0.05		Minor surficial erosion	23	Acceptable	Minor erosion noted on lower east side slope of landfill. Self-armouring.

Checklist Item	Present (Yes/No)	Location	Length (m)	Width (m)	Depth (m)	Extent	Description	Photographic Record	Severity Rating	Additional Comments
Frost Action	No	N/A	N/A	N/A	N/A	None	N/A	N/A	Not Observed	N/A
Animal Burrows	No	N/A	N/A	N/A	N/A	None	N/A	N/A	Not Observed	N/A
Vegetation	No	N/A	N/A	N/A	N/A	None	N/A	N/A	Not Observed	N/A
Staining	No	N/A	N/A	N/A	N/A	None	N/A	N/A	Not Observed	N/A
Vegetation Stress	No	N/A	N/A	N/A	N/A	None	N/A	N/A	Not Observed	N/A
Seepage Points	No	N/A	N/A	N/A	N/A	None	N/A	N/A	Not Observed	N/A
Debris Exposed	No	Feature G	N/A	N/A	Unknown	Isolated <1%	Partially exposed metal rod at toe of landfill	N/A	Acceptable	Removed by field assistants.
Presence/Condition of Monitoring Instruments	Yes	See Figure CAM-2.6 MW-5 to MW-8	N/A	N/A	N/A	None	Steel protective casings	52, 53, 54, 59	Acceptable	All monitoring wells in good condition.
Other Features of Note	Yes	Feature J See Figure CAM-2.6 (north slope middle)	1	2 mm	Unknown	Occasional	Small tension crack	16	Acceptable	New Observation: Small tension crack associated with depression on the north slope of the landfill.
		Feature K See Figure CAM-2.6 (east slope)	6	0.01 - 0.1			Tension crack	24, 25	Acceptable	New Observation: Discontinuous partially in filled tension crack on the east slope of the landfill.
		Feature L See Figure CAM-2.6 (south slope)	50	0 - 0.05			Tension crack	40-43	Acceptable	New Observation: Discontinuous tension crack that extends the length of the south slope of the landfill running parallel to the toe at the approximate middle of the slope.
Additional Photos	Yes	See Figure CAM-2.6 and Photographic Record	N/A	N/A	N/A	N/A	General Photographic Record	N/A	Not Observed	General photos for documentation, no features of note.
Overall Landfill Performance:		Acceptable								

7.3 PRELIMINARY STABILITY ASSESSMENT

The Preliminary Stability Assessment for NHWL has been completed as per the TOR and is included as Table XXVIII hereafter.

Table XXVIII: Preliminary Stability Assessment – NHWL

Feature	Severity Rating	Extent
Settlement	Acceptable	Occasional
Erosion	Acceptable	Occasional
Frost Action	Not observed	None
Staining	Not observed	None
Vegetation Stress	Not observed	None
Seepage/Ponded Water	Not observed	None
Debris Exposure	Acceptable	Isolated
Overall Landfill Performance	Acceptable	

7.4 LOCATION PLAN

The Location Plan for the NHWL has been completed as per the TOR and is included in the following page as Figure CAM-2.6 Gladman Point – NHWL.

Figure 5 : CAM-2.6 Gladman Point – NHWL

7.5 PHOTOGRAPHIC RECORDS

The Photographic Record for the NHWL has been completed as per the TOR and is included in the following pages as Table XXIX. The Photographic Record only contains an index and “thumbnail” photographs. Full-sized photographs are contained in the Addendum DVD-ROM.

Table XXIX: Landfill Visual Inspection Photo Log – NHWL

Photo (2012-C2-)	Thumbnail	Filename	Size (KB)	Date	Vantage Point		Caption
					Easting	Northing	
General Photos							
2		2012-C2-NHWL-2	0.544	Aug 27, 2012	548672	7618384	Panoramic N - E of the SW corner of the landfill, taken from MW-8
8		2012-C2-NHWL-8	2.830	Aug 27, 2012	548675	7618474	View E of N slope of landfill, taken from the NW corner.
9		2012-C2-NHWL-9	2.630	Aug 27, 2012	548675	7618474	View S of the W slope of the landfill, taken from the NW corner
10		2012-C2-NHWL-10	15.200	Aug 27, 2012	548691	7618464	Panoramic E - S of the landfill surface taken from the top NW corner.
11		2012-C2-NHWL-11	2.540	Aug 27, 2012	548690	7618464	Feature I: Close-up of linear depression 1 m from the N crest at the NW corner. (1 m x 0.3 m x 0.10 m)
12		2012-C2-NHWL-12	2.540	Aug 27, 2012	548695	7618467	Feature C: Close-up of depression on the N side slope of the NHWL (0.75 m x 0.75 m x 0.10 m)
13		2012-C2-NHWL-13	2.440	Aug 27, 2012	548695	7618468	Feature C: Close-up of linear depression on the N side slope of the NHWL located 1 m below the depression in the previous photograph (2 m x 0.05 - 0.20 m x 0.05 m)
14		2012-C2-NHWL-14	2.460	Aug 27, 2012	548695	7618468	Feature C: View N from landfill crest of linear depressions on the N side slope of the NHWL (1 - 2 m x 0.05 - 0.75 m x 0.05 - 0.1 m)
15		2012-C2-NHWL-15	2.530	Aug 27, 2012	548712	7618478	Feature J: Close-up of depression 4 m from the N toe mid-way between the NW and NE corners. (1 m x 0.75 m x 0.05 - 0.20 m)
16		2012-C2-NHWL-16	2.820	Aug 27, 2012	548712	7618478	Feature J: Small tension crack observed 0.10 m below the depression. (1 m x 0.002 m)
17		2012-C2-NHWL-17	2.400	Aug 27, 2012	548734	7618475	Feature C: Depression located 2 m below the N crest at the NE corner, depression appears to have increased in size from 2010. (2 m x 0.8 m x 0.05 - 0.20 m).
18		2012-C2-NHWL-18	2.640	Aug 27, 2012	548744	7618485	View S of the E slope of the landfill, taken from the NE corner
19		2012-C2-NHWL-19	2.640	Aug 27, 2012	548744	7618485	View W of N slope of landfill, taken from the NE corner.
20		2012-C2-NHWL-20	8.610	Aug 27, 2012	548737	7618474	Panoramic view S - W of the landfill surface taken from the NE corner.
21		2012-C2-NHWL-21	2.510	Aug 27, 2012	548740	7618460	View S of the E landfill crest, Feature H - a tension crack 0.4 m from the E crest, was not observed this year.
22		2012-C2-NHWL-22	2.570	Aug 27, 2012	548750	7618459	Feature E: View N of minor erosion along the E toe of the landfill. (25 m x 0.1 - 0.2 m x 0.05 m)
23		2012-C2-NHWL-23	2.500	Aug 27, 2012	548741	7618465	Feature F: View E of a minor erosion channel on the E slope, taken 11 m SSE of the NE corner. (10 m x 0.1 - 0.20 x 0.05 m)
24		2012-C2-NHWL-24	2.390	Aug 27, 2012	548752	7618435	Feature K: View N of a tension crack on the E side slope of the landfill, located 25 m SSE of the NE corner. (6 m x 0.01 - 0.1).
25		2012-C2-NHWL-25	2.000	Aug 27, 2012	548752	7618435	Feature K: Close-up of a tension crack on the E side slope of the landfill, located 25 m SSE of the NE corner. (6 m x 0.01 - 0.01 m).
26		2012-C2-NHWL-26	2.700	Aug 27, 2012	548760	7618411	View N of E landfill slope/toe, taken from the SE corner of the landfill
27		2012-C2-NHWL-27	2.470	Aug 27, 2012	548760	7618411	View W of S landfill slope/toe, several erosion channels are visible extending from the crest to the toe of the landfill. Taken from the SE corner of the landfill.
28		2012-C2-NHWL-28	7.750	Aug 27, 2012	548749	7618426	Panoramic view W - N of the landfill surface taken from the SE corner.
29		2012-C2-NHWL-29	2.160	Aug 27, 2012	548751	7618425	Feature B: View SE at two small depressions (potholes) noted below southeast top corner of landfill (0.20 - 0.30 m x 0.20 m x 0.05 m)
30		2012-C2-NHWL-30	2.520	Aug 27, 2012	548750	7618422	Feature B: Close-up of small depressions (potholes) noted below southeast top corner of landfill (0.20 - 0.30 m x 0.20 m x 0.05 m)
31		2012-C2-NHWL-31	2.440	Aug 27, 2012	548749	7618421	Feature D: View from the S from the top of the landfill of two erosion channels that extend to the landfill toe, approximately 1 m W of SE corner (10 m x 0.2 m x 0.05 - 0.15 m)

Photo (2012-C2-)	Thumbnail	Filename	Size (KB)	Date	Vantage Point		Caption
					Easting	Northing	
General Photos							
32		2012-C2-NHWL-32	2.590	Aug 27,2012	548750	7618409	Feature D: View from the S landfill toe of two erosion channels (10 m x 0.2 m x 0.05 - 0.15 m)
33		2012-C2-NHWL-33	2.520	Aug 27,2012	548740	7618418	Feature D: View S from the top of the landfill of erosion channel that extend to the landfill toe (10 m x 0.2 - 2 m x 0.1 - 0.25 m)
34		2012-C2-NHWL-34	2.640	Aug 27,2012	548743	7618408	Feature D: View from the S landfill toe erosion channel (10 m x 0.2 - 2 m x 0.1 - 0.25 m)
35		2012-C2-NHWL-35	2.520	Aug 27,2012	548740	7618418	Feature D: Close-up of erosion a the crest of the landfill.
36		2012-C2-NHWL-36	2.500	Aug 27,2012	548738	7618419	Feature D: Sixth channel not observed previously, view from the S crest of the landfill (10 m x 0.1 m x 0.02 - 0.05 m)
37		2012-C2-NHWL-37	2.520	Aug 27,2012	548739	7618406	Feature D: View from the S landfill toe erosion channels(10 m x 0.1 m x 0 - 0.05 m)
38		2012-C2-NHWL-38	2.460	Aug 27,2012	548716	7618414	Feature D: View from the S from the top of the landfill of erosion channel that extend to the landfill toe (10 m x 0.75 m x 0.05 m)
39		2012-C2-NHWL-39	2.420	Aug 27,2012	548718	7618401	Feature D: View from the S landfill toe erosion channel (10 m x 0.75 m x 0.05 m)
40		2012-C2-NHWL-40	2.430	Aug 27,2012	548750	7618416	Feature L: View W of discontinuous crack extending the length of the S side of the landfill. (60 m x 0 - 0.05 m)
41		2012-C2-NHWL-41	2.520	Aug 27,2012	548750	7618416	Feature L: Close-up of tension crack extending the length of the S slope of the landfill
42		2012-C2-NHWL-42	2.430	Aug 27,2012	548740	7618413	Feature L: Discontinuous crack extending the length of the S side of the landfill, taken 10 m W of photo 40 (60 m x 0 - 0.05 m)
43		2012-C2-NHWL-43	2.430	Aug 27,2012	548710	7618405	Feature L: Discontinuous crack extending the length of the S side of the landfill, taken 20 m W of photo 42 (60 m x 0 - 0.05 m)
44		2012-C2-NHWL-44	2.640	Aug 27,2012	548690	7618399	View N of the W landfill slope/toe, taken from the SW corner of the landfill
45		2012-C2-NHWL-45	2.540	Aug 27,2012	548690	7618399	View E of the S landfill slope/toe, taken from the SW corner of the landfill
46		2012-C2-NHWL-46	69.300	Aug 27,2012	548700	7618412	Panoramic view N - E
47		2012-C2-NHWL-47	2.470	Aug 27,2012	548700	7618412	Feature A: View E of depression, reduced in size since last observation, (3 m x 0.2 m x 0.05 m)
48		2012-C2-NHWL-48	2.520	Aug 27,2012	548699	7618411	Feature M: Small depression associated with large cobble 1 m from the crest of the SW corner on the S slope. (0.3 m x 0.2 m x 0.15 m)
49		2012-C2-NHWL-49	2.650	Aug 27,2012	548699	7618411	Feature M: Close-up of depression on the S slope.
50		2012-C2-NHWL-50	2.400	Aug 27,2012	548699	7618411	Feature M: View S from crest of landfill of depression.
51		2012-C2-NHWL-51	2.590	Aug 27,2012	548699	7618410	View S of ponded water along the S toe of the landfill.
52		2012-C2-NHWL-52	2.710	Aug 27,2012	548675	7618378	View NNW of MW-8
53		2012-C2-NHWL-53	2.650	Aug 27,2012	548726	7618378	View N of MW-7
54		2012-C2-NHWL-54	2.860	Aug 27,2012	548762	7618384	View N of MW-6, erosion visible on the S side slope of the landfill.
55		2012-C2-NHWL-55	2.400	Aug 27,2012	548723	7618438	Close-up of metal wire found compacted into the landfill cap.
56		2012-C2-NHWL-56	2.450	Aug 27,2012	548723	7618438	Close-up of removed metal wire found compacted into the landfill cap.
57		2012-C2-NHWL-57	2.900	Aug 27,2012	548693	7618465	View NW of ponded water along the NW landfill toe
58		2012-C2-NHWL-58	2.750	Aug 27,2012	548693	7618465	View NNE of ponded water between landfill toe and MW-5
59		2012-C2-NHWL-59	2.720	Aug 27,2012	548696	7618501	View S of MW-5

Photo (2012-C2-)	Thumbnail	Filename	Size (KB)	Date	Vantage Point		Caption
					Easting	Northing	
Soil Sampling							
1		2012-C2-NHWL-1	2.430	24/08/2012	548672	7618384	MW-6: Close-up of open soil test pit
3		2012-C2-NHWL-3	2.340	24/08/2012	548672	7618384	MW-6: Close-up of closed soil test pit
4		2012-C2-NHWL-4	2.370	24/08/2012	548721	7618381	MW-7: Close-up of open soil test pit
5		2012-C2-NHWL-5	2.320	24/08/2012	548721	7618381	MW-7: Close-up of closed soil test pit
6		2012-C2-NHWL-6	2.380	24/08/2012	548756	7618383	MW-8: Close-up of open soil test pit
7		2012-C2-NHWL-7	2.370	24/08/2012	548756	7618383	MW-8: Close-up of closed soil test pit

7.6 SOIL SAMPLE ANALYTICAL DATA

The soil chemical analysis results and evaluation of analytical data for the 2012 Non-Hazardous Waste Landfill samples are presented in Tables XXX and XXXI below. Certificates of Analysis and results for field duplicates collected as part of the QA/QC program are presented in Appendix C at the end of this report.

Table XXX: Non-Hazardous Waste Landfill Summary Table of Soil Analytical Data

Sample #	Location	Depth [cm]	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	PHC(F1)	PHC(F2)	PHC(F3)	TPH
													C ₆ -C ₁₀	C ₁₀ -C ₁₆	C ₁₆ -C ₃₄	C ₆ -C ₃₄
Upgradient Samples																
C2-12-MW5-A	MW-5	0-15	12.2	8.7	2.3	<0.5	6.8	15	7.7	1.2	<0.5	<0.05	<10	<10	136.0	136.0
C2-12-MW5-A-D		0-15	11.4	8.5	2.2	<0.5	7.1	14	6.7	1.1	<0.5	<0.05	<10	<10	147.0	147.0
C2-12-MW5-B		40-50	8.0	9.7	3.9	<0.5	8.7	14	11.1	2.2	<0.5	123	<10	<10	<10	<10
Downgradient Samples																
C2-12-MW6-A	MW-6	0-15	3.6	3.1	0.7	<0.5	1.8	6	3.0	<0.5	<0.5	<0.05	<10	<10	133.0	133.0
C2-12-MW6-B		40-50	6.2	9.0	3.8	<0.5	9.9	21	10.0	1.8	<0.5	<0.05	<10	<10	<10	<10
C2-12-MW7-A	MW-7	0-15	11.1	18.4	3.8	0.7	4.6	11	8.1	2.2	<0.5	<0.05	<10	<10	306.0	306.0
C2-12-MW7-B		40-50	8.2	10.9	3.8	<0.5	8.9	16	11.9	2.6	<0.5	<0.05	<10	<10	195.0	195.0
C2-12-MW8-A	MW-8	0-15	8.1	11.3	1.6	<0.5	3.1	8	5.9	1.4	<0.5	<0.05	<10	46.0	1320.0	1366.0
C2-12-MW8-B		40-50	4.7	6.7	2.0	<0.5	5.0	9	6.9	1.5	<0.5	<0.05	<10	<10	25.0	25.0

Table XXXI: Evaluation of 2012 Soil Analytical Data – NHL

Parameter	Evaluation
Copper (Cu)	Copper was detected at all sample locations. Concentrations ranged from 3.6 – 12.2 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of copper was detected at the surface of MW5, the upgradient location. All values were below CCME guidelines.
Nickel (Ni)	Nickel was detected at all sample locations. Results were consistent at upgradient and downgradient locations with concentrations ranging from 3.1 – 18.4 mg/kg. The highest concentration was detected at the surface of MW7, a downgradient sample. All values were below CCME guidelines.
Cobalt (Co)	Cobalt was detected at all sample locations. Concentrations ranged from 0.7 – 3.9 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of cobalt was detected at the surface of MW5 the upgradient location. All values were below CCME guidelines.
Cadmium (Cd)	Cadmium was detected at MW7 at surface, at a concentration of 0.7 mg/kg. The concentration is below CCME guidelines.
Lead (Pb)	Lead was detected at all sample locations. Concentrations ranged from 1.8 – 9.9 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of lead was detected at depth at MW6, a downgradient location. All values were below CCME guidelines.
Zinc (Zn)	Zinc was detected at all sample locations. Concentrations ranged from 6 – 21 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of zinc was detected at depth MW6, a downgradient sample. All values were below CCME guidelines.
Chromium (Cr)	Chromium was detected at all sample locations. Concentrations ranged from 3.0 – 11.9 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of chromium was detected at depth at MW7, a downgradient sample. All values were below CCME guidelines.
Arsenic (As)	Arsenic was detected at all sample locations in all samples with the exception of the surface sample at MW6. Detected concentrations ranged from 1.1 – 2.6 mg/kg. Concentrations were similar at upgradient and downgradient sample locations. The highest concentration of arsenic was detected at depth at MW7. All values were below CCME guidelines.
Mercury (Hg)	Mercury was below the method detection limit at all sampling locations.
PCBs	PCBs were detected at depth at one sampling site, MW5 the upgradient location with a concentration of 123 mg/kg. PCBs are considered hazardous at this concentration in soil.
TPH	TPH was detected at all sampling locations at surface and depth with the exception of MW5 and MW6 m where TPH was not detected at depth. Detected TPH concentrations ranged from 25 – 1366 mg/kg with the highest concentration detected at the surface of MW8. Although relatively high at MW8, TPH concentrations are below standard DEW Line remediation criterion for TPH concentrations in soil.

7.7 GROUNDWATER SAMPLE ANALYTICAL DATA

The groundwater chemical analysis results and evaluation of analytical data for the 2012 Non-Hazardous Waste Landfill samples are presented in Tables XXXII and XXXIII. Certificates of Analysis and results of groundwater samples collected as part of the QA/QC program are presented in Appendix C, at the end of this report.

Table XXXII: Non-Hazardous Waste Landfill Summary Table for Groundwater Analytical Data

Sample #	Location	Groundwater Elevation (masl)	Cu [mg/L]	Ni [mg/L]	Co [mg/L]	Cd [mg/L]	Pb [mg/L]	Zn [mg/L]	Cr [mg/L]	As [mg/L]	Hg [mg/L]	PCBs [µg/L]	PHC(F1)	PHC(F2)	PHC(F3)	TPH
													C ₆ -C ₁₀	C ₁₀ -C ₁₆	C ₁₆ -C ₃₄	C ₆ -C ₃₄
Upgradient Samples																
C2-12-MW5	MW5	13.6	0.015	0.03	0.003	0.000096	0.002	0.313	0.029	0.003	<0.000025	<0.01	<0.1	<0.1	<0.1	<0.1
Downgradient Samples																
C2-12-MW6	MW6	11.6	0.025	0.04	0.003	0.000116	0.005	0.262	0.204	0.008	<0.000025	<0.01	<0.1	<0.1	<0.1	<0.1
C2-12-MW6-D			0.02	0.03	0.003	0.000075	0.003	0.225	0.103	0.008	<0.000025	<0.01	<0.1	<0.1	<0.1	<0.1
FM12-MW7	MW7	9	0.052	0.34	0.006	<0.000160	0.003	0.292	1.02	0.015	<0.000025	<0.01	<0.1	<0.1	<0.1	<0.1
FM12-MW8	MW8	12	0.021	0.07	0.008	0.000372	0.002	0.123	0.018	0.008	<0.000025	<0.01	<0.1	<0.1	1.7	1.7

*masl values are to be considered within +/- 3 m as elevations were not provided in the TOR and masl was measured with a handheld GPS

Table XXXIII: Evaluation of 2012 Groundwater Analytical Data – NHWL

Parameter	Evaluation
Copper (Cu)	Copper was detected all monitoring well locations, concentrations ranged from 0.015 – 0.052 mg/L with the highest concentration occurring at MW7. Results were consistent at upgradient and downgradient locations.
Nickel (Ni)	Nickel was detected at all monitoring well locations, concentrations ranged from 0.03 – 0.34 mg/L with the highest concentration occurring at MW7. Results are consistent at upgradient and downgradient locations.
Cobalt (Co)	Cobalt was detected at all monitoring locations, concentrations ranged from 0.003 – 0.08 mg/L with the highest concentration occurring at MW8. Results were consistent at upgradient and downgradient locations.
Cadmium (Cd)	Cadmium was detected at all monitoring well locations with the exception of MW7, concentrations ranging from 0.000096 – 0.000372 mg/L with the highest concentration occurring at MW8.
Lead (Pb)	Lead was detected at all monitoring well locations, concentrations ranged from 0.002 – 0.005 mg/L with the highest concentration occurring at MW6. Results were consistent at upgradient and downgradient locations.
Zinc (Zn)	Zinc was detected at all monitoring well locations, concentrations ranged from 0.123 – 0.313 mg/L, with the highest concentration occurring at MW5 the upgradient location. Results were consistent at upgradient and downgradient locations.
Chromium (Cr)	Chromium was detected at all monitoring well locations, concentrations ranged from 0.018 – 1.02 mg/L, with the highest concentration occurring at MW7. Results were consistent at upgradient and downgradient locations.
Arsenic (As)	Arsenic was detected at all monitoring well locations, concentrations ranged from 0.003 – 0.015 mg/L, with the highest concentration occurring at MW7. Results were consistent at upgradient and downgradient locations.
Mercury (Hg)	Mercury was not detected at any monitoring well locations
PCBs	Mercury was not detected at any monitoring well locations
TPH	TPH was detected at one location MW8 a downgradient location at a concentration of 1.7 mg/L. Free Phase was not detected at this location during sampling.

7.8 MONITORING WELL SAMPLING / INSPECTION LOGS

The monitoring well sampling logs for MW-5 to MW-8 are included in this section.

Monitoring Well Sampling Record			
Site Name:	CAM-2	Gladman Point	Nunavut
Date of Sampling Event	25-Aug-12	Time:	8:10 AM
Names of Samplers:	Brandon MacKay	Dwayne Allukpik	Jay Evalik
Landfill Name:	NHWL		
Monitoring Well ID:	MW5		
Sample Number:	12-C2-MW5		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm) =	20.0		
Diameter of well (cm) =	5		
Depth of well installation (cm) = (from ground surface)	350		
Length screened section (cm) =	200		
Depth to top of screen (cm) = (from ground surface)	50		
Depth to water surface (cm) = (from top of pipe)	56.0	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm) = (below ground surface)	36.0		
Measured well refusal depth (cm) = (i.e. depth to frozen ground)	151.0	Evidence of sludge or siltation:	No evidence of sludge or siltation, probable freezing at well bottom
Thickness of water column (cm) =	95.0		
Static volume of water in well (mL) =	1865.3		
Free product thickness (mm) =	N/A	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra Tubing and Foot Valve
Volume Purged Water =	2500 mL		Oakton Turbidimeter T-100
Decontamination required: (Y/N)	N - Dedicated waterra tubing		WTW 3401 pH/conductivity meter
Number washes:	N/A		
Number rinses:	N/A		
Final pH =	7.21		
Final Conductivity (uS/cm) =	4040		
Final Temperature (°C) =	4.1		

Monitoring Well Sampling Record			
Site Name:	CAM-2	Gladman Point	Nunavut
Date of Sampling Event	24-Aug-12	Time:	7:50 PM
Names of Samplers:	Brandon MacKay	Dwayne Allukpik	Jay Evalik
Landfill Name:	NHWL		
Monitoring Well ID:	MW6		
Sample Number:	12-C2-MW6	12-C2-MW6-D	
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm) =	38.0		
Diameter of well (cm) =	5		
Depth of well installation (cm) = (from ground surface)	350		
Length screened section (cm) =	200		
Depth to top of screen (cm) = (from ground surface)	50		
Depth to water surface (cm) = (from top of pipe)	76.0	Measurement method: (meter, tape, etc.)	Interface Meter
Static water level (cm) = (below ground surface)	38.0		
Measured well refusal depth (cm) = (i.e. depth to frozen ground)	171.0	Evidence of sludge or siltation:	No evidence of sludge or siltation, probable freezing at well bottom
Thickness of water column (cm) =	95.0		
Static volume of water in well (mL) =	1865.3		
Free product thickness (mm) =	N/A	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra Tubing and Foot Valve
Volume Purged Water =	3000 mL		Oakton Turbidimeter T-100
Decontamination required: (Y/N)	N - Dedicated waterra tubing		WTW 3401 pH/conductivity meter
Number washes:	N/A		
Number rinses:	N/A		
Final pH =	9.57		
Final Conductivity (uS/cm) =	3564		
Final Temperature (°C) =	3.8		

Monitoring Well Sampling Record			
Site Name:	CAM-2	Gladman Point	Nunavut
Date of Sampling Event	24-Aug-12	Time:	7:26 PM
Names of Samplers:	Brandon MacKay	Dwayne Allukpik	Jay Evalik
Landfill Name:	NHWL		
Monitoring Well ID:	MW7		
Sample Number:	12-C2-MW7		
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm) =	42.0		
Diameter of well (cm) =	5		
Depth of well installation (cm) = (from ground surface)	350		
Length screened section (cm) =	200		
Depth to top of screen (cm) = (from ground surface)	50		
Depth to water surface (cm) = (from top of pipe)	52.0	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm) = (below ground surface)	10.0		
Measured well refusal depth (cm) = (i.e. depth to frozen ground)	150.0	Evidence of sludge or siltation:	No evidence of sludge or siltation, probable freezing at well bottom
Thickness of water column (cm) =	98.0		
Static volume of water in well (mL) =	1924.2		
Free product thickness (mm) =	N/A	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra Tubing and Foot Valve
Volume Purged Water =	3000 mL		Oakton Turbidimeter T-100
Decontamination required: (Y/N)	N - Dedicated waterra tubing		WTW 3401 pH/conductivity meter
Number washes:	N/A		
Number rinses:	N/A		
Final pH =	9.52		
Final Conductivity (uS/cm) =	8377		
Final Temperature (°C) =	3.7		

Monitoring Well Sampling Record			
Site Name:	CAM-2	Gladman Point	Nunavut
Date of Sampling Event	24-Aug-12	Time:	7:11 PM
Names of Samplers:	Brandon MacKay	Dwayne Allukpik	Jay Evalik
Landfill Name:	NHWL		
Monitoring Well ID:	MW8		
Sample Number:	12-C2-MW8	12-C2-MW8 (Interlab)	
Condition of Well:	Good		
Measured Data			
Well pipe height above ground (cm) =	60.5		
Diameter of well (cm) =	5		
Depth of well installation (cm) = (from ground surface)	350		
Length screened section (cm) =	200		
Depth to top of screen (cm) = (from ground surface)	50		
Depth to water surface (cm) = (from top of pipe)	65.5	Measurement method: (meter, tape, etc.)	Interface meter
Static water level (cm) = (below ground surface)	5.0		
Measured well refusal depth (cm) = (i.e. depth to frozen ground)	127.0	Evidence of sludge or siltation:	No evidence of sludge or siltation, probable freezing at well bottom
Thickness of water column (cm) =	61.5		
Static volume of water in well (mL) =	1207.5		
Free product thickness (mm) =	N/A	Measurement method: (meter, paste, etc.)	Interface meter
Purging: (Y/N)	Y	Purging/Sampling Equipment:	Waterra Tubing and Foot Valve
Volume Purged Water =	1250 mL		Oakton Turbidimeter T-100
Decontamination required: (Y/N)	N - Dedicated waterra tubing		WTW 3401 pH/conductivity meter
Number washes:	N/A		
Number rinses:	N/A		
Final pH =	6.62		
Final Conductivity (uS/cm) =	7034		
Final Temperature (°C) =	4.5		

8 QUALITY ASSURANCE / QUALITY CONTROL

The Quality Assurance/Quality Control (QA/QC) program was implemented to monitor the quality of the analytical results. The main objective of this QA/QC program is to insure that sampling data and analysis results are complete, precise, exact, representative and comparable. The review consisted of evaluating sample collection/handling methodology, general laboratory comments, field (blind) duplicate samples, and inter-laboratory duplicate samples. Samples collected during the monitoring program were submitted to laboratories accredited by the Canadian Association for Environmental Analytical Laboratories (CAEAL).

All samples were collected following strict Biogénie sampling procedures. Samples were uniquely labelled and control was maintained through use of chain of custody forms. All samples were collected in laboratory supplied containers and preserved in insulated coolers. Appropriate QA/QC procedures were adhered to at all times.

Blind duplicate samples were submitted to AGAT for intra-laboratory analysis, with additional duplicate samples were sent to Maxxam for inter-laboratory comparison purposes.

The relative percent difference (RPD) is used to evaluate the sample result variability. Average RPD values of less than 100% for soil samples and 30% for groundwater samples are considered an indication of acceptable duplicate sample variability. For groundwater samples, an RPD of greater than 30% may reflect difference in sample turbidity or variance in the sample procedures. Individual RPD values greater than 50% are not considered to reflect acceptable variability. RPD values are not used to evaluate those compounds that are present at concentrations less than five times the method detection limit (MDL).

As discussed in Section 1.4, inter-laboratory samples were lost during transport and subsequently not analyzed.

8.1 SOIL SAMPLES

In case of soil samples, four blind duplicate samples were submitted for intra- and inter-laboratory comparisons. Review of blind duplicate results indicated very minor differences in the detected concentrations of the various parameters. All evaluated RPD values are within the acceptable ranges for metals, TPH and PCBs.

Overall, the soil sample results are coherent and within the same range of results for intra- laboratory samples; therefore the reliability of soil analytical results are considered as good.

Table XXXIV: Evaluation of 2012 Soil Analytical Data – QA/QC – Blind Duplicates

Soil Sample Blind Duplicate Results																
Sample #	Location	Depth [cm]	Cu [mg/kg]	Ni [mg/kg]	Co [mg/kg]	Cd [mg/kg]	Pb [mg/kg]	Zn [mg/kg]	Cr [mg/kg]	As [mg/kg]	Hg [mg/kg]	PCBs [mg/kg]	PHC(F1)	PHC(F2)	PHC(F3)	TPH
													C ₆ -C ₁₀	C ₁₀ -C ₁₆	C ₁₆ -C ₃₄	C ₆ -C ₃₄
C2-12-2-A	C2-2	0-15	5.3	4.5	1.4	<0.5	3.9	12	7.6	1.3	<0.5	<0.05	<10	11	382	393
C2-12-2-A-D		0-15	5.9	3.6	1.2	<0.5	3.5	14	7.0	0.9	<0.5	<0.05	<10	<10	485	485
C2-12-MW11-A	C2-11	0-15	4.2	5.7	1.7	<0.5	3.6	10	6.8	0.6	<0.5	<0.05	<10	<10	130.0	130.0
C2-12-MW11-A-D		0-15	5.7	4.9	1.4	<0.5	3.0	12	6.6	0.7	<0.5	<0.05	<10	<10	210.0	210.0
C2-12-MW2-A	MW-2	0-15	5.7	6.5	2.1	<0.5	11.7	15.0	6.9	1.3	<0.5	<0.05	<10	<10	47.0	47.0
C2-12-MW2-A-D		0-15	5.4	6.6	2.0	<0.5	9.5	15.0	6.4	1.4	<0.5	<0.05	<10	<10	47.0	47.0
C2-12-MW5-A	MW-5	0-15	12.2	8.7	2.3	<0.5	6.8	15	7.7	1.2	<0.5	<0.05	<10	<10	136.0	136.0
C2-12-MW5-A-D		0-15	11.4	8.5	2.2	<0.5	7.1	14	6.7	1.1	<0.5	<0.05	<10	<10	<10	<10

8.2 GROUNDWATER SAMPLES

In case of groundwater samples, one blind duplicate sample was submitted for intra- and inter-laboratory comparisons. Review of results indicated relatively minor differences in concentrations within the blind duplicate results, with one parameter slightly outside the acceptable RPD range (Cadmium 49.5%). This difference may be attributed to variations in sample turbidity.

Overall, the soil sample results are coherent and within the same range of results for intra- laboratory samples; therefore the reliability of soil analytical results are considered as good.

Table XXXV: Evaluation of 2012 Groundwater Analytical Data – QA/QC

Groundwater Blind Duplicate Analytical Results															
Sample #	Location	Cu	Ni	Co	Cd	Pb	Zn	Cr	As	Hg	PCBs	PHC(F1)	PHC(F2)	PHC(F3)	TPH
		[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	[mg/kg]	C ₆ -C ₁₀	C ₁₀ -C ₁₆	C ₁₆ -C ₃₄	C ₆ -C ₃₄
C2-12-MW6	MW-6	0.025	0.04	0.003	0.000116	0.005	0.262	0.204	0.008	<0.000025	<0.01	<0.1	<0.1	<0.1	<0.1
C2-12-MW6-D		0.02	0.03	0.003	0.000075	0.003	0.225	0.103	0.008	<0.000025	<0.01	<0.1	<0.1	<0.1	<0.1

SUMMARY

As of the 2012 monitoring program, all of the Landfills at CAM-2 Gladman Point are functioning as designed, with little change since the 2010 monitoring program. The Station Landfill has had slight increases in erosion and settlement from the 2010 monitoring program. The erosion channels on Lobe 2 are the largest observed at CAM-2 however, they appear to be self-armouring and remain at an acceptable severity rating. The West Landfill North and South have changed little in the way of erosional features since the 2010 monitoring program, with minor increases in settlement. The Tier II Disposal Facility saw a reduction in desiccation cracking (likely due to recent precipitation events at the time of monitoring), and little change in the stability of the Tier II Disposal Facility. All monitoring stations and equipment remain in good condition. The NHWL saw slight increases in settlement and erosion. Despite these increases, all features are of little impact to the Facility. As of 2012, plants have begun to colonize on Lobe 5 of the Station Landfill and the Tier II Disposal Facility.

APPENDIX A

Range of the Report and Limitation of Responsibilities

APPENDIX B

Field Notes

APPENDIX C

AGAT QA/QC Reports and Certificates of Analysis